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I.S.N.D.

PIPING

SPECIFICATION



IDD EL SHARGI NORTH & SOUTH DOME, PS-1 PIPING SPECIFICATION

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IDD EL SHARGI NORTH & SOUTH DOME PS-1

PIPING SPECIFICATION DOCUMENT P-SP-L-001-A

INDEX

- 1.0 Introduction**
- 2.0 Codes and Standards**
- 3.0 Materials**
- 4.0 Components**
- 5.0 Piping Specification Matrix**
- 6.0 List of Specifications**
- 7.0 Example Specification**
- 8.0 Current Specifications**
- 9.0 Superseded Specifications:**
 - 9.1 Additional Specifications For Gas Compression Upgrade (GCU)**
 - 9.2 Rev A Specifications**
 - 9.3 Base Specifications**

Appendix 1.0 Original Station Specifications



1.0

INTRODUCTION

This Occidental Petroleum of Qatar Limited (**OPQL**) Piping Specification Document has been produced with the purpose of compiling in one document all specifications applicable to the facilities in the Idd El Shargi North (ISND) and South Dome Field (ISSD). [B]

This document defines the minimum design standard and material specifications for all standard components used in piping systems installed on the PS-1 Production Station, satellite field and South Dome. [B]

The Specifications are presented in three sections:-

- a) Those currently in use by OPQL
- b) Superseded QGPC specifications that are still referred to on P&ID's
- c) Original Contractor Construction Specifications still referred to on P&ID's see Appendix 1 [B]

Current Specifications

- The current specifications are updated and expanded versions of the specifications issued at Rev A and the specifications generated for GCU which are in use with OPQL as at the date of issue of this document [B]
- The current specs are valid and in use by OPQL and may be utilised for new or replacement piping on the ISND and ISSD facilities. Therefore these may be considered as valid engineering specifications. [B]
- These specifications use the MESC material coding system from which the standard specifications and technical data needed for requisitioning is obtained. The data bank for MESC codings is held by OPQL Supply Department. [B]

The database for MESC coding is held by QGPC & OPQL.

Superseded QGPC and Contractor Specifications

- The superseded QGPC specifications were extracted from the Shell DEP 31-38-01-15 GEN and DEP 31-38-01-12 GEN. The contractor specifications are the original construction specifications which have been incorporated in the QGPC system and still appear on some P&ID's. [B]

Note: Information contained on P&ID's is indicative only as most of the older McDermott pipework has been replaced.



- The superseded specifications are for reference purposes only and are included in order that all piping specifications referenced on key engineering documents may be found in a compiled PS-1 Piping Specification.

2.0 CODES AND SPECIFICATIONS

All piping systems are designed and installed in accordance with the QGPC Standards and Codes. As such, these Standards and Codes have not been detailed in this document. In addition, International design codes and specifications are listed but not included. Reference should be made to the design code and the appropriate ASME, API or ASTM documents detailed on the piping material and valve specification sheets for further information. [B]

Note: MESC sheets provide detail specification/data sheets for equipment and material procurement.

2.1 Standards and Codes

- DEP 31.38.01.11 Piping General Requirements
- DEP 31.38.01.15 Piping Classes Exploration & Production
- QGPC STD-TD-03/88 Technical Specification for the Fabrication, Inspection & Installation of Process Pipework
- QGPC STD-ES-M-11 Specification for Sour Service Material
(April 1990)
- ASME B16.5 Pipe Flanges and Flanged Fittings
(Latest Edition) [B]
- ASME B31.3 Chemical Plant and Petroleum Refinery Piping
(Latest Edition) [B]
- API-RP-14E Recommended Practice for Design and Installation of
(Latest Edition) Offshore Production Platform Piping Systems [B]
- EN 10204 Certificates on Material Testing [B]

3.0 MATERIALS

All pipe, fittings, flanges, valves, flange bolting and gaskets shall be supplied in accordance with the latest revision of the material specifications detailed on the individual line specifications and MESC data sheets.



3.1 Certification

All materials shall be supplied with certification in accordance with EN 10204 3.1B as a minimum, unless otherwise specified by OPQL. [B]

4.0 COMPONENTS

All components used in the piping system shall be in accordance with the Codes and Specifications detailed on the piping material specification sheets and detailed on MESC Data sheet or document 000000-8-XPS1-SP-0004-001, for *xx.x coded items. [B]

4.1 Special Items

Special Items, such as flow glasses and line strainers shall be specified individually and shall be compatible with the piping system in which they are installed.

4.2 Pipe

Piping shall be in accordance with latest revision of line specification. Non standard sizes shall not be used except where necessary to connect to vendor equipment. Size shall revert to standard immediately after equipment connections, pipe shall always be rated suitable for intended pressure service.

4.3 Butt Welded Fittings

Butt welded fittings shall be supplied to the same nominal wall schedule as the piping to which they are attached and shall be in accordance with the latest line specification sheets.

Long radius elbows shall be used wherever possible. Short radius elbows shall only be used where space dictates. Where larger radius elbows are specified i.e. 3D elbows, the radius dimension shall be 3 times the nominal pipe diameter.

4.4 Flanges

Flange faces shall be in accordance with the latest line specification sheets. Weld neck flanges shall normally be used and shall be supplied in the nominal wall schedule as the piping to which they are attached. Slip on flanges shall not be used. [B]

4.5 Bolting

All bolting materials shall be in accordance with the latest revision of the line specification sheets. Generally materials shall be in accordance with ASME B16.5, refer to MESC data sheets for dimensions.



4.6 Valves

All valves shall meet the requirements as detailed by the latest revision of the line specification sheets and suitable for the intended service conditions.



5.0

PIPING SPECIFICATION MATRIX

Piping Specifications Matrix

CURRENT Pipe Class	SUPERSEDED				Rating	Temp Limits °C		Pressure Barg @ 38°C	Material	Services
	Pipe Class	PS1R	Gas Compress.	Early Prod.		Min	Max			
-----	1141	1141			150RF	0	120	19	C.S.	Nitrogen, Diesel, Plant Air
	1142 / 1144	1144		1144	150RF	0	120	19		Crude Oil, Gas Condensate, Fuel Gas, Process Gas,
			1144X			-20	200	19.6	C.S.	Seal Gas, Flare, Contaminated water, Treated Water,
1144G						-20	150	19.6	CA - 3mm	Tempered Water, Nitrogen, Diesel, Plant Air, W.I
	1147 / 1150	1150	1150		150RF	-50	100	18	L.T.C.S	Crude Oil, Gas Condensate
1150G					150RF	-50	120	18.2	CA - 3mm	
-----	1341				150RF	0	120	19	S.S	Gas Condensate, Nitrogen, Seal Gas, Lube Oil
			1343X			0	140	18.4		
	1341				150RF	0	120	19	S.S	Flare
				1346X		-100	100	18.9		
1346G						-100	120	18.96	CA - 0mm	
	1541	1541			150RF	0	66	15	CuNi	Fire Water, Service Water
						-10	75	20	CA - 0.53mm	
1541G		1841			150RF	0	60	14	C.S Galv	Instrument Air, Potable Water
	1842		1841			0	60	7		
1841G						-10	60	15.5	CA - 0mm	
1843G	-----				150RF	-10	100	19.6	C.S Lined	Raw Seawater
									CA - 0mm	
	3141 / 3144	3144			300RF	0	120	51	.CS.	Gas Condensate, Fuel Gas, Process Gas,
3144G			3144X			-20	150	51	CA - 3mm	Oilly Drain, Crude Oil
	3150		3150		300RF	-50	100	47	L.T.C.S	Gas Condensate
3150G						-50	120	47.9		
3346G	-----				300RF	-100	120	49.6	S.S.	Crude Oil, Gas Condensate, Fuel Gas, Process Gas,
									CA - 0mm	Oilly Drain.
	6141					0	120	102	C.S	Crude Oil, Fuel Gas, Process Gas, Seal Gas,
	6144	6144			600RF	0	120	91		
			6144X			-20	135	86		Oilly Drain, Flare
6144G						-20	150	91	CA - 3mm	
6150G	-----				600RF	-50	120	95.8	L.T.C.S	Process Gas, Flare
									CA - 3mm	
6346G	-----				600RF	0	140	99.3	S.S.	Gas Condensate, Nitrogen, Seal Gas
			6343X			-100	120	99.3	CA - 0mm	



6.0 LIST OF SPECIFICATIONS
QGPC RELATED SPECIFICATIONS

CURRENT		SUPERSEDED	
	GCU	Rev A	Base
	<u>Specs</u>	<u>Specs</u>	<u>Specs</u>
[B]	[B]	[B]	
1144G	1144X	1141	1101
1150G	1343X	1142	1102
1346G	3144X	1144	1108
1541G	6144X	1147	1117
1841G	6343X	1150	1121
1843G	9144X	1341	1501
3144G	9150X	1541	1609X
3150G	15144X	1841	1701
3346G	15151X	1842	1803
6144G	15346X	3141	1806
6150G		3144	1807
6346G		3150	1808
9144G		6141	3101
9144GX		6144	3107
9150G		9141	3609X
9151G		9144	6101
15144G		9147	6117
15150G		15141	9101
15151G		15144	9177
15346G		15150	15101
		15151	15117X
			15177



7.0 EXAMPLE SPECIFICATION

Each piping specification consists of five sheets comprising of the following:

Sheet 1 :

Defines the service limits, branch connection type, pipe schedules and general notes. [B]

Sheet 2 :

Lists all size ranges, materials for pipe, fittings, flanges, bolts etc. and a list of the type of valves and materials available within the specification. [B]

Sheet 3 :

Lists all the available sizes of pipe, fittings, flanges and valves. [B]

Sheet 4 :

Lists all components required for vents, drains, pressure and temperature connections, branch fittings and bolting requirements. [B]

Sheet 5 :

Lists all components for orifice flanges, displacement chambers, level and pressure control instrument assemblies for vessel connection. [B]

Commodity Coding :

All the above items listed on pages 2 – 5 have a commodity coding allocated to them known as the M.E.S.C. NUMBER. This is a unique number for any specification. When called up it gives a complete specification for the item which allows a requisition to be issued for purchase. OPQL have access to the complete M.E.S.C. system available on C.D. ROM and held by the supply and Transportation Department.

When the M.E.S.C. number is entered, a complete specification for that item can be printed out from the C.D. ROM and attached to the commercial terms and conditions for enquiry/purchase of the material.

Items shown *xx.x are additional items not found in the M.E.S.C. system. The Complete specification for these items can be found in document 000000-8-XPS1-SP-0004-001. The specification can be copied and attached to the commercial terms and conditions for enquiry/purchase. [B]

TEMPERATURE DEGC	SERVICE LIMITS					
	-20	38	50	75	100	120
150						
160						
168						
176						
185						
19.2						
19.6						
19.6						

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.1.1.
- FOR ORIFICE FLANGES, LEVEL INSTRUMENT CONNECTIONS, PRESSURE INSTRUMENT TAPPING, TEMPERATURE INSTRUMENT CONNECTIONS AND CLASS 300# CONTROL VALVES, CLASS 300# FLANGES, FITTINGS, VALVES, BOLTS AND GASKETS ARE USED.
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- THE USE OF HIGH INTEGRITY BUTTERFLY VALVES IS PREFERRED IN LIEU OF BALL VALVES FOR WATER INJECTION SYSTEMS.

BRANCH CONNECTIONS 90 DEG												
NOMINAL BRANCH SIZE												
DN	15	20	25	40	50	80	100	150	200	250	300	350
600	C	C	C	C	D	D	D	D	D	D	B	B
500	C	C	C	C	D	D	D	D	D	D	B	B
450	C	C	C	C	D	D	D	D	D	D	B	B
400	C	C	C	C	D	D	D	D	D	D	B	B
350	C	C	C	C	D	D	D	D	D	D	B	B
300	C	C	C	C	D	D	D	D	D	D	B	B
250	C	C	C	C	D	D	D	D	D	D	B	B
200	C	C	C	C	D	D	D	D	D	D	B	B
150	C	C	C	C	D	D	D	D	D	D	B	B
100	C	C	C	C	D	D	D	D	D	D	B	B
80	C	C	C	C	D	D	D	D	D	D	B	B
50	C	C	C	C	D	D	D	D	D	D	B	B
40	B	B	B	B	A							
25	B	B	B	A								
20	B	A										
15	A											
NOMINAL RUN PIPE SIZE												
600	A											
500	B	A										
450	B	B	A									
400	B	B	B	A								
350	B	B	B	B	A							
300	B	B	B	B	B	A						
250	B	B	B	B	B	B	A					
200	B	B	B	B	B	B	B	A				
150	B	B	B	B	B	B	B	B	A			
100	B	B	B	B	B	B	B	B	B	A		
80	B	B	B	B	B	B	B	B	B	B	A	
50	B	B	B	B	B	B	B	B	B	B	B	A
40	B	B	B	B	B	B	B	B	B	B	B	B
25	B	B	B	B	B	B	B	B	B	B	B	B
20	B	B	B	B	B	B	B	B	B	B	B	B
15	A											

EXPLANATION OF CHARACTERS

- A Equal tee
 - B Reducing tee
 - C Branch outlet - Butt weld / Flanged (NOL / NOF)
 - D Branch outlet - Butt weld / Flanged (WOL / WOF)
- NOF - Nippo flange
NOL - Nippolet
WOF - Weldo flange
WOL - Weldolet

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	40
450	30
500	30
600	30

ISSUE DATE	APRIL 1998	REV LETTER	00	01	
DATE	22/04/98	SIGN	M.H.	M.H.	
PLANT	PS - 1	CARBON STEEL	PIPING GENERAL		
CONSIGNEE	-	SOUR SERVICE	CLASS No.: 1144G		
ENG BY	MMCL	CONTR. No.	-	ASME RATING:	150
PRINCIPAL	OPCQL	PROJECT No.	-	CORR. ALL:	3 mm

COMPONENT / MATERIAL DESCRIPTIONS
(For full material description see relevant MESG buying description)

PIPE		VALVES - RAISED FACE	
PIPE, SEAMLESS	DN 15 - 600	ASTM A106 - B	
FLANGES - RAISED FACE			
BLIND FLANGE	DN 15 - 600	ASTM A105N	
SPECTACLE BLIND FLANGE	DN 15 - 600	ASTM A285 - C	
SPACER RING	DN 15 - 600	ASTM A285 - C	
SPADE BLIND	DN 15 - 600	ASTM A285 - C	
WELDING NECK FLANGE	DN 15 - 600	ASTM A105N	
FITTINGS			
CAP, BUTT - WELD. END	DN 15 - 600	ASTM A234 - WPB	
ELBOW 45°, BUTT - WELD. ENDS	DN 15 - 600	ASTM A234 - WPB	
ELBOW 90°, BUTT - WELD. ENDS	DN 15 - 600	ASTM A234 - WPB	
EQUAL TEE, BUTT - WELD. ENDS	DN 15 - 600	ASTM A234 - WPB	
REDUCING FITTINGS			
BRANCH OUTLET. FLG. RF (NOF)	DN 15 - 40	ASTM A105N	
BRANCH OUTLET BW END (NOL)	DN 15 - 40	ASTM A105N	
BRANCH OUTLET FLG. RF (WOF)	DN 50 - 200	ASTM A105N	
BRANCH OUTLET BW END (WOL)	DN 50 - 200	ASTM A105N	
REDUCER CONC. BUTT - WELD. ENDS	DN 15 - 600	ASTM A234 - WPB	
REDUCER ECC. BUTT - WELD. ENDS	DN 15 - 600	ASTM A234 - WPB	
TEE REDUCING, BUTT - WELD. ENDS	DN 15 - 600	ASTM A234 - WPB	
MISCELLANEOUS			
GASKET, RAISED FACE	DN 15 - 600	CNAF, OIL RESISTANT	
GASKET, SPIRAL WOUND (300#)	DN 15 - 600	ASTM A105N	
STUD BOLTS / HEX NUTS	-	ASTM A193-B7M	
LEVEL DISPLACER CHAMBER	DN 100 - 100	ASTM A106 - B	
LEVEL GAUGE REFLEX TYPE	DN 20 - 20	ASTM A105N	
LEVEL GAUGE THROUGH VISION	DN 20 - 20	ASTM A105N	
ORIFICE FLANGE SET RAISED FACE	DN 50 - 600	ASTM A105N	

PIPE,
FTGS,
FLGS
&
MAT

VALVES - RAISED FACE

BALL VALVE, FLOATING BALL, FULL BORE, FLANGED.	DN 15 - 150	ASTM A216-WCBWCC or ASTM A105N	
BALL VALVE, FLOATING BALL, RED BORE, FLANGED.	DN 15 - 150	ASTM A216-WCBWCC or ASTM A105N	
BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN 200 - 600	ASTM A216 -WCBWCC+ENP or ASTM A105N+ENP	
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN 200 - 600	ASTM A216-WCBWCC+ENP or ASTM A105N+ENP	
BUTTERFLY VALVE, HIGH PERFORM DOUBLE FLANGED.	DN 50 - 600	ASTM A216WCBWCC	
CHECK VALVE, PISTON, FLANGED.	DN 15 - 40	ASTM A216-WCBWCC or ASTM A105N	
DUAL PL. CHECK VALVE, WAFER	DN 50 - 600	ASTM A216-WCBWCC or ASTM A105N	
GATE VALVE, FLANGED.	DN 15 - 600	ASTM A216-WCBWCC or ASTM A105N	
GLOBE VALVE, FLANGED.	DN 15 - 200	ASTM A216-WCBWCC or ASTM A105N	
[01] NEEDLE TYPE GLOBE VALVE, FLANGED.	DN 15 - 40	ASTM A216-WCBWCC or ASTM A105N	
DOUBLE BLOCK & BLEED (300#), FLANGED - BORE 10mm	DN 15 - 25	ASTM A350-LF2	

SCHD	Nominal Pipe Size	PIPE		FLANGES			STRAINERS	
		Cap	Blind	WN	Spect	Spacer	Spade	
160	15	74.30.03	76.62.11	76.62.77	76.88.36	76.88.46	76.88.42	
160	20	020.1	058.1	412.9	108.1	308.1	002.1	
160	25	030.1	062.1	414.9	112.1	312.1	004.1	
160	30	040.1	066.1	416.9	116.1	316.1	006.1	
160	40	060.1	088.1	418.9	118.1	318.1	008.1	
80	50	071.1	070.1	390.9	120.1	320.1	010.1	
80	80	109.1	072.1	392.9	122.1	322.1	012.1	
80	100	137.1	074.1	394.9	124.1	324.1	014.1	
80	150	219.1	076.1	396.9	126.1	326.1	016.1	
40	200	245.1	078.1	368.9	128.1	328.1	018.1	
40	250	287.1	080.1	370.9	130.1	330.1	020.1	
40	300	331.1	082.1	372.9	132.1	332.1	022.1	
40	350	379.1	084.1	374.9	134.1	334.1	024.1	
40	400	431.1	086.1	376.9	136.1	336.1	026.1	
30	450	477.1	088.1	378.9	138.1	338.1	028.1	
30	500	529.1	090.1	380.9	140.1	340.1	030.1	
30	600	579.1	092.1	382.9	142.1	342.1	032.1	

UNIQUE MESCN^o
76.88.42.024.1

SCHD	Nominal Pipe Size	FITTINGS				GASKETS	
		Cap	Elbow 45	Elbow 90SR	Elbow 90 LR	Equal Tee	CNAF RF
160	15	76.30.17	76.30.34		572.1	572.1	85.31.02
160	20	572.1	572.1		578.1	578.1	*00.1
160	25	582.1	582.1		582.1	582.1	*00.2
160	40	592.1	592.1	NOT USED	592.1	592.1	*00.3
80	50	608.1	608.1		608.1	608.1	*00.4
80	80	628.1	628.1		628.1	628.1	*00.5
80	100	648.1	648.1		648.1	648.1	*00.7
80	150	668.1	668.1		668.1	668.1	*00.8
40	200	685.1	685.1		685.1	685.1	*00.9
40	250	705.1	705.1		705.1	705.1	*01.0
40	300	728.1	728.1		728.1	728.1	*01.1
40	350	747.1	747.1		747.1	747.1	*01.2
40	400	768.1	768.1		768.1	768.1	*01.3
30	450	786.1	786.1		786.1	786.1	*01.4
30	500	807.1	807.1		807.1	807.1	*01.5
30	600	828.1	828.1		828.1	828.1	*01.6

UNIQUE NON -
STANDARD
MESCN^o
88.31.02.*01.3

Nominal Pipe Size	Ball RB Floating ball Flanged	Ball RB Trunnion mounted Flanged	Ball FB Floating ball Flanged	Ball FB Trunnion mounted Flanged	Gate	VALVES		Needle	Check	Piston Flanged	DB & B 2 ball + needle vent Flanged	DB & B 3 ball Flanged
						Butterfly high performance Flanged	Globe					
15	003.1	77.00.73	553.1	77.00.73	003.1	77.57.00	003.1	603.1	77.67.06	77.10.23	*00.1	*00.5
20	004.1	554.1	554.1	004.1	004.1	[01]	004.1	604.1		004.1	*00.2	*01.4
25	005.1	555.1	555.1	005.1	005.1		005.1	605.1		005.1	*00.3	*00.2
40	007.1	557.1	557.1	007.1	007.1		007.1	607.1		007.1		
50	008.1	558.1	558.1	008.1	008.1		008.1	608.1		508.1		
80	010.1	560.1	560.1	010.1	010.1		010.1	610.1		510.1		
100	012.1	562.1	562.1	012.1	012.1		012.1	612.1		512.1		
150	064.1		564.1	014.1	014.1		014.1	614.1		514.1		
200		015.1		015.1	015.1		015.1	615.1		515.1		
250		016.1		016.1	016.1		016.1	616.1		516.1		
300		017.1		017.1	017.1		017.1	617.1		517.1		
350		018.1		018.1	018.1		018.1	618.1		518.1		
400		019.1		019.1	019.1		019.1	619.1		519.1		
450		020.1		020.1	020.1		020.1	620.1		520.1		
500		021.1		021.1	021.1		021.1	621.1		521.1		
600		023.1		023.1	023.1		023.1	623.1		523.1		

A LIST OF ALL AVAILABLE SIZES FOR PIPE FITTINGS & VALVES

SCHD	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer	Ecc reducer	Reducing Tee	
160	20 x 15	76.30.66	76.30.67	76.30.88	
160	25 x 15	151.1	151.1	039.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
80/160	50 x 20	199.1	199.1	111.1	
80/160	50 x 40	208.1	208.1	120.1	
80/160	80 x 40	229.1	229.1	129.1	
80	80 x 50	237.1	237.1	133.1	
80/160	100 x 40	253.1	253.1	147.1	
80	100 x 50	267.1	267.1	154.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
40/80	200 x 100	326.1	326.1	212.1	
40/80	200 x 150	336.1	336.1	232.1	
40/80	250 x 100			260.1	
40/80	250 x 150	356.1	356.1	278.1	
40	250 x 200	365.1	365.1	291.1	
40/80	300 x 150	380.1	380.1	317.1	
40	300 x 200	396.1	396.1	328.1	
40	300 x 250	404.1	404.1	350.1	
40/80	350 x 150			379.1	
40	350 x 200	422.1	422.1	390.1	
40	350 x 250	438.1	438.1	415.1	
40	350 x 300	447.1	447.1	441.1	
40/80	400 x 150			469.1	
40	400 x 200	453.1	453.1	479.1	
40	400 x 250	462.1	462.1	505.1	
40	400 x 300	474.1	474.1	531.1	
40	400 x 350	487.1	487.1	556.1	
30/40	450 x 200			589.1	
30/40	450 x 250	534.1	534.1	613.1	
30/40	450 x 300	564.1	564.1	637.1	
30/40	450 x 350	596.1	596.1	661.1	
30/40	450 x 400	626.1	626.1	685.1	
30/40	500 x 200			709.1	
30/40	500 x 250			733.1	
30/40	500 x 300	654.1	654.1	757.1	
30/40	500 x 350	686.1	686.1	781.1	
30/40	500 x 400	716.1	716.1	805.1	
30	500 x 450	732.1	732.1	819.1	
30/40	600 x 250			853.1	
30/40	600 x 300			877.1	
30/40	600 x 350			901.1	
30/40	600 x 400	896.1	896.1	925.1	
30	600 x 450	912.1	912.1	939.1	
30	600 x 500	942.1	942.1	963.1	

BOLTING FOR FLANGES & VALVES

BOLTING									
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES
		81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm		
15	4	154.1	1/2 x 65			156.1	1/2 x 75		
20	4	154.1	1/2 x 65			156.1	1/2 x 75		
25	4	155.1	1/2 x 70			157.1	1/2 x 80		
40	4	156.1	1/2 x 75			158.1	1/2 x 85		
50	4	269.1	5/8 x 80	280.1	5/8 x 145	272.1	5/8 x 95	8	278.1 5/8 x 130
80	4	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1 3/4 x 140
100	8	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1 3/4 x 140
150	8	329.1	3/4 x 100	345.1	3/4 x 205	332.1	3/4 x 120	12	335.1 3/4 x 140
200	8	330.1	3/4 x 110	351.1	3/4 x 240	334.1	3/4 x 130	12	406.1 3/4 x 150
250	12	401.1	7/8 x 120	425.1	7/8 x 270	405.1	7/8 x 145	16	474.1 1 x 170
300	12	401.1	7/8 x 120	431.1	7/8 x 305	406.1	7/8 x 150	16	534.1 1 1/8 x 185
350	12	468.1	1 x 130	500.1	1 x 330	472.1	1 x 160	20	535.1 1 1/8 x 190
400	16	469.1	1 x 140	502.1	1 x 340	474.1	1 x 170	20	594.1 1 1/4 x 205
450	16	529.1	1 1/8 x 150	562.1	1 1/8 x 360	534.1	1 1/8 x 185	24	596.1 1 1/4 x 215
500	20	530.1	1 1/8 x 160	565.1	1 1/8 x 385	537.1	1 1/8 x 205	24	598.1 1 1/4 x 230
600	20	590.1	1 1/4 x 180	625.1	1 1/4 x 400	598.1	1 1/4 x 230	24	688.1 1 1/2 x 250

BRANCH OUTLETS									
Nominal Run Pipe	Nominal Branch	NOL		WOF**		WOL		WOF	WOL
		76.80.31	76.80.37	76.80.31	76.80.37	76.80.31	76.80.37		
50 - 600	15	*51.1	021.1	-	-	-	-	-	-
80 - 600	20	*51.2	023.1	-	-	-	-	-	-
80 - 100	25	*51.3	025.1	-	-	-	-	-	-
150 - 600	25	*51.4	026.1	-	-	-	-	-	-
150 - 600	40	*51.6	031.1	-	-	-	-	-	-
150	50	-	-	-	-	*10.1	01.364.1	-	-
200	50	-	-	-	-	*10.2	01.066.1	-	-
250	50	-	-	-	-	*10.3	01.068.1	-	-
300	50	-	-	-	-	*10.4	01.070.1	-	-
350	50	-	-	-	-	*10.5	01.072.1	-	-
400	50	-	-	-	-	*10.6	01.074.1	-	-
450	50	-	-	-	-	*10.7	01.268.1	-	-
500	50	-	-	-	-	*10.8	01.269.1	-	-
600	50	-	-	-	-	*10.9	01.271.1	-	-
200	80	-	-	-	-	*11.0	01.090.1	-	-
250	80	-	-	-	-	*11.1	01.092.1	-	-
300	80	-	-	-	-	*11.2	01.094.1	-	-
350	80	-	-	-	-	*11.3	01.096.1	-	-
400	80	-	-	-	-	*11.4	01.098.1	-	-
450	80	-	-	-	-	*11.5	01.280.1	-	-
500	80	-	-	-	-	*11.6	01.281.1	-	-
600	80	-	-	-	-	*11.7	01.283.1	-	-
300	100	-	-	-	-	*11.8	01.116.1	-	-
350	100	-	-	-	-	*11.9	01.118.1	-	-
400	100	-	-	-	-	*12.0	01.120.1	-	-
450	100	-	-	-	-	*12.1	01.292.1	-	-
500	100	-	-	-	-	*12.2	01.293.1	-	-
600	100	-	-	-	-	*12.3	01.295.1	-	-
400	150	-	-	-	-	*12.4	01.303.1	-	-
500	150	-	-	-	-	*12.5	01.304.1	-	-
600	150	-	-	-	-	*12.6	01.306.1	-	-
600	200	-	-	-	-	*12.7	00.194.1	-	-

** Dimensions to SIPM standard drawing S-38.080

VENT POINTS					
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50
Valve, globe	1	77.30.23	005.1	005.1	005.1
Tee equal	1	76.30.81	089.1	111.1	
Tee reducing	1	76.30.88	066.1	066.1	066.1
Flange blind	1	76.62.11	066.1	066.1	
Flange WN	1	76.62.77	416.9	416.9	
NOF	1	76.80.37			
Bolting	8	81.38.66	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3

DRAIN POINTS					
COMPONENTS	Nos reqd	Run Pipe Drain Size	25	40	50
Valve, ball	1	77.00.03	005.1	005.1	005.1
Tee equal	1	76.30.81	089.1	111.1	
Tee reducing	1	76.30.88	066.1	066.1	066.1
Flange blind	1	76.62.10	066.1	066.1	
Flange WN	1	76.62.77	416.9	416.9	
NOF	1	76.80.37			
Bolting	8	81.38.66	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3

PRESSURE INSTRUMENT CONNECTIONS 300#					
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50
DBB Valve	1	77.85.46	*00.3	*00.3	*00.3
Tee equal	1	76.30.81	089.1	111.1	
Tee reducing	1	76.30.88	066.1	066.1	066.1
Flange WN	1	76.62.77	256.9	256.9	
NOF	1	76.80.37			
Bolting	8	81.38.66	269.1	269.1	269.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1

TEMPERATURE INSTRUMENT CONNECTIONS 300#					
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50
Flange WN	1	76.62.77	254.9	254.9	
Tee Reducing	1	76.30.88	129.1	129.1	
NOF	1	76.80.37			
Thermowell	1				
Bolting	4	81.38.66	328.1	328.1	328.1
Gasket Sp WD	1	85.41.36	112.1	112.1	112.1

VENT, DRAIN & INSTRUMENT ASSEMBLIES

ORIFICE INSTRUMENT CONNECTIONS 300#														
COMPONENTS	Nos reqd	Run Pipe	50	80	100	150	200	250	300	350	400	450	500	600
		Size	15	15	15	15	15	15	15	15	15	15	15	15
DBB Valve	2	77.85.46	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1
Flange set	1	76.62.95	*16.1	*16.2	*16.3	*16.4	*14.6	*14.8	*15.0	*15.2	*15.4	*13.6	*13.8	*14.0
NOL-plain end	2	76.80.31	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2
Bolting		81.38.66	278.1	335.1	335.1	335.1	406.1	474.1	534.1	535.1	594.1	596.1	598.1	688.1
Number of bolts			8	8	8	12	12	16	16	20	20	24	24	24
Gasket Sp. WD	2	85.41.36	114.1	118.1	070.1	074.1	076.1	078.1	080.1	082.1	084.1	086.1	088.1	092.1

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LEVEL GAUGE CONNECTIONS THROUGH VISION - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.66	062.1	064.1	066.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

LEVEL GAUGE CONNECTIONS REFLEX - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.66	562.1	564.1	566.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT - 300#					
COMPONENTS	Nos reqd	Length Size	355	405	455
Thermowell	1	SUPPLIED BY INSTRUMENTS	40	40	40
Bolting	4	81.38.66	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

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PRESSURE INST. CONNECTIONS ON EQUIPMENT				
COMPONENTS	Nos reqd	Class Size	300#	
Double Block & Bleed Valve	1	77.85.46	*00.3	[01]
Bolting	4	81.38.66	269.1	[01]
Gasket Sp.WD	1	85.41.36	104.3	[01]

INSTRUMENT ASSEMBLIES

DISPLACER CHAMBER	LEVEL CONTROL CONNECTIONS - 300#		
	Std Length L-MM	COMPONENTS	Nos reqd
76.80.60.422.1	356	Valve, Ball	1
76.80.60.424.1	813	Valve, Ball	2
76.80.60.426.1	1219	Flange blind	2
76.80.60.428.1	1524	Flange WN	1
76.80.60.430.1	1829	Gasket Sp.WD	1
76.80.60.432.1	2134	Gasket Sp.WD	4
76.80.60.434.1	2438	Gasket Sp.WD	3
76.80.60.436.1	2743	Bolting	8
76.80.60.438.1	3048	Bolting	32
		Bolting	12



8.0

CURRENT SPECIFICATIONS

**1144G
1150G
1346G
1541G
1841G
1843G
3144G
3150G
3346G
6144G
6150G
6346G
9144G
9144GX
9150G
9151G
15144G
15150G
15151G
15346G**

PIPING CLASS INDEX

Pipe Spec.	Rev	ANSI Rating	Temp. Limits deg. C		Corrosion Allowance mm.	Material	Remarks
			Min.	Max.			
1144G	01	150RF	-20	150	3	Carbon Steel	Sour Service
1150G	00	150RF	-50	120	3	LT Carbon Steel	Sour Service
1346G	01	150RF	-100	120	Nil	Stainless Steel	Sour Service
1541G	01	150FF	-10	75	0.5	Cunifer	
1841G	00	150RF	-10	60	Nil	Galvanised Steel	
1843G	01	150RF	-10	100	Nil	Carbon Steel Lined	
3144G	01	300RF	-20	150	3	Carbon Steel	Sour Service
3150G	00	300RF	-50	120	3	LT Carbon Steel	Sour Service
3346G	00	300RF	-100	120	Nil	Stainless Steel	Sour Service
6144G	00	600RF	-20	150	3	Carbon Steel	Sour Service
6150G	00	600RF	-50	120	3	LT Carbon Steel	Sour Service
6346G	00	600RF	-100	120	Nil	Stainless Steel	Sour Service
9144G	00	900RF	-20	120	3	Carbon Steel	Sour Service
9144GX	01	900RF	-20	120	6	Carbon Steel	Sour Service
9150G	00	900RF	-50	120	3	LT Carbon Steel	Sour Service
9151G	00	900RTJ	-20	120	6	Carbon Steel	Sour Service
9346G	00	900RF	-100	120	Nil	Stainless Steel	Sour Service
15144G	00	1500RF	-20	120	3	Carbon Steel	Sour Service
15150G	01	1500RF	-50	120	3	LT Carbon Steel	Sour Service
15151G	01	1500RTJ	-20	150	3	Carbon Steel	Sour Service
15346G	01	1500RF	-100	120	Nil	Stainless Steel	Sour Service

TEMPERATURE DEG C	SERVICE LIMITS						
	-20	38	50	75	100	120	150
PRESSURE BAR GA	19.6	19.6	19.2	18.5	17.6	16.9	16.8

NOTES

- 1) SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.1.1.
- 2) FOR ORIFICE FLANGES, LEVEL INSTRUMENT CONNECTIONS, PRESSURE INSTRUMENT TAPPING, TEMPERATURE INSTRUMENT CONNECTIONS AND CLASS 300# CONTROL VALVES, CLASS 300# FLANGES, FITTINGS, VALVES, BOLTS AND GASKETS ARE USED.
- 3) COLD BENDING OF THE PIPE IS NOT ALLOWED.
- 4) THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- 5) PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- 6) CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE
- 7) ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- 8) ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE
- 9) ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- 10) DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- 11) THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- 12) THE USE OF HIGH INTEGRITY BUTTERFLY VALVES IS PREFERRED IN LIEU OF BALL VALVES FOR WATER INJECTION SYSTEMS.
- 13) FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130
- 14) THE USE OF HIGH PERFORMANCE BUTTERFLY VALVES IS PREFERRED IN LIEU OF BALL VALVES FOR WATER INJECTION

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	500	C	C	C	C	D	E	E	E	B	B	B	B	B	B	B	A
	450	C	C	C	C	D	E	E	E	B	B	B	B	B	B	B	A
	400	C	C	C	C	D	E	E	B	B	B	B	B	B	B	B	A
	350	C	C	C	C	D	E	E	B	B	B	B	B	B	B	B	A
	300	C	C	C	C	D	E	E	B	B	B	B	B	B	B	B	A
	250	C	C	C	C	D	E	B	B	B	B	B	B	B	B	B	A
	200	C	C	C	C	D	E	B	B	B	B	B	B	B	B	B	A
	150	C	C	C	C	D	B	B	B	B	B	B	B	B	B	B	A
	100	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	A
	80	C	C	C	B	B	B	B	B	B	B	B	B	B	B	B	A
	50	C	B	B	B	A											
	40	B	B	B	A												
	25	B	B	A													
	20	B	A														
	15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	40
450	30
500	30
600	30

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

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ISSUE DATE	APRIL 1998	REV LETTER	00	01		
		DATE	22/04/98	04/12/98		
		SIGN	M.H.	M.H.		
PLANT	PS - 1	CARBON STEEL		PIPING GENERAL		
CONSIGNEE	-	SOUR SERVICE		CLASS No. :	1144G	
ENG BY	AKER MARITIME	CONTR. No.	-	ASME RATING :	150	
PRINCIPAL	OPQL	PROJECT No.	-	CORR. ALL :	3 mm	

COMP / MATERIAL DESCRIPTIONS
(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS DN 15 - 600 ASTM A106 - B

FLANGES - RAISED FACE

BLIND FLANGE DN 15 - 600 ASTM A105N
SPECTACLE BLIND FLANGE DN 15 - 600 ASTM A285 - C
SPACER RING DN 15 - 600 ASTM A285 - C
SPADE BLIND DN 15 - 600 ASTM A285 - C
WELDING NECK FLANGE DN 15 - 600 ASTM A105N

FITTINGS

CAP, BUTT - WELD. END DN 15 - 600 ASTM A234 - WPB
ELBOW 45°, BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB
ELBOW 90°, BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB
EQUAL TEE, BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB

REDUCING FITTINGS

BRANCH OUTLET, FLG. RF (NOF) DN 15 - 50 ASTM A105N
BRANCH OUTLET BW END (NOL) DN 15 - 40 ASTM A105N
BRANCH OUTLET FLG. RF (WOF) DN 80 - 200 ASTM A105N
BRANCH OUTLET BW END (WOL) DN 50 - 200 ASTM A105N
REDUCER CONC. BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB
REDUCER ECC. BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB
TEE REDUCING, BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB

MISCELLANEOUS

GASKET, RAISED FACE DN 15 - 600 CNAF, OIL RESISTANT
GASKET, SPIRAL WOUND (300#) DN 15 - 600 AISI 316, GRAPHITE
STUD BOLTS / HEX NUTS - BOLTS: ASTM A193-B7M
NUTS: ASTM A194-2HM
ASTM A193-B8MA
JACKSCREWS
LEVEL DISPLACER CHAMBER DN 100 - 100 ASTM A106 - B
LEVEL GAUGE REFLEX TYPE DN 20 - 20 BODY: ASTM A105N
BOLTS: ASTM A193-B7M/A194-2HM
GASKET: GRAPHITE
LEVEL GAUGE THROUGH VISION DN 20 - 20 BODY: ASTM A105N
BOLTS: ASTM A193-B7M/A194-2HM
GASKET: GRAPHITE

VALVES - RAISED FACE

BALL VALVE, FLOATING BALL, DN 15 - 150 BODY: ASTM A216-WCB/WCC
FULL BORE, FLANGED. or ASTM A105N
TRIM: AISI 316, 316L, AISI 410
SEATS: PTFE
BALL VALVE, FLOATING BALL, DN 15 - 150 BODY: ASTM A216-WCB/WCC
RED BORE, FLANGED. or ASTM A105N
TRIM: AISI 316, 316L, AISI 410
SEATS: PTFE
BALL VALVE, TRUNNION MOUNTED, DN 200 - 600 BODY: ASTM A216 -WCB/WCC+ENP
FULL BORE, FLANGED. ASTM A105N+ENP
STEM: BODY MAT + ENP or
ASTM A182 F316(L) or F6A
TRIM: ASTM A182 F6a or 316(L)
SEATS: PTFE
BALL VALVE, TRUNNION MOUNTED, DN 200 - 600 BODY: ASTM A216-WCB/WCC+ENP
RED BORE, FLANGED. or ASTM A105N+ENP
STEM: BODY MAT + ENP or
ASTM A182 F316(L) or F6A
TRIM: ASTM A182 F6a or 316(L)
SEATS: PTFE
[01] BUTTERFLY VALVE, HIGH PERFORM DN 50 - 600 BODY/DISC: ALUMINIUM BRONZE BS1400 ABZ
[01] LUGGED TYPE SHAFT: MONEL K500
[01] SEATS: VIRGIN PTFE/INCONEL
[01] 625 BODY or LAMINATED
MONEL 400/SUPAGRAF
CHECK VALVE, PISTON, FLANGED. DN 15 - 40 BODY: ASTM A216-WCB/WCC
or ASTM A105N
TRIM: AISI 410 or STELLITE
DUAL PL. CHECK VALVE, WAFER DN 50 - 600 BODY: ASTM A216-WCB/WCC
or ASTM A105N
PLATE: BODY+AISI 410 or STELLITE
SEATS: VITON B or GLT
GATE VALVE, FLANGED. DN 15 - 600 BODY: ASTM A216-WCB/WCC
or ASTM A105N
TRIM: AISI 410 or STELLITE
[01] GLOBE VALVE, FLANGED. DN 15 - 200 BODY: ASTM A216-WCB/WCC
[01] or ASTM A105N
[01] TRIM: AISI 410 or STELLITE
[01] NEEDLE TYPE GLOBE VALVE, DN 15 - 40 BODY: ASTM A216-WCB/WCC
FLANGED. or ASTM A105N
TRIM: AISI 410 or STELLITE
DOUBLE BLOCK & BLEED (300#), DN 15 - 25 BODY: ASTM A350-LF2
FLANGED - BORE 10mm
(2 ball + needle vent or 3 ball
alternative) TRIM: AISI 316
SEATS: PTFE/KEL 'F'

SCHED	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74.30.03			Blind 76.62.11	WN 76.62.77	Spect 76.88.36	Spacer 76.88.46	Spade 76.88.42		
160	15	020.1			058.1	412.9	108.1	308.1	002.1		
160	20	030.1			062.1	414.9	112.1	312.1	004.1		
160	25	040.1			066.1	416.9	116.1	316.1	006.1		
160	40	060.1			068.1	418.9	118.1	318.1	008.1		
80	50	071.1			070.1	390.9	120.1	320.1	010.1		
80	80	109.1			072.1	392.9	122.1	322.1	012.1		
80	100	157.1			074.1	394.9	124.1	324.1	014.1		
80	150	219.1			076.1	396.9	126.1	326.1	016.1		
40	200	245.1			078.1	368.9	128.1	328.1	018.1		
40	250	287.1			080.1	370.9	130.1	330.1	020.1		
40	300	331.1			082.1	372.9	132.1	332.1	022.1		
40	350	379.1			084.1	374.9	134.1	334.1	024.1		
40	400	431.1			086.1	376.9	136.1	336.1	026.1		
30	450	477.1			088.1	318.9	138.1	338.1	028.1		
30	500	529.1			090.1	320.9	140.1	340.1	030.1		
30	600	579.1			092.1	324.9	144.1	344.1	032.1		

SCHED	Nominal Pipe Size	FITTINGS						GASKETS		
		Cap 76.30.17	Elbow 45 76.30.34	Elbow 90SR	Elbow 90 LR 76.30.42	Equal Tee 76.30.81		CNAF RF 85.31.02	Spiral Wnd 300# 85.41.36	
160	15	572.1	572.1		572.1	572.1		*00.1	104.1	
160	20	578.1	578.1		578.1	578.1		*00.2	106.1	
160	25	582.1	582.1	NOT USED	582.1	582.1		*00.3	108.1	
160	40	592.1	592.1		592.1	592.1		*00.4	112.1	
80	50	608.1	608.1		608.1	608.1		*00.5	114.1	
80	80	628.1	628.1		628.1	628.1		*00.7	118.1	
80	100	648.1	648.1		648.1	648.1		*00.8	070.1	
80	150	668.1	668.1		668.1	668.1		*00.9	074.1	
40	200	685.1	685.1		685.1	685.1		*01.0	076.1	
40	250	705.1	705.1		705.1	705.1		*01.1	078.1	
40	300	728.1	728.1		728.1	728.1		*01.2	080.1	
40	350	747.1	747.1		747.1	747.1		*01.3	082.1	
40	400	768.1	768.1		768.1	768.1		*01.4	084.1	
30	450	786.1	786.1		786.1	786.1		*01.5	086.1	
30	500	807.1	807.1		807.1	807.1		*01.6	088.1	
30	600	828.1	828.1		828.1	828.1		*01.7	092.1	

Nominal Pipe Size	VALVES										[01]	[01]
	Ball RB Floating ball Flanged 77.00.03	Ball RB Trunnion mounted Flanged 77.00.73	Ball FB Floating ball Flanged 77.00.03	Ball FB Trunnion mounted Flanged 77.00.73	Gate Flanged 77.20.23	Butterfly high performance Flanged 77.57.98	Globe Flanged 77.30.23	Needle Flanged 77.30.23	Check Dual plate. Wafer 77.67.06	Check Piston Flanged 77.10.23	DB & B 2 ball + needle vent Flanged 77.85.46	DB & B 3 ball Flanged 77.85.45
15	003.1		553.1		003.1		003.1			003.1	*00.1	*00.5
20	004.1		554.1		004.1	[01]	004.1			004.1	*00.2	*01.4
25	005.1		555.1		005.1		005.1			005.1	*00.3	*00.2
40	007.1		557.1		007.1		007.1			007.1		
50	008.1		558.1		008.1	*00.1	008.1		508.1			
80	010.1		560.1		010.1	*00.2	010.1		510.1			
100	012.1		562.1		012.1	*00.3	012.1		512.1			
150	064.1		564.1		014.1	*00.4	014.1		514.1			
200		015.1		515.1	015.1	*00.5	015.1		515.1			
250		016.1		516.1	016.1	*00.6			516.1			
300		017.1		517.1	017.1	*00.7			517.1			
350		018.1		518.1	018.1	*00.8			518.1			
400		019.1		519.1	019.1	*00.9			519.1			
450		020.1		520.1	020.1	*01.0			520.1			
500		021.1		521.1	021.1	*01.1			521.1			
600		023.1		523.1	023.1	*01.2			523.1			

REDUCING FITTINGS					
SCHED	Nominal Pipe Size	Conc reducer 76.30.66	Ecc reducer 76.30.67	Reducing Tee 76.30.88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
80/160	50 x 20			102.1	
80/160	50 x 25	199.1	199.1	111.1	
80/160	50 x 40	208.1	208.1	120.1	
80/160	80 x 40	229.1	229.1	129.1	
80	80 x 50	237.1	237.1	133.1	
80/160	100 x 40	253.1	253.1	147.1	
80	100 x 50	267.1	267.1	154.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
40/80	200 x 100	326.1	326.1	212.1	
40/80	200 x 150	336.1	336.1	232.1	
40/80	250 x 100	-	-	260.1	
40/80	250 x 150	356.1	356.1	278.1	
40	250 x 200	365.1	365.1	291.1	
40/80	300 x 150	380.1	380.1	317.1	
40	300 x 200	396.1	396.1	328.1	
40	300 x 250	404.1	404.1	350.1	
40/80	350 x 150	-	-	379.1	
40	350 x 200	422.1	422.1	390.1	
40	350 x 250	438.1	438.1	415.1	
40	350 x 300	447.1	447.1	441.1	
40/80	400 x 150	-	-	469.1	
40	400 x 200	453.1	453.1	479.1	
40	400 x 250	462.1	462.1	505.1	
40	400 x 300	474.1	474.1	531.1	
40	400 x 350	487.1	487.1	556.1	
30/40	450 x 200	-	-	589.1	
30/40	450 x 250	534.1	534.1	613.1	
30/40	450 x 300	564.1	564.1	637.1	
30/40	450 x 350	596.1	596.1	661.1	
30/40	450 x 400	626.1	626.1	685.1	
30/40	500 x 200	-	-	709.1	
30/40	500 x 250	-	-	733.1	
30/40	500 x 300	654.1	654.1	757.1	
30/40	500 x 350	686.1	686.1	781.1	
30/40	500 x 400	716.1	716.1	805.1	
30	500 x 450	732.1	732.1	819.1	
30/40	600 x 250	-	-	853.1	
30/40	600 x 300	-	-	877.1	
30/40	600 x 350	-	-	901.1	
30/40	600 x 400	896.1	896.1	925.1	
30	600 x 450	912.1	912.1	939.1	
30	600 x 500	942.1	942.1	963.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
Valve, globe	1	77.30.23	005.1	005.1	005.1	005.1	005.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	111.1	-	-
Flange blind	1	76.62.11	066.1	066.1	066.1	066.1	066.1
Flange WN	1	76.62.77	416.9	416.9	416.9	-	-
NOF	1	76.80.37	-	-	-	025.1	026.1
Bolting	8	81.38.66	155.1	155.1	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3	*00.3	*00.3

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
Valve, ball	1	77.00.03	005.1	005.1	005.1	005.1	005.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	111.1	-	-
Flange blind	1	76.62.10	066.1	066.1	066.1	066.1	066.1
Flange WN	1	76.62.77	416.9	416.9	416.9	-	-
NOF	1	76.80.37	-	-	-	025.1	026.1
Bolting	8	81.38.66	155.1	155.1	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3	*00.3	*00.3

PRESSURE INSTRUMENT CONNECTIONS 300#							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
DBB Valve	1	77.85.46	*00.3	*00.3	*00.3	*00.3	*00.3
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	111.1	-	-
Flange WN	1	76.62.77	256.9	256.9	256.9	-	-
NOF	1	76.80.37	-	-	-	125.1	126.1
Bolting	8	81.38.66	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

TEMPERATURE INSTRUMENT CONNECTIONS 300#					
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 40	200 - 600 40
Flange WN	1	76.62.77	254.9	-	-
Tee Reducing	1	76.30.88	129.1	-	-
NOF	1	76.80.37	-	131.1	131.1
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm		Dia x L In x mm	Dia x L In x mm
15	4	154.1	1/2 x 65			156.1	1/2 x 75			
20	4	154.1	1/2 x 65			156.1	1/2 x 75			
25	4	155.1	1/2 x 70			157.1	1/2 x 80			
40	4	156.1	1/2 x 75			158.1	1/2 x 85			
50	4	269.1	5/8 x 80	280.1	5/8 x 145	272.1	5/8 x 95	8	278.1	5/8 x 130
80	4	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1	3/4 x 140
100	8	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1	3/4 x 140
150	8	329.1	3/4 x 100	345.1	3/4 x 205	332.1	3/4 x 120	12	335.1	3/4 x 140
200	8	330.1	3/4 x 110	351.1	3/4 x 240	334.1	3/4 x 130	12	406.1	3/4 x 150
250	12	401.1	7/8 x 120	425.1	7/8 x 270	405.1	7/8 x 145	16	474.1	1 x 170
300	12	401.1	7/8 x 120	431.1	7/8 x 305	406.1	7/8 x 150	16	534.1	11/8 x 185
350	12	468.1	1 x 130	500.1	1 x 330	472.1	1 x 160	20	535.1	11/8 x 190
400	16	469.1	1 x 140	502.1	1 x 340	474.1	1 x 170	20	594.1	11/4 x 205
450	16	529.1	11/8 x 150	562.1	11/8 x 360	534.1	11/8 x 185	24	596.1	11/4 x 215
500	20	530.1	11/8 x 160	565.1	11/8 x 385	537.1	11/8 x 205	24	598.1	11/4 x 230
600	20	590.1	11/4 x 180	625.1	11/4 x 400	598.1	11/4 x 230	24	688.1	11/2 x 250

BRANCH OUTLETS [01]					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79
50 - 600	15	*51.1	021.1	-	-
80 - 600	20	*51.2	023.1	-	-
80-100	25	*51.3	025.1	-	-
150-600	25	*51.4	026.1	-	-
150-600	40	*51.6	031.1	-	-
150	50	-	018.1	-	01.364.1
200	50	-	018.1	-	01.066.1
250	50	-	018.1	-	01.068.1
300	50	-	019.1	-	01.070.1
350	50	-	019.1	-	01.072.1
400	50	-	019.1	-	01.074.1
450	50	-	020.1	-	01.268.1
500	50	-	020.1	-	01.269.1
600	50	-	020.1	-	01.271.1
200	80	-	-	*11.0	01.090.1
250	80	-	-	*11.1	01.092.1
300	80	-	-	*11.2	01.094.1
350	80	-	-	*11.3	01.096.1
400	80	-	-	*11.4	01.098.1
450	80	-	-	*11.5	01.280.1
500	80	-	-	*11.6	01.281.1
600	80	-	-	*11.7	01.283.1
300	100	-	-	*11.8	01.116.1
350	100	-	-	*11.9	01.118.1
400	100	-	-	*12.0	01.120.1
450	100	-	-	*12.1	01.292.1
500	100	-	-	*12.2	01.293.1
600	100	-	-	*12.3	01.295.1
450	150	-	-	*12.4	01.303.1
500	150	-	-	*12.5	01.304.1
600	150	-	-	*12.6	01.306.1
600	200	-	[01]	*12.7	00.194.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS 300#														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450 15	500 15	600 15
DBB Valve	2	77.85.46	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1
Flange WN RF	2	76.62.77	210.9	212.9	214.9	216.9	168.9	170.9	172.9	174.9	176.9	178.9	180.9	184.9
Jackscrews**		81.86.35	*01.3	*00.6	*02.1	*00.7	*02.2	*00.2	*00.9	*00.5	*02.3	*01.7	*02.4	*01.2
NOL-plain end	2	76.80.31	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2
Bolting		81.38.66	278.1	335.1	335.1	335.1	406.1	474.1	534.1	535.1	594.1	596.1	598.1	688.1
Number of bolts			8	8	8	12	12	16	16	20	20	24	24	24
Gasket Sp.WD	2	85.41.36	114.1	118.1	070.1	074.1	076.1	078.1	080.1	082.1	084.1	086.1	088.1	092.1

** 1 Jackscrew for DN50 to 100

[01]

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM	LEVEL CONTROL CONNECTIONS - 300#		
		COMPONENTS	Nos reqd	
76.80.60.422.1	356	Valve, Ball	1	77.00.03.104.1
76.80.60.424.1	813	Valve, Ball	2	77.00.72.058.1
76.80.60.426.1	1219	Flange blind	2	76.62.11.112.1
76.80.60.428.1	1524	Flange WN	1	76.62.77.254.9
76.80.60.430.1	1829	Gasket Sp.WD	1	85.41.36.070.1 DN 100
76.80.60.432.1	2134	Gasket Sp.WD	4	85.41.36.114.1 DN 50
76.80.60.434.1	2438	Gasket Sp.WD	3	85.41.36.106.1 DN 20
76.80.60.436.1	2743	Bolting	8	81.38.66.331.1
76.80.60.438.1	3048	Bolting	32	81.38.66.271.1
		Bolting	12	81.38.66.268.1

LEVEL GAUGE CONNECTIONS THROUGH VISION - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.66	062.1	064.1	066.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket SpW	6	85.41.36	106.1	106.1	106.1

[01]

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LEVEL GAUGE CONNECTIONS REFLEX - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.66	562.1	564.1	566.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT - 300#					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

[01]

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	300# 25
Double Block & Bleed Valve	1	77.85.46	*00.3
Bolting	4	81.38.66	269.1
Gasket Sp.WD	1	85.41.36	104.3

[01]

[01]

[01]

[01]

TEMPERATURE DEG C	SERVICE LIMITS					
	-50	38	50	75	100	120
PRESSURE BAR GA	18.2	18.2	18	17.5	17	16.5

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.1.3.
- FOR ORIFICE FLANGES, LEVEL INSTRUMENT CONNECTIONS, PRESSURE INSTRUMENT TAPPING, TEMPERATURE INSTRUMENT CONNECTIONS AND CLASS 300# CONTROL VALVES, CLASS 300# FLANGES, FITTINGS, VALVES, BOLTS AND GASKETS ARE USED.
- COLD BENDING OF THE PIPE IS NOT ALLOWED
- WELDS SHALL BE POST-WELD HEAT TREATED FOR WALL THICKNESS EQUAL OR > 12mm.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
DN		15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
NOMINAL RUN PIPE SIZE	600	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	500	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	450	C	C	C	C	D	E	E	E	E	B	B	B	B	B	A	
	400	C	C	C	C	D	E	E	E	B	B	B	B	B	A		
	350	C	C	C	C	D	E	E	E	B	B	B	B	A			
	300	C	C	C	C	D	E	E	E	B	B	B	A				
	250	C	C	C	C	D	E	E	B	B	B	A					
	200	C	C	C	C	D	E	E	B	B	A						
	150	C	C	C	C	D	E	B	B	A							
	100	C	C	C	C	D	B	B	A								
	80	C	C	C	B	B	A										
	50	C	B	B	B	A											
	40	B	B	B	A												
	25	B	B	A													
	20	B	A														
	15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	40
450	30
500	30
600	30

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

ISSUE DATE : DECEMBER 1998		REV LETTER	00		
		DATE	4/12/98		
		SIGN	M. H.		
PLANT	PS - 1	LOW TEMP.CARBON STEEL		PIPING GENERAL	
CONSIGNEE		SOUR SERVICE		CLASS No. :	1150G
ENG BY	AKER MARITIME	CONTRACT JOB NO	-	ANSI RATING :	150
PRINCIPAL	OPQL	PROJECT NO	-	CORR ALL :	3mm

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 600	ASTM A333 - 6
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 600	ASTM A350 - LF2
SPECTACLE BLIND FLANGE	DN	15 - 600	ASTM A516 - 60
SPACER RING	DN	15 - 600	ASTM A516 - 60
SPADE BLIND	DN	15 - 600	ASTM A516 - 60
WELDING NECK FLANGE	DN	15 - 600	ASTM A350 - LF2

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 600	ASTM A420 - WPL6
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420 - WPL6
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420 - WPL6
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420 - WPL6

REDUCING FITTINGS

BRANCH OUTLET. FLG. RF (NOF)	DN	15 - 50	ASTM A350 - LF2
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A350 - LF2
BRANCH OUTLET FLG. RF (WOF)	DN	80 - 200	ASTM A350 - LF2
BRANCH OUTLET BW END (WOL)	DN	50 - 200	ASTM A350 - LF2
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A420 - WPL6
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A420 - WPL6
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420 - WPL6

MISCELLANEOUS

GASKET, RAISED FACE	DN	15 - 600	CNAF, OIL RESISTANT
GASKET, SPIRAL WOUND (300#)	DN	15 - 40	AISI 316, GRAPHITE FILLED, CS CENTRING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M
JACKSCREWS			ASTM A193-B8MA
LEVEL DISPACER CHAMBER	DN	100 - 100	ASTM A333 - 6 (SEAMLESS)
LEVEL GAUGE REFLEX	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A320-L7M/A194-7M GASKET: GRAPHITE
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A320-L7M/A194-7M GASKET: GRAPHITE
ORIFICE FLANGE SET, RAISED FACE	DN	50 - 600	FLANGES: ASTM A350 - LF2

VALVES - RAISED FACE

BALL VALVE, FLOATING BALL, FULL BORE, FLANGED.	DN	15 - 150	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, FLOATING BALL, RED BORE, FLANGED.	DN	15 - 150	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	200 - 600	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : FILLED PTFE
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	200 - 600	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : FILLED PTFE
CHECK VALVE, PISTON, FLANGED	DN	15 - 40	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 TRIM : AISI 316(L) or STELLITE
DUAL PL. CHECK VALVE WAFER	DN	50 - 600	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 PLATE : BODY + STELLITE SEATS : 316 OR STELLITE
GATE VALVE, FLANGED	DN	15 - 200	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 TRIM: AISI 316(L) or STELLITE
GLOBE VALVE, FLANGED	DN	15 - 200	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 TRIM: AISI 316(L) or STELLITE
DOUBLE BLOCK & BLEED (300#) FLANGED - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A350-LF2 TRIM: AISI 316 SEATS: PTFE/KEL 'F'

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74.30.16			Blind 76.62.12	WN 76.62.82	Spect. 76.88.35	Spacer 76.88.47	Spade 76.88.42		
160	15	023.1			458.1	182.1	108.1	008.1	002.1		
160	20	030.1			462.1	184.1	112.1	012.1	004.1		
160	25	038.1			466.1	186.1	116.1	016.1	006.1		
160	40	054.1			468.1	188.1	118.1	018.1	008.1		
80	50	061.1			470.1	160.1	120.1	020.1	010.1		
80	80	069.1			472.1	162.1	122.1	022.1	012.1		
80	100	077.1			474.1	164.1	124.1	024.1	014.1		
80	150	086.1			476.1	166.1	126.1	026.1	016.1		
40	200	095.1			478.1	118.1	128.1	028.1	018.1		
40	250	107.1			480.1	120.1	130.1	030.1	020.1		
40	300	119.1			482.1	122.1	132.1	032.1	022.1		
40	350	132.1			484.1	124.1	134.1	034.1	024.1		
40	400	142.1			486.1	126.1	136.1	036.1	026.1		
30	450	166.1			488.1	068.1	138.1	038.1	028.1		
30	500	206.1			490.1	070.1	140.1	040.1	030.1		
30	600	236.1			492.1	074.1	144.1	044.1	032.1		

SCHD	Nominal Pipe Size	FITTINGS					GASKETS		
		Cap 76.31.17	Elbow 45 76.31.34	Elbow 90 SR	Elbow 90 LR 76.31.43	Equal Tee 76.31.80	CNAF RF 85.31.02	Spiral Wnd 300# 85.41.36	
160	15	172.1	172.1		172.1	172.1	*00.1	104.1	
160	20	178.1	178.1		178.1	178.1	*00.2	106.1	
160	25	182.1	182.1	NOT USED	182.1	182.1	*00.3	108.1	
160	40	192.1	192.1		192.1	192.1	*00.4	112.1	
80	50	210.1	210.1		210.1	210.1	*00.5	114.1	
80	80	230.1	230.1		230.1	230.1	*00.7	118.1	
80	100	248.1	248.1		248.1	248.1	*00.8	070.1	
80	150	268.1	268.1		268.1	268.1	*00.9	074.1	
40	200	284.1	284.1		284.1	284.1	*01.0	076.1	
40	250	306.1	306.1		306.1	306.1	*01.1	078.1	
40	300	328.1	328.1		328.1	328.1	*01.2	080.1	
40	350	348.1	348.1		348.1	348.1	*01.3	082.1	
40	400	368.1	368.1		368.1	368.1	*01.4	084.1	
30	450	385.1	385.1		385.1	385.1	*01.5	086.1	
30	500	395.1	395.1		395.1	395.1	*01.6	088.1	
30	600	405.1	405.1		405.1	405.1	*01.7	092.1	

Nominal Pipe Size	VALVES										
	Ball RB Floating ball Flanged 77.00.33	Ball RB Trunnion mounted Flanged 77.00.83	Ball FB Floating ball Flanged 77.00.33	Ball FB Trunnion mounted Flanged 77.00.83	Gate Flanged 77.20.33	Globe Flanged 77.30.33	Needle Flanged	Check Dual plate Wafer 77.67.52	Check Piston Flanged 77.10.33	DB & B 2 ball + needle vent Flanged 77.85.46	DB & B 3 ball Flanged 77.85.45
15	003.1		553.1		003.1	003.1			003.1	*00.1	*00.5
20	004.1		554.1		004.1	004.1			004.1	*00.2	*01.4
25	005.1		555.1		005.1	005.1	NOT USED		005.1	*00.3	*00.2
40	007.1		557.1		007.1	007.1			007.1		
50	008.1		558.1		008.1	008.1			008.1		
80	010.1		560.1		010.1	010.1			010.0		
100	012.1		562.1		012.1	012.1			012.1		
150	064.1		564.1		014.1	014.1			014.1		
200		015.1		515.1	015.1	015.1			015.1		
250		016.1		516.1	016.1	016.1			016.1		
300		017.1		517.1	017.1	017.1			017.1		
350		018.1		518.1	018.1	018.1			018.1		
400		019.1		519.1	019.1	019.1			019.1		
450		020.1		520.1	020.1	020.1			020.1		
500		021.1		521.1	021.1	021.1			021.1		
600		023.1		523.1	023.1	023.1			023.1		

SCHD	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer 76.31.66	Ecc reducer 76.31.75	Tee 76.31.88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
160	50 x 20	193.1	193.1	102.1	
80/160	50 x 25	199.1	199.1	111.1	
80/160	50 x 40	208.1	208.1	120.1	
80/160	80 x 40	229.1	229.1	129.1	
80	80 x 50	237.1	237.1	133.1	
80	100 x 40	251.1	251.1	147.1	
80	100 x 50	267.1	267.1	154.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
40/80	200 x 100	326.1	326.1	212.1	
40/80	200 x 150	336.1	336.1	232.1	
80	250 x 100	345.1	345.1	261.1	
40/80	250 x 150	356.1	356.1	278.1	
40/80	250 x 200	365.1	365.1	291.1	
40/80	300 x 150	384.1	384.1	317.1	
40	300 x 200	396.1	396.1	328.1	
80	300 x 250	404.1	404.1	350.1	
40/80	350 x 150	414.1	414.1	379.1	
40	350 x 200	422.1	422.1	390.1	
40	350 x 250	438.1	438.1	415.1	
40	350 x 300	447.1	447.1	441.1	
40/80	400 x 150	-	-	469.1	
40	400 x 200	453.1	453.1	479.1	
40	400 x 250	462.1	462.1	505.1	
40	400 x 300	474.1	474.1	531.1	
40	400 x 350	487.1	487.1	556.1	
30/40	450 x 200	-	-	589.1	
30/40	450 x 250	534.1	534.1	613.1	
30/40	450 x 300	564.1	564.1	637.1	
30/40	450 x 350	596.1	596.1	661.1	
30/40	450 x 400	626.1	626.1	685.1	
30/40	500 x 200	-	-	709.1	
30/40	500 x 250	-	-	733.1	
30/40	500 x 300	654.1	654.1	737.1	
30/40	500 x 350	686.1	686.1	781.1	
30/40	500 x 400	716.1	716.1	805.1	
30	500 x 450	732.1	732.1	819.1	
30/40	600 x 250	-	-	853.1	
30/40	600 x 300	-	-	877.1	
30/40	600 x 350	-	-	901.1	
30/40	600 x 400	896.1	896.1	925.1	
30	600 x 450	912.1	912.1	939.1	
30	600 x 500	942.1	942.1	963.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80 -100	150 - 600
			25	25	25	25	25
Valve Globe	1	77.30.33	005.1	005.1	005.1	005.1	5.1
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	111.1	-	-
Flange blind	1	76.62.12	466.1	466.1	466.1	466.1	466.1
Flange WN	1	76.62.82	186.1	186.1	186.1	-	-
NOF	1	76.80.37	-	-	-	525.1	526.1
Bolting	8	81.38.67	155.1	155.1	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3	*00.3	*00.3

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25	40	50	80 -100	150 - 600
			25	25	25	25	25
Valve Ball	1	77.00.33	005.1	005.1	005.1	005.1	5.1
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	111.1	-	-
Flange blind	1	76.62.12	466.1	466.1	466.1	466.1	466.1
Flange WN	1	76.62.82	186.1	186.1	186.1	-	-
NOF	1	76.80.37	-	-	-	525.1	526.1
Bolting	8	81.38.67	155.1	155.1	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3	*00.3	*00.3

PRESSURE INSTRUMENT CONNECTIONS - 300#							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50	80 -100	150 - 600
			25	25	25	25	25
DBB Valve	1	77.85.46	*00.3	*00.3	*00.3	*00.3	*00.3
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	111.1	-	-
Flange WN	1	76.62.82	852.1	852.1	852.1	-	-
NOF	1	76.80.37	-	-	-	625.1	625.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

TEMPERATURE INSTRUMENT CONNECTIONS - 300#					
COMPONENTS	Nos reqd	Run Pipe Conn Size	100	150 - 600	
			40	40	
Flange WN	1	76.62.82	858.1	-	
Tee reducing	1	76.31.88	147.1	-	
NOF	1	76.80.37	-	631.1	
Thermowell	1		SUPPLIED BY INSTRUMENTS		
Bolting	4	81.38.67	328.1	328.1	
Gasket Sp.WD	1	85.41.36	112.1	112.1	

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L	81.38.67	Dia x L	81.38.67	Dia x L		81.38.67	Dia x L
			In x mm		In x mm		In x mm			In x mm
15	4	154.1	1/2 x 65			156.1	1/2 x 75			
20	4	154.1	1/2 x 65			156.1	1/2 x 75			
25	4	155.1	1/2 x 70			157.1	1/2 x 80			
40	4	156.1	1/2 x 75			158.1	1/2 x 85			
50	4	269.1	5/8 x 80	280.1	5/8 x 145	272.1	5/8 x 95	8	278.1	5/8 x 130
80	4	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1	3/4 x 140
100	8	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1	3/4 x 140
150	8	329.1	3/4 x 100	345.1	3/4 x 205	332.1	3/4 x 120	12	335.1	3/4 x 140
200	8	330.1	3/4 x 110	351.1	3/4 x 240	334.1	3/4 x 130	12	406.1	7/8 x 150
250	12	401.1	7/8 x 120	425.1	7/8 x 270	406.1	7/8 x 146	16	474.1	1 x 170
300	12	401.1	7/8 x 120	431.1	7/8 x 305	406.1	7/8 x 150	16	534.1	11/8 x 185
350	12	468.1	1 x 130	500.1	1 x 330	472.1	1 x 160	20	535.1	11/8 x 190
400	16	469.1	1 x 140	502.1	1 x 340	474.1	1 x 170	20	594.1	11/4 x 205
450	16	529.1	11/8 x 150	562.1	11/8 x 360	534.1	11/8 x 185	24	596.1	11/4 x 215
500	20	530.1	11/8 x 160	565.1	11/8 x 385	538.1	11/8 x 205	24	599.1	11/4 x 230
600	20	590.1	11/4 x 180	625.1	11/4 x 400	599.1	11/4 x 230	24	688.1	11/2 x 250

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79
50 - 600	15	*56.1	521.1	-	-
80 - 600	20	*56.2	523.1	-	-
80 - 100	25	*56.3	525.1	-	-
150 - 600	25	*56.4	526.1	-	-
150 - 600	40	*56.5	531.1	-	-
150	50	-	518.1	-	05.364.1
200	50	-	518.1	-	05.066.1
250	50	-	518.1	-	05.068.1
300	50	-	519.1	-	05.070.1
350	50	-	519.1	-	05.072.1
400	50	-	519.1	-	05.074.1
450	50	-	520.1	-	05.268.1
500	50	-	520.1	-	05.269.1
600	50	-	520.1	-	05.271.1
200	80	-	-	*68.0	050.90.1
250	80	-	-	*68.1	05.092.1
300	80	-	-	*68.2	05.094.1
350	80	-	-	*68.3	05.096.1
400	80	-	-	*68.4	05.098.1
450	80	-	-	*68.5	05.280.1
500	80	-	-	*68.6	05.281.1
600	80	-	-	*68.7	05.283.1
300	100	-	-	*68.8	05.116.1
350	100	-	-	*69.0	05.118.1
400	100	-	-	*69.1	05.120.1
450	100	-	-	*69.2	05.292.1
500	100	-	-	*69.3	05.293.1
600	100	-	-	*69.4	05.295.1
450	150	-	-	*69.5	05.303.1
500	150	-	-	*69.6	05.304.1
600	150	-	-	*69.7	05.306.1
600	200	-	-	*69.8	04.417.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS 300#														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450 15	500 15	600 15
DBB Valve	2	77.85.46	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1
Flange WN RF	2	76.62.82	812.1	814.1	816.1	818.1	768.1	770.1	772.1	774.1	776.1	778.1	780.1	782.1
Jackscrews**		81.86.35	*01.3	*00.6	*02.1	*00.7	*02.2	*00.2	*00.9	*00.5	*02.3	*01.7	*02.4	*01.2
NOL-plain end	2	76.80.31	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4
Bolting		81.38.67	278.1	335.1	335.1	335.1	406.1	474.1	534.1	535.1	594.1	596.1	599.1	688.1
Number of bolts			8	8	8	12	12	16	16	20	20	24	24	24
Gasket Sp.WD	2	85.41.36	114.1	118.1	070.1	074.1	076.1	078.1	080.1	082.1	084.1	086.1	088.1	092.1

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS 300#		
		COMPONENTS	Nos reqd	
76.80.60.602.1	356	Valve, Gate	1	77.20.33.054.1
76.80.60.604.1	813	Valve, Ball	2	77.00.03.058.1
76.80.60.606.1	1219	Flange blind	2	76.62.10.512.1
76.80.60.608.1	1524	Flange WN	1	76.62.78.854.1
76.80.60.610.1	1829	Gasket Sp.WD	1	85.41.36.070.1 DN 100
76.80.60.612.1	2134	Gasket Sp.WD	4	85.41.36.114.1 DN 50
76.80.60.614.1	2438	Gasket Sp.WD	3	85.41.36.106.1 DN 20
76.80.60.616.1	2743	Bolting	8	81.38.66.331.1
76.80.60.618.1	3048	Bolting	32	81.38.66.271.1
		Bolting	12	81.38.66.268.1

LEVEL GAUGE CONNECTIONS THROUGH VISION - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.67	062.1	064.1	066.1
Valve, ball	3	77.00.33	104.1	104.1	104.1
Flange blind	2	76.62.12	512.1	512.1	512.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

LEVEL GAUGE CONNECTIONS REFLEX - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.67	562.1	564.1	566.1
Valve, ball	3	77.00.33	104.1	104.1	104.1
Flange blind	2	76.62.12	512.1	512.1	512.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT-300#					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT-300#			
COMPONENTS	Nos reqd	Class Size	300# 25
Double Block & Bleed Valve	1	77.85.45	*00.2
Bolting	4	81.38.67	269.1
Gasket Sp.WD	1	85.41.36	108.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-100	38	50	75	100	120
PRESSURE BAR GA	18.96	18.96	18.4	17.3	16.3	15.7

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.2.2.
- FOR DESIGN TEMPERATURES ABOVE 50 DEG.C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.
- WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 DEG.C, TO PREVENT CHLORIDE CORROSION CRACKING.
- FOR ORIFICE FLANGES, LEVEL INSTRUMENT CONNECTIONS, PRESSURE INSTRUMENT TAPPING, TEMPERATURE INSTRUMENT CONNECTIONS AND CLASS 300# CONTROL VALVES, CLASS 300# FLANGES, FITTINGS, VALVES, BOLTS AND GASKETS ARE USED.
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE.
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE. [01]
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE. [01]
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38 130 [01]

		BRANCH CONNECTIONS 90 DEG													
		NOMINAL BRANCH SIZE													
		DN	15	20	25	40	50	80	100	150	200	250	300	350	400
NOMINAL RUN PIPE SIZE	600														
	500														
	450														
	400	C	C	C	C	C	D	D	B	B	B	B	B	A	
	350	C	C	C	C	C	D	D	B	B	B	B	B	A	
	300	C	C	C	C	C	D	D	B	B	B	A			
	250	C	C	C	C	C	D	B	B	B	A				
	200	C	C	C	C	C	D	B	B	A					
	150	C	C	C	C	C	B	B	A						
	100	C	C	C	B	B	A								
	80	C	C	C	B	B	A								
	50	C	B	B	B	A									
	40	B	B	B	A										
	25	B	B	A											
	20	B	A												
	15	A													

EXPLANATION OF CHARACTERS

- A Equal tee
B Reducing tee
C Branch outlet - Plain / Flanged (NOL / NOF)
D Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
NOL - Nippolet
WOF - Weldoflange
WOL - Weldolet

TABLE OF SCHEDULES	
DN	SCHEDULE
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	10S
200	10S
250	10S
300	10S
350	10S
400	10S

ISSUE DATE	APRIL 1998	REV LETTER	00	01		
		DATE	22/4/98	04/12/98		
		SIGN	M.H.	M.H.		
PLANT	PS - 1	STAINLESS STEEL (16Cr-12Ni-2Mo)		PIPING GENERAL		
CONSIGNEE	-	LOW TEMP. SOUR SERVICE		CLASS No. :	1346G	
ENG BY	AKER MARITIME	CONTR. No.	-	ASME RATING :	150	
PRINCIPAL	OPQL	PROJECT No.	-	CORR. ALL :	0mm	

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 300	ASTM A312-TP316L
PIPE, WELDED		350 - 400	ASTM A358-TP316L

FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 400	ASTM A182-F316
SPECTACLE BLIND FLANGE	DN	15 - 400	ASTM A240-TP316
SPACER RING	DN	15 - 400	ASTM A240-TP316
SPADE BLIND	DN	15 - 400	ASTM A240-TP316
WELDING NECK FLANGE	DN	15 - 400	ASTM A182-F316

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 400	ASTM A403-WP316L
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A403-WP316L
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A403-WP316L
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A403-WP316L

REDUCING FITTINGS

BRANCH OUTLET. FLG RF (NOF)	DN	15 - 40	ASTM A182-F316
BRANCH OUTLET PLAIN END (NOL)	DN	15 - 40	ASTM A182-F316
BRANCH OUTLET FLG. RF (WOF)	DN	50 - 100	ASTM A182-F316
BRANCH OUTLET BW END (WOL)	DN	50 - 100	ASTM A182-F316
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A403-WP316L
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A403-WP316L
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 400	ASTM A403-WP316L

MISCELLANEOUS

GASKET, RAISED FACE	DN	15 - 400	CNAF, OIL RESISTANT
GASKET, SPIRAL WOUND (300#)	DN	15 - 400	AISI 316, GRAPHITE FILLED
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M
JACKSCREWS			ASTM A193-B8MA
LEVEL DISPLACER CHAMBER	DN	100 - 100	ASTM A312-TP316
LEVEL GAUGE REFLEX TYPE	DN	20 - 20	BODY: ASTM A182-F316 BOLTS: ASTM A320-L7M / A194-7M GASKET: GRAPHITE
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A182-F316 BOLTS: ASTM A320-L7M / A194-7M GASKET: GRAPHITE

VALVES - RAISED FACE.

BALL VALVE, FLOATING BALL, FULL BORE, FLANGED.	DN	15 - 150	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L SEATS : PTFE
BALL VALVE, FLOATING BALL, RED BORE, FLANGED.	DN	15 - 150	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L SEATS : PTFE
BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	200 - 400	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L SEATS : FILLED PTFE
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	200 - 400	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L SEATS : FILLED PTFE
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L
DUAL PL. CHECK VALVE, WAFER	DN	50 - 400	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L SEATS : VITON B or GF
GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L
DOUBLE BLOCK & BLEED(300#), FLANGED - BORE 10mm	DN	15 - 25	BODY : ASTM A182 F316 TRIM : AISI 316 SEATS : PTFE/PCTFE

[01] (2 ball + needle vent or 3 ball alternative)

[01]

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74.36.33			Blind 76.65.10	WN 76.65.79	Spect. 76.88.10	Spacer 76.88.19	Spade 76.88.43		
40S	15	018.1			312.1	262.1	158.1	408.1	252.1		
40S	20	026.1			314.1	264.1	162.1	412.1	254.1		
10S	25	033.1			316.1	206.1	166.1	416.1	256.1		
10S	40	049.1			318.1	208.1	168.1	418.1	258.1		
10S	50	057.1			320.1	210.1	170.1	420.1	260.1		
10S	80	065.1			322.1	212.1	172.1	422.1	262.1		
10S	100	073.1			324.1	214.1	174.1	424.1	264.1		
10S	150	082.1			326.1	216.1	176.1	426.1	266.1		
10S	200	091.1			328.1	218.1	178.1	428.1	268.1		
10S	250	103.1			330.1	220.1	180.1	430.1	270.1		
10S	300	115.1			332.1	222.1	182.1	432.1	272.1		
10S	350	127.1			334.1	224.1	184.1	434.1	274.1		
10S	400	137.1			336.1	226.1	186.1	436.1	276.1		
	450										
	500										
	600										

SCHD	Nominal Pipe Size	FITTINGS						GASKETS		
		Cap 76.33.19	Elbow 45 76.33.37	Elbow 90 SR	Elbow 90 LR 76.33.41	Equal Tee 76.33.84		CNAF RF 85.31.02	Spiral Wvd 300# 85.41.36	
40S	15	286.1	286.1	NOT USED	286.1	786.1		*00.1	*24.1	
40S	20	296.1	296.1		296.1	796.1		*00.2	*24.2	
10S	25	304.1	304.1		304.1	804.1		*00.3	*24.3	
10S	40	324.1	324.1		324.1	824.1		*00.4	*24.4	
10S	50	334.1	334.1		334.1	834.1		*00.5	*24.5	
10S	80	354.1	354.1		354.1	854.1		*00.7	*24.7	
10S	100	374.1	374.1		374.1	874.1		*00.8	*24.8	
10S	150	393.1	393.1		393.1	894.1		*00.9	*24.9	
10S	200	404.1	404.1		404.1	904.1		*01.0	*25.0	
10S	250	417.1	417.1		417.1	917.1		*01.1	*25.1	
10S	300	433.1	433.1		433.1	933.1		*01.2	*25.2	
10S	350	447.1	447.1		447.1	948.1		*01.3	*25.3	
10S	400	457.1	457.1		457.1	957.1		*01.4	*25.4	
	450									
	500									
	600									

Nominal Pipe Size	VALVES								[01]	[01]	
	Ball RB Floating ball Flanged 77 03 07	Ball RB Trunnion Flanged 77 03 73	Ball FB Floating ball Flanged 77 03 07	Ball FB Trunnion Flanged 77 03 73	Gate Flanged	Globe Flanged 77 33 09	Needle Flanged	Check dual pl. Wafer 77 68 00	Check Piston Flanged 77 13 09	DB & B 2 ball + needle vent Flanged 77 85 46	DB & B 3 ball Flanged 77 85 45
15	003 1		553.1		NOT USED	003.1	NOT USED		003 1	*10.1	*11.2
20	004 1		554.1			004 1			004.1	*10.2	*10.8
25	005.1		555.1			005.1			005.1	*10.3	*11.0
40	007 1		557.1			007 1			007.1		
50	008 1		558.1			008 1			508 1		
80	010 1		560.1			010 1			510 1		
100	012 1		562.1			012 1			512 1		
150	064.1		564.1			014 1			514 1		
200		015.1		515 1		015 1			515 1		
250		016.1		516 1					516 1		
300		017 1		517 1					517 1		
350		018 1		518 1					518 1		
400		019 1		519 1					519 1		
450											
500											
600											

SCHD	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer 76.33.70	Ecc reducer 76.33.72	Reducing Tee	
40S	20 x 15	566.1	566.1	618.1	-
10S/40S	25 x 15	579.1	579.1	632.1	-
10S/40S	25 x 20	589.1	589.1	637.1	-
10S/40S	40 x 15	599.1	599.1	643.1	-
10S/40S	40 x 20	619.1	619.1	649.1	-
10S	40 x 25	624.1	624.1	656.1	-
10S/40S	50 x 20	-	-	665.1	-
10S	50 x 25	634.1	634.1	672.1	-
10S	50 x 40	644.1	644.1	683.1	-
10S	80 x 40	674.1	674.1	693.1	-
10S	80 x 50	684.1	684.1	-	352.1
10S	100 x 40	-	-	-	360.1
10S	100 x 50	704.1	704.1	-	368.1
10S	100 x 80	714.1	714.1	-	376.1
10S	150 x 80	744.1	744.1	-	384.1
10S	150 x 100	754.1	754.1	-	392.1
10S	200 x 100	764.1	764.1	-	400.1
10S	200 x 150	774.1	774.1	-	408.1
10S	250 x 100	-	-	-	416.1
10S	250 x 150	789.1	789.1	-	421.1
10S	250 x 200	803.1	803.1	-	426.1
10S	300 x 150	816.1	816.1	-	431.1
10S	300 x 200	827.1	827.1	-	436.1
10S	300 x 250	839.1	839.1	-	441.1
10S	350 x 150	-	-	-	446.1
10S	350 x 200	848.1	848.1	-	451.1
10S	350 x 250	851.1	851.1	-	456.1
10S	350 x 300	863.1	863.1	-	461.1
10S	400 x 150	-	-	-	466.1
10S	400 x 200	869.1	869.1	-	471.1
10S	400 x 250	873.1	873.1	-	476.1
10S	400 x 300	878.1	878.1	-	481.1
10S	400 x 350	892.1	892.1	-	486.1

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, globe	1	77.33.09	005.1	005.1	005.1	005.1	005.1
Tee equal	1	76.33.84	804.1	-	-	-	-
Tee reducing	1	76.33.85	-	656.1	672.1	-	-
Flange blind	1	76.65.10	316.1	316.1	316.1	316.1	316.1
Flange WN	1	76.65.79	206.1	206.1	206.1	-	-
NOF	1	76.80.39	-	-	-	027.1	028.1
Bolting	8	81.38.67	155.1	155.1	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3	*00.3	*00.3

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, ball	1	77.03.07	005.1	005.1	005.1	005.1	005.1
Tee equal	1	76.33.84	804.1	-	-	-	-
Tee reducing	1	76.33.85	-	656.1	672.1	-	-
Flange blind	1	76.65.10	316.1	316.1	316.1	316.1	316.1
Flange WN	1	76.65.79	206.1	206.1	206.1	-	-
NOF	1	76.80.39	-	-	-	027.1	028.1
Bolting	8	81.38.67	155.1	155.1	155.1	155.1	155.1
Gasket CNAF	2	85.31.02	*00.3	*00.3	*00.3	*00.3	*00.3

PRESSURE INSTRUMENT CONNECTIONS 300#							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
DBB Valve	1	77.85.46	*10.3	*10.3	*10.3	*10.3	*10.3
Tee equal	1	76.33.84	804.1	-	-	-	-
Tee reducing	1	76.33.85	-	656.1	672.1	-	-
Flange WN	1	76.65.79	406.1	406.1	406.1	-	-
NOF	1	76.80.39	-	-	-	067.1	068.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	*24.3	*24.3	*24.3	*24.3	*24.3

TEMPERATURE INSTRUMENT CONNECTIONS 300#					
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 - 300 40	350 - 400 40
Flange WN	1	76.65.79	408.1	-	-
Tee Reducing	1	76.33.89	360.1	-	-
NOF	1	76.80.39	-	073.1	074.1
Thermowell	1		SUPPLIED BY INSTRUMENTS		
Bolting	4	81.38.67	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	*24.4	*24.4	*24.4

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number off Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L	81.38.67	Dia x L	81.38.67	Dia x L		81.38.67	Dia x L
			In x mm		In x mm		In x mm			In x mm
15	4	154.1	1/2 x 65			156.1	1/2 x 75			
20	4	154.1	1/2 x 65			156.1	1/2 x 75			
25	4	155.1	1/2 x 70			157.1	1/2 x 80			
40	4	156.1	1/2 x 75			158.1	1/2 x 85			
50	4	269.1	5/8 x 80	280.1	5/8 x 145	272.1	5/8 x 95	8	278.1	5/8 x 130
80	4	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1	3/4 x 140
100	8	272.1	5/8 x 95	284.1	5/8 x 170	274.1	5/8 x 110	8	335.1	3/4 x 140
150	8	329.1	3/4 x 100	345.1	3/4 x 205	332.1	3/4 x 120	12	335.1	3/4 x 140
200	8	330.1	3/4 x 110	351.1	3/4 x 240	334.1	3/4 x 130	12	406.1	3/4 x 150
250	12	401.1	7/8 x 120	425.1	7/8 x 270	405.1	7/8 x 145	16	474.1	1 x 170
300	12	401.1	7/8 x 120	431.1	7/8 x 305	406.1	7/8 x 150	16	534.1	1 1/8 x 185
350	12	468.1	1 x 130	500.1	1 x 330	472.1	1 x 160	20	535.1	1 1/8 x 190
400	16	469.1	1 x 140	502.1	1 x 340	474.1	1 x 170	20	594.1	1 1/4 x 205

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.39	WOF 76.80.37	WOL 76.79.68
50 - 150	15	451.1	001.1	-	-
200 - 400	15	452.1	002.1	-	-
80	20	453.1	003.1	-	-
100 - 400	20	454.1	004.1	-	-
80 - 100	25	467.1	027.1	-	-
150 - 400	25	468.1	028.1	-	-
150 - 300	40	472.1	033.1	-	-
350 - 400	40	473.1	034.1	-	-
150	50	-	-	*50.1	364.1
200	50	-	-	*50.2	366.1
250	50	-	-	*50.3	368.4
300	50	-	-	*50.4	370.1
350	50	-	-	*50.5	372.1
400	50	-	-	*50.6	374.1
200	80	-	-	*50.7	390.1
250	80	-	-	*50.8	392.1
300	80	-	-	*50.9	394.1
350	80	-	-	*51.0	396.1
400	80	-	-	*51.1	398.1
300	100	-	-	*51.2	416.1
350	100	-	-	*51.3	418.1
400	100	-	-	*51.4	420.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS 300#											
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15		
DBB Valve	2	77.85.46	*10.1	*10.1	*10.1	*10.1	*10.1	*10.1	*10.1		
Flange WN RF	2	76.65.79	410.1	412.1	414.1	-	-	-	-		
Flange WN RF		76.65.80	-	-	-	416.1	418.1	420.1	422.1		
Jackscrews**		81.86.35	*01.3	*00.6	*02.1	*00.7	*02.2	*00.2	*00.9		
NOL plain end	2	76.80.31	*00.6	*00.6	*00.6	*00.6	*00.6	*00.6	*00.6		
Bolting		81.38.67	278.1	335.1	335.1	335.1	406.1	474.1	534.1		
Number of bolts			8	8	8	12	12	16	16		
Gasket Sp.WD	2	85.41.36	*24.5	*24.7	*24.8	*24.9	*25.0	*25.1	*25.2		

** 1 Jackscrew for DN50 to 100

[01]

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS 300#		
		COMPONENTS	Nos reqd	
76.80.60.462.1	356	Valve, Gate	1	77.23.09.054.1
76.80.60.464.1	813	Valve, Ball	2	77.30.73.058.1
76.80.60.466.1	1219	Flange blind	2	76.65.10.314.1
76.80.60.468.1	1524	Flange WN	1	76.65.79.264.1
76.80.60.470.1	1829	Gasket Sp.WD	1	85.41.36.*24.8
76.80.60.472.1	2134	Gasket Sp.WD	4	85.41.36.*24.5
76.80.60.474.1	2438	Gasket Sp.WD	3	85.41.36.*24.2
76.80.60.476.1	2743	Bolting	8	81.38.67.331.1
76.80.60.478.1	3048	Bolting	32	81.38.67.271.1
		Bolting	12	81.38.67.268.1

DN 100

DN 50

DN 20

LEVEL GAUGE CONNECTIONS THROUGH VISION - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.72	162.1	164.1	166.1
Valve, gate	3	77.23.09	054.1	054.1	054.1
Flange blind	2	76.65.10	414.1	414.1	414.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	*24.2	*24.2	*24.2

[01]

[01]

[01]

[01]

LEVEL GAUGE CONNECTIONS REFLEX - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.72	562.1	564.1	566.1
Valve, gate	3	77.23.09	054.1	054.1	054.1
Flange blind	2	76.62.10	414.1	414.1	414.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	*24.2	*24.2	*24.2

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT-300#					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	*24.4	*24.4	*24.4

[01]

PRESSURE INST. CONNECTIONS ON EQUIPMENT-300#			
COMPONENTS	Nos reqd	Class Size	300# 25
Double Block & Bleed Valve	1	77.85.46	*10.3
Bolting	4	81.38.67	269.1
Gasket Sp.WD	1	85.41.36	*24.3

[01]

[01]

[01]

[01]

TEMPERATURE DEG C	SERVICE LIMITS				
	-10	0	38	50	75
PRESSURE BAR GA	20	20	20	20	20

NOTES

- SERVICE LIMITS ARE BASED ON BS5154 FOR SERIES B CLASS 150 FLANGED VALVES
- MAX IMUM VELOCITY FOR PIPE WORK IS 3.5M/S
- COMPOSITE BLIND FLANGES TO BE PROVIDED WITH CuNi DISC [01]
- BACKING FLANGES TO BE USED WITH WELD END TYPE STUB ENDS
- STUB ENDS 419mm OD AND BELOW MAY BE MANUFACTURED FROM PIPE WITH FLANGE END SWAGED 90°. SWAGE END TO BE SUBJECT TO DPI BEFORE AND AND AFTER BENDING.
- TUBE, FLANGES AND FITTINGS IN ACC. WITH EEMUA PUBLICATIONS 144,145 & 146
- CONNECTIONS BETWEEN LINED BUTTERFLY VALVES AND MATING FLANGES DO NOT REQUIRE GASKETS.
- SOLID TYPE FLANGES SHALL ONLY BE USED WITH FLAT FACE FLANGES / EQUIPMENT.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND PLUG.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES

BRANCH CONNECTIONS 90 DEG																		
		NOMINAL BRANCH SIZE																
NOMINAL RUN PIPE SIZE	DN	15	20	25	32	40	50	80	100	150	200	250	300	350	400	450	500	600
	600	F	F	E	E	E	D	D	C	C	C	B	B	B	B	B	B	A
	500	F	F	E	E	E	D	C	C	C	C	B	B	B	B	B	B	A
	450	F	F	E	E	E	D	C	C	C	C	B	B	B	B	B	A	
	400	F	F	E	E	E	D	C	C	C	B	B	B	B	B	A		
	350	F	F	E	E	E	D	C	C	C	B	B	B	B	A			
	300	F	F	E	E	E	D	C	C	C	B	B	B	B	A			
	250	F	F	E	E	E	D	C	C	C	B	B	B	B	A			
	200	F	F	E	E	E	D	C	C	C	B	B	B	B	A			
	150	F	F	E	E	C	C	C	C	B	B	B	B	A				
	100	F	F	C	C	C	C	B	B	B	A							
	80	F	F	C	C	B	B	B	A									
	50	F	F	B	B	B	B	A										
	40	F	F	B	B	B	A											
	32	F	F	B	A													
	25	F	F	A														
	20																	
	15																	

TABLE OF SCHEDULES	
DN	Wall Thick.
15	2.0
20	2.0
25	2.5
32	2.5
40	2.5
50	2.5
80	2.5
100	3.0
150	3.5
200	4.5
250	5.5
300	7.0
350	8.0
400	9.0
450	9.5
500	11.0
600	13.0

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- S Reducing tee + reducer
- C Reducing tee + 2 reducers
- D Forging e.g lightweight outlet
- E Branch outlet - Butt weld / Flanged (NOL / NOF)
- F Branch outlet - Threaded (TOL)

NOF - Nippofflange
NOL - Nippolet
TOL - Threadolet

FIRST ISSUE	MAY 1998	REV LETTER	00	01		
		DATE	18/05/98	04/12/98		
		SIGN	MH	M.H		
PLANT	PS - 1	90/10 COPPER NICKEL			PIPING GENERAL	
CONSIGNEE		Cu Ni 10Fe			CLASS No:	1541G
ENG BY	AKER MARITIME	CONTR No	-		ASME RATING:	150
PRINCIPAL	OPQL	PROJECT No	-		CORR No:	0.5mm

COMPONENT / MATERIAL DESCRIPTION

(For full material description see relevant MESG buying description)

TUBE

TUBE, SEAMLESS,	DN	25 - 400	UNS 7060X
TUBE, WELDED	DN	450 - 600	UNS 7060X

FLANGES

BLIND FLANGE FF	DN	25 - 600	UNS 7060X
BLIND FLANGE C/W CuNi disc	DN	25 - 600	ASTM A105 GALV / CuNi CN102 disc
COMPOSITE TYPE / BACKING FLG	DN	25 - 600	ASTM A105 GALV ANISED
WELDING NECK FLANGE FF	DN	25 - 600	UNS 7060X
STUB END	DN	25 - 600	UNS 7060X

FITTINGS

PLUG, SCREWED, HEX HEAD	DN	15 - 25	UNS 7060X
CAP, THREADED	DN	15 - 25	UNS 7060X
CAP, BUTT - WELD. END	DN	25 - 600	UNS 7060X
ELBOW 45°, BUTT - WELD. ENDS	DN	25 - 600	UNS 7060X
ELBOW 90°, BUTT - WELD. ENDS	DN	25 - 600	UNS 7060X
EQUAL TEE, BUTT - WELD. ENDS	DN	25 - 600	UNS 7060X

REDUCING FITTINGS

BRANCH OUTLET, FLG F.F.(NOF)	DN	25 - 40	UNS 7060X
BRANCH OUTLET, PLAIN END (NOL)	DN	25 - 40	UNS 7060X
BRANCH OUTLET, THREADED (TOL)	DN	15 - 25	UNS 7060X
REDUCER CONC. BUTT - WELD. ENDS	DN	25 - 600	UNS 7060X
REDUCER ECC. BUTT - WELD. ENDS	DN	25 - 600	UNS 7060X
TEE REDUCING, BUTT - WELD. ENDS	DN	25 - 600	UNS 7060X

***MISCELLANEOUS**

GASKET, RAISED FACE	DN	25 - 600	CNAF, OIL RESISTANT
GASKET, FLAT FACE	DN	25 - 600	CNAF, OIL RESISTANT
INSULATING FLANGE SET	DN	25 - 600	PHENLIC RESIN
STUD BOLTS / HEX NUTS			BOLTS: ASTM A193-B7M
			NUTS: ASTM A194-2HM
STUD BOLTS / HEX NUTS	DN	25 - 600	BOLTS AND NUTS;
(FOR SOLID FLANGES)			BS 2872 or BS2874 CA104
			NON-MAGNETIC

***VALVES**

[01] BALL VALVE, FLOATING BALL,	DN	40 - 100	BODY: ASTM B148
[01] RED BORE, FLANGED FLAT FACE			TRIM: ASTM B148
			SEATS: PTFE
GLOBE VALVE, THREADED.	DN	15 - 25	BODY: ASTM B283 or B584
			STEM: ASTM B283 or B150
			DISC/SEAT: ASTM B283, B584 or B763
[01] GLOBE VALVE, FLANGED FLAT FACE.	DN	40 - 80	BODY: ASTM B148
[01]			TRIM: ASTM B148
[01]			SEATS: PTFE
CHECK VALVE, PISTON, THREADED	DN	15 - 25	BODY: ASTM B283, B584 or B763
			TRIM: ASTM B283 or B150
[01] DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 600	BODY: ASTM B148
[01]			PLATES: ASTM B148
[01]			SEATS: NBR
[01] GATE VALVE, THREADED	DN	15 - 25	BODY: ASTM B283 or B584
			STEM: ASTM B283 or B150
			WEDGE: ASTM B283, B584 or B763
[01] GATE VALVE, FLANGED FLAT FACE.	DN	40 - 80	BODY: ASTM B148
[01]			TRIM: ASTM B148
[01] BUTTERFLY, WAFER	DN	50 - 600	BODY: ASTM A216-WCB/WCC
[01]			or ASTM A105N
[01]			DISC: ASTM A351-CF8M or
[01]			ASTM 182-F316(L)
			LINING: CR(CHLOROPRENE
			RUBBER)
BUTTERFLY VALVE	DN	50 - 600	BODY/DISC: ALUMINIUM BRONZE [01]
HIGH PERFORMANCE			BS1400 ABZ
LUGGED TYPE			SHAFT: MONEL K500
			SEATS: VIRGIN PTFE/INCONEL
			625 or LAMINATED MONEL
			A001 SURAGRAF

Wall Thickness mm	Nominal Pipe Size	Actual Pipe OD	TUBE			FLANGES						
			74.66 28			Blind 76 62.10	Blind Solid 76 62 20	Stub End 76 28 55	Back Flg 76 62 20	WN Solid 76 63.20		
15	20											
2.5	25	30	*01.3			*01.3	[01] *08.3	*01.3	*01.3	*01.3		
2.5	32	38	*01.5			*01.5	*08.5	*01.5	*01.5	*01.5		
2.5	40	44.5	*01.4			*01.4	*08.4	*01.4	*01.4	*01.4		
2.5	50	57	*00.4			*00.1	*07.1	*00.1	*00.1	*00.1		
2.5	80	89	*00.5			*00.2	*07.2	*00.2	*00.2	*00.2		
2.5	100	108	*00.6			*00.3	*07.3	*00.3	*00.3	*00.3		
3.0	150	159	*00.1			*00.4	*07.4	*00.4	*00.4	*00.4		
3.5	200	219.1	*00.2			*00.5	*07.5	*00.5	*00.5	*00.5		
4.5	250	267	*00.3			*00.6	*07.6	*00.6	*00.6	*00.6		
5.5	300	323.9	*00.7			*00.7	*07.7	*00.7	*00.7	*00.7		
7.0	350	368	*00.8			*00.8	*07.8	*00.8	*00.8	*00.8		
8.0	400	419	*00.9			*00.9	*07.9	*00.9	*00.9	*00.9		
9.5	450	457.2	*01.0			*01.0	*08.0	*01.0	*01.0	*01.0		
11.0	500	508	*01.1			*01.1	*08.1	*01.1	*01.1	*01.1		
13.0	600	610	*01.2			*01.2	*08.2	*01.2	*01.2	*01.2		

Wall Thickness mm	Nominal Pipe OD	FITTINGS							GASKETS		
		Cap 76 28 18	Elbow 45 76 28 34	Elbow 90 LR 76 28 46	Elbow 90 SR	Equal Tee 76 28 83	Plug Hex Head 76 28 66	Cap Threaded 76 28 18	CNAF RF 85.31.02	CNAF FF 85.31.02	Maloney ENDW 85.48.55
15	20						*00.1	*05.4			
2.5	25	*01.3	*01.3	*01.3		*01.3	*00.2	*05.3	*00.3	*055	008.1
2.5	32	*01.5	*01.5	*01.5		*01.5	*00.3	*05.2	*00.4	*057	010.1
2.5	40	*01.4	*01.4	*01.4	NOT USED	*01.4	*00.4		*00.5	*056	012.1
2.5	50	*00.4	*00.4	*00.4		*00.4	[01] *00.5		*00.6	*04.1	014.1
2.5	80	*00.5	*00.5	*00.5		*00.5			*00.7	*04.2	018.1
2.5	100	*00.6	*00.6	*00.6		*00.6			*00.8	*04.3	020.1
3.0	150	*00.1	*00.1	*00.1		*00.1			*00.9	*04.4	022.1
3.5	200	*00.2	*00.2	*00.2		*00.2			*01.0	*04.5	024.1
4.5	250	*00.3	*00.3	*00.3		*00.3			*01.1	*04.6	026.1
5.5	300	*00.7	*00.7	*00.7		*00.7			*01.2	*04.7	028.1
7.0	350	*00.8	*00.8	*00.8		*00.8			*01.3	*04.8	030.1
8.0	400	*00.9	*00.9	*00.9		*00.9			*01.4	*04.9	032.1
9.5	450	*01.0	*01.0	*01.0		*01.0			*01.5	*05.0	034.1
11.0	500	*01.1	*01.1	*01.1		*01.1			*01.6	*05.1	036.1
13.0	600	*01.2	*01.2	*01.2		*01.2			*01.7	*05.2	042.1

Nominal Pipe Size	Ball RB Floating ball Flanged 77.06.01	VALVES									
		Gate Threaded 77.27.00	Gate Flanged 77.26.01	Globe threaded 77.37.00	Globe Flanged 77.36.01	Butterfly Wafer 77.57.98	Check Dual plate Wafer 77.69.00	Check Piston Threaded 77.17.00			
15		003.1		003.1				003.1			
20		004.1		004.1				004.1			
25		005.1		005.1				005.1			
40	007.1		007.1			007.1					
50	008.1		008.1			008.1					
80	010.1		010.1			010.1					
100	012.1										
150											
200											
250											
300											
350											
400											
450											
500											
600											

REDUCING FITTINGS					
Pipe Wall Thickness	Nominal Pipe Size	Conc reducer 76 28.61	Ecc reducer 76 28.63	Reducing Tee 76 28.84	
2.5 x 2.5	32 x 25	*04.6	*04.6	*04.6	
2.5 x 2.5	40 x 25	*04.4	*04.4	*04.4	
2.5 x 2.5	40 x 32	*04.7	*04.7	*04.7	
2.5 x 2.5	50 x 25	*00.9	*00.9	*00.9	
2.5 x 2.5	50 x 32	*04.8	*04.8	*04.8	
2.5 x 2.5	50 x 40	*00.3	*00.3	*00.3	
2.5 x 2.5	80 x 32	*04.5	*04.5	*04.5	
2.5 x 2.5	80 x 40	*00.4	*00.4	*00.4	
2.5 x 2.5	80 x 50	*00.5	*00.5	*00.5	
3.0 x 2.5	100 x 50	*00.6	*00.6	*00.6	
3.0 x 2.5	100 x 80	*00.7	*00.7	*00.7	
3.5 x 2.5	150 x 80	*00.8	*00.8	*00.8	
3.5 x 3.0	150 x 100	*00.2	*00.2	*00.2	
4.5 x 2.5	200 x 80	*00.1	*00.1	*00.1	
4.5 x 3.0	200 x 100	*01.0	*01.0	*01.0	
4.5 x 3.5	200 x 150	*01.1	*01.1	*01.1	
5.5 x 3.0	250 x 100	*01.2	*01.2	*01.2	
5.5 x 3.5	250 x 150	*01.3	*01.3	*01.3	
5.5 x 4.5	250 x 200	*01.4	*01.4	*01.4	
7.0 x 3.5	300 x 150	*01.5	*01.5	*01.5	
7.0 x 4.5	300 x 200	*01.6	*01.6	*01.6	
7.0 x 5.5	300 x 250	*01.7	*01.7	*01.7	
8.0 x 3.5	350 x 150	*01.8	*01.8	*01.8	
8.0 x 4.5	350 x 200	*01.9	*01.9	*01.9	
8.0 x 5.5	350 x 250	*02.0	*02.0	*02.0	
8.0 x 7.0	350 x 300	*02.1	*02.1	*02.1	
9.0 x 3.5	400 x 150	*02.2	*02.2	*02.2	
9.0 x 4.5	400 x 200	*02.3	*02.3	*02.3	
9.0 x 5.5	400 x 250	*02.4	*02.4	*02.4	
9.0 x 7.0	400 x 300	*02.5	*02.5	*02.5	
9.0 x 8.0	400 x 350	*02.6	*02.6	*02.6	
9.5 x 4.5	450 x 200	*02.7	*02.7	*02.7	
9.5 x 5.5	450 x 250	*02.8	*02.8	*02.8	
9.5 x 7.0	450 x 300	*02.9	*02.9	*02.9	
9.5 x 8.0	450 x 350	*03.0	*03.0	*03.0	
9.5 x 9.0	450 x 400	*03.1	*03.1	*03.1	
11.0 x 4.5	500 x 200	*03.2	*03.2	*03.2	
11.0 x 5.5	500 x 250	*03.3	*03.3	*03.3	
11.0 x 7.0	500 x 350	*03.4	*03.4	*03.4	
11.0 x 8.0	500 x 300	*03.5	*03.5	*03.5	
11.0 x 9.0	500 x 400	*03.6	*03.6	*03.6	
11.0 x 9.5	500 x 450	*03.7	*03.7	*03.7	
13.0 x 5.5	600 x 250	*03.8	*03.8	*03.8	
13.0 x 7.5	600 x 300	*03.9	*03.9	*03.9	
13.0 x 8.0	600 x 350	*04.0	*04.0	*04.0	
13.0 x 9.0	600 x 400	*04.1	*04.1	*04.1	
13.0 x 9.5	600 x 450	*04.2	*04.2	*04.2	
13.0 x 11.0	600 x 500	*04.3	*04.3	*04.3	

VENT POINTS - Threaded						
COMPONENTS	Nos Reqd	Run Pipe Vent Size	25 - 150 15	50 25	80 - 100 25	150 - 600 25
Valve, globe	1	77.37.00	003.1	005.1	005.1	005.1
TOL	1	76.80.32	*10.1	*10.6	*10.7	*10.8
Plug	1	76.28.66	*00.1	*00.3	*00.3	*00.3

DRAIN POINTS - Threaded						
COMPONENTS	Nos Reqd	Run Pipe Drain Size	25 - 150 15	50 25	80 - 100 25	150 - 600 25
Valve, gate	1	77.27.00	003.1	005.1	005.1	005.1
TOL	1	76.80.32	*10.1	*10.6	*10.7	*10.8
Plug	1	76.28.66	*00.1	*00.3	*00.3	*00.3

PRESSURE INSTRUMENT CONNECTIONS - Threaded						
COMPONENTS	Nos Reqd	Run Pipe Conn. Size	25 - 150 15	200 - 600 15		
Valve, gate	1	77.27.00	003.1	003.1		
TOL	1	76.80.32	*10.1	*10.2		
PLug	1	76.28.66	*00.1	*00.1		

TEMPERATURE INSTRUMENT CONNECTIONS						
COMPONENTS	Nos Reqd	Run Pipe Conn. Size				
				NOT USED		

BOLTING									
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS COMPOSITE WN		FLANGED JOINTS SOLID WN		WAFFER CHECK VALVES		WAFFER BUTTERFLY VALVES	
		81.38.66	Dia x L In x mm	81.39.11	Dia x L In x mm	81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm
15				[01]					
20									
25	4	157.1	1/2 x 80	*00.3	1/2 x 75				
32	4	157.1	1/2 x 80	*00.3	1/2 x 75				
40	4	157.1	1/2 x 80	*00.2	1/2 x 80				
50	4	272.1	5/8 x 95	*00.4	5/8 x 95	282.1	5/8 x 155	279.1	5/8 x 135
80	4	272.1	5/8 x 95	*00.5	5/8 x 100	284.1	5/8 x 170	280.1	5/8 x 145
100	8	274.1	5/8 x 110	*00.5	5/8 x 100	287.1	5/8 x 190	284.1	5/8 x 170
150	8	333.1	3/4 x 125	*00.6	3/4 x 110	349.1	3/4 x 230	342.1	3/4 x 185
200	8	335.1	3/4 x 140	*00.7	3/4 x 120	*01.9	3/4 x 270	345.1	3/4 x 205
250	12	406.1	7/8 x 150	*00.8	7/8 x 120	431.1	7/8 x 305	417.1	7/8 x 220
300	12	407.1	7/8 x 160	*00.9	7/8 x 130	*02.0	7/8 x 345	420.1	7/8 x 240
350	12	476.1	1 x 185	*01.0	1 x 145	*02.1	1 x 370	491.1	1 x 280
400	16	479.1	1 x 205	*01.1	1 x 150	*02.2	1 x 400	496.1	1 x 310
450	16	537.1	1 1/8 x 205	*01.2	1 1/8 x 160	569.1	1 1/8 x 405	555.1	1 1/8 x 320
500	20	539.1	1 1/8 x 215	*01.3	1 1/8 x 165	*02.3	1 1/8 x 435	559.1	1 1/8 x 345
600	20	603.1	1 1/4 x 260	*01.4	1 1/4 x 180	635.1	1 1/4 x 490	*02.4	1 1/4 x 415

BRANCH OUTLETS				
Nominal Run Pipe Size	Nominal Branch Size	TOL 76.80.32	NOL 76.80.31	NOF** 76.80.37
25 - 150	15	*10.1	-	-
200 - 600	15	*10.2	-	-
40 - 80	20	*10.3	-	-
100 - 600	20	*10.4	-	-
40	25	*10.5	*50.5	*40.1
50	25	*10.6	*50.6	*40.2
80 - 100	25	*10.7	*50.6	*40.3
150 - 600	25	*10.8	*50.6	*40.4
80 - 100	32	-	*50.7	*40.5
150 - 600	32	-	*50.8	*40.6
50	40	-	*50.8	*40.7
80	40	-	*50.8	*40.8
100	40	-	*50.8	*40.9
150 - 300	40	-	*50.8	*41.0
350 - 60	40	-	*50.8	*41.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS 300#														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450 15	500 15	600 15
			NOT USED											

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS 300#		
		COMPONENTS	Nos reqd	
				NOT USED

LEVEL GAUGE CONNECTIONS THROUGH VISION - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
			NOT USED		

LEVEL GAUGE CONNECTIONS REFLEX - 300#					
COMPONENTS	Nos reqd	Length	450	840	1230
			NOT USED		

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT-300#					
COMPONENTS	Nos reqd	Length	355	405	455
			NOT USED		

PRESSURE INST. CONNECTIONS ON EQUIPMENT-300#			
COMPONENTS	Nos reqd	Class Size	300# 15
		NOT USED	

	SERVICE LIMITS			
TEMPERATURE DEG C	-10	0	38	60
PRESSURE BAR GA	15.5	15.5	15.5	15.5

NOTES

- 1) SERVICE LIMITS ARE BASED ON VALVE RATING BS 5154
- 2) PISTON TYPE CHECK VALVES (DN 15 - 25, FOR HORIZONTAL MOUNTING ONLY)
- 3) CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.

[illegible][illegible]

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Reducing tee + bushing

FIRST ISSUE	DECEMBER 1998	REV LETTER	00			
		DATE	04/12/98			
		SIGN	MH			
PLANT	PS - 1	CARBON STEEL, GALVANISED		PIPING GENERAL		
CONSIGNEE		CLASS 150		CLASS No:	1841G	
ENG BY	AKER MARITIME	CONTR. No	-	ASME RATING:	150	
PRINCIPAL	OPQL	PROJECT No	-	CORR. ALL:	0mm	

COMPONENT / MATERIAL DESCRIPTION

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS,	DN	15 - 100	API 5L-B, HOT DIP GALV TO: ASTM A53 OR BS 729
PIPE NIPPLE, THREADED	DN	15 - 50	API 5L-B, HOT DIP GALV TO: ASTM A53 OR BS 729

FLANGES

BLIND FLANGE, FLAT FACE	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A53 OR BS 729
FLANGE THREADED, FLAT FACE,	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A53 OR BS 729

FITTINGS

CAP , THREADED	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A153-CL.B
COUPLING, THREADED ENDS	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A153-CL.B
ELBOW 45°, THREADED ENDS	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A153-CL.B
ELBOW 90°, THREADED ENDS	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A153-CL.B
EQUAL TEE,THREADED ENDS	DN	15 -1600	ASTM A 105N, HOT DIPPED GALV TO ASTM A153-CL.B
PLUG NPT	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A153-CL.B
UNION, THREADED ENDS	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A153-CL.B

REDUCING FITTINGS

BUSHING, THREADED	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV ASTM A153-CL.B
REDUCER CONC. THREADED ENDS	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV ASTM A153-CL.B
REDUCING TEE,THREADED ENDS,	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV ASTM A153-CL.B
REDUCING FLANGE, THREADED ENDS,	DN	15 - 100	ASTM A 105N, HOT DIPPED GALV TO ASTM A53 OR BS 729

VALVES

BALL VALVE, FLOATING BALL, RED BORE, FLANGED FLAT FACE.	DN	40 - 100	BODY : ASTM B148 BALL: ASTM B148 STEM : ASTM B148 SEATS : PTFE
BALL VALVE, FLOATING BALL, RED BORE, THREADED.	DN	15 - 25	BODY : ASTM B148 BALL: ASTM B148 STEM : ASTM B148 SEATS : PTFE
CHECK VALVE, PISTON, THREADED.	DN	15 - 25	BODY : ASTM B148 PISTON: ASTM B148
CHECK VALVE, FLANGED FLAT FACE	DN	40 - 80	BODY: ASTM B148 TRIM: ASTM B148
CHECK VALVE, WAFER TYPE	DN	50 - 100	BODY: ASTM B148 TRIM: ASTM B148 SEAT: VITON B or GLT
GLOBE VALVE, FLANGED FLAT FACE	DN	40 - 80	BODY: ASTM B148 TRIM: ASTM B148
GLOBE VALVE, THREADED	DN	15 - 25	BODY: ASTM B148 TRIM: ASTM B148

MISCELLANEOUS

GASKET, RAISED FACE	DN	15 - 100	CNAF, OIL RESISTANT 1.5mm
GASKET, FLAT FACE	DN	15 - 100	CNAF, OIL RESISTANT 1.5mm
INSULATION SET. MALONEY ENDW	DN	15 - 100	PHENOLIC RESIN NEOPRENE COATED, FULL FACE.
STUD BOLTS/HEX BOLTS			BOLTS: ASTM A193-B7 NUTS: ASTM 194-2H

SCHED	Nominal Pipe Size	PIPE			FLANGES			NIPPLES			
		74 13 08			Thrd FF 76 62 50	Thrd RF 76 62 50	Blind 76 62 10	L - 50 76 06 56	L - 75 76 06 56	L - 100 76 05 56	L - 150 76 06 56
80	15	018 1			028 1	758 1	658 1	092 1	093 1	094 1	96 1
80	20	023 1			032 1	762 1	662 1	132 1	133 1	134 1	136 1
80	25	028 1			036 1	766 1	666 1	172 1	173 1	174 1	176 1
80	40	038 1			038 1	768 1	668 1	*00 2	193 1	194 1	*00 3
80	50	043 1			040 1	770 1	670 1	212 1	213 1	214 1	216 1
40	80	051 1			042 1	772 1	672 1				
40	100	061 1			044 1	774 1	674 1				

SCHED	Nominal Pipe Size	FITTINGS							GASKETS		
		Cap thrd 76 06 18	Elbow 45 thrd 76 06 38	Elbow 90 thrd 76 06 39	Equal Tee thrd 76 06 84	Coupling thrd 76 06 28	Plug thrd 76 06 66	Union thrd 76 06 91	CNAF RF 85 31 02	CNAF FF 85 31 02	Maloney ins.set. 85 48 55
80	15	008 1	008 1	008 1	008 1	008 1	008 1	008 1	*00 1	*05 3	004 1
80	20	012 1	012 1	012 1	012 1	012 1	012 1	012 1	*00 2	*05 4	006 1
80	25	016 1	016 1	016 1	016 1	016 1	016 1	016 1	*00 3	*05 5	008 1
80	40	018 1	018 1	018 1	018 1	018 1	018 1	018 1	*00 4	*05 6	012 1
80	50	020 1	020 1	020 1	020 1	020 1	020 1	020 1	*00 5	*04 1	014 1
40	80	022 1	022 1	022 1	022 1	022 1	022 1	022 1	*00 7	*04 2	018 1
40	100	024 1	024 1	024 1	024 1	024 1	024 1	024 1	*00 8	*04 3	020 1

Nominal Pipe Size	VALVES									
	Ball RB Floating ball Threaded 77 07 01	Ball RB Floating ball Flanged 77 06 01		Globe Threaded 77 37 01	Globe Flanged 77 36 01		Check Dual plate Wafer 77 69 00	Check Piston Threaded 77 17 01	Check Piston Flanged 77 16 01	
15	003 1			003 1				003 1		
20	004 1			004 1				004 1		
25	005 1			005 1				005 1		
40		007 1			007 1				007 1	
50		008 1			008 1		008 1		008 1	
80		010 1			010 1		010 1		010 1	
100		012 1					012 1			

SCHED	Nominal Pipe Size	REDUCING FITTINGS			
		Bushing red thrd 76 06 14	Conc thrd 076 1	Reducing Tee thrd 76 06 85	Flange RF thrd 76 62 61
	20 x 15	122 1	122 1	026 1	130 1
	25 x 15	162 1	162 1	034 1	140 1
	25 x 20	164 1	164 1	036 1	142 1
	40 x 15	181 1	181 1	044 1	160 1
	40 x 20	183 1	183 1	046 1	161 1
	40 x 25	185 1	185 1	048 1	163 1
	50 x 15	200 1	200 1	054 1	180 1
	50 x 20	201 1	201 1	056 1	182 1
	50 x 25	202 1	202 1	058 1	184 1
	50 x 40	204 1	204 1	060 1	186 1
	80 x 15	-	-	-	200 1
	80 x 20	-	-	-	202 1
	80 x 25	222 1	222 1	068 1	204 1
	80 x 40	224 1	224 1	070 1	206 1
	80 x 50	225 1	225 1	072 1	208 1
	100 x 15	-	-	-	210 1
	100 x 20	-	-	-	212 1
	100 x 25	-	-	-	214 1
	100 x 40	241 1	241 1	076 1	216 1
	100 x 50	242 1	242 1	078 1	218 1
	100 x 80	244 1	244 1	080 1	220 1

VENT POINTS - Threaded									
COMPONENTS	Nos reqd	Run Pipe Vent Size	15 15	20 15	25 15	40 20	50 20	80 20	100 20
Valve, ball	1	77 07.01	003.1	003.1	003.1	004.1	004.1	004.1	004.1
Bushing	1	76.06.14	-	-	-	-	-	164.1	183.1
Cap	1	76.06.18	008.1	008.1	008.1	012.1	012.1	012.1	012.1
Nipple	2	76.06.56	092.1	092.1	092.1	132.1	132.1	132.1	132.1
Tee equal	1	76.06.84	008.1	-	-	-	-	-	-
Tee reducing	1	76.06.85	-	026.1	034.1	046.1	056.1	068.1	076.1

DRAIN POINTS - Threaded									
COMPONENTS	Nos reqd	Run Pipe Drain Size	15 15	20 15	25 15	40 20	50 20	80 20	100 20
Valve, ball	1	77.07 01	003.1	003.1	003.1	004.1	004.1	004.1	004.1
Bushing	1	76.06 14	-	-	-	-	-	164.1	183.1
Cap	1	76.06 18	008.1	008.1	008.1	012.1	012.1	012.1	012.1
Nipple	2	76.06 56	092.1	092.1	092.1	132.1	132.1	132.1	132.1
Tee equal	1	76.06 84	008.1	-	-	-	-	-	-
Tee reducing	1	76.06 85	-	026.1	034.1	046.1	056.1	068.1	076.1

PRESSURE INSTRUMENT CONNECTIONS - Threaded									
COMPONENTS	Nos reqd	Run Pipe Conn Size	15 15	20 15	25 15	40 15	50 15	80 15	100 15
Valve, ball	1	77.07.01	003.1	003.1	003.1	003.1	003.1	003.1	003.1
Bushing	1	76.06.14	-	-	-	-	-	162.1	181.1
Nipple	1	76.06.56	092.1	092.1	092.1	092.1	092.1	092.1	092.1
Tee equal	1	76.06.84	008.1	-	-	-	-	-	-
Tee reducing	1	76.06.85	-	026.1	034.1	046.1	056.1	068.1	076.1

TEMPERATURE INSTRUMENT CONNECTIONS					
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40		
Nipple, thrd	1	76 06 56	194 1		
Tee, red	1	76 06 85	075 1		
Flange, thrd	1	76 62 50	768 1		
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81 38361	156 1		
Gasket CNAF	1	85 31 02	*00 4		

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm		Dia x L In x mm			Dia x L In x mm
15	4	154 1	1/2 x 65							
20	4	154 1	1/2 x 65							
25	4	155 1	1/2 x 70							
40	4	156 1	1/2 x 75							
50	8	269 1	5/8 x 80	280 1	5/8 x 145					
80	8	272 1	5/8 x 95	284 1	5/8 x 170					
100	8	272 1	5/8 x 95	284 1	5/8 x 170					

BRANCH OUTLETS			
Nominal Run Pipe	Nominal Branch	NOL	NOF**
	NOT USED		

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS													
COMPONENTS	Nos reqd	Run Pipe Size											
			NOT USED										

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
			NOT USED	

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length			
		NOT USED			

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length			
		NOT USED			

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length			
		NOT USED			

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	15
		NOT USED	

TEMPERATURE DEG C	SERVICE LIMITS				
	-10	38	60	75	100
PRESSURE BAR GA	19.6	19.6	19.2	18.5	17.6

NOTES

- 1) DESIGN LIMITS ARE IN ACC. WITH FLANGE RATING IN ASME B16.5 MAT.GRP.1.1.
- 2) FOR ORIFICE FLANGES, TEMPERATURE CONNECTIONS AND 300# CONTROL VALVES, CLASS 300# FLANGES, FITTINGS, BOLTS AND GASKETS ARE USED.
- 3) ORIFICE PLATE CONNECTIONS TO COMPRISE OF 300# WN FLANGED JOINT WITH 2"-150# BRANCH TAPPING UPSTREAM AND DOWMSTREAM.
- 4) COLD BENDING OF THE PIPE IS NOT ALLOWED.
- 5) SLIP ON FLANGES SHALL NOT BE USED.
- 6) SHORT RADIUS BENDS SHALL NOT BE USED.
- 7) CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- 8) AFTER FABRICATION, ALL INTERNAL SURFACES OF PIPE SPOOLS SHALL BE CLEAN AND FREE FROM BURRS, SCALE ETC. ALL WELDS SHALL BE GROUND SMOOTH AND EDGES ROUNDED TO A MINIMUM RADIUS OF 3mm.
- 9) PIPEWORK SHALL BE PREPARED AND INTERNALLY LINED TO A GLASS FLAKE LINING PROCESS COMPLYING WITH DATA SHEET 000000-1-XPS1-DS-0008-001.
- 10) FABRICATION REQUIREMENTS ARE DETAILED ON SHEET 2.
- 11) TO AVOID DAMAGE TO THE LINING MATERIAL WHEN ASSEMBLYING FLANGED JOINTS, BOLTS TO BE EVENLY LOADED.
- 12) SPECTACLE BLINDS AND BLIND FLANGES USED IN CONJUNCTION WITH THIS CLASS SHOULD BE COATED.
- 13) FOR LINE SIZES DN 40 AND SMALLER REFER TO PIPE SPEC. 1144G.

BRANCH CONNECTIONS 90 DEG																	
NOMINAL BRANCH SIZE																	
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600					C	C	C	C	R	B	B	B	B	B	B	A
	500					C	C	C	C	B	B	B	B	B	B	A	
	450					C	C	C	C	B	B	B	B	B	A		
	400					C	C	C	B	B	B	B	B	A			
	350					C	C	C	B	B	B	B	A				
	300					C	C	C	B	B	R	A					
	250					C	C	B	B	B	A						
	200					C	C	B	B	A							
	150					C	B	B	A								
	100					B	B	A									
	80																
	50																
	40																
	25																
	20																
	15																

TABLE OF SCHEDULES

DN	SCHEDULE
15	
20	
25	
40	
50	40
80	40
100	40
150	40
200	20
250	20
300	20
350	20
400	20
450	20
500	20
600	20

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Flanged (WOF)

WOF - Weldoflange

ISSUE DATE	MAY 1998	REV LETTER	00	01		
		DATE	18/05/98	04/12/98		
		SIGN	MH	M.H		
PLANT	PS - 1	CARBON STEEL LINED			PIPING GENERAL	
CONSIGNEE	-				CLASS No. :	1843G
ENG BY	AKER MARITIME	CONTR. No.	-	ASME RATING : 150		
PRINCIPAL	OPQL	PROJECT No.	-	CORR. ALL : 0 mm		

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE SEAMLESS	DN 100 - 600	ASTM A106 - B
---------------	--------------	---------------

FLANGES - RAISED FACE

BLIND FLANGE	DN	50 - 600	ASTM A105N
SPECTACLE BLIND	DN	50 - 600	ASTM A285 - C
SPACER RING	DN	50 - 600	ASTM A285 - C
SPADE BLIND	DN	50 - 600	ASTM A285 - C
WELDING NECK FLANGE	DN	50 - 600	ASTM A105N

FITTINGS

CAP. BUTT - WELD. END	DN 100 - 600	ASTM A234 - WPB
ELBOW 45°, BUTT - WELD. ENDS	DN 100 - 600	ASTM A234 - WPB
ELBOW 90°, BUTT - WELD. ENDS	DN 100 - 600	ASTM A234 - WPB
EQUAL TEE BUTT - WELD. ENDS	DN 100 - 600	ASTM A234 - WPB

REDUCING FITTINGS

BRANCH OUTLET, FLANGED RF	DN 50	ASTM A105N
REDUCER CONC. B.W. ENDS	DN 50 - 600	ASTM A234 - WPB
REDUCER ECC. B.W. ENDS	DN 50 - 600	ASTM A234 - WPB
TEE REDUCING, B.W. ENDS	DN 50 - 600	ASTM A234 - WPB

MISCELLANEOUS

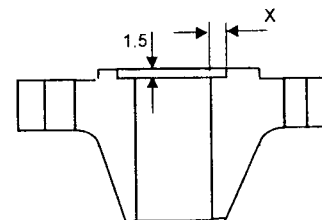
GASKET, RAISED FACE (150 & 300#)	DN	50 - 600	CNAF, OIL RESISTANT
STUD BOLTS / HEX NUTS			BOLTS: ASTM A193-B7M NUTS: ASTM A194-2HM
JACKSCREWS			ASTM A 193-B8MA

VALVES

BUTTERFLY VALVE, HIGH PERFORMANCE, LUGGED TYPE	DN 50 - 600	BODY/DISC : ALUM BRONZE; BS 1400 AB2 SHAFT : MONEL K500 SEATS : LAMINATED MONEL 408/SUPAGRAF or VIRGIN PTFE/INCONEL 625	[01]
DUAL PL. CHECK VALVE WAFER LUG	DN 50 - 600	BODY: ALUM BRONZE; ASTM B148, UNS C954000 /PLATES BS 1400 AB2 SEAT/SEAL : FKM (VITON B or GF) SPRINGS: ASTM B471, UNS N08020	
GATE VALVE, FLANGED FF	DN 20 - 50	BODY : ALUM BRONZE; ASTM B148, UNS C954000 TRIM : ALUM BRONZE; ASTM B148, UNS C954000	
GLOBE VALVE, FLANGED FF	DN 50	BODY : ALUM BRONZE; ASTM B148, UNS C954000 TRIM : ALUM BRONZE; ASTM B148, UNS C954000	

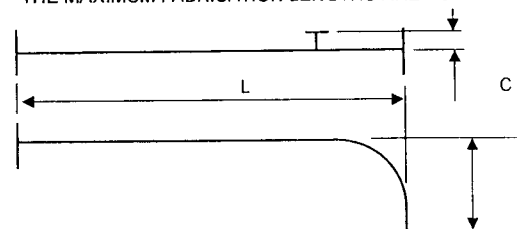
FABRICATION REQUIREMENTS

FLANGE FACES SHALL BE MACHINED WITH A REBATE 1.5mm DEEP. THE WIDTH 'X' SHALL BE 10 mm OR HALF THE RAISED FACE WIDTH, WHICHEVER IS THE LESSER. WHERE POSSIBLE THE FLANGE REBATES ARE TO BE MACHINED PRIOR TO FABRICATION.



[01]

THE MAXIMUM FABRICATION LENGTHS ARE AS DETAILED BELOW.



MAX DIMS	NOM PIPE SIZE	
	4" - 8"	10" - 24"
L	12M	20M
B	0.5M	1.0M
C	0.3M	0.5M

MINIMUM BRANCH SIZE 2"NB

SCHD	Nominal Pipe Size	PIPE		FLANGES						STRAINERS	
		74 30.03		Blind 76 62.11	WN 76 62.78	WN(300) 76 62.78	Spect. 76 88.36	Spacer 76 88.46	Spade 76 88.42		
	15										
	20										
	25										
	40										
40	50	069.1		070.1	310.1	560.1	120.1	320.1	010.1		
40	80	103.1		072.1	312.1	562.1	122.1	322.1	012.1		
40	100	149.1		074.1	314.1	564.1	124.1	324.1	014.1		
40	150	211.1		076.1	316.1	566.1	126.1	326.1	016.1		
20	200	239.1		078.1	208.1	468.1	128.1	328.1	018.1		
20	250	279.1		080.1	210.1	470.1	130.1	330.1	020.1		
20	300	319.1		082.1	212.1	472.1	132.1	332.1	022.1		
20	350	373.1		084.1	214.1	474.1	134.1	334.1	024.1		
20	400	421.1		086.1	216.1	476.1	136.1	336.1	026.1		
20	450	469.1		088.1	218.1	478.1	138.1	338.1	028.1		
20	500	521.1		090.1	220.1	480.1	140.1	340.1	030.1		
20	600	569.1		092.1	224.1	484.1	144.1	344.1	032.1		

SCHD	Nominal Pipe Size	FITTINGS						GASKETS		
			Elbow 45 76 30.38	Elbow 90 LR 76 30.40	Equal Tee 76 30.84			CNAF RF 85 31.02	CNAF 300# RF 85 31.02	
	15									
	20									
	25									
	40									
40	50		-	-	-			*00.5	*25.7	
40	80		-	-	-			*00.7	*25.8	
40	100		645.1	645.1	645.1			*00.8	*25.9	
40	150		665.1	665.1	665.1			*00.9	*26.0	
20	200		682.1	682.1	682.1			*01.0	*26.1	
20	250		702.1	702.1	702.1			*01.1	*26.2	
20	300		722.1	722.1	722.1			*01.2	*26.3	
20	350		742.1	742.1	742.1			*01.3	*26.4	
20	400		762.1	762.1	762.1			*01.4	*26.5	
20	450		782.1	782.1	782.1			*01.5	*26.6	
20	500		805.1	805.1	805.1			*01.6	*26.7	
20	600		825.1	825.1	825.1			*01.7	*26.8	

Nominal Pipe Size	VALVES									
	Ball RB Floating ball Flanged	Ball RB Trunnion Flanged	Ball FB Floating ball Flanged	Ball FB Trunnion Flanged	Gate Flanged 77 26.01	Globe Flanged 77 36.01	Needle Flanged	Check Dual plate Wafer 77 69.00	Check Piston Flanged	Butterfly Wafer 77 57.98
15										
20										
40	NOT USED	NOT USED	NOT USED	NOT USED	004.1 005.1 008.1	008.1	NOT USED	108.1 110.1 112.1 114.1 115.1 116.1 117.1 118.1 119.1 120.1 121.1 123.1	NOT USED	*00.1 *00.2 *00.3 *00.4 *00.5 *00.6 *00.7 *00.8 *00.9 *01.0 *01.1 *01.2
50										
80										
100										
150										
200										
250										
300										
350										
400										
450										
500										
600										

REDUCING FITTINGS					
SCHD	Nomina Pipe Size	Conc reducer 76 30.72	Ecc reducer 76 30.73	Reducing Tee 76 30.88	
40	100 x 50	265.1	265.1	153.1	
40	100 x 80	275.1	275.1	165.1	
40	150 x 80	295.1	295.1	177.1	
40	150 x 100	305.1	305.1	189.1	
20/40	200 x 100	322.1	322.1	210.1	
20/40	200 x 150	333.1	333.1	230.1	
20/40	250 x 100	-	-	258.1	
20/40	250 x 150	353.1	353.1	276.1	
20	250 x 200	361.1	361.1	289.1	
20/40	300 x 150	386.1	386.1	315.1	
20	300 x 200	392.1	392.1	326.1	
20	300 x 250	402.1	402.1	348.1	
20/40	350 x 150	-	-	377.1	
20	350 x 200	423.1	423.1	388.1	
20	350 x 250	430.1	430.1	413.1	
20	350 x 300	442.1	442.1	439.1	
20/40	400 x 150	-	-	467.1	
20	400 x 200	454.1	454.1	477.1	
20	400 x 250	463.1	463.1	503.1	
20	400 x 300	470.1	470.1	529.1	
20	400 x 350	482.1	482.1	554.1	
20	450 x 200	-	-	578.1	
20	450 x 250	520.1	520.1	602.1	
20	450 x 300	550.1	550.1	626.1	
20	450 x 350	581.1	581.1	650.1	
20	450 x 400	611.1	611.1	674.1	
20	500 x 200	-	-	698.1	
20	500 x 250	-	-	722.1	
20	500 x 300	640.1	640.1	746.1	
20	500 x 350	671.1	671.1	770.1	
20	500 x 400	701.1	701.1	794.1	
20	500 x 450	731.1	731.1	818.1	
20	600 x 250	-	-	842.1	
20	600 x 300	-	-	866.1	
20	600 x 350	-	-	890.1	
20	600 x 400	881.1	881.1	914.1	
20	600 x 450	911.1	911.1	938.1	
20	600 x 500	941.1	941.1	962.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	100 50	150-250 50	300-400 50	450-600 50	
Valve, globe	1	77.36.01	008.1	008.1	008.1	008.1	
Tee equal							
Tee reducing	1	76.30.88	153.1	-	-	-	
Flange blind	1	76.62.11	070.1	070.1	070.1	070.1	
Flange WN	1	76.62.78	310.1	-	-	-	
WOF	1	76.80.37	-	018.1	019.1	020.1	
Bolting	8	81.38.66	269.1	269.1	269.1	269.1	
Gasket CNAF	2	85.31.02	*00.5	*00.5	*00.5	*00.5	

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	100 50	150-250 50	300-400 50	450-600 50	
Valve, gate	1	77.26.01	008.1	008.1	008.1	008.1	
Tee equal							
Tee reducing	1	76.30.88	153.1	-	-	-	
Flange blind	1	76.62.11	070.1	070.1	070.1	070.1	
Flange WN	1	76.62.78	310.1	-	-	-	
WOF	1	76.80.37	-	018.1	019.1	020.1	
Bolting	8	81.38.66	269.1	269.1	269.1	269.1	
Gasket CNAF	2	85.31.02	*00.5	*00.5	*00.5	*00.5	

PRESSURE INSTRUMENT CONNECTIONS - 150#							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 50	150-250 50	300-400 50	450-600 50	
Valve, gate	1	77.26.01	008.1	008.1	008.1	008.1	
Tee equal							
Tee reducing	1	76.30.88	153.1	-	-	-	
Flange WN	1	76.62.78	310.1	-	-	-	
WOF	1	76.80.37	-	018.1	019.1	020.1	
Bolting	8	81.38.66	269.1	269.1	269.1	269.1	
Gasket CNAF	2	85.31.02	*00.5	*00.5	*00.5	*00.5	

TEMPERATURE INSTRUMENT CONNECTIONS - 300#							
COMPONENTS	Nos reqd	Run Size Conn Size	100 50	150-250 50	300-400 50	450-600 50	
Flange WN	1	76.62.78	560.1	-	-	-	
Tee reducing	1	76.30.88	153.1	-	-	-	
WOF	1	76.80.37	-	118.1	119.1	120.1	
Thermowell	1			SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	278.1	278.1	278.1	278.1	
Gasket CNAF	2	85.31.02	*25.7	*25.7	*25.7	*25.7	

BOLTING									
Nom Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE BUTTERFLY VALVES		SPECTACLES / SPACERS		WAFER TYPE CHECK VALVE	
		81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm	81.38.66	Dia x L In x mm
15									
20									
25									
40									
50	4	269.1	5/8 x 80	279.1	5/8 x 135	272.1	5/8 x 95	280.1	5/8 x 145
80	4	272.1	5/8 x 95	280.1	5/8 x 145	274.1	5/8 x 110	284.1	5/8 x 170
100	8	272.1	5/8 x 95	281.1	5/8 x 150	274.1	5/8 x 110	284.1	5/8 x 170
150	8	329.1	3/4 x 100	338.1	3/4 x 160	332.1	3/4 x 120	345.1	3/4 x 205
200	8	330.1	3/4 x 110	340.1	3/4 x 170	334.1	3/4 x 130	351.1	3/4 x 240
250	12	401.1	7/8 x 120	412.1	7/8 x 190	405.1	7/8 x 145	425.1	7/8 x 270
300	12	401.1	7/8 x 120	415.1	7/8 x 210	406.1	7/8 x 150	431.1	7/8 x 305
350	12	468.1	1 x 130	483.1	1 x 230	472.1	1 x 160	500.1	1 x 330
400	16	469.1	1 x 140	486.1	1 x 250	474.1	1 x 170	502.1	1 x 340
450	16	529.1	1 1/8 x 150	547.1	1 1/8 x 265	534.1	1 1/8 x 185	562.1	1 1/8 x 360
500	20	530.1	1 1/8 x 160	551.1	1 1/8 x 290	536.1	1 1/8 x 205	565.1	1 1/8 x 385
600	20	589.1	1 1/4 x 170	*025	1 1/4 x 335	595.1	1 1/4 x 230	625.1	1 1/4 x 400

BRANCH OUTLETS				
Nominal Run Pipe	Nominal Branch	WOL	WOF 150#	WOF 300#
100	50		017.1	117.1
150-250	50		018.1	118.1
300-400	50	NOT USED	019.1	119.1
450-600	50		020.1	120.1

BOLTING			
Nom Pipe Size	Number of Bolts	300# FLG'D JOINTS (for orifice plates)	
		81.38.66	Dia x L In x mm
15			
20			
25			
40			
50	8	278.1	5/8 x 130
80	8	335.1	3/4 x 140
100	12	335.1	3/4 x 140
150	12	335.1	3/4 x 140
200	12	337.1	3/4 x 150
250	16	474.1	1 x 170
300	16	534.1	1 1/8 x 185
350	20	535.1	1 1/8 x 190
400	20	594.1	1 1/4 x 205
450	24	596.1	1 1/4 x 215
500	24	598.1	1 1/4 x 230
600	24	688.1	1 1/2 x 250

ORIFICE INSTRUMENT CONNECTIONS													
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 50	150 50	200 50	250 50	300 50	350 50	400 50	450 50	500 50	600 50	
Valve, gate	2	77.26.01	008.1	008.1	008.1	008.1	008.1	008.1	008.1	008.1	008.1	008.1	
Tee reducing	2	76.30.88	153.1	-	-	-	-	-	-	-	-	-	
WOF	2	76.80.37	-	018.1	018.1	018.1	019.1	019.1	019.1	020.1	020.1	020.1	
Flange WN-300#	2	76.62.78	564.1	566.1	668.1	670.1	672.1	674.1	676.1	678.1	680.1	684.1	
Flange WN	2	76.62.78	310.1	-	-	-	-	-	-	-	-	-	
Jackscrews**		81.86.35	*02.1	*00.7	*02.2	*00.2	*00.9	*00.5	*02.3	*01.7	*02.4	*01.2	
Bolting	16	81.38.66	269.1	269.1	269.1	269.1	269.1	269.1	269.1	269.1	269.1	269.1	
Gasket CNAF	4	85.31.02	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	
Gasket CNAF	2	85.31.02	*25.9	*26.0	*26.1	*26.2	*26.3	*26.4	*26.5	*26.6	*26.7	*26.8	

** 1 Jackscrew for DN100

[01]

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
			NOT USED	

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge					
Valve, gate					
Flange blind		NOT USED			
Bolting					
Gasket SpW					

[01]

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge					
Valve, gate					
Flange blind		NOT USED			
Bolting					
Gasket					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT - 300#					
COMPONENTS	Nos reqd	Length Size	355 50	405 50	455 50
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	278.1	278.1	278.1
Gasket	1	85.31.02	*25.7	*25.7	*25.7

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	150# 50
Gate Valve	1	77.26.01	008.1
Bolting	4	81.38.66	269.1
Gasket	1	85.31.02	*00.5

**Aker Maritime**Aker Oil and Gas
Technology UK plc**COATING SPECIFICATION;
GLASS / FLAKE LINING**

DATA SHEET No.

000000-1-XPS1-DS-0008-001

PAGE

1 of 1

REV

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PREPARED BY

M Higgins

CHECKED BY

APPROVED BY

DATE

18/05/98

REVISION

00

Specification for internal surfaces of carbon steel pipe handling raw sea water at operating temperature above 60°C and up to and including 80°C.

RECOMMENDED SYSTEMS

VENDOR	COAT 1(4) (DFT microns)	COAT 2 (DFT microns)	COAT 3 (DFT microns)	MIN TOTAL DFT (microns)
Corrocoat	Polyglass PPV (50)	Polyglass VEF (750)	Polyglass VEF (750)	1550 (1500 without holding primer)
Ceilecote	P.370 (50)	Flakeline 180 (1000)	Flakeline 180 (1000)	2050 (2000 without holding primer)

1. This system shall be applied by the Paint Vendor or by parties approved by the Paint Vendor
2. All welds shall be reasonably smooth and should be slag and spatter free.
3. The internal surface of the pipe and the machined rebates, are to be blast cleaned to Swedish standard Sa 2 1/2. Blast residues are to be removed from the pipe internals by vacuuming or blowing surface with dry oil free compressed air.
4. Coat 2 may be applied directly to the blast-cleaned surface without the holding primer (coat 1) providing the coating process is applied within 4 hours of blast cleaning.
5. After coating, material in flange rebates shall be levelled with the existing flange face by rubbing with a suitable rubbing block and checking for squareness with a straight edge.
6. The system shall be 100% holiday tested using a high frequency spark tester at 15 KV and a suitable extension probe.
7. Thickness checks should be carried out using an inductance type instrument to ensure minimum total film thickness is achieved.

TEMPERATURE DEG C	SERVICE LIMITS						
	-20	38	50	75	100	120	150
PRESSURE BAR GA	51	51	50	48	46.3	45.8	45

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP. 1.1.
- COLD BENDING OF THE PIPE IS NOT ALLOWED
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	500	C	C	C	C	D	E	E	E	B	B	B	B	B	B	B	A
	450	C	C	C	C	D	E	E	E	B	B	B	B	B	B	A	
	400	C	C	C	C	D	E	E	B	B	B	B	B	B	A		
	350	C	C	C	C	D	E	E	B	B	B	B	B	A			
	300	C	C	C	C	D	E	E	B	B	B	B	A				
	250	C	C	C	C	D	E	B	B	B	B	A					
	200	C	C	C	C	D	E	B	B	B	A						
	150	C	C	C	C	D	B	B	B	A							
	100	C	C	C	B	B	B	A									
	80	C	C	C	B	B	A										
	50	C	B	B	B	A											
	40	B	B	B	A												
	25	B	B	A													
	20	B	A														
	15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF) [01]
 E Branch outlet - Butt weld / Flanged (WOL / WOF) [01]

- NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldo flange
 WOL - Weldolet

[01]

[01]

[01]

ISSUE DATE: MAY 1998	REV LETTER	00	01		
	DATE	18/05/98	04/12/98		
	SIGN	M.H	M.H.		
PLANT PS - 1	CARBON STEEL		PIPING GENERAL		
CONSIGNEE -	SOUR SERVICE		CLASS No.:	3144G	
ENG BY AKER MARITIME	CONTR. No.	-	ASME RATING:	300	
PRINCIPAL OPQL	PROJECT No.	-	CORR. ALL:	3mm	

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESG buying description)

PIPE

PIPE SEAMLESS	DN	15 - 600	ASTM A106 - B
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 600	ASTM A105N
SPECTACLE BLIND FLANGE	DN	15 - 600	ASTM A285 - C
SPACER RING	DN	15 - 600	ASTM A285 - C
SPADE BLIND	DN	15 - 600	ASTM A285 - C
WELDING NECK FLANGE	DN	15 - 600	ASTM A105N

FITTINGS

CAP, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB

REDUCING FITTINGS

BRANCH OUTLET, FLG. RF (NOF)	DN	15 - 50	ASTM A105N	[01]
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A105N	
BRANCH OUTLET FLG. RF (WOF)	DN	80 - 200	ASTM A105N	[01]
BRANCH OUTLET BW END (WOL)	DN	50 - 200	ASTM A105N	
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, GRAPHITE FILLED. CS CENTRING	
STUD BOLTS / HEX NUTS			BOLTS: ASTM A193-B7M NUTS: ASTM A194-2HM	
JACKSCREWS			ASTM A193-B8MA	[01]
LEVEL DISPACER CHAMBER	DN	100 - 100	ASTM A106-B	[01]
LEVEL GAUGE REFLEX	DN	20 - 20	BODY: ASTM A105B	[01]
			BOLTS: ASTM A193-B7M/A194-2HM	
			GASKET: GRAPHITE	[01]
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A105N BOLTS: ASTM A193-B7M/A194-2HM GASKETS: GRAPHITE	

VALVES - RAISED FACE

BALL VALVE, FLOATING BALL, FULL BORE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, FLOATING BALL, RED BORE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 600	BODY : ASTM A216 -WCB/WCC+ENP ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182 F6a or 316(L) SEATS : PTFE
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 600	BODY : ASTM A216-WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182 F6a or 316(L) SEATS : PTFE
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
DUAL PL. CHECK VALVE WAFER.	DN	50 - 600	BODY : ASTM A216-WCB/WCC or ASTM A105N PLATE : BODY + AISI 410 of STELLITE SEATS : VITON B or GLT
GATE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: AISI 410 or STELLITE
GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: AISI 410 or STELLITE
NEEDLE TYPE GLOBE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
DOUBLE BLOCK AND BLEED VALVE FLANGED - BORE 10mm. (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A350-LF2 TRIM: AISI 316 SEATS: PTFE/KEL 'F'

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74 30 03			Blind 76 62 11	WN 76 62 77	Spect. 76 88 36	Spacer 76 88 46	Spade 76 88 42		
160	15	020.1			108.1	252.9	258.1	458.1	042.1		
160	20	030.1			112.1	254.9	262.1	462.1	044.1		
160	25	040.1			116.1	256.9	266.1	466.1	046.1		
160	40	060.1			118.1	258.9	268.1	468.1	048.1		
80	50	071.1			120.1	210.9	270.1	470.1	050.1		
80	80	109.1			122.1	212.9	272.1	472.1	052.1		
80	100	157.1			124.1	214.9	274.1	474.1	054.1		
80	150	219.1			126.1	216.9	276.1	476.1	056.1		
40	200	245.1			128.1	168.9	278.1	478.1	058.1		
40	250	287.1			130.1	170.9	280.1	480.1	060.1		
40	300	331.1			132.1	172.9	282.1	482.1	062.1		
40	350	379.1			134.1	174.9	284.1	484.1	064.1		
40	400	431.1			136.1	176.9	286.1	486.1	066.1		
40	450	483.1			138.1	178.9	288.1	488.1	068.1		
40	500	533.1			140.1	180.9	290.1	490.1	070.1		
40	600	583.1			142.1	184.9	294.1	494.1	072.1		

SCHD	Nominal Pipe Size	FITTINGS						GASKETS	
		Cap 76 30 17	Elbow 45 76 30 34	Elbow 90 SR	Elbow 90 LR 76 30 42	Equal Tee 76 30 81		Spiral Wound 85 41 36	
160	15	572.1	572.1	NOT USED	572.1	572.1		104.1	
160	20	578.1	578.1		578.1	578.1		106.1	
160	25	582.1	582.1		582.1	582.1		108.1	
160	40	592.1	592.1		592.1	592.1		112.1	
80	50	608.1	608.1		608.1	608.1		114.1	
80	80	628.1	628.1		628.1	628.1		118.1	
80	100	648.1	648.1		648.1	648.1		070.1	
80	150	668.1	668.1		668.1	668.1		074.1	
40	200	685.1	685.1		685.1	685.1		076.1	
40	250	705.1	705.1		705.1	705.1		078.1	
40	300	728.1	728.1		728.1	728.1		080.1	
40	350	747.1	747.1		747.1	747.1		082.1	
40	400	768.1	768.1		768.1	768.1		084.1	
40	450	790.1	790.1		790.1	790.1		086.1	
40	500	810.1	810.1		810.1	810.1		088.1	
40	600	830.1	830.1		830.1	830.1		092.1	

VALVES											[01]	[01]
Nominal Pipe	Ball RB	Ball RB Trunnion mounted	Ball FB	Ball FB Trunnion mounted	Gate	Globe	Needle	Check	Check	DB & B 2 ball + needle vent	DB & B	
Size	Floating ball Flanged 77 00 03	Flanged 77 00 73	Floating ball Flanged 77 00 03	Flanged 77 00 73	Flanged 77 20 23	Flanged 77 30 23	Flanged 77 30 23	Dual Plate Wafer 77 67 06	Piston Flanged 77 10 23	Flanged 77 85 46	3 ball Flanged 77 85 45	
15	103.1		653.1		053.1	053.1	653.1		053.1	*00.1	*00.5	
20	104.1		654.1		054.1	054.1	654.1		054.1	*00.2	*01.4	
25	105.1		655.1		055.1	055.1	655.1		055.1	*00.3	*00.2	
40	107.1		657.1		057.1	057.1	657.1		057.1			
50		058.1		558.1		058.1		558.1				
80		060.1		560.1		060.1		560.1				
100		062.1		562.1		062.1		562.1				
150		064.1		564.1		064.1		564.1				
200		065.1		565.1		065.1		565.1				
250		066.1		566.1				566.1				
300		067.1		567.1				567.1				
350		068.1		568.1				568.1				
400		069.1		569.1				569.1				
450		070.1		570.1				570.1				
500		071.1		571.1				571.1				
600		073.1		573.1				573.1				

SCHD	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer 76 30 66	Ecc reducer 76 30 67	Reducing Tee 76 30 88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
80/160	50 x 20	-	-	102.1	
80/160	50 x 25	199.1	199.1	111.1	
80/160	50 x 40	208.1	208.1	120.1	
80/160	80 x 40	229.1	229.1	129.1	
80	80 x 50	237.1	237.1	133.1	
80/160	100 x 40	-	-	147.1	
80	100 x 50	267.1	267.1	154.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
40/80	200 x 100	326.1	326.1	212.1	
40/80	200 x 150	336.1	336.1	232.1	
40/80	250 x 100	-	-	260.1	
40/80	250 x 150	356.1	356.1	278.1	
40	250 x 200	365.1	365.1	291.1	
40/80	300 x 150	380.1	380.1	317.1	
40	300 x 200	396.1	396.1	328.1	
40	300 x 250	404.1	404.1	350.1	
40/80	350 x 150	-	-	379.1	
40	350 x 200	422.1	422.1	390.1	
40	350 x 250	438.1	438.1	415.1	
40	350 x 300	447.1	447.1	441.1	
40/80	400 x 150	-	-	469.1	
40	400 x 200	453.1	453.1	479.1	
40	400 x 250	462.1	462.1	505.1	
40	400 x 300	474.1	474.1	531.1	
40	400 x 350	487.1	487.1	556.1	
40	450 x 200	-	-	580.1	
40	450 x 250	523.1	523.1	604.1	
40	450 x 300	553.1	553.1	628.1	
40	450 x 350	584.1	584.1	652.1	
40	450 x 400	614.1	614.1	676.1	
40	500 x 200	-	-	700.1	
40	500 x 250	-	-	724.1	
40	500 x 300	643.1	643.1	748.1	
40	500 x 350	674.1	674.1	772.1	
40	500 x 400	704.1	704.1	796.1	
40	500 x 450	734.1	734.1	820.1	
40	600 x 250	-	-	844.1	
40	600 x 300	-	-	868.1	
40	600 x 350	-	-	892.1	
40	600 x 400	884.1	884.1	916.1	
40	600 x 450	914.1	914.1	940.1	
40	600 x 500	944.1	944.1	964.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80 - 100	150 - 600
			25	25	25	25	25
Valve, globe	1	77.30.23	055.1	055.1	055.1	055.1	055.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	111.1	-	-
Flange blind	1	76.62.11	116.1	116.1	116.1	116.1	116.1
Flange WN	1	76.62.77	256.9	256.9	256.9	-	-
NOF	1	76.80.37	-	-	-	125.1	126.1
Bolting	8	81.38.66	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25	40	50	80 - 100	150 - 600
			25	25	25	25	25
Valve, gate	1	77.20.23	055.1	055.1	055.1	055.1	055.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	111.1	-	-
Flange blind	1	76.62.11	116.1	116.1	116.1	116.1	116.1
Flange WN	1	76.62.77	256.9	256.9	256.9	-	-
NOF	1	76.80.37	-	-	-	125.1	126.1
Bolting	8	81.38.66	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50	80 - 10	150 - 600
			25	25	25	25	25
DBB Valve	1	77.85.46	*00.3	*00.3	*00.3	*00.3	*00.3
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	111.1	-	-
Flange WN	1	76.62.77	256.9	256.9	256.9	256.9	256.9
NOF	1	76.80.31	-	125.1	125.1	125.1	126.1
Bolting	8	81.38.66	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

TEMPERATURE INSTRUMENT CONNECTIONS						
COMPONENTS	Nos reqd	Run Pipe Conn Size	100	150	200 - 600	
			40	40	40	
Flange WN	1	76.62.77	258.9	-	-	
Tee Reducing	1	76.30.88	129.1	-	-	
NOF	1	76.80.37	-	130.1	131.1	
Thermowell	1		SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	328.1	328.1	328.1	
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1	

BOLTING										
NOM PIPE SIZE	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.66	Dia x L In x mm	81.38	Dia x L In x mm	81.38.66	Dia x L In x mm		81.38.66	Dia x L In x mm
15	4	155.1	1/2 x 70			158.1	1/2 x 85			
20	4	268.1	5/8 x 75			271.1	5/8 x 90			
25	4	269.1	5/8 x 80			272.1	5/8 x 95			
40	4	328.1	3/4 x 95			331.1	3/4 x 115			
50	8	271.1	5/8 x 90	66.282.1	5/8 x 155	275.1	5/8 x 115		278.1	5/8 x 130
80	8	330.1	3/4 x 110	66.342.1	3/4 x 185	335.1	3/4 x 140		335.1	3/4 x 140
100	8	331.1	3/4 x 115	66.343.1	3/4 x 190	336.1	3/4 x 145		335.1	3/4 x 140
150	12	333.1	3/4 x 125	66.348.1	3/4 x 220	338.1	3/4 x 160		335.1	3/4 x 140
200	12	404.1	7/8 x 140	66.425.1	7/8 x 270	410.1	7/8 x 180		406.1	7/8 x 150
250	16	472.1	1 x 160	66.496.1	1 x 310	479.1	1 x 205		474.1	1 x 170
300	16	532.1	11/8 x 170	66.562.1	11/8 x 360	539.1	11/8 x 215		534.1	11/8 x 185
350	20	533.1	11/8 x 180	66.569.1	11/8 x 405	541.1	11/8 x 230		535.1	11/8 x 190
400	20	592.1	11/4 x 190	66.631.1	11/4 x 435	600.1	11/4 x 240		594.1	11/4 x 205
450	24	593.1	11/4 x 195	66.634.1	11/4 x 470	601.1	11/4 x 245		596.1	11/4 x 215
500	24	595.1	11/4 x 210	86.142.1	11/4 x 510	604.1	11/4 x 265		598.1	11/4 x 230
600	24	686.1	11/2 x 235	86.288.1	11/2 x 570	697.1	11/2 x 305		688.1	11/2 x 250

BRANCH OUTLETS [01]					
Nominal Runn Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79.01
50 - 600	15	*51.1	121.1	-	-
80 - 600	20	*51.2	123.1	-	-
80 - 100	25	*51.3	125.1	-	-
150 - 600	25	*51.4	126.1	-	-
150-600	40	*51.6	131.1	-	-
150	50	-	113.1	-	364.1
200	50	-	113.1	-	066.1
250	50	-	113.1	-	068.1
300	50	-	113.1	-	070.1
350	50	-	114.1	-	072.1
400	50	-	114.1	-	074.1
450	50	-	114.1	-	076.1
500	50	-	114.1	-	078.1
600	50	-	114.1	-	082.1
200	80	-	-	*18.0	090.1
250	80	-	-	*18.1	092.1
300	80	-	-	*18.2	094.1
350	80	-	-	*18.3	096.1
400	80	-	-	*18.4	098.1
450	80	-	-	*18.5	100.1
500	80	-	-	*18.6	102.1
600	80	-	-	*18.7	106.1
300	100	-	-	*18.8	116.1
350	100	-	-	*18.9	118.1
400	100	-	-	*19.0	120.1
450	100	-	-	*19.1	122.1
500	100	-	-	*19.2	124.1
600	100	-	-	*19.3	128.1
450	150	-	-	*19.4	142.1
500	150	-	-	*19.5	144.1
600	150	-	-	*19.6	148.1
600	200	-	[01]	*19.7	166.1

** Dimensions to SIPM standard drawing S-38.090

[01]

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450 15	500 15	600 15
DBB Valve	2	77.85.46	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1
Flange WN RF Jackscrews**	2	76.62.77	210.9	212.9	214.9	216.9	168.9	170.9	172.9	174.9	176.9	178.9	180.9	184.9
NOL-Plain end Bolting	2	81.86.35	*01.3	*00.6	*02.1	*00.7	*02.2	*00.2	*00.9	*00.5	*02.3	*01.7	*02.4	*01.2
Number of bolts		75.80.31	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2
Gasket Sp.WD	2	81.38.66	278.1	335.1	335.1	335.1	406.1	474.1	534.1	535.1	594.1	596.1	599.1	688.1
			8	8	8	12	12	16	16	20	20	24	24	24
		85.41.36	114.1	118.1	070.1	074.1	076.1	078.1	080.1	082.1	084.1	086.1	088.1	092.1

** 1 Jackscrew for DN50 to 100 [01]
2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.422.1	356	Valve, Gate	1	77.20.23.054.1
76.80.60.424.1	813	Valve, Ball	2	77.00.72.058.1
76.80.60.426.1	1219	Flange, blind	2	76.62.11.112.1
76.80.60.428.1	1524	WN Flange	1	76.62.77.254.9
76.80.60.430.1	1829	Gasket Sp.WD	1	85.41.36.070.1 DN 100
76.80.60.432.1	2134	Gasket Sp.WD	4	85.41.36.114.1 DN 50
76.80.60.434.1	2438	Gasket Sp.WD	3	85.41.36.106.1 DN 20
76.80.60.436.1	2743	Bolting	8	81.38.66.331.1
76.80.60.438.1	3048	Bolting	32	81.38.66.271.1
		Bolting	12	81.38.66.268.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.66	062.1	064.1	066.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.66	562.1	564.1	566.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.09	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*00.3
Bolting	8	81.38.66	269.1
Gasket Sp.WD	1	85.41.36	108.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-50	38	50	75	100	120
PRESSURE BAR GA	47.9	47.3	46	46	45	44.6

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.1.3.
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- WELDS SHALL BE POST WELD HEAT TREATED FOR WALL THICKNESSES EQUAL OR > 12mm.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

		BRANCH CONNECTIONS 90 DEG													
		NOMINAL BRANCH SIZE													
		15	20	25	40	50	80	100	150	200	250	300	350	400	450
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450
	600	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	500	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	450	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	400	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	350	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	300	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	250	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	200	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	150	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	100	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	80	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	50	C	C	C	C	D	E	E	E	B	B	B	B	B	A
	40	B	B	B	B	A									
	25	B	B	B	B	A									
	20	B	B	B	B	A									
	15	A													

DN	SCHEDULE
15	160
20	160
25	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldo flange
 WOL - Weldolet

ISSUE DATE : DECEMBER 1998		REV LETTER	00		
		DATE	04/12/98		
		SIGN	M. H.		
PLANT	PS - 1	LOW TEMP. CARBON STEEL (SOUR)		PIPING GENERAL	
CONSIGNEE	-	NACE		CLASS No:	3150G
ENG BY	AKER MARITIME	CONTRACT JOB NO -		ASME RATING:	300
PRINCIPAL	OPQL	PROJECT NO -		COORR. ALL:	3mm

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description.)

PIPE

PIPE, SEAMLESS	DN	15 - 600	ASTM A333-6
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 600	ASTM A350-LF2
SPECTACLE BLIND FLANGE	DN	15 - 600	ASTM A516 - 60
SPACER RING	DN	15 - 600	ASTM A516 - 60
SPADE BLIND	DN	15 - 600	ASTM A516 - 60
WELDING NECK FLANGE	DN	15 - 600	ASTM A350-LF2

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 600	ASTM A420-WPL6
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420-WPL6
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420-WPL6
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420-WPL6

REDUCING FITTINGS

BRANCH OUTLET, FLG. RF (NOF)	DN	15 - 50	ASTM A350-LF2
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A350-LF2
BRANCH OUTLET FLG. RF (WOF)	DN	80 - 200	ASTM A350-LF2
BRANCH OUTLET BW END (WOL)	DN	50 - 200	ASTM A350-LF2
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A420-WPL6
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A420-WPL6
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 600	ASTM A420-WPL6

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, GRAPHITE FILLED, CS CENTRING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M ASTM A193-B8MA
JACKSCREWS	DN	100 - 100	ASTM A333 - 6 (SEAMLESS)
LEVEL DISPACER CHAMBER	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A 320-L7M/A194-7M GASKETS: GRAPHITE
LEVEL GAUGE REFLEX			
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A 320-L7M/A194-7M GASKETS: GRAPHITE
ORIFICE FLANGE SET, RAISED FACE	DN	50 - 600	FLANGES: ASTM A350 - LF2

VALVES - RAISED FACE

BALL VALVE, FLOATING BALL, FULL BORE, FLANGED.	DN	15 - 40	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, FLOATING BALL, RED BORE, FLANGED.	DN	15 - 40	BODY : ASTM A352-LCB/LCC or ASTM A350-LF2 TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 600	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : FILLED PTFE
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 600	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : FILLED PTFE
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316 or STELLITE
DUAL PL. CHECK VALVE WAFER	DN	50 - 600	BODY : ASTM A352M-LCB/LCC or A350M-LF2 PLATE : BODY + STELLITE SEATS : WELDED ON WITH AISI 316(L) or STELLITE
GATE VALVE, FLANGED.	DN	15 - 600	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE
GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A350-LF2 TRIM: AISI 316 SEATS: PTFE/KEL 'F'

SCHD	Nominal Ppe Size	PIPE			FLANGES					STRAINERS	
		74 30.16			Blind	WN	Spect	Spacer	Spade		
					76 62.12	76 62.82	76 88.35	76 88.47	76 88.42		
160	15	023.1			508.1	852.1	258.1	108.1	042.1		
160	20	030.1			512.1	854.1	262.1	112.1	044.1		
160	25	038.1			516.1	856.1	266.1	116.1	046.1		
160	40	054.1			518.1	858.1	268.1	118.1	048.1		
80	50	061.1			520.1	812.1	270.1	120.1	050.1		
80	80	069.1			522.1	814.1	272.1	122.1	052.1		
80	100	077.1			524.1	816.1	274.1	124.1	054.1		
80	150	086.1			526.1	818.1	276.1	126.1	056.1		
40	200	095.1			528.1	768.1	278.1	128.1	058.1		
40	250	107.1			530.1	770.1	280.1	130.1	060.1		
40	300	119.1			532.1	772.1	282.1	132.1	062.1		
40	350	132.1			534.1	774.1	284.1	134.1	064.1		
40	400	142.1			536.1	776.1	286.1	136.1	066.1		
40	450	170.1			538.1	778.1	288.1	138.1	068.1		
40	500	210.1			540.1	780.1	290.1	140.1	070.1		
40	600	240.1			542.1	782.1	292.1	142.1	072.1		

SCHD	Nominal pip Size	FITTINGS					GASKETS	
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Equal Tee	Spiral Wound	
		76 31.17	76 31.34	90 SR	90 LR	76 31.80		
160	15	172.1	172.1	NOT USED	172.1	172.1	104.1	
160	20	178.1	178.1		178.1	178.1	106.1	
160	25	182.1	182.1		182.1	182.1	108.1	
160	40	192.1	192.1		192.1	192.1	112.1	
80	50	210.1	210.1		210.1	210.1	114.1	
80	80	230.1	230.1		230.1	230.1	118.1	
80	100	248.1	248.1		248.1	248.1	120.1	
80	150	268.1	268.1		268.1	268.1	122.1	
40	200	284.1	284.1		284.1	284.1	124.1	
40	250	306.1	306.1		306.1	306.1	126.1	
40	300	328.1	328.1		328.1	328.1	128.1	
40	350	348.1	348.1		348.1	348.1	130.1	
40	400	368.1	368.1		368.1	368.1	132.1	
40	450	386.1	386.1		386.1	386.1	134.1	
40	500	396.1	396.1		396.1	396.1	136.1	
40	600	406.1	406.1		406.1	406.1	138.1	

Nominal Pipe Size	VALVES									
	Ball RB	Ball RB Trunnion mounted	Ball FB	Ball FB Trunnion mounted	Gate	Globe	Needle	Check	Check	DB & B
	Floating ball Flanged 77 00.33	Flanged 77 00.83	Floating ball Flanged 77 00.33	Flanged 77 00.83	Flanged 77 20.33	Flanged 77 30.33	Flanged	Dual plate Wafer 77 67.52	Piston Flanged 77 10.33	DB & B 2 ball + needle vent Flanged 77 85.46
15	103.1		653.1		053.1	053.1	NOT USED		053.1	*00.1
20	104.1		654.1		054.1	054.1			054.1	*00.2
25	105.1		655.1		055.1	055.1			055.1	*00.3
40	107.1		657.1		057.1	057.1			057.1	
50		058.1		558.1	058.1	058.1		558.1		
80		060.1		560.1	060.1	060.1		560.1		
100		062.1		562.1	062.1	062.1		562.1		
150		064.1		564.1	064.1	064.1		564.1		
200		065.1		565.1	065.1	065.1		565.1		
250		066.1		566.1	066.1	066.1		566.1		
300		067.1		567.1	067.1	067.1		567.1		
350		068.1		568.1	068.1	068.1		568.1		
400		069.1		569.1	069.1	069.1		569.1		
450		070.1		570.1	070.1	070.1		570.1		
500		071.1		571.1	071.1	071.1		571.1		
600		073.1		573.1	073.1	073.1		573.1		

SCHD	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer	Ecc reducer	Reducing Tee	
		76 31.66	76 31.75	76 31.85	
160	20 x 15	141.1	141.1	035.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
80/160	50 x 20	194.1	194.1	102.1	
80/160	50 x 25	199.1	199.1	111.1	
80/160	50 x 40	208.1	208.1	120.1	
80/160	80 x 40	229.1	229.1	129.1	
80	80 x 50	237.1	237.1	133.1	
80/160	100 x 40	253.1	253.1	147.1	
80	100 x 50	267.1	267.1	154.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
40/80	200 x 100	326.1	326.1	212.1	
40/80	200 x 150	336.1	336.1	232.1	
40/80	250 x 100	344.1	344.1	260.1	
40/80	250 x 150	356.1	356.1	278.1	
40	250 x 200	365.1	365.1	291.1	
40/80	300 x 150	384.1	384.1	317.1	
40	300 x 200	396.1	396.1	328.1	
40	300 x 250	404.1	404.1	350.1	
40/80	350 x 150	414.1	414.1	379.1	
40	350 x 200	422.1	422.1	390.1	
40	350 x 250	438.1	438.1	415.1	
40	350 x 300	447.1	447.1	441.1	
40/80	400 x 150	-	-	469.1	
40	400 x 200	453.1	453.1	479.1	
40	400 x 250	462.1	462.1	505.1	
40	400 x 300	474.1	474.1	531.1	
40	400 x 350	487.1	487.1	556.1	
40	450 x 200	-	-	580.1	
40	450 x 250	523.1	523.1	604.1	
40	450 x 300	553.1	553.1	628.1	
40	450 x 350	584.1	584.1	652.1	
40	450 x 400	614.1	614.1	676.1	
40	500 x 200	-	-	700.1	
40	500 x 250	-	-	724.1	
40	500 x 300	643.1	643.1	748.1	
40	500 x 350	674.1	674.1	772.1	
40	500 x 400	704.1	704.1	796.1	
40	500 x 450	734.1	734.1	820.1	
40	600 x 250	-	-	844.1	
40	600 x 300	-	-	868.1	
40	600 x 350	-	-	892.1	
40	600 x 400	884.1	884.1	916.1	
40	600 x 450	914.1	914.1	940.1	
40	600 x 500	944.1	944.1	964.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
Globe Valve	1	77.30.33	055.1	055.1	055.1	055.1	55.1
Tee equal	1	76.31.80	180.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	111.1	-	-
Flange blind	1	76.62.12	516.1	516.1	516.1	516.1	516.1
Flange WN	1	76.62.82	856.1	856.1	856.1	-	-
NOF	1	76.80.37	-	-	-	625.1	626.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
Gate Valve	1	77.20.33	005.1	005.1	005.1	005.1	005.1
Tee equal	1	76.31.80	180.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	111.1	-	-
Flange blind	1	76.62.12	516.1	516.1	516.1	516.1	516.1
Flange WN	1	76.62.82	856.1	856.1	856.1	-	-
NOF	1	76.80.37	-	-	-	625.1	626.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
DBB Valve	1	77.85.46	*00.3	*00.3	*00.3	*00.3	*00.3
Tee equal	1	76.31.80	180.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	111.1	-	-
Flange WN	1	76.62.82	856.1	856.1	856.1	-	-
NOF	1	76.80.37	-	-	-	625.1	626.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 40	200 - 600 40		
Flange WN	1	76.62.82	858.1	-	-		
Tee reducing	1	76.31.88	147.1	-	-		
NOF	1	76.80.37	-	631.1	631.1		
Thermowell	1					SUPPLIED BY INSTRUMENTS	
Bolting	4	81.38.67	328.1	328.1	328.1		
Gasket Sp WD	1	85.41.36	112.1	112.1	112.1		

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm		81.38.67	Dia x L In x mm
15	4	155.1	1/2 x 70			158.1	1/2 x 85			
20	4	268.1	5/8 x 75			271.1	5/8 x 90			
25	4	269.1	5/8 x 80			272.1	5/8 x 95			
40	4	328.1	3/4 x 95			331.1	3/4 x 115			
50	8	271.1	5/8 x 90	282.1	5/8 x 155	275.1	5/8 x 115		278.1	5/8 x 130
80	8	330.1	3/4 x 110	342.1	3/4 x 185	335.1	3/4 x 140		335.1	3/4 x 140
100	12	331.1	3/4 x 115	343.1	3/4 x 190	336.1	3/4 x 145		335.1	3/4 x 140
150	12	333.1	3/4 x 125	348.1	3/4 x 220	338.1	3/4 x 160		335.1	3/4 x 140
200	12	404.1	7/8 x 140	425.1	7/8 x 270	410.1	7/8 x 180		406.1	7/8 x 150
250	16	472.1	1 x 160	496.1	1 x 310	479.1	1 x 205		474.1	1 x 170
300	16	532.1	1 1/8 x 170	562.1	1 1/8 x 360	539.1	1 1/8 x 215		534.1	1 1/8 x 185
350	20	533.1	1 1/8 x 180	569.1	1 1/8 x 405	541.1	1 1/8 x 230		535.1	1 1/8 x 190
400	20	592.1	1 1/4 x 190	631.1	1 1/4 x 435	600.1	1 1/4 x 240		594.1	1 1/4 x 205
450	24	893.1	1 1/4 x 195	634.1	1 1/4 x 470	601.1	1 1/4 x 245		596.1	1 1/4 x 215
500	24	595.1	1 1/4 x 210	*01.7	1 1/4 x 510	604.1	1 1/4 x 265		598.1	1 1/4 x 230
600	24	686.1	1 1/2 x 235	*01.8	1 1/2 x 570	697.1	1 1/2 x 305		688.1	1 1/2 x 250

BRANCH OUTLETS						
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79	
50 - 600	15	*56.1	621.1	-	-	
80 - 600	20	*56.2	623.1	-	-	
80 - 100	25	*56.3	625.1	-	-	
150 - 600	25	*56.4	626.1	-	-	
150 - 600	40	*56.5	631.1	-	-	
150	50	-	518.1	-	05.064.1	
200	50	-	518.1	-	05.066.1	
250	50	-	518.1	-	05.068.1	
300	50	-	519.1	-	05.070.1	
350	50	-	519.1	-	05.072.1	
400	50	-	519.1	-	05.074.1	
450	50	-	520.1	-	05.076.1	
500	50	-	520.1	-	05.078.1	
600	50	-	520.1	-	05.082.1	
200	80	-	-	*71.0	05.090.1	
250	80	-	-	*71.1	05.092.1	
300	80	-	-	*71.2	05.094.1	
350	80	-	-	*71.3	05.096.1	
400	80	-	-	*71.4	05.098.1	
450	80	-	-	*71.5	05.100.1	
500	80	-	-	*71.6	05.102.1	
600	80	-	-	*71.7	05.106.1	
300	100	-	-	*71.8	05.116.1	
350	100	-	-	*71.9	05.118.1	
400	100	-	-	*72.0	05.120.1	
450	100	-	-	*72.1	05.122.1	
500	100	-	-	*72.2	05.124.1	
600	100	-	-	*72.3	05.128.1	
450	150	-	-	*72.4	05.142.1	
500	150	-	-	*72.5	05.144.1	
600	150	-	-	*72.6	05.148.1	
600	200	-	-	*72.7	04.916.1	

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 DN 15	450 DN 15	500 DN 15	600 DN 15
DBB Valve	2	77.85.45	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5
Flange WN RF	2	76.62.82	812.1	814.1	816.1	818.1	768.1	770.1	772.1	774.1	776.1	778.1	780.1	782.1
Jackscrews**		81.86.35	*01.3	*00.6	*02.1	*00.7	*02.2	*00.2	*00.9	*00.5	*02.3	*01.7	*02.4	*01.2
NOL-Plain end	2	76.80.31	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4
Bolting		81.38.67	278.1	335.1	335.1	335.1	406.1	474.1	534.1	535.1	594.1	596.1	598.1	688.1
Number of bolts			8	8	12	12	12	16	16	20	20	24	24	24
Gasket Sp.WD	2	85.41.36	114.1	118.1	070.1	074.1	076.1	078.1	080.1	082.1	084.1	086.1	088.1	092.1

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.602.1	356	Valve, Gate	1	77.20.33.054.1
76.80.60.604.1	813	Valve, Ball	2	77.00.82.058.1
76.80.60.606.1	1219	Flange blind	2	76.62.12.512.1
76.80.60.608.1	1524	Flange WN	1	76.62.82.854.1
76.80.60.610.1	1829	Gasket Sp.WD	1	85.41.36.070.1 DN 100
76.80.60.612.1	2134	Gasket Sp.WD	4	85.41.36.114.1 DN 50
76.80.60.614.1	2438	Gasket Sp.WD	3	85.41.36.106.1 DN 20
76.80.60.616.1	2743	Bolting	8	81.38.67.331.1
76.80.60.618.1	3048	Bolting	32	81.38.67.271.1
		Bolting	12	81.38.67.268.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.68	062.1	062.1	062.1
Valve, ball	3	77.00.33	104.1	104.1	104.1
Flange blind	2	76.62.12	512.1	512.1	512.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.68	562.1	564.1	566.1
Valve, ball	3	77.00.33	104.1	104.1	104.1
Flange blind	2	76.62.12	512.1	512.1	512.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*00.3
Bolting	4	81.38.67	269.1
Gasket Sp.WD	1	85.41.36	108.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-100	38	50	75	100	120
PRESSURE BAR GA	49.6	49.6	48.2	45	42.2	40.8

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT. GRP. 2.2
- FOR DESIGN TEMPERATURES ABOVE 50 DEG.C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.
- WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 DEG.C, TO PREVENT CHLORIDE CORROSION CRACKING
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FORX ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

BRANCH CONNECTIONS 90 DEG																	
NOMINAL BRANCH SIZE																	
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400																
	350																
	300	C	C	C	C	D	D	D	B	B	B	A					
	250	C	C	C	C	D	D	D	B	B	B	A					
	200	C	C	C	C	D	D	D	B	B	B	A					
	150	C	C	C	C	D	D	D	B	B	B	A					
	100	C	C	C	B	B	B	B	A								
	80	C	C	C	B	B	B	A									
	50	C	B	B	B	A											
	40	B	B	B	A												
	25	B	B	A													
	20	B	A														
	15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	40S
200	40S
250	40S
300	40S

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Plain / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippo flange
 NOL - Nippolet
 WOF - Weldo flange
 WOL - Weldolet

ISSUE DATE	DECEMBER 1998	REV LETTER	00			
		DATE	04/12/98			
		SIGN	M.H.			
PLANT	PS - 1	STAINLESS STEEL (16Cr-12Ni-2Mo)		PIPING GENERAL		
CONSIGNEE	-	LOW TEMP. SOUR SERVICE		CLASS No. :	3346G	
ENG BY	AKER MARITIME	CONTR. No.	-	ASME RATING :	300	
PRINCIPAL	OPQL	PROJECT No.	-	CORR. ALL :	0 mm	

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 300	ASTM A312-TP316L
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 300	ASTM A182-F316
SPECTACLE BLIND FLANGE	DN	15 - 300	ASTM A240-TP316
SPACER RING	DN	15 - 300	ASTM A240-TP316
SPADE BLINDS	DN	15 - 300	ASTM A240-TP316
WELDING NECK FLANGE	DN	15 - 300	ASTM A182-F316

FITTINGS

CAP, BUTT - WELD. ENDS	DN	15 - 300	ASTM A403-WP316L
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 300	ASTM A403-WP316L
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 300	ASTM A403-WP316L
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 300	ASTM A403-WP316L

REDUCING FITTINGS

BRANCH OUTLET, FLG RF (NOF)	DN	15 - 40	ASTM A182-F316
BRANCH OUTLET PLAIN END (NOL)	DN	15 - 40	ASTM A182-F316
BRANCH OUTLET FLG. RF (WOF)	DN	50 - 100	ASTM A182-F316
BRANCH OUTLET BW END (WOL)	DN	50 - 100	ASTM A182-F316
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 300	ASTM A403-WP316L
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 300	ASTM A403-WP316L
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 300	ASTM A403-WP316L

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 300	AISI 316, GRAPHITE FILLED WITH SS CENTRING
STUD BOLTS / HEX NUTS	-	-	BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M ASTM A193-B8MA
JACKSCREWS	DN	100 - 100	ASTM A312-TP316
LEVEL DISPLACER CHAMBER	DN	20 - 20	BODY: ASTM A182-F316
LEVEL GAUGE REFLEX TYPE			BOLTS: ASTM A320-L7M / A194-7M GASKET: GRAPHITE
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A182-F316 BOLTS: ASTM A320-L7M / A194-7M GASKET: GRAPHITE
ORIFICE FLANGE SET, RAISED FACE	DN	50 - 300	FLANGES: ASTM A182-F316

VALVES - RAISED FACE

BALL VALVE, FLOATING BALL, FULL BORE, FLANGED.	DN	15 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, FLOATING BALL, RED BORE, FLANGED.	DN	15 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : PTFE
BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 300	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM AISI 316, 316L SEATS : FILLED PTFE
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 300	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM AISI 316, 316L SEATS : FILLED PTFE
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
DUAL PL. CHECK VALVE WAFER	DN	50 - 300	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : VITON B or GF
GATE VALVE, FLANGED	DN	15 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
GLOBE VALVE, FLANGED	DN	15 - 200	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
DOUBLE BLOCK & BLEED FLANGED - Bore 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A182 F316 or ASTM A351-CF8M TRIM: AISI 316 SEATS : PTFE or PCTFE

SCHED	Nominal Pipe Size	PIPE		FLANGES						STRAINERS	
		74.36.33		Blind 76.65.10	WN 76.65.79	WN 76.65.80	Spect. 76.88.10	Spacer 76.88.19	Spade 76.88.43		
40S	15	018.1		412.1	-	402.1	208.1	458.1	292.1		
40S	20	026.1		414.1	-	404.1	212.1	462.1	294.1		
10S	25	033.1		416.1	406.1	-	216.1	466.1	296.1		
10S	40	049.1		418.1	408.1	-	218.1	468.1	298.1		
10S	50	057.1		420.1	410.1	-	220.1	470.1	300.1		
10S	80	065.1		422.1	412.1	-	222.1	472.1	302.1		
10S	100	073.1		424.1	414.1	-	224.1	474.1	304.1		
40S	150	083.1		416.1	-	416.1	226.1	476.1	306.1		
40S	200	094.1		418.1	-	418.1	228.1	478.1	308.1		
40S	250	106.1		420.1	-	420.1	230.1	480.1	310.1		
40S	300	118.1		422.1	-	422.1	232.1	482.1	312.1		
	350										
	400										
	450										
	500										
	600										

SCHED	Nominal Pipe Size	FITTINGS					GASKETS		
		Cap 76.33.19	Elbow 45 76.33.37	Elbow 90 SR 76.33.41	Elbow 90 LR 76.33.41	Equal Tee 76.33.84		Spiral Wound 85.41.36	
40S	15	286.1	286.1		286.1	786.1		*24.1	
40S	20	296.1	296.1		296.1	796.1		*24.2	
10S	25	304.1	304.1	NOT USED	304.1	804.1		*24.3	
10S	40	324.1	324.1		324.1	824.1		*24.4	
10S	50	334.1	334.1		334.1	834.1		*24.5	
10S	80	354.1	354.1		354.1	854.1		*24.7	
10S	100	374.1	374.1		374.1	874.1		*24.8	
40S	150	396.1	396.1		396.1	396.1		*24.9	
40S	200	409.1	409.1		409.1	409.1		*25.0	
40S	250	421.1	421.1		421.1	421.1		*25.1	
40S	300	438.1	438.1		438.1	438.1		*25.2	
	350								
	400								
	450								
	500								
	600								

Nominal Pipe Size	VALVES										
	Ball RB	Ball RB	Ball FB	Ball FB	Gate	Globe	Needle	Check	Check	DB & B	DB & B
	Floating ball Flanged 77.03.07	Trunnion mounted Flanged 77.03.73	Floating ball Flanged 77.03.07	Trunnion mounted Flanged 77.03.73	Flanged 77.23.09	Flanged 77.33.09	Flanged	Dual plate Wafer 77.68.00	Piston Flanged 77.13.09	2 ball + needle vent Flanged 77.85.46	3 ball Flanged 77.85.45
15	103.1		653.1		053.1	053.1	NOT USED		053.1	*10.1	*11.2
20	104.1		654.1		054.1	054.1			054.1	*10.2	*10.8
25	105.1		655.1		055.1	055.1			055.1	*10.3	*11.0
40	107.1		657.1		057.1	057.1			057.1		
50		058.1		558.1		058.1			558.1		
80		060.0		560.1		060.1			560.1		
100		062.1		562.1		062.1			562.1		
150		064.1		564.1		064.1			564.1		
200		065.1		565.1		065.1			565.1		
250		066.1		566.1					566.1		
300		067.1		567.1					567.1		
350											
400											
450											
500											
600											

REDUCING FITTINGS					
SCHED	Nominal Pipe Size	Conc reducer 76.33.70	Ecc reducer 76.33.72	Reducing Tee 76.33.85	Reducing Tee 76.33.89
40S	20 x 15	566.1	566.1	618.1	-
10S/40S	25 x 15	579.1	579.1	632.1	-
10S/40S	25 x 20	589.1	589.1	637.1	-
10S/40S	40 x 15	599.1	599.1	643.1	-
10S/40S	40 x 20	619.1	619.1	649.1	-
10S	40 x 25	624.1	624.1	656.1	-
10S/40S	50 x 20	-	-	665.1	-
10S	50 x 25	634.1	634.1	672.1	-
10S	50 x 40	644.1	644.1	683.1	-
10S	80 x 40	674.1	674.1	693.1	-
10S	80 x 50	684.1	684.1	-	352.1
10S	100 x 40	-	-	-	360.1
10S	100 x 50	704.1	704.1	-	368.1
10S	100 x 80	714.1	714.1	-	376.1
40S/10S	150 x 80	749.1	749.1	-	385.1
40S/10S	150 x 100	759.1	759.1	-	393.1
40S/10S	200 x 100	766.1	766.1	-	401.1
40S	200 x 150	779.1	779.1	-	410.1
40S/10S	250 x 100	-	-	-	417.1
40S	250 x 150	779.1	779.1	-	423.1
40S	250 x 200	809.1	809.1	-	428.1
40S	300 x 150	817.1	817.1	-	433.1
40S	300 x 200	830.1	830.1	-	436.1
40S	300 x 250	842.1	842.1	-	443.1

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80-100	150-300
			25	25	25	25	25
Valve, globe	1	77.33.09	055.1	055.1	055.1	055.1	055.1
Tee equal	1	76.33.84	804.1	-	-	-	-
Tee reducing	1	76.33.85	-	656.1	672.1	-	-
Flange blind	1	76.65.10	416.1	416.1	416.1	416.1	416.1
Flange WN	1	76.65.79	406.1	406.1	406.1	-	-
NOF	1	76.80.39	-	-	-	067.1	068.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	*24.3	*24.3	*24.3	*24.3	*24.3

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25	40	50	80-100	150-300
			25	25	25	25	25
Valve, gate	1	77.23.09	005.1	005.1	005.1	005.1	005.1
Tee equal	1	76.33.84	804.1	-	-	-	-
Tee reducing	1	76.33.85	-	656.1	672.1	-	-
Flange blind	1	76.65.10	416.1	416.1	416.1	416.1	416.1
Flange WN	1	76.65.79	406.1	406.1	406.1	-	-
NOF	1	76.80.39	-	-	-	067.1	068.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.31.02	*24.3	*24.3	*24.3	*24.3	*24.3

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50	80-100	150-300
			25	25	25	25	25
DBB Valve	1	77.85.46	*10.3	*10.3	*10.3	*10.3	*10.3
Tee equal	1	76.33.84	804.1	-	-	-	-
Tee reducing	1	76.33.85	-	656.1	672.1	-	-
Flange WN	1	76.65.79	406.1	406.1	406.1	-	-
NOF	1	76.80.39	-	-	-	067.1	068.1
Bolting	8	81.38.67	269.1	269.1	269.1	269.1	269.1
Gasket Sp.WD	2	85.41.36	*24.3	*24.3	*24.3	*24.3	*24.3

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100	150-300			
			40	40			
Flange WN	1	76.65.79	408.1	-			
Tee Reducing	1	76.33.85	-	-			
Tee Reducing	1	76.33.89	360.1	-			
NOF	1	76.80.39	-	073.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.67	328.1	328.1			
Gasket Sp.WD	1	85.41.36	*24.4	*24.4			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number off Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm		81.38.67	Dia x L In x mm
15	4	155.1	1/2 x 70			158.1	1/2 x 85			
20	4	268.1	5/8 x 75			271.1	5/8 x 90			
25	4	269.1	5/8 x 80			272.1	5/8 x 95			
40	4	328.1	3/4 x 95			331.1	3/4 x 115			
50	8	271.1	5/8 x 90	66.282.1	5/8 x 155	275.1	5/8 x 115		278.1	5/8 x 130
80	8	330.1	3/4 x 110	66.342.1	3/4 x 185	335.1	3/4 x 140		335.1	3/4 x 140
100	8	331.1	3/4 x 115	66.343.1	3/4 x 190	336.1	3/4 x 145		335.1	3/4 x 140
150	12	333.1	3/4 x 125	66.348.1	3/4 x 220	338.1	3/4 x 160		335.1	3/4 x 140
200	12	404.1	7/8 x 140	66.425.1	7/8 x 270	410.1	7/8 x 180		406.1	7/8 x 150
250	16	472.1	1 x 160	66.496.1	1 x 310	479.1	1 x 205		474.1	1 x 170
300	16	532.1	1 1/8 x 170	66.562.1	1 1/8 x 360	539.1	1 1/8 x 215		534.1	1 1/8 x 185
350										
400										
450										
500										
600										

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.39	WOF 76.80.37	WOL 76.79.68
50-150	15	451.1	041.1	-	-
200-300	15	452.1	042.1	-	-
80	20	453.1	043.1	-	-
100-300	20	454.1	044.1	-	-
80-100	25	467.1	067.1	-	-
150-300	25	468.1	068.1	-	-
150-300	40	472.1	073.1	-	-
150	50	-	-	*52.1	544.1
200	50	-	-	*52.2	546.1
250	50	-	-	*52.3	548.1
300	50	-	-	*52.4	550.1
200	80	-	-	*52.7	560.1
250	80	-	-	*52.8	562.1
300	80	-	-	*52.9	564.1
300	100	-	-	*53.2	416.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS										
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	
DBB Valve	2	77.85.45	*11.2	*11.2	*11.2	*11.2	*11.2	*11.2	*11.2	
Flange WN RF	2	76.65.79	410.1	412.1	-	-	-	-	-	
Flange WN RF	2	76.65.80	-	-	414.1	416.1	418.1	420.1	422.1	
Jackscrews**		81.86.35	*01.3	*00.6	*02.1	*00.7	*02.2	*00.2	*00.9	
NOL-Plain end	2	76.80.31	*00.6	*00.6	*00.6	*00.6	*00.6	*00.6	*00.6	
Bolting		81.38.67	278.1	335.1	335.1	335.1	406.1	474.1	534.1	
Number of bolts			8	8	8	12	12	16	16	
Gasket Sp.WD	2	85.41.36	*24.5	*24.7	*24.8	*24.9	*25.0	*25.1	*25.2	

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.462.1	356	Valve, Gate	1	77.23.09.054.1
76.80.60.464.1	813	Valve, Ball	2	77.30.73.058.1
76.80.60.466.1	1219	Flange blind	2	76.62.10.414.1
76.80.60.468.1	1524	Flange WN	1	76.62.80.404.1
76.80.60.470.1	1829	Gasket Sp.WD	1	85.41.36.*24.8 DN 100
76.80.60.472.1	2134	Gasket Sp.WD	4	85.41.36.*24.5 DN 50
76.80.60.474.1	2438	Gasket Sp.WD	3	85.41.36.*24.2 DN 20
76.80.60.476.1	2743	Bolting	8	81.38.67.331.1
76.80.60.478.1	3048	Bolting	32	81.38.67.271.1
		Bolting	12	81.38.67.268.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.72	162.1	164.1	166.1
Valve, gate	3	77.23.09	054.1	054.1	054.1
Flange blind	2	76.65.10	414.1	414.1	414.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	*24.2	*24.2	*24.2

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.72	562.1	564.1	566.1
Valve, gate	3	77.23.09	054.1	054.1	054.1
Flange blind	2	76.62.10	414.1	414.1	414.1
Bolting	24	81.38.67	268.1	268.1	268.1
Gasket Sp.WD	6	85.41.36	*24.2	*24.2	*24.2

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	328.1	328.1	328.1
Gasket Sp.WD	1	85.41.36	*24.4	*24.4	*24.4

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.45	*11.0
Bolting	4	81.38.67	269.1
Gasket Sp.WD	1	85.41.36	*24.3

TEMPERATURE DEG C	SERVICE LIMITS						
	-20	38	50	75	100	120	150
PRESSURE BAR GA	91	91	91	91	91	91	91

NOTES

- SERVICE LIMITS ARE BASED ON B7M BOLTING LIMITS
- COLD BENDING OF PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

BRANCH CONNECTIONS 90 DEG																	
NOMINAL BRANCH SIZE																	
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	500	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	450	C	C	C	C	D	E	E	E	E	B	B	B	B	B	A	
	400	C	C	C	C	D	E	E	E	B	B	B	B	B	A		
	350	C	C	C	C	D	E	E	E	B	B	B	B	A			
	300	C	C	C	C	D	E	E	E	B	B	B	B	A			
	250	C	C	C	C	D	E	E	B	B	B	A					
	200	C	C	C	C	D	E	B	B	B	A						
	150	C	C	C	C	D	B	B	B	A							
	100	C	C	C	B	B	B	B	A								
	80	C	C	C	B	B	A										
	50	C	B	B	B	A											
	40	B	B	B	A												
	25	B	B	A													
	20	B	A														
	15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	160
80	80
100	80
150	80
200	80
250	80
300	80
350	80
400	80
450	80
500	80
600	80

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch outlet - Butt weld / Flanged (NOL / NOF)
- D Branch outlet - Butt weld / Flanged (WOL / NOF)
- E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
NOL - Nippolet
WOF - Weldoflange
WOL - Weldolet

FIRST ISSUE : DECEMBER 1998	REV LETTER	00			
	DATE	04/12/98			
	SIGN	M.H.			
PLANT PS - 1	CARBON STEEL		PIPING GENERAL		
CONSIGNEE -	SOUR SERVICE		CLASS No. : 6144G		
ENG BY AKER MARITIME	CON. JOB NO	-	ANSI RATING : 600		
PRINCIPAL OPQL	PROJECT NO	-	CORR. ALL : 3mm		

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 600	ASTM A106 - B
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 600	ASTM A105
SPECTACLE BLIND FLANGE	DN	15 - 600	ASTM A285 - C
SPACER RING	DN	15 - 600	ASTM A285 - C
SPADE BLIND	DN	15 - 600	ASTM A285 - C
WELDING NECK FLANGE	DN	15 - 600	ASTM A105

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 600	ASTM A234 - WPB
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB

REDUCING FITTINGS

BRANCH OUTLET, FLG END RF (NOF)	DN	15 - 50	ASTM A105N
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A105N
BRANCH OUTLET FLG END RF (WOF)	DN	80 - 200	ASTM A105N
BRANCH OUTLET BW END (WOL)	DN	50 - 200	ASTM A105N
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, GRAPHITE FILLED. CS CENTRING
STUD BOLTS / HEX NUTS		-	BOLTS: ASTM A193.B7M NUTS: ASTM A194-2HM ASTM A193-B8MA
JACKSCREWS			
LEVEL DISPACER CHAMBER	DN	00 - 100	ASTM A106-B
LEVEL GAUGE REFLEX	DN	20 - 20	BODY: ASTM A105 BOLTS: ASTM A193.B7M GASKET: GRAPHITE
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A105 BOLTS: ASTM A193.B7M GASKET: GRAPHITE
ORIFICE FLANGE SET RAISED FACE	DN	50 - 600	FLANGES: ASTM A105

VALVES - RAISED FACE

BALL VALVE, TRUNNIOM MOUNTED, FULL BORE, FLANGED.	DN	50 - 600	BODY : ASTM A216 -WCB/WCC+ENP ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182 F6a or 316(L) SEATS : NYLON PA12, DEVLON V
BALL VALVE, TRUNION MOUNTED, RED BORE, FLANGED.	DN	50 - 600	BODY : ASTM A216 -WCB/WCC+ENP ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182 F6a or 316(L) SEATS : NYLON PA12, DEVLON V
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + AISI 410 or STELLITE
DUAL PL. CHECK VALVE WAFER	DN	50 - 600	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + AISI 410 or STELLITE SEATS : PTFE
GATE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GATE VALVE, FLANGED.	DN	50 - 150	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + STELLITE or AISI 410
GLOBE VALVE, FLANGED.	DN	15 - 150	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
NEEDLE TYPE GLOBE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED - FULL BORE (2 ball + needle vent)	DN	50	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12

SCHED	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74 30 03			Blind 76 62 10	WN 76 62 79	Spect 76 88 36	Spacer 76 88 46	Spade 76 88 42		
160	15	020.1			208.1	802.1	408.1	508.1	082.1		
160	20	030.1			212.1	804.1	412.1	512.1	084.1		
160	25	040.1			216.1	806.1	416.1	516.1	086.1		
160	40	060.1			218.1	808.1	418.1	518.1	088.1		
160	50	073.1			220.1	810.1	420.1	520.1	090.1		
80	80	109.1			222.1	762.1	422.1	522.1	092.1		
80	100	157.1			224.1	764.1	424.1	524.1	094.1		
80	150	219.1			226.1	766.1	426.1	526.1	096.1		
80	200	255.1			228.1	768.1	428.1	528.1	098.1		
80	250	295.1			230.1	770.1	430.1	530.1	100.1		
80	300	341.1			232.1	772.1	432.1	532.1	102.1		
80	350	391.1			234.1	774.1	434.1	534.1	104.1		
80	400	445.1			236.1	776.1	436.1	536.1	106.1		
80	450	497.1			238.1	778.1	438.1	538.1	108.1		
80	500	548.1			240.1	780.1	440.1	540.1	110.1		
80	600	597.1			242.1	784.1	444.1	544.1	112.1		

SCHED	NOM PIPE SIZE	FITTINGS						GASKETS			
		Cap 76 30 17	Elbow 45 76 30 34	Elbow 90 SR	Elbow 90 LR 76 30 42	Equal Tee 76 30 81		Spiral Wound 85 41 36			
160	15	572.1	572.1	NOT USED	572.1	572.1		104.1			
160	20	578.1	578.1		578.1	578.1		106.1			
160	25	582.1	582.1		582.1	582.1		108.1			
160	40	592.1	592.1		592.1	592.1		112.1			
160	50	612.1	612.1		612.1	612.1		114.1			
80	80	628.1	628.1		628.1	628.1		118.1			
80	100	648.1	648.1		648.1	648.1		120.1			
80	150	668.1	668.1		668.1	668.1		124.1			
80	200	689.1	689.1		689.1	689.1		126.1			
80	250	710.1	710.1		710.1	710.1		128.1			
80	300	733.1	733.1		733.1	733.1		130.1			
80	350	752.1	752.1		752.1	752.1		132.1			
80	400	772.1	772.1		772.1	772.1		134.1			
80	450	794.1	794.1		794.1	794.1		136.1			
80	500	814.1	814.1		814.1	814.1		138.1			
80	600	834.1	834.1		834.1	834.1		142.1			

Nominal Pipe Size	VALVES									
	Ball RB Trunnion mounted Flanged 77 00 73	Ball FB Trunnion mounted Flanged 77 00 73	Gate Flanged 77 20 23	Globe Flanged 77 30 23	Globe Needle Flanged 77 30 23	Check Dual plate Wafer 77 67 06	Check Piston Flanged 77 10 23	DB & B 2 ball + needle vent Flanged 77 85 46	DB & B 3 ball Flanged 77 85 45	DB & B Full Bore Flanged 77 85 50
15			103.1	103.1	703.1		103.1	*00.1	*00.5	
20			104.1	104.1	704.1		104.1	*00.2	*01.4	
25			105.1	105.1	705.1		105.1	*00.3	*00.2	
40			107.1	107.1	707.1		107.1			
50	108.1	608.1		108.1		108.1				*00.4
80	110.1	610.1		110.1		110.1				
100	112.1	612.1		112.1		112.1				
150	114.1	614.1		114.1		114.1				
200	115.1	615.1				115.1				
250	116.1	616.1				116.1				
300	117.1	617.1				117.1				
350	118.1	618.1				118.1				
400	119.1	619.1				119.1				
450	120.1	620.1				120.1				
500	121.1	621.1				121.1				
600	123.1	623.1				123.1				

SCHED	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer 76 30 66	Ecc reducer 76 30 67	Reducing Tee 76 30 88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
160	50 x 20	195.1	195.1	098.1	
160	50 x 25	201.1	201.1	107.1	
160	50 x 40	211.1	211.1	116.1	
80/160	80 x 40	231.1	231.1	125.1	
80/160	80 x 50	241.1	241.1	134.1	
80/160	100 x 40	-	-	147.1	
80/160	100 x 50	271.1	271.1	155.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
80	200 x 100	327.1	327.1	206.1	
80	200 x 150	337.1	337.1	226.1	
80	250 x 100	345.1	345.1	254.1	
80	250 x 150	358.1	358.1	272.1	
80	250 x 200	368.1	368.1	293.1	
80	300 x 150	385.1	385.1	311.1	
80	300 x 200	398.1	398.1	330.1	
80	300 x 250	408.1	408.1	352.1	
80	350 x 150	415.1	415.1	374.1	
80	350 x 200	424.1	424.1	392.1	
80	350 x 250	439.1	439.1	417.1	
80	350 x 300	449.1	449.1	443.1	
80	400 x 150	-	-	464.1	
80	400 x 200	455.1	455.1	481.1	
80	400 x 250	464.1	464.1	507.1	
80	400 x 300	475.1	475.1	533.1	
80	400 x 350	489.1	489.1	558.1	
80	450 x 200	-	-	582.1	
80	450 x 250	526.1	526.1	606.1	
80	450 x 300	556.1	556.1	630.1	
80	450 x 350	587.1	587.1	654.1	
80	450 x 400	617.1	617.1	678.1	
80	500 x 200	-	-	702.1	
80	500 x 250	-	-	726.1	
80	500 x 300	646.1	646.1	750.1	
80	500 x 350	677.1	677.1	774.1	
80	500 x 400	707.1	707.1	798.1	
80	500 x 450	737.1	737.1	822.1	
80	600 x 250	-	-	846.1	
80	600 x 300	-	-	870.1	
80	600 x 350	-	-	894.1	
80	600 x 400	887.1	887.1	918.1	
80	600 x 450	917.1	917.1	942.1	
80	600 x 500	947.1	947.1	966.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
Valve globe	1	77.30.23	105.1	105.1	105.1	105.1	105.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	107.1	-	-
Flange blind	1	76.62.10	216.1	216.1	216.1	216.1	216.1
Flange WN	1	76.62.79	806.1	806.1	806.1	-	-
NOF	1	76.80.37	-	-	-	225.1	226.1
Bolting	8	81.38.66	272.1	272.1	272.1	272.1	272.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
Valve gate	1	77.20.23	105.1	105.1	105.1	105.1	105.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	107.1	-	-
Flange blind	1	76.62.10	216.1	216.1	216.1	216.1	216.1
Flange WN	1	76.62.79	806.1	806.1	806.1	-	-
NOF	1	76.80.31	-	-	-	225.1	226.1
Bolting	8	81.38.66	272.1	272.1	272.1	272.1	272.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
DBB Valve	1	77.85.46	*00.3	*00.3	*00.3	*00.3	*00.3
Equal tee	1	76.30.81	582.1	-	-	-	-
Reducing tee	1	76.30.88	-	089.1	107.1	-	-
Flange WN	1	76.62.79	806.1	806.1	806.1	-	-
NOF	1	76.80.37	-	-	-	225.1	226.1
Bolting	8	81.38.66	272.1	272.1	272.1	272.1	272.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	100 40	150 - 600 40			
Flange WN	1	76.62.79	808.1	-			
Tee Reducing	1	76.30.88	147.1	-			
NOF	1	76.80.37	-	231.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.66	330.1	330.1			
Gasket Sp WD	1	85.41.36	112.1	112.1			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.66	Dia x L In x mm	81.38	Dia x L In x mm	81.38.66	Dia x L In x mm		81.38.66	Dia x L In x mm
15	4	157.1	1/2 x 80			160.1	1/2 x 95			
20	4	271.1	5/8 x 90			274.1	5/8 x 110			
25	4	272.1	5/8 x 95			275.1	5/8 x 115			
40	4	330.1	3/4 x 110			334.1	3/4 x 130			
50	8	274.1	5/8 x 110	66.284.1	5/8 x 170	279.1	5/8 x 135		278.1	5/8 x 130
80	8	333.1	3/4 x 125	66.345.1	3/4 x 205	337.1	3/4 x 150		335.1	3/4 x 140
100	8	405.1	7/8 x 145	66.419.1	7/8 x 235	410.1	7/8 x 175		407.1	7/8 x 160
150	12	474.1	1 x 170	66.500.1	1 x 330	479.1	1 x 205		475.1	1 x 180
200	12	536.1	1 1/8 x 195	66.563.1	1 1/8 x 370	543.1	1 1/8 x 240		537.1	1 1/8 x 205
250	16	596.1	1 1/4 x 215	66.631.1	1 1/4 x 435	604.1	1 1/4 x 265		598.1	1 1/4 x 230
300	20	597.1	1 1/4 x 220	66.633.1	1 1/4 x 455	606.1	1 1/4 x 275		599.1	1 1/4 x 235
350	20	645.1	1 3/8 x 235	86.213.1	1 3/8 x 520	665.1	1 3/8 x 300		647.1	1 3/8 x 250
400	20	689.1	1 1/2 x 255	86.288.1	1 1/2 x 570	700.1	1 1/2 x 320		692.1	1 1/2 x 275
450	20	721.1	1 5/8 x 275	86.366.1	1 5/8 x 650	734.1	1 5/8 x 350		724.1	1 5/8 x 290
500	24	724.1	1 5/8 x 290	86.368.1	1 5/8 x 670	738.1	1 5/8 x 370		726.1	1 5/8 x 305
600	24	786.1	1 7/8 x 330	86.519.1	1 7/8 x 780	801.1	1 7/8 x 425		789.1	1 7/8 x 350

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79
50 - 600	15	*51.1	222.1	-	-
80 - 600	20	*51.2	223.1	-	-
80-100	25	*51.3	225.1	-	-
150 - 600	25	*51.4	226.1	-	-
150 - 600	40	*51.6	231.1	-	-
150	50	-	237.1	-	02.184.1
200	50	-	237.1	-	02.186.1
250	50	-	237.1	-	02.188.1
300	50	-	238.1	-	02.190.1
350	50	-	238.1	-	02.192.1
400	50	-	238.1	-	02.194.1
450	50	-	238.1	-	02.196.1
500	50	-	238.1	-	02.198.1
600	50	-	238.1	-	02.200.1
200	80	-	-	*070.1	01.390.1
250	80	-	-	*071.1	01.392.1
300	80	-	-	*072.1	01.394.1
350	80	-	-	*073.1	01.396.1
400	80	-	-	*074.1	01.398.1
450	80	-	-	*075.1	01.400.1
500	80	-	-	*076.1	01.402.1
600	80	-	-	*077.1	01.406.1
300	100	-	-	*078.1	01.416.1
350	100	-	-	*079.1	01.418.1
400	100	-	-	*080.1	01.420.1
450	100	-	-	*081.1	01.422.1
500	100	-	-	*082.1	01.424.1
600	100	-	-	*083.1	01.428.1
450	150	-	-	*084.1	01.442.1
500	150	-	-	*085.1	01.444.1
600	150	-	-	*086.1	01.448.1
600	200	-	-	*087.1	01.466.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450 15	500 15	600 15
DBB Valve	2	77.85.46	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1	*00.1
Flange WN RF	1	76.62.79	810.1	762.1	764.1	766.1	768.1	770.1	772.1	774.1	776.1	778.1	780.1	784.1
Jackscrews**		81.86.35	*00.6	*00.8	*01.1	*00.9	*00.5	*01.0	*00.1	*00.1	*02.6	*00.3	*02.7	*02.9
NOL-Plain end	1	76.80.31	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2
Bolting		81.38.66	278.1	335.1	407.1	475.1	537.1	598.1	599.1	647.1	672.1	724.1	726.1	789.1
Number of bolts			8	8	8	12	12	16	20	20	20	20	24	24
Gasket Sp.WD	2	85.41.36	114.1	118.1	120.1	124.1	126.1	128.1	130.1	132.1	134.1	136.1	138.1	142.1

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
76 80 60 442.1	356	Valve, Gate	2	77.20.23.103.1
76 80 60 444.1	813	Valve, Ball	1	77.00.72.108.1
76 80 60 446.1	1219	Flange blind	2	76.62.10.212.1
76 80 60 448.1	1524	Flange WN	1	76.62.79.804.1
76 80 60 450.1	1829	Gasket Sp.WD	1	85.41.36.120.1
76 80 60 452.1	2134	Gasket Sp.WD	4	85.41.36.114.1
76 80 60 454.1	2438	Gasket Sp.WD	3	85.41.36.106.1
76 80 60 456.1	2743	Bolting	8	81.38.66.405.1
76 80 60 458.1	3048	Bolting	32	81.38.66.274.1
		Bolting	12	81.38.66.271.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level gauge	1	77.81.66	072.1	074.1	076.1
Valve, gate	3	77.20.23	104.1	104.1	104.1
Flange blind	2	76.62.10	212.1	212.1	212.1
Bolting	24	81.38.66	271.1	271.1	271.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level gauge	1	77.81.66	572.1	574.1	576.1
Valve, gate	3	77.20.23	104.1	104.1	104.1
Flange blind	2	76.62.10	212.1	212.1	212.1
Bolting	24	81.38.66	271.1	271.1	271.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.66	330.1	330.1	330.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD	Class Size	25
Double Block & Bleed Valve	1	77.85.45	*00.2
Bolting	8	81.38.66	157.1
Gasket Sp.WD	2	85.41.36	104.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-50	38	50	75	100	120
PRESSURE BAR GA	95.8	95.8	94.6	92.3	90.3	89.5

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ANSI B16.5 MAT.GRP. 1.3
- COLD BENDING OF PIPE IS NOT ALLOWED.
- WELDS SHALL BE POST -WELD HEAT TREATED FOR WALL THICKNESS EQUAL OR > 12mm.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

		BRANCH CONNECTIONS 90 DEG												
		NOMINAL BRANCH SIZE												
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400
	600													
	500													
	450													
	400	C	C	C	C	D	E	E	B	B	B	B	B	A
	350	C	C	C	C	D	E	E	B	B	B	B	A	
	300	C	C	C	C	D	E	E	B	B	B	A		
	250	C	C	C	C	D	E	E	B	B	B	A		
	200	C	C	C	C	D	E	E	B	B	A			
	150	C	C	C	C	D	B	B	A					
	100	C	C	C	B	B	B	A						
	80	C	C	C	B	B	A							
	50	C	B	B	B	A								
	40	B	B	B	A									
	25	B	B	A										
	20	B	A											
	15	A												

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	160
80	80
100	80
150	80
200	80
250	80
300	80
350	80
400	80

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

ISSUE DATE : DECEMBER 1998		REV LETTER	00			
		DATE	04/12/98			
		SIGN	M.H.			
PLANT	PS - 1	LOW TEMP CARBON STEEL		PIPING GENERAL		
CONSIGNEE		SOUR SERVICE		CLASS No. : 6150G		
ENG BY	AKER MARITIME	CONTRACT JOB NO -		ASME RATING : 600		
PRINCIPAL	OPQL	PROJECT NO -		CORR. ALL : 3 mm		

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description.

PIPE

PIPE, SEAMLESS	DN	15 - 400	ASTM A333-6
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 400	ASTM A350-LF2
SPECTACLE BLIND FLANGE	DN	15 - 400	ASTM A516-60
SPACER RING	DN	15 - 400	ASTM A516-60
SPADE BLINDS	DN	15 - 400	ASTM A516-60
WELDING NECK FLANGE	DN	15 - 400	ASTM A350-LF2

FITTINGS

CAP, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6

REDUCING FITTINGS

BRANCH OUTLET, FLG. RF (NOF)	DN	15 - 50	ASTM A350-LF2
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A350-LF2
BRANCH OUTLET FLG. RF (WOF)	DN	80 - 200	ASTM A350-LF2
BRANCH OUTLET BW END (WOL)	DN	50 - 200	ASTM A350-LF2
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, GRAPHITE FILLED, CS CENTRING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M
JACKSCREWS			ASTM A193-B8MA
LEVEL DISPACER CHAMBER	DN	100 - 100	ASTM A333 - 6 (SEAMLESS)
LEVEL GAUGE REFLEX	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A 320-L7M/A194-7M GASKETS: GRAPHITE
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A 320-L7M/A194-7M GASKETS: GRAPHITE
ORIFICE FLANGE SET, RAISED FACE	DN	50 - 600	FLANGES: ASTM A350 - LF2

VALVES

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 400	BODY: ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM: BODY MAT.+ENP or ASTM A182 F316(L) SEATS: NYLON PA12, DEVLON V
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 400	BODY: ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM: BODY MAT.+ENP or ASTM A182 F316(L) SEATS: NYLON PA12, DEVLON V
CHECK VALVE, PISTON, FLANGED	DN	15 - 40	BODY: ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM: AISI 316 or STELLITE
DUAL PL. CHECK VALVE WAFER	DN	50 - 400	BODY: ASTM A352M-LCB/LCC or A350M-LF2 PLATE: BODY + STELLITE SEATS: WELDED ON WITH AISI 316(L) or STELLITE
GATE VALVE, FLANGED.	DN	15 - 40	BODY: ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM: AISI 316(L) or STELLITE
GLOBE VALVE, FLANGED.	DN	15 - 200	BODY: ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM: AISI 316(L) or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY: ASTM A350-LF2 TRIM: AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED - FULL BORE (2 ball + needle vent)	DN	50	BODY: ASTM A350-LF2 TRIM: AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74 30 16			Blind 76 62 12	WN 76 62 86	Spect. 76 88 35	Spacer 76 88 47	Spade 76 88 43		
160	15	023.1			558.1	262.1	408.1	158.1	*08.2		
160	20	030.1			562.1	264.1	412.1	162.1	*08.4		
160	25	038.1			566.1	266.1	416.1	166.1	*08.6		
160	40	054.1			568.1	268.1	418.1	168.1	*08.8		
160	50	063.1			570.1	270.1	420.1	170.1	*09.0		
80	80	069.1			572.1	162.1	422.1	172.1	*09.2		
80	100	077.1			574.1	164.1	424.1	174.1	*09.4		
80	150	086.1			576.1	166.1	426.1	176.1	*09.6		
80	200	098.1			578.1	168.1	428.1	178.1	*09.8		
80	250	110.1			580.1	170.1	430.1	180.1	*10.0		
80	300	122.1			582.1	172.1	432.1	182.1	*10.2		
80	350	135.1			584.1	174.1	434.1	184.1	*10.4		
80	400	144.1			586.1	176.1	436.1	186.1	*10.6		
	450										
	500										
	600										

SCHD	Nominal Pipe Size	FITTINGS					GASKETS	
		Cap 76 31 17	Elbow 45 76 31 34	Elbow 90 SR	Elbow 90 LR 76 31 43	Equal Tee 76 31 80	Spiral Wound 85 41 36	
160	15	172.1	172.1	NOT USED	172.1	172.1	104.1	
160	20	178.1	178.1		178.1	178.1	106.1	
160	25	182.1	182.1		182.1	182.1	108.1	
160	40	192.1	192.1		192.1	192.1	112.1	
160	50	212.1	212.1		212.1	212.1	114.1	
80	80	230.1	230.1		230.1	230.1	118.1	
80	100	248.1	248.1		248.1	248.1	120.1	
80	150	268.1	268.1		268.1	268.1	124.1	
80	200	288.1	288.1		288.1	288.1	126.1	
80	250	310.1	310.1		310.1	310.1	128.1	
80	300	332.1	332.1		332.1	332.1	130.1	
80	350	352.1	352.1		352.1	352.1	132.1	
80	400	372.1	372.1		372.1	372.1	134.1	
	450							
	500							
	600							

Nominal Pipe Size	VALVES										
	Ball RB Floating ball Flanged	Ball RB Trunnion Flanged	Ball FB Floating ball Flanged	Ball FB Trunnion mounted Flanged	Gate Flanged	Globe Flanged	Check dual pl. Wafer	Check Piston Flanged	DB & B 2 ball + needle vent Flanged	DB & B 3 ball Flanged	DB & B Full Bore Flanged
15					103.1	103.1		103.1	*00.1	*00.5	
20					104.1	104.1		104.1	*00.2	*01.4	
25					105.1	105.1		105.1	*00.3	*00.2	
40	NOT USED		NOT USED		107.1	107.1		107.1			
50		108.1		608.1		108.1	608.1				*00.4
80		110.1		610.1		110.1	610.1				
100		112.1		612.1		112.1	612.1				
150		114.1		614.1		114.1	614.1				
200		115.1		615.1			615.1				
250		116.1		616.1			616.1				
300		117.1		617.1			617.1				
350		118.1		618.1			618.1				
400		119.1		619.1			619.1				
450											
500											
600											

SCHD	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer 76 31 66	Ecc reducer 76 31 75	Reducing Tee 76 31 88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
160	50 x 20	195.1	195.1	098.1	
160	50 x 25	201.1	201.1	107.1	
160	50 x 40	211.1	211.1	116.1	
80/160	80 x 40	229.1	229.1	129.1	
80/160	80 x 50	238.1	238.1	138.1	
80/160	100 x 40	253.1	253.1	147.1	
80/160	100 x 50	268.1	268.1	159.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
80	200 x 100	327.1	327.1	206.1	
80	200 x 150	337.1	337.1	226.1	
80	250 x 100	345.1	345.1	254.1	
80	250 x 150	358.1	358.1	272.1	
80	250 x 200	367.1	367.1	293.1	
80	300 x 150	385.1	385.1	311.1	
80	300 x 200	397.1	397.1	330.1	
80	300 x 250	408.1	408.1	352.1	
80	350 x 150	415.1	415.1	374.1	
80	350 x 200	424.1	424.1	392.1	
80	350 x 250	439.1	439.1	417.1	
80	350 x 300	449.1	449.1	443.1	
80	400 x 150	-	-	464.1	
80	400 x 200	455.1	455.1	481.1	
80	400 x 250	464.1	464.1	507.1	
80	400 x 300	475.1	475.1	533.1	
80	400 x 350	489.1	489.1	558.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
Globe Valve	1	77.30.33	105.1	105.1	105.1	105.1	105.1
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	107.1	-	-
Flange blind	1	76.62.12	566.1	566.1	566.1	566.1	566.1
Flange WN	1	76.62.86	266.1	266.1	266.1	-	-
NOF	1	76.80.37	-	-	-	725.1	725.1
Bolting	8	81.38.67	272.1	272.1	272.1	272.1	272.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
Gate Valve	1	77.20.33	105.1	105.1	105.1	105.1	105.1
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	107.1	-	-
Flange blind	1	76.62.12	566.1	566.1	566.1	566.1	566.1
Flange WN	1	76.62.86	266.1	266.1	266.1	-	-
NOF	1	76.80.37	-	-	-	725.1	725.1
Bolting	8	81.38.67	272.1	272.1	272.1	272.1	272.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50	80 - 100	150 - 600
			25	25	25	25	25
DBB Valve	1	77.85.46	*00.3	*00.3	*00.3	*00.3	*00.3
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	107.1	-	-
Flange WN	1	76.62.86	266.1	266.1	266.1	-	-
NOF	1	76.80.37	-	-	-	725.1	725.1
Bolting	8	81.38.67	272.1	272.1	272.1	272.1	272.1
Gasket Sp WD	2	85.41.36	108.1	108.1	108.1	108.1	108.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100	150 - 400			
			40	40			
Flange WN	1	76.62.86	268.1	-			
Tee reducing	1	76.31.88	147.1	-			
NOF	1	76.80.37	-	731.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.67	330.1	330.1			
Gasket Sp WD	1	85.41.36	112.1	112.1			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L	81.38	Dia x L	81.38.67	Dia x L		81.38.67	Dia x L
			In x mm		In x mm		In x mm			In x mm
15	4	157.1	1/2 x 80			160.1	1/2 x 95			
20	4	271.1	5/8 x 90			274.1	5/8 x 110			
25	4	272.1	5/8 x 95			275.1	5/8 x 115			
40	4	330.1	3/4 x 110			334.1	3/4 x 130			
50	8	274.1	5/8 x 110	67.284.1	5/8 x 170	279.1	5/8 x 135	278.1	5/8 x 130	
80	8	333.1	3/4 x 125	67.345.1	3/4 x 205	337.1	3/4 x 150	335.1	3/4 x 140	
100	8	405.1	7/8 x 145	67.*01.2	7/8 x 235	410.1	7/8 x 180	407.1	7/8 x 160	
150	12	474.1	1 x 170	67.500.1	1 x 330	479.1	1 x 205	475.1	1 x 180	
200	12	536.1	1 1/8 x 195	67.*01.5	1 1/8 x 370	543.1	1 1/8 x 240	537.1	1 1/8 x 205	
250	16	596.1	1 1/4 x 215	67.631.1	1 1/4 x 435	604.1	1 1/4 x 265	598.1	1 1/4 x 230	
300	20	597.1	1 1/4 x 220	67.*01.6	1 1/4 x 455	606.1	1 1/4 x 275	599.1	1 1/4 x 235	
350	20	645.1	1 3/8 x 235	94.213.1	1 3/8 x 520	655.1	1 3/8 x 300	647.1	1 3/8 x 250	
400	20	689.1	1 1/2 x 255	94.288.1	1 1/2 x 570	700.1	1 1/2 x 320	692.1	1 1/2 x 275	
450										
500										
600										

BRANCH NIPPLES						
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79	
50-400	15	*56.1	721.1	-	-	
80-400	20	*56.2	723.1	-	-	
80-100	25	*56.3	725.1	-	-	
150-400	25	*56.4	726.1	-	-	
150-400	40	*56.5	731.1	-	-	
150	50	-	737.1	-	06.184.1	
200	50	-	737.1	-	06.186.1	
250	50	-	737.1	-	06.188.1	
300	50	-	738.1	-	06.190.1	
350	50	-	738.1	-	06.192.1	
400	50	-	738.1	-	06.194.1	
200	80	-	-	*74.0	05.390.1	
250	80	-	-	*74.1	05.392.1	
300	80	-	-	*74.2	05.394.1	
350	80	-	-	*74.3	05.396.1	
400	80	-	-	*74.4	05.398.1	
300	100	-	-	*74.8	05.416.1	
350	100	-	-	*74.9	05.418.1	
400	100	-	-	*75.0	05.420.1	

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS													
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15		
DBB Valve	2	77.85.45	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5		
Flange WN RF	2	76.62.86	270.1	162.1	164.1	166.1	168.1	170.1	172.1	174.1	176.1		
Jackscrews**		81.86.35	*00.6	*00.8	*01.1	*00.9	*00.5	*01.0	*00.1	*00.1	*02.6		
NOL plain end	2	76.80.31	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4		
Bolting		81.38.67	278.1	335.1	407.1	475.1	537.1	598.1	599.1	649.1	692.1		
Number of bolts			8	8	8	12	12	16	20	20	20		
Gasket Sp.WD	2	85.41.36	114.1	118.1	120.1	124.1	126.1	128.1	130.1	132.1	134.1		

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR CONNECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.622.1	356	Valve, Gate	1	77.20.33.104.1
76.80.60.624.1	813	Valve, Ball	2	77.00.82.108.1
76.80.60.626.1	1219	Flange blind	2	76.62.12.562.1
76.80.60.628.1	1524	Flange WN	1	76.62.82.264.1
76.80.60.630.1	1829	Gasket Sp.WD	1	85.41.36.120.1 DN 100
76.80.60.632.1	2134	Gasket Sp.WD	4	85.41.36.114.1 DN 50
76.80.60.634.1	2438	Gasket Sp.WD	3	85.41.36.106.1 DN 20
76.80.60.636.1	2743	Bolting	8	81.38.67.405.1
76.80.60.638.1	3048	Bolting	32	81.38.67.274.1
		Bolting	12	81.38.67.271.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.68	022.1	024.1	026.1
Valve, gate	3	77.20.33	104.1	104.1	104.1
Flange blind	2	76.62.12	562.1	562.1	562.1
Bolting	24	81.38.67	271.1	271.1	271.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.68	5522.1	5524.1	5526.1
Valve, gate	3	77200.3	104.1	104.1	104.1
Flange blind	2	76.62.12	562.1	562.1	562.1
Bolting	24	81.38.67	271.1	271.1	271.1
Gasket Sp.WD	6	85.41.36	106.1	106.1	106.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	330.1	330.1	330.1
Gasket Sp.WD	1	85.41.36	112.1	112.1	112.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*00.3
Bolting	4	81.38.67	272.1
Gasket Sp.WD	1	85.41.36	108.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-100	38	50	75	100	120
PRESSURE BAR GA	99.3	99.3	96.3	90	84.5	81.5

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP 2.2
- FOR DESIGN TEMPERATURES ABOVE 50 DEG.C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.
- WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 DEG.C, TO PREVENT CHLORIDE CORROSION CRACKING
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400																
	350																
	300																
	250																
	200	C	C	C	C	D	E	B	B	A							
	150	C	C	C	C	D	B	B	A								
	100	C	C	C	B	B	B	A									
	80	C	C	C	B	B	A										
	50	C	B	B	B	A											
	40	B	B	B	A												
	25	B	B	A													
	20	B	A														
	15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	40S
20	40S
25	40S
40	40S
50	40S
80	40S
100	40S
150	80S
200	80S

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch outlet - Plain / Flanged (NOL / NOF)
- D Branch outlet - Butt weld / Flanged (WOL / NOF)
- E Branch outlet - Butt weld / Flanged (WOL / WOF)

- NOF - Nippoflange
- NOL - Nippolet
- WOF - Weldoflange
- WOL - Weldolet

ISSUE DATE	DECEMBER 1998	REV LETTER	00			
		DATE	04/12/98			
		SIGN	M.H.			
PLANT	PS - 1	STAINLESS STEEL (16Cr-12Ni-2Mo)		PIPING GENERAL		
CONSIGNEE	-	LOW TEMP. SOUR SERVICE		CLASS No. :	6346G	
ENG BY	AKER MARITIME	CONTR. No.	-	ASME RATING :	600	
PRINCIPAL	OPQL	PROJECT No.	-	CORR. ALL :	0 mm	

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 200	ASTM A312-TP316L
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 200	ASTM A182-F316
SPECTACLE BLIND FLANGE	DN	15 - 200	ASTM A240-TP316
SPACER RING	DN	15 - 200	ASTM A240-TP316
SPADE BLINDS	DN	15 - 200	ASTM A240-TP316
WELDING NECK FLANGE	DN	15 - 200	ASTM A182-F316

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 200	ASTM A403-WP316L
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L

REDUCING FITTINGS

BRANCH OUTLET, FLG RF (NOF)	DN	15 - 50	ASTM A182-F316
BRANCH OUTLET PLAIN END (NOL)	DN	15 - 40	ASTM A182-F316
BRANCH OUTLET FLG. RF (WOF)	DN	80 - 100	ASTM A182-F316
BRANCH OUTLET BW END (WOL)	DN	50 - 100	ASTM A182-F316
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 200	AISI 316, GRAPHITE FILLED WITH SS CENTRING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M
JACKSCREWS			ASTM A193-B8MA
LEVEL DISPLACER CHAMBER	DN	100 - 100	ASTM A312-TP316
LEVEL GAUGE REFLEX TYPE	DN	20 - 20	BODY: ASTM A182-F316 BOLTS: ASTM A320-L7M / A194-7M GASKET: GRAPHITE
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A182-F316 BOLTS: ASTM A320-L7M / A194-7M GASKET: GRAPHITE
ORIFICE FLANGE SET, RAISED FACE	DN	50 - 200	FLANGES: ASTM A182-F316

VALVES - RAISED FACE

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 200	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : PCTFE
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 200	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : PCTFE
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
DUAL PL. CHECK VALVE WAFER	DN	50 - 200	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : VITON B or GF
GATE VALVE, FLANGED	DN	15 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
GLOBE VALVE, FLANGED	DN	15 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
DOUBLE BLOCK & BLEED FLANGED - Bore 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A182 F316 or ASTM A351-CF8M TRIM ASTM A182 F316(L) SEATS : PTFE/PCTFE
DOUBLE BLOCK & BLEED FLANGED - FULL BORE (2 ball + needle vent)	DN	50	BODY : ASTM A182 F316 or ASTM A351-CF8M TRIM: AISI 316 SEATS : PTFE/PCTFE

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74 36 33			Blind 76 65 10	WN 76 65 80	Spect 76 88 10	Spacer 76 88 19	Spade 76 88 43		
40S	15	018.1			462.1	482.1	408.1	508.1	332.1		
40S	20	026.1			464.1	484.1	412.1	512.1	334.1		
40S	25	034.1			466.1	486.1	416.1	516.1	336.1		
40S	40	050.1			468.1	488.1	418.1	518.1	338.1		
40S	50	058.1			470.1	490.1	420.1	520.1	340.1		
40S	80	066.1			472.1	492.1	422.1	522.1	342.1		
40S	100	074.1			474.1	494.1	424.1	524.1	344.1		
80S	150	085.1			476.1	556.1	426.1	526.1	346.1		
80S	200	097.1			478.1	558.1	428.1	528.1	348.1		
	250										
	300										
	350										
	400										
	450										
	500										
	600										

SCHD	Nominal Pipe Size	FITTINGS						GASKETS		
		Cap 76 33 19	Elbow 45 76 33 37	Elbow 90 SR 76 33 41	Elbow 90 LR 76 33 41	Equal Tee 76 33 84		Spiral Wound 85 41 36		
40S	15	286.1	286.1		286.1	786.1		*24.1		
40S	20	296.1	296.1		296.1	796.1		*24.2		
40S	25	306.1	306.1		306.1	806.1		*24.3		
40S	40	326.1	326.1	NO USED	326.1	826.1		*24.4		
40S	50	336.1	336.1		336.1	836.1		*24.5		
40S	80	356.1	356.1		356.1	856.1		*26.7		
40S	100	376.1	376.1		376.1	876.1		*26.8		
80S	150	397.1	397.1		397.1	897.1		*26.9		
80S	200	411.1	411.1		411.1	911.1		27.0		
	250									
	300									
	350									
	400									
	450									
	500									
	600									

Nominal Pipe Size	VALVES										
	Ball RB	Ball RB	Ball FB	Ball FB	Gate	Globe	Check	Check	DB & B	DB & B	DB & B
	Floating ball Flanged	Trunnion mounted Flanged 77 03.73	Floating ball Flanged	Trunnion mounted Flanged 77 03.73	Flanged 77 23.09	Flanged 77 33.09	dual pl. Wafer 77 68.00	Piston Flanged 77 13.09	2 ball + needle vent Flanged 77 85.46	3 ball Flanged 77 85.45	Full Bore Flanged 77 85.50
15	NOT USED	108 1	NOT USED	608 1	103 1	103 1	608 1	103 1	*10 1	*11 2	*00 5
20					104 1	104 1		104 1	*10 2	*10 8	
25					105 1	105 1		105 1	*10 3	*11 0	
40					107 1	107 1		107 1			
50											
80											
100											
150											
200											
250											
300											
350											
400											
450											
500											
600											

REDUCING FITTINGS					
SCHD	Nominal Pipe Size	Conc reducer 76 33 70	Ecc reducer 76 33 72	Reducing Tee 76 33 85	Reducing Tee 76 33 89
40S	20 x 15	566.1	566.1	618.1	-
40S	25 x 15	576.1	576.1	628.1	-
40S	25 x 20	586.1	586.1	638.1	-
40S	40 x 15	596.1	596.1	642.1	-
40S	40 x 20	616.1	616.1	648.1	-
40S	40 x 25	626.1	626.1	658.1	-
40S	50 x 20	-	-	664.1	-
40S	50 x 25	636.1	636.1	674.1	-
40S	50 x 40	646.1	646.1	684.1	-
40S	80 x 40	676.1	676.1	694.1	-
40S	80 x 50	686.1	686.1	-	354.1
40S	100 x 40	-	-	-	362.1
40S	100 x 50	706.1	706.1	-	370.1
40S	100 x 80	716.1	716.1	-	378.1
80S/40S	150 x 80	746.1	746.1	-	387.1
80S/40S	150 x 100	756.1	756.1	-	395.1
80S/40S	200 x 100	768.1	768.1	-	403.1
80S/40S	200 x 150	781.1	781.1	-	412.1

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80-100 25	150-200 25
Valve, globe	1	77.33.09	105.1	105.1	105.1	105.1	105.1
Tee equal	1	76.33.84	806.1			-	-
Tee reducing	1	76.33.85		658.1	674.1	-	-
Flange blind	1	76.65.10	466.1	466.1	466.1	466.1	466.1
Flange WN	1	76.65.80	486.1	486.1	486.1		
NOF	1	76.80.39				087.1	88.1
Bolting	8	81.38.67	272.1	272.1	272.1	272.0	272.1
Gasket Sp.WD	2	85.41.36	*24.3	*24.3	*24.3	*24.3	*24.3

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25 25	40 25	50 25	80-100 25	150-200 25
Valve, gate	1	77.23.09	105.1	105.1	105.1	105.1	105.1
Tee equal	1	76.33.84	806.1			-	-
Tee reducing	1	76.33.85		658.1	674.1	-	-
Flange blind	1	76.65.10	466.1	466.1	466.1	466.1	466.1
Flange WN	1	76.65.80	486.1	486.1	486.1		
NOF	1	76.80.39				087.1	88.1
Bolting	8	81.38.67	272.1	272.1	272.1	272.0	272.1
Gasket Sp.WD	2	85.41.36	*24.3	*24.3	*24.3	*24.3	*24.3

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80-100 25	150-200 25
DBB Valve	1	77.85.45	*11.0	*11.0	*11.0	*11.0	*11.0
Tee equal	1	76.33.84	806.1			-	-
Tee reducing	1	76.33.85		658.1	674.1	-	-
Flange WN	1	76.65.80	486.1	486.1	486.1	-	-
NOF	1	76.80.39				087.1	88.1
Bolting	8	81.38.67	272.1	272.1	272.1	272.0	272.1
Gasket Sp.WD	2	85.41.36	*24.3	*24.3	*24.3	*24.3	*24.3

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150-200 40			
Flange WN	1	76.65.80	488.1				
Tee Reducing	1	76.33.85	362.1				
NOF	1	76.80.39		093.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.67	330.1	330.1			
Gasket Sp.WD	1	85.41.36	*24.4	*24.4			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number off Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm		81.38.67	Dia x L In x mm
15	4	157.1	1/2 x 80			160.1	1/2 x 95			
20	4	271.1	5/8 x 90			274.1	5/8 x 110			
25	4	272.1	5/8 x 95			275.1	5/8 x 115			
40	4	330.1	3/4 x 110			334.1	3/4 x 130			
50	8	274.1	5/8 x 110	284.1	5/8 x 170	279.1	5/8 x 135		278.1	5/8 x 130
80	8	333.1	3/4 x 125	345.1	3/4 x 205	337.1	3/4 x 150		335.1	3/4 x 140
100	8	405.1	7/8 x 145	*01.2	7/8 x 235	410.1	7/8 x 180		407.1	7/8 x 160
150	12	474.1	1 x 170	500.1	1 x 330	479.1	1 x 205		475.1	1 x 180
200	12	536.1	11/8 x 195	*01.5	11/8 x 370	543.1	11/8 x 240		537.1	11/8 x 205
250										
300										
350										
400										
450										
500										
600										

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.39	WOF 76.80.37	WOL 76.79.70
50-150	15	451.1	081.1	-	-
200	15	452.1	082.1	-	-
80	20	453.1	083.1	-	-
100-300	20	454.1	084.1	-	-
80-100	25	457.1	087.1	-	-
150-200	25	458.1	088.1	-	-
150-200	40	462.1	093.1	-	-
150	50	-	098.1	-	184.1
200	50	-	098.1	-	186.1
200	80	-	-	*54.7	208.1

** Dimensions to SIPM standard drawing S-38 090

ORIFICE INSTRUMENT CONNECTIONS													
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15						
DBB Valve	2	77.85.45	*11.2	*11.2	*11.2	*11.2	*11.2						
Flange WN RF	2	76.65.80	490.1	492.1	494.1	556.1	558.1						
Jackscrews**		81.86.35	*00.6	*00.8	*01.1	*00.9	*00.5						
NOL plain end	2	76.80.31	*00.6	*00.6	*00.6	*00.6	*00.6						
Bolting		81.38.67	278.1	335.1	407.1	475.1	537.1						
Number of bolts			8	8	8	12	12						
Gasket Sp.WD	2	85.41.36	*24.1	*24.1	*24.1	*24.1	*24.1						

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.482.1	356	Valve, Gate	1	77.23.09.104.1
76.80.60.484.1	813	Valve, Ball	2	77.30.73.108.1
76.80.60.486.1	1219	Flange blind	2	76.62.10.464.1
76.80.60.488.1	1524	Flange WN	1	76.62.80.484.1
76.80.60.490.1	1829	Gasket Sp.WD	1	85.41.36.*26.8 DN 100
76.80.60.492.1	2134	Gasket Sp.WD	4	85.41.36.*24.5 DN 50
76.80.60.494.1	2438	Gasket Sp.WD	3	85.41.36.*24.2 DN 20
76.80.60.496.1	2743	Bolting	8	81.38.67.405.1
76.80.60.498.1	3048	Bolting	32	81.38.67.274.1
		Bolting	12	81.38.67.271.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.72	172.1	174.1	176.1
Valve, gate	3	77.23.09	104.1	104.1	104.1
Flange blind	2	76.65.10	464.1	464.1	464.1
Bolting	24	81.38.67	271.1	271.1	271.1
Gasket Sp.WD	6	85.41.36	*24.2	*24.2	*24.2

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge	1	76.81.72	5672.1	5674.1	5676.1
Valve, gate	3	77.23.09	104.1	104.1	104.1
Flange blind	2	76.62.10	464.1	464.1	464.1
Bolting	24	81.38.67	271.1	271.1	271.1
Gasket Sp.WD	6	85.41.36	*24.2	*24.2	*24.2

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	330.1	330.1	330.1
Gasket Sp.WD	1	85.41.36	*24.6	*24.6	*24.6

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.45	*11.0
Bolting	4	81.38.67	272.1
Gasket Sp.WD	1	85.41.36	*24.3

TEMPERATURE DEG C	SERVICE LIMITS					
	-20	38	50	75	100	120
PRESSURE BAR GA	130	130	130	130	130	130

NOTES

- SERVICE LIMITS ARE BASED ON B7M BOLTING LIMITS
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- FLANGES, GASKETS AND FLANGED VALVES DN 15 UP TO AND INCLUDING DN 50 ARE CLASS 1500.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

BRANCH CONNECTIONS 90 DEG																
NOMINAL BRANCH SIZE																
DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
600																
500																
450																
400	C	C	C	C	D	E	E	B	B	B	B	B	A			
350	C	C	C	C	D	E	E	B	B	B	B	A				
300	C	C	C	C	D	E	E	B	B	B	A					
250	C	C	C	C	D	E	B	B	B	A						
200	C	C	C	C	D	E	B	B	A							
150	C	C	C	C	D	B	B	A								
100	C	C	C	B	B	B	A									
80	C	C	C	B	B	A										
50	C	B	B	B	A											
40	B	B	B	A												
25	B	B	A													
20	B	A														
15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	160
80	160
100	120
150	120
200	120
250	120
300	120
350	120
400	120

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

FIRST ISSUE : DECEMBER 1998		REV LETTER	00			
		DATE	04/12/98			
		SIGN	M.H.			
PLANT	PS - 1	CARBON STEEL		PIPING GENERAL		
CONSIGNEE	-	SOUR SERVICE		CLASS No. : 9144G		
ENG BY	AKER MARITIME	CON. JOB NO -		ANSI RATING : 900		
PRINCIPAL	OPQL	PROJECT NO -		CORR. ALL : 3mm		

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 400	ASTM A106 - B
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 400	ASTM A105
SPECTACLE BLIND FLANGE	DN	15 - 400	ASTM A285 - C
SPACER RING	DN	15 - 400	ASTM A285 - C
SPADE BLIND	DN	15 - 400	ASTM A516 - 60
WELDING NECK FLANGE	DN	15 - 400	ASTM A105

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 400	ASTM A234 - WPB
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB

REDUCING FITTINGS

BRANCH OUTLET, FLG END RF (NOF)	DN	15 - 50	ASTM A105N
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A105N
BRANCH OUTLET FLG END RF (WOF)	DN	80 - 100	ASTM A105N
BRANCH OUTLET BW END (WOL)	DN	50 - 100	ASTM A105N
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 400	AISI 316, GRAPHITE FILLED. CS CENTRING AND INNER RING
STUD BOLTS / HEX NUTS		-	BOLTS: ASTM A193.B7M NUTS: ASTM A194-2HM ASTM A193-B8MA
JACKSCREWS			
ORIFICE FLANGE SET RAISED FACE	DN	50 - 400	FLANGES: ASTM A105

VALVES - RAISED FACE

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182-F6a or 316(L) SEATS : NYLON PA12, DEVLON V
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182-F6a or 316(L) SEATS : NYLON PA12, DEVLON V
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + AISI 410 or STELLITE
DUAL PL. CHECK VALVE WAFER	DN	50 - 400	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: BODY + AISI 410 or STELLITE SEATS : PTFE
GATE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, NEEDLE TYPE , FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED - FULL BORE (2 ball + needle vent)	DN	50	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74 30 03			Blind 76 62 10	WN 76 62 79	Spect. 76 88 36	Spacer 76 88 46	Spade 76 88 42		
160	15	020.1			408.1	962.1	508.1	608.1	122.1		
160	20	030.1			412.1	964.1	512.1	612.1	124.1		
160	25	040.1			416.1	966.1	516.1	616.1	126.1		
160	40	060.1			418.1	968.1	518.1	618.1	128.1		
160	50	073.1			420.1	970.1	520.1	620.1	130.1		
160	80	113.1			322.1	886.1	522.1	622.1	132.1		
120	100	159.1			324.1	864.1	524.1	624.1	134.1		
120	150	223.1			326.1	866.1	526.1	626.1	136.1		
120	200	263.1			328.1	868.1	528.1	628.1	138.1		
120	250	303.1			330.1	870.1	530.1	630.0	140.1		
120	300	347.1			332.1	872.1	532.1	632.1	142.1		
120	350	395.1			334.1	874.1	534.1	634.1	144.1		
120	400	449.1			336.1	876.1	536.1	636.1	146.1		
	450										
	500										
	600										

SCHD	Nominal Pipe Size	FITTINGS						GASKETS			
		Cap 76 30 17	Elbow 45 76 30 34	Elbow 90 SR	Elbow 90 LR 76 30 42	Equal Tee 76 30 81		Spiral Wound 85 41 36			
160	15	572.1	572.1	NOT USED	572.1	572.1		204.1			
160	20	578.1	578.1		578.1	578.1		206.1			
160	25	582.1	582.1		582.1	582.1		208.1			
160	40	592.1	592.1		592.1	592.1		212.1			
160	50	612.1	612.1		612.1	612.1		214.1			
160	80	632.1	632.1		632.1	632.1		168.1			
120	100	650.1	650.1		650.1	650.1		170.1			
120	150	670.1	670.1		670.1	670.1		174.1			
120	200	691.1	691.1		691.1	691.1		176.1			
120	250	712.1	712.1		712.1	712.1		178.1			
120	300	735.1	735.1		735.1	735.1		180.1			
120	350	755.1	755.1		755.1	755.1		182.1			
120	400	775.1	775.1		775.1	775.1		184.1			
	450										
	500										
	600										

Nominal Pipe Size	VALVES										
	Ball RB Trunnion mounted Flanged 77.00.73	Ball FB Trunnion mounted Flanged 77.00.73	Gate Flanged 77.20.23	Globe Flanged 77.30.23	Globe needle Flanged 77.30.23	Check Dual PI Wafer 77.67.06	Check Piston Flanged 77.10.23	DB & B 2 ball + needle vent Flanged 77.85.46	DB & B 3 ball Flanged 77.85.45	DB & B Full Bore Flanged 77.85.50	
15			203.1	203.1	753.1		203.1	*00.4	*00.4	*00.2	
20			204.1	204.1	754.1		204.1	*00.5	*01.3		
25			205.1	205.1	755.1		205.1	*00.6	*00.1		
40			207.1	207.1	757.1		207.1				
50	208.1	708.1		208.1		208.1					
80	160.1	660.1		160.1		160.1					
100	162.1	662.1		162.1		162.1					
150	164.1	664.1		164.1		164.1					
200	165.1	665.1				165.1					
250	166.1	666.1				166.1					
300	167.1	667.1				167.1					
350	168.1	668.1				168.1					
400	169.1	669.1				169.1					
450											
500											
600											

REDUCING FITTINGS					
SCHED	Nominal Pipe Size	Conc reducer 76 30 66	Ecc reducer 76 30 67	Reducing Tee 76 30 88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
160	50 x 20	195.1	195.1	098.1	
160	50 x 25	201.1	201.1	107.1	
160	50 x 40	211.1	211.1	116.1	
160	80 x 40	231.1	231.1	125.1	
160	80 x 50	241.1	241.1	134.1	
120/160	100 x 40	*01.2	*01.2	149.1	
120/160	100 x 50	270.1	270.1	161.1	
120/160	100 x 80	280.1	280.1	173.1	
120/160	150 x 80	300.1	300.1	185.1	
120	150 x 100	309.1	309.1	191.1	
120	200 x 100	329.1	329.1	207.1	
120	200 x 150	339.1	339.1	227.1	
120	250 x 100	347.1	347.1	255.1	
120	250 x 150	359.1	359.1	273.1	
120	250 x 200	369.1	369.1	295.1	
120	300 x 150	387.1	387.1	312.1	
120	300 x 200	399.1	399.1	332.1	
120	300 x 250	409.1	409.1	354.1	
120	350 x 150	417.1	417.1	375.1	
120	350 x 200	426.1	426.1	394.1	
120	350 x 250	440.1	440.1	419.1	
120	350 x 300	450.1	450.1	445.1	
120	400 x 150	-	-	465.1	
120	400 x 200	457.1	457.1	483.1	
120	400 x 250	466.1	466.1	509.1	
120	400 x 300	476.1	476.1	535.1	
120	400 x 350	490.1	490.1	560.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
Valve, globe	1	77.30.23	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.30.88	-	089.1	107.1	-	-
Flange blind	1	76.62.10	616.1	616.1	616.1	616.1	616.1
Flange WN	1	76.62.79	966.1	966.1	966.1	-	-
NOF	1	76.80.37	-	-	-	325.1	326.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
Valve, gate	1	77.20.23	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.80.88	-	089.1	107.1	-	-
Flange blind	1	76.62.10	616.1	616.1	616.1	616.1	616.1
Flange WN	1	76.62.79	966.1	966.1	966.1	-	-
NOF	1	76.80.37	-	-	-	325.1	326.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.37.20	208.1	208.1	208.1	208.1	208.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
DBB Valve	1	77.85.46	*00.6	*00.6	*00.6	*00.6	*00.6
Tee equal	1	76.30.81	582.1	-	-	-	-
Tee reducing	1	76.80.88	-	089.1	107.1	-	-
Flange WN	1	76.62.79	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	325.1	326.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100	150 - 400			
			40	40			
Flange WN	1	76.6.79	968.1	-			
Tee reducing	1	76.30.88	149.1	-			
NOF	1	76.80.37	-	331.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.66	469.1	469.1			
Gasket Sp.WD	1	85.41.36	212.1	212.1			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.66	Dia x L In x mm	81.38	Dia x L In x mm	81.38	Dia x L In x mm		81.38.66	Dia x L In x mm
15	4	330.1	3/4 x 110			66.333.1	3/4 x 125			
20	4	331.1	3/4 x 115			66.335.1	3/4 x 140			
25	4	402.1	7/8 x 125			66.405.1	7/8 x 145			
40	4	469.1	1 x 140			66.472.1	1 x 160			
50	8	405.1	7/8 x 145	66.417.1	7/8 x 220	66.409.1	7/8 x 170		407.1	7/8 x 160
80	8	405.1	7/8 x 145	66.419.1	7/8 x 235	66.410.1	7/8 x 180		407.1	7/8 x 160
100	8	532.1	1 1/8 x 170	66.549.1	1 1/8 x 280	66.537.1	1 1/8 x 205		533.1	1 1/8 x 180
150	12	536.1	1 1/8 x 195	66.562.1	1 1/8 x 360	66.542.1	1 1/8 x 235		537.1	1 1/8 x 205
200	12	643.1	1 3/8 x 220	66.672.1	1 3/8 x 435	66.651.1	1 3/8 x 275		645.1	1 3/8 x 235
250	16	645.1	1 3/8 x 235	66.675.1	1 3/8 x 485	66.655.1	1 3/8 x 300		647.1	1 3/8 x 250
300	20	648.1	1 3/8 x 255	86.217.1	1 3/8 x 560	66.657.1	1 3/8 x 330		650.1	1 3/8 x 265
350	20	692.1	1 1/2 x 275	86.295.1	1 1/2 x 640	66.703.1	1 1/2 x 345		694.1	1 1/2 x 285
400	20	723.1	1 5/8 x 285	86.370.1	1 5/8 x 690	66.738.1	1 5/8 x 370		725.1	1 5/8 x 300
450										
500										
600										

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL	NOF**	WOF	WOL
		76.80.31	76.80.37	76.80.37	76.79
50 - 400	15	*51.1	321.1	-	-
80 - 400	20	*51.2	323.1	-	-
80 - 100	25	*51.3	325.1	-	-
150 - 400	25	*51.4	326.1	-	-
150 - 400	40	*51.6	331.1	-	-
150	50	-	337.1	-	03.002.1
200	50	-	337.1	-	03.003.1
250	50	-	337.1	-	03.004.1
300	50	-	339.1	-	03.005.1
350	50	-	339.1	-	03.006.1
400	50	-	339.1	-	03.007.1
200	80	-	-	*20.7	03.016.1
250	80	-	-	*20.8	03.017.1
300	80	-	-	*20.9	03.018.1
350	80	-	-	*21.0	03.019.1
400	80	-	-	*22.7	03.020.1
300	100	-	-	*22.8	02.676.1
350	100	-	-	*22.9	02.678.1
400	100	-	-	*23.0	02.680.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450	500	600
DBB Valve	2	77.85.46	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4			
Flange set WN RF	2	76.62.79	970.1	886.1	864.1	866.1	868.1	870.1	872.1	874.1	876.1			
Jackscrews**		81.86.35	*01.6	*01.1	*00.2	*00.5	*01.7	*01.2	*00.4	*00.3	*02.7			
NOL plain end	2	76.80.31	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2	*00.2			
Bolting		81.38.66	407.1	407.1	533.1	537.1	545.1	647.1	660.1	694.1	725.1			
Number of bolts			8	8	8	12	12	16	20	20	20			
Gasket Sp.WD	2	85.41.36	214.1	168.1	170.1	174.1	176.1	178.1	180.1	182.1	184.1			

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.462.1	356	Valve, Gate	1	77.20.23.204.1
76.80.60.464.1	813	Valve, Ball	2	77.00.72.208.1
76.80.60.466.1	1219	Flange blind	2	76.62.10.412.1
76.80.60.468.1	1524	Flange WN	1	76.62.79.964.1
76.80.60.470.1	1829	Gasket Sp.WD	1	85.41.36.170.1 DN 100
76.80.60.472.1	2134	Gasket Sp.WD	4	85.41.36.214.1 DN 50
76.80.60.474.1	2438	Gasket Sp.WD	3	85.41.36.206.1 DN 20
76.80.60.476.1	2743	Bolting	8	81.38.66.532.1
76.80.60.478.1	3048	Bolting	32	81.38.66.405.1
		Bolting	12	81.38.66.331.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket Sp.WD					

NOT USED

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket Sp.WD					

NOT USED

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1				
Bolting	4	81.38.66	469.1	469.1	469.1
Gasket Sp.WD	1	85.41.36	212.1	212.1	212.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*00.6
Bolting	8	81.38.66	402.1
Gasket Sp.WD	1	85.41.36	208.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-20	38	50	75	100	120
PRESSURE BAR GA	153	153	150	144	139	137.8

NOTES

- SERVICE LIMITS ARE IN ACC. WITH FLANGE RATING IN ASME B16.5 MAT .GRP. 1.1
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- FLANGES, GASKETS AND FLANGED VALVES DN 15 UP TO AND INCLUDING DN 50 ARE CLASS 1500.
- THE USE OF HIGH PERFORMANCE BUTTERFLY VALVES IS PREFERRED GATE VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- DUAL PLATE CHECK VALVES IN NON - INSULATED PIPELINES ARE TO BE PROTECTED WITH FIRE SHIELDS.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130
- BOLTING SHALL NOT BE DIRECTLY EXPOSED TO SOUR ENVIRONMENT AND NOT BE COVERED, INSULATED OR EQUIPPED WITH FLANGE PROTECTORS OR OTHERWISE DENIED DIRECT EXPOSURE TO ATMOSPHERE

[01]

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	30	35	40	50	60	75	90	100	120	150	200	250	300
	600	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	500	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	450	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	400	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	350	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	300	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	250	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	200	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	150	C	C	C	C	D	E	E	E	E	B	B	B	B	B	B	A
	100	C	C	C	C	B	B	B	B	A							
	80	C	C	C	C	B	B	B	B	A							
	50	C	B	B	B	B	A										
	40	B	B	B	B	A											
	25	B	B	A													
	20	B	A														
	15	A															

[01]

TABLE OF SCHEDULES	
DN	SCHEDULE
15	XXS
20	XXS
25	XXS
40	XXS
50	XXS
80	XXS
100	XXS
150	160
200	160
250	160
300	160
350	160
400	160

EXPLANATION OF CHARACTERS

- A Equal tee
 - B Reducing tee
 - C Branch outlet - Butt weld / Flanged (NOL / NOF)
 - D Branch outlet - Butt weld / Flanged (WOL / NOF)
 - E Branch outlet - Butt weld / Flanged (WOL / WOF)
- NOF - Nippoflange
NOL - Nippolet
WOF - Weldooflange
WOL - Weldolet

[01]

[01]

[01]

[01]

FIRST ISSUE : MAY 1998	REV LETTER	00	01		
	DATE	18/05/98	04/12/98		
	SIGN	M.H	M.H		
PLANT PS - 1	CARBON STEEL		PIPING GENERAL		
CONSIGNEE -	SOUR SERVICE		CLASS No. : 9144GX		
ENG BY AKER MARITIME	CON. JOB NO -		ASME RATING : 900		
PRINCIPAL OPQL	PROJECT NO -		CORR. ALL : 6mm		

[01]

[01]

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESG buying description)

PIPE

PIPE, SEAMLESS	DN	25 - 600	ASTM A106 - B
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 600	ASTM A105N
SPECTACLE BLIND FLANGE	DN	25 - 600	ASTM A285 - C
SPACER RING	DN	25 - 600	ASTM A285 - C
SPADE BLIND	DN	25 - 600	ASTM A285 - C
WELDING NECK FLANGE	DN	15 - 600	ASTM A105N

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 600	ASTM A234 - WPB	[01]
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	[01]
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	[01]
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	[01]

REDUCING FITTINGS

BRANCH OUTLET, FLG END RF (NOF)	DN	15 - 50	ASTM A105N	
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A105N	[01]
BRANCH OUTLET FLG END RF (WOF)	DN	80 - 100	ASTM A105N	
BRANCH OUTLET BW END (WOL)	DN	50 - 100	ASTM A105N	[01]
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB	

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, GRAPHITE FILLED. CS CENTRING AND INNER RING	
STUD BOLTS / HEX NUTS			BOLTS: ASTM A193-B7 NUTS: ASTM A194-2H	[01] [01]
JACKSCREWS			ASTM A193-B8MA	[01]

VALVES - RAISED FACE

BUTTERFLY VALVE, HIGH PERFORM., DOUBLE FLANGED	DN	100 - 600	BODY : ASTM A216-WCB/WCC DISC: ASTM A216-WCB/WCC TRIM : SUPER DUPLEX UNS S32760 SEATS: SUPER DUPLEX / [01] GRAPHITE LAMINATE
CHECK VALVE, PISTON, FLANGED	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 OR STELLITE
DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 600	BODY : ASTM A216-WCB/WCC or ASTM A105N PLATE : BODY MAT'L + AISI 410 OVERLAY SEATS : VITON AED
GATE VALVE, FLANGED.	DN	15 - 600	BODY : ASTM A216-WCB/WCC or ASTM A105N STEM: MONEL K500 TRIM: ASTM A 105 + ENP
GLOBE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N STEM: ASTM A182-F6A TRIM : AISI 410 or STELLITE
NEEDLE TYPE GLOBE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC STEM: ASTM A182 F6A TRIM : AISI 410 or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED - BORE 10mm. (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A350-LF2 TRIM : AISI 316 SEATS : PTFE/KEL 'F' or NYLON PA12 [01]
DOUBLE BLOCK & BLEED VALVE FLANGED - FULL BORE. (2 ball + needle vent)	DN	50	BODY : ASTM A350-LF2 TRIM : AISI 316 SEATS : PTFE/KEL 'F' or NYLON PA12 [01]

SCHD	Nominal Pipe Size	PIPE		FLANGES						STRAINERS	
		74.30.03		Blind 76.62.10	WN 76.62.80	WN 76.62.79	Spect 76.88.36	Spacer 76.88.46	Spade 76.88.42		
XXS	15	022.1		408.1	032.1		508.1	608.1	122.1		
XXS	20	032.1		412.1	034.1		512.1	612.1	124.1		
XXS	25	042.1		416.1	036.1		516.1	616.1	126.1		
XXS	40	062.1		418.1	038.1		518.1	618.1	128.1		
XXS	50	075.1		420.1	040.1		520.1	620.1	130.1		
XXS	80	115.1		322.1	044.1		522.1	622.1	132.1		
XXS	100	163.1		324.1	046.1		524.1	624.1	134.1		
160	150	227.1		326.1		888.1	526.1	626.1	136.1		
160	200	267.1		328.1		889.1	528.1	628.1	138.1		
160	250	309.1		330.1		890.1	530.1	630.1	140.1		
160	300	349.1		332.1		891.1	532.1	632.1	142.1		
160	350	399.1		334.1		892.1	534.1	634.1	144.1		
160	400	453.1		336.1		893.1	536.1	636.1	146.1		
160	450	502.1		338.1		894.1	538.1	638.1	148.1		
160	500	552.1		340.1		895.1	540.1	640.1	150.1		
160	600	599.1		342.1		896.1	544.1	641.1	152.1		

SCHD	Nominal Pipe Size	FITTINGS						GASKETS	
		Cap 76.30.17	Elbow 45 76.30.34	Elbow 90 SR	Elbow 90 LR 76.30.42	Equal Tee 76.30.81		Spiral Wound 85.41.36	
XXS	15	573.1	573.1		573.1	573.1		204.1	
XXS	20	579.1	579.1		579.1	579.1		206.1	
XXS	25	583.1	583.1	NOT USED	583.1	583.1		208.1	
XXS	40	593.1	593.1		593.1	593.1		212.1	
XXS	50	613.1	613.1		613.1	613.1		214.1	
XXS	80	633.1	633.1		633.1	633.1		168.1	
XXS	100	653.1	653.1		653.1	653.1		170.1	
160	150	672.1	672.1		672.1	672.1		174.1	
160	200	695.1	695.1		695.1	695.1		176.1	
160	250	715.1	715.1		715.1	715.1		178.1	
160	300	737.1	737.1		737.1	737.1		180.1	
160	350	757.1	757.1		757.1	757.1		182.1	
160	400	777.1	777.1		777.1	777.1		184.1	
160	450	798.1	798.1		798.1	798.1		186.1	
160	500	818.1	818.1		818.1	818.1		188.1	
160	600	838.1	838.1		838.1	838.1		192.1	

Nominal Pipe Size	VALVES									
	Ball RB Trunnion mounted Flanged	Gate Flanged	Gate Flanged	Globe Flanged	Needle Flanged	Check dual pl. Wafer	Check hor. pist Flanged	Butterfly High integrity Flanged	DB & B 2 ball + needle vent Flanged	DB & B 3 ball Flanged
15		504.9		203.1	753.1		203.1		*00.4	*00.4
20		506.9		204.1	754.1		204.1		*00.5	*01.3
25		508.9		205.1	755.1		205.1		*00.6	*00.1
40	NOT USED	512.9		207.1	757.1		207.1			
50			*00.1				208.1			*00.2
80			*00.2				160.1			
100			*00.3				162.1	*00.3		
150			*00.4				164.1	*00.4		
200			*00.5				165.1	*00.5		
250			*00.6				166.1	*00.6		
300			*00.7				167.1	*00.7		
350			*00.8				168.1	*00.8		
400			*00.9				169.1	*00.9		
450			*01.0				170.1			
500			*01.1				171.1			
600			*01.2				173.1			

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REDUCING FITTINGS				
SCHED	Nominal Pipe Size	Conc reducer 76.30.66	Ecc reducer 76.30.67	Reducing Tee 76.30.88
XXS	20 x 15	142.1	142.1	040.1
XXS	25 x 15	152.1	152.1	050.1
XXS	25 x 20	162.1	162.1	060.1
XXS	40 x 15	172.1	172.1	070.1
XXS	40 x 20	182.1	182.1	080.1
XXS	40 x 25	192.1	192.1	090.1
XXS	50 x 20	-	-	099.1
XXS	50 x 25	202.1	202.1	108.1
XXS	50 x 40	212.1	212.1	117.1
XXS	80 x 40	232.1	232.1	126.1
XXS	80 x 50	242.1	242.1	135.1
XXS	100 x 40	-	-	144.1
XXS	100 x 50	272.1	272.1	156.1
XXS	100 x 80	282.1	282.1	168.1
160/XXS	150 x 80	294.1	294.1	188.1
160/XXS	150 x 100	-	-	204.1
160/XXS	200 x 100	332.1	332.1	222.1
160	200 x 150	341.1	341.1	228.1
160	250 x 100	349.1	349.1	256.1
160	250 x 150	360.1	360.1	274.1
160	250 x 200	370.1	370.1	296.1
160	300 x 150	389.1	389.1	313.1
160	300 x 200	400.1	400.1	333.1
160	300 x 250	410.1	410.1	355.1
160	350 x 150	419.1	419.1	376.1
160	350 x 200	428.1	428.1	395.1
160	350 x 250	441.1	441.1	420.1
160	350 x 300	451.1	451.1	446.1
160	400 x 150	-	-	466.1
160	400 x 200	459.1	459.1	484.1
160	400 x 250	468.1	468.1	510.1
160	400 x 300	480.1	480.1	536.1
160	400 x 350	491.1	491.1	561.1
160	450 x 200	-	-	585.1
160	450 x 250	530.1	530.1	609.1
160	450 x 300	560.1	560.1	633.1
160	450 x 350	591.1	591.1	657.1
160	450 x 400	621.1	621.1	681.1
160	500 x 200	-	-	705.1
160	500 x 250	-	-	729.1
160	500 x 300	650.1	650.1	753.1
160	500 x 350	681.1	681.1	777.1
160	500 x 400	711.1	711.1	801.1
160	500 x 450	741.1	741.1	825.1
160	600 x 250	-	-	849.1
160	600 x 300	-	-	873.1
160	600 x 350	-	-	897.1
160	600 x 400	891.1	891.1	921.1
160	600 x 450	921.1	921.1	945.1
160	600 x 500	951.1	951.1	969.1

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	250 25	40 25	50 25	80 - 100 25	150 - 600 25
Valve, globe	1	77.30.23	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.30.88	-	090.1	108.1	-	-
Flange blind	1	76.62.10	416.1	416.1	416.1	416.1	416.1
Flange WN	1	76.62.80	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.61	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

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DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
Valve, gate	1	75.37.37	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.30.88	-	090.1	108.1	-	-
Flange blind	1	76.62.10	416.1	416.1	416.1	416.1	416.1
Flange WN	1	76.62.80	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.61	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

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PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 600 25
DBB Valve	1	77.85.46	*00.6	*00.6	*00.6	*00.6	*00.6
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.30.88	-	090.1	108.1	-	-
Flange WN	1	76.62.80	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.61	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

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TEMPERATURE INSTRUMENT CONNECTIONS					
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 - 600 40	
Flange WN	1	76.62.80	038.1	038.1	
Tee Reducing	1	76.30.88	144.1	-	
NOF	1	76.80.37	-	351.1	
Thermowell	1		SUPPLIED BY INSTRUMENTS		
Bolting	4	81.38.61	469.1	469.1	
Gasket Sp.WD	1	85.41.36	212.1	212.1	

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BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.61	Dia x L In x mm	81.38.61	Dia x L In x mm	81.38.61	Dia x L In x mm		81.38.61	Dia x L In x mm
15	4	330.1	3/4 x 110			334.1	3/4 x 130			
20	4	331.1	3/4 x 115			335.1	3/4 x 140			
25	4	402.1	7/8 x 125			405.1	7/8 x 160			
40	4	469.1	1 x 140			474.1	1 x 160			
50	8	405.1	7/8 x 145	417.1	7/8 x 220	411.1	7/8 x 185		407.1	7/8 x 160
80	8	405.1	7/8 x 145	419.1	7/8 x 235	411.1	7/8 x 185		407.1	7/8 x 160
100	8	532.1	1 1/8 x 170	549.1	1 1/8 x 280	538.1	1 1/8 x 210		533.1	1 1/8 x 180
150	12	536.1	1 1/8 x 195	562.1	1 1/8 x 360	548.1	1 1/8 x 240		537.1	1 1/8 x 205
200	12	643.1	1 3/8 x 220	672.1	1 3/8 x 435	651.1	1 3/8 x 300		645.1	1 3/8 x 235
250	16	645.1	1 3/8 x 235	675.1	1 3/8 x 485	655.1	1 3/8 x 330		647.1	1 3/8 x 250
300	20	648.1	1 3/8 x 255	*00.1	1 3/8 x 560	657.1	1 3/8 x 330		650.1	1 3/8 x 265
350	20	692.1	1 1/2 x 275	*00.2	1 1/2 x 640	705.1	1 1/2 x 355		694.1	1 1/2 x 285
400	20	723.1	1 5/8 x 285	*00.3	1 5/8 x 690	738.1	1 5/8 x 370		725.1	1 5/8 x 300
450	20	785.1	1 7/8 x 325	*00.4	1 5/8 x 780	800.1	1 7/8 x 415			
500	20	815.1	2 x 345	*00.5	2 x 800	829.1	2 x 440			
600	20	864.1	2 1/2 x 440	*00.6	2 1/2 x 935	*00.6	2 1/2 x 540			

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BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79.03
50 - 600	15	*55.1	341.1	-	-
50 - 600	20	*55.2	343.1	-	-
80-100	25	*55.3	345.1	-	-
150- 600	25	*55.4	346.1	-	-
150 - 600	40	*55.6	351.1	-	-
150	50	-	357.1	-	*01.1
200	50	-	357.1	-	103.1
250	50	-	357.1	-	104.1
300	50	-	358.1	-	105.1
350	50	-	358.1	-	106.1
400	50	-	358.1	-	107.1
200	80	-	-	*13.0	116.1
250	80	-	-	*13.1	117.1
300	80	-	-	*13.2	118.1
350	80	-	-	*13.3	119.1
400	80	-	-	*13.4	120.1
450	80	-	-	*13.5	121.1
500	80	-	-	*13.6	122.1
600	80	-	-	*13.7	124.1
300	100	-	-	*13.8	129.1
350	100	-	-	*13.9	130.1
400	100	-	-	*14.0	131.1
400	150	-	-	*14.1	132.1
500	100	-	-	*14.2	133.1
600	100	-	-	*14.3	135.1
450	150	-	-	*14.4	262.1
500	150	-	-	*14.5	264.1
600	150	-	-	*14.6	268.1
600	200	-	-	*14.7	289.1

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** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Conn Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15			
DBB Valve	2	77.85.46	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4			
Flange WN RF	2	76.62.80	040.1	044.1	046.1	-	-	-	-	-	-			
Flange WN RF	2	76.62.79	-	-	-	888.1	889.1	890.1	891.1	892.1	893.1			
Jackscrews**		81.86.35	*01.6	*01.1	*00.2	*00.5	*01.7	*01.2	*00.4	*00.3	*02.7			
NOL Plain end	2	76.80.31	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3			
Bolting		81.38.61	407.1	407.1	533.1	537.1	645.1	647.1	650.1	694.1	725.1			
Number of bolts			8	8	8	12	12	16	20	20	20			
Gasket Sp.WD	2	85.41.36	214.1	168.1	170.1	174.1	176.1	178.1	180.1	182.1	184.1			

** 1 Jackscrew for DN50 to 100
2 Jackscrews for DN150 & over

[illegible]

LEVEL GAUGE CONNECTIONS THROUGH VISION				
COMPONENTS	Nos reqd	Length		
Level gauge				
Valve, gate				
Flange blind		NOT USED		
Bolting				
Gasket Sp.WD				

LEVEL GAUGE CONNECTIONS REFLEX				
COMPONENTS	Nos reqd	Length		
Level gauge				
Valve, gate				
Flange blind		NOT USED		
Bolting				
Gasket Sp.WD				

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT				
COMPONENTS	Nos reqd	Length		
Cover flange				
Thermowell		NOT USED		
Bolting				
Gasket Sp.WD				

PRESSURE INST. CONNECTIONS ON EQUIPMENT		
COMPONENTS	Nos reqd	
Double Block & Bleed Valve Bolting Gasket Sp.WD	NOT USED	

TEMPERATURE DEG C	SERVICE LIMITS					
	-50	38	50	75	100	120
PRESSURE BAR GA	138	138	138	138	138	138

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ANSI B16.5 MAT.GRP. 1.3
- COLD BENDING OF PIPE IS NOT ALLOWED.
- FLANGES, GASKETS AND FLANGED VALVES DN 15 UP TO AND INCLUDING DN 50 ARE CLASS 1500.
- WELDS SHALL BE POST -WELD HEAT TREATED FOR WALL THICKNESS EQUAL OR > 12mm.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

		BRANCH CONNECTIONS 90 DEG														
		NOMINAL BRANCH SIZE														
		DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450
NOMINAL RUN PIPE SIZE	600															
	500															
	450															
	400	C	C	C	C	D	E	E	B	B	B	B	B	A		
	350	C	C	C	C	D	E	E	B	B	B	B	A			
	300	C	C	C	C	D	E	R	B	B	B	A				
	250	C	C	C	C	D	E	B	B	B	A					
	200	C	C	C	C	D	E	B	B	A						
	150	C	C	C	C	D	B	B	A							
	100	C	C	C	B	B	B	A								
	80	C	C	C	B	B	A									
	50	C	B	B	B	A										
	40	B	B	B	A											
	25	B	B	A												
	20	B	A													
	15	A														

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	160
80	160
100	120
150	120
200	120
250	120
300	120
350	120
400	120

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

FIRST ISSUE : DECEMBER 1998	REV LETTER	00			
	DATE	04/12/98			
	SIGN	M.H.			
PLANT	PS - 1	LOW TEMP. CARBON STEEL		PIPING GENERAL	
CONSIGNEE	-	SOUR SERVICE		CLASS No. :	9150G
ENG BY	AKER MARITIME	CON. JOB NO -		ANSI RATING :	900
PRINCIPAL	OPQL	PROJECT NO -		CORR. ALL :	3mm

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS.	DN	15 - 400	ASTM A333-6 (SEAMLESS)
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 400	ASTM A350-LF2
SPECTACLE BLIND FLANGE	DN	15 - 400	ASTM A516-60
SPACER RING	DN	15 - 400	ASTM A516-60
SPADE BLINDS	DN	15 - 400	ASTM A516-60
WELDING NECK FLANGE	DN	15 - 400	ASTM A350-LF2

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 400	ASTM A420-WPL6
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6

REDUCING FITTINGS

BRANCH OUTLET. FLG END RF (NOF)	DN	15 - 50	ASTM A350-LF2
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A350-LF2
BRANCH OUTLET FLG END RF (WOF)	DN	80 - 150	ASTM A350-LF2
BRANCH OUTLET BW END (WOL)	DN	50 - 150	ASTM A350-LF2
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, GRAPHITE FILLED, CS CENTRING & INNER RING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M ASTM A193-B8MA
JACKSCREWS			
LEVEL DISPARER CHAMBER	DN	100 - 100	ASTM A333 - 6 (SEAMLESS)
LEVEL GAUGE REFLEX	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A320-L7M/A194-7M GASKET: GRAPHITE
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A320-L7M/A194-7M GASKET: GRAPHITE
ORIFICE FLANGE SET,RAISED FACE	DN	50 -600	FLANGES: ASTM A350-LF2

VALVES - RAISED FACE

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 400	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : NYLON PA12, DEVLON V
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 400	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : NYLON PA12, DEVLON V
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316 or STELLITE
DUAL PL. CHECK VALVE WAFER	DN	50 - 400	BODY : ASTM A352M-LCB/LCC or A350M-LF2 PLATE : BODY + STELLITE SEATS : WELDED ON WITH AISI 316(L) or STELLITE
GATE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE
GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED - Bore 10mm. (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A350-LF2 TRIM AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED - FULL BORE. (2 ball + needle vent)	DN	50	BODY : ASTM A350-LF2 TRIM AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12

SCHD	Nominal Pipe	PIPE			FLANGES					STRAINERS	
		74.30.16			Blind 76.62.12	WN 76.62.86	Spect 76.88.35	Spacer 76.88.47	Spade 76.88.43		
160	15	023.1			658.1	662.1	608.1	608.1	*12.2		
160	20	030.1			662.1	664.1	612.1	612.1	*12.4		
160	25	038.1			666.1	666.1	616.1	616.1	*12.6		
160	40	054.1			668.1	668.1	618.1	618.1	*12.8		
160	50	063.1			670.1	670.1	620.1	620.1	*13.0		
160	80	071.1			622.1	472.1	522.1	522.1	*13.2		
120	100	078.1			624.1	414.1	524.1	524.1	*13.4		
120	150	087.1			626.1	416.1	526.1	526.1	*13.6		
120	200	100.1			628.1	418.1	528.1	528.1	*13.8		
120	250	112.1			630.1	420.1	530.1	530.1	*14.0		
120	300	124.1			632.1	422.1	532.1	532.1	*14.2		
120	350	137.1			634.1	424.1	534.1	534.1	*14.4		
120	400	146.1			636.1	426.1	536.1	536.1	*14.6		
	450										
	500										
	600										

SCHD	Nominal Pipe Size	FITTINGS						GASKETS			
		Cap 76.31.17	Elbow 45 76.31.34	Elbow 90 SR	Elbow 90 LR 76.31.43	Equal Tee 76.31.80		Spiral Wound 85.41.36			
160	15	172.1	172.1		172.1	172.1		204.1			
160	20	178.1	178.1		178.1	178.1		206.1			
160	25	182.1	182.1	NOT USED	182.1	182.1		208.1			
160	40	192.1	192.1		192.1	192.1		212.1			
160	50	212.1	212.1		212.1	212.1		214.1			
160	80	232.1	232.1		232.1	232.1		168.1			
120	100	250.1	250.1		250.1	250.1		170.1			
120	150	270.1	270.1		270.1	270.1		174.1			
120	200	291.1	291.1		291.1	291.1		176.1			
120	250	312.1	312.1		312.1	312.1		178.1			
120	300	335.1	335.1		335.1	335.1		180.1			
120	350	355.1	355.1		355.1	355.1		182.1			
120	400	375.1	375.1		375.1	375.1		184.1			
	450										
	500										
	600										

Nominal Pipe Size	VALVES									
	Ball RB Trunnion mounted Flanged 77.00.83	Ball FB Trunnion mounted Flanged 77.00.83	Gate Flanged 77.20.33	Globe Flanged 77.30.33	Globe needle Flanged	Check Dual PI Wafer 77.67.52	Check Piston Flanged 77.10.33	DB & B 2 ball + needle vent Flanged 77.85.46	DB & B 3 ball Flanged 77.85.45	DB & B Full Bore Flanged 77.85.50
15			203.1	203.1			203.1	*00.4	*00.4	
20			204.1	204.1			204.1	*00.5	*01.3	
25			205.1	205.1			205.1	*00.6	*00.1	
40			207.1	207.1	NOT USED		207.1			
50	208.1	708.1		208.1		208.1				*00.2
80	160.1	660.1		160.1		160.1				
100	162.1	662.1		162.1		162.1				
150	164.1	664.1		164.1		164.1				
200	165.1	665.1				165.1				
250	166.1	666.1				166.1				
300	167.1	667.1				167.1				
350	168.1	668.1				168.1				
400	169.1	669.1				169.1				
450										
500										
600										

REDUCING FITTINGS					
SCHED	Nominal Pipe Size	Conc reducer 76.31.66	Ecc reducer 76.31.67	Reducing Tee 76.31.88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
160	50 x 20	195.1	195.1	098.1	
160	50 x 25	201.1	201.1	107.1	
160	50 x 40	211.1	211.1	116.1	
160	80 x 40	231.1	231.1	125.1	
160	80 x 50	241.1	241.1	134.1	
120/160	100 x 40	254.1	254.1	149.1	
120/160	100 x 50	270.1	270.1	161.1	
120/160	100 x 80	280.1	280.1	173.1	
120/160	150 x 80	300.1	300.1	185.1	
120	150 x 100	309.1	309.1	191.1	
120	200 x 100	329.1	329.1	207.1	
120	200 x 150	339.1	339.1	227.1	
120	250 x 100	347.1	347.1	255.1	
120	250 x 150	359.1	359.1	273.1	
120	250 x 200	369.1	369.1	295.1	
120	300 x 150	387.1	387.1	312.1	
120	300 x 200	399.1	399.1	332.1	
120	300 x 250	409.1	409.1	354.1	
120	350 x 150	417.1	417.1	375.1	
120	350 x 200	426.1	426.1	394.1	
120	350 x 250	440.1	440.1	419.1	
120	350 x 300	450.1	450.1	445.1	
120	400 x 150	-	-	465.1	
120	400 x 200	457.1	457.1	483.1	
120	400 x 250	466.1	466.1	509.1	
120	400 x 300	476.1	476.1	535.1	
120	400 x 350	490.1	490.1	560.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
Valve, globe	1	77.30.33	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	107.1	-	-
Flange blind	1	76.62.12	666.1	666.1	666.1	666.1	666.1
Flange WN	1	76.62.86	666.1	666.1	666.1	-	-
NOF	1	76.80.37	-	-	-	825.1	826.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
Valve, gate	1	77.20.33	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	107.1	-	-
Flange blind	1	76.62.12	666.1	666.1	666.1	666.1	666.1
Flange WN	1	76.62.86	666.1	666.1	666.1	-	-
NOF	1	76.80.37	-	-	-	825.1	826.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50	80 - 100	150 - 400
			25	25	25	25	25
DBB Valve	1	77.85.46	*00.6	*00.6	*00.6	*00.6	*00.6
Tee equal	1	76.31.80	182.1	-	-	-	-
Tee reducing	1	76.31.88	-	089.1	107.1	-	-
Flange WN	1	76.62.86	666.1	666.1	666.1	-	-
NOF	1	76.80.37	-	-	-	825.1	826.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100	150 - 400			
			40	40			
Flange WN	1	76.62.86	668.1	-			
Tee reducing	1	76.31.88	149.1	-			
NOF	1	76.80.37	-	831.1			
Thermowell	1						
Bolting	4	81.38.67	469.1	469.1			
Gasket Sp.WD	1	85.41.36	212.1	212.1			

SUPPLIED BY INSTRUMENTS

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L In x mm	81.38	Dia x L In x mm	81.38.67	Dia x L In x mm		81.38.67	Dia x L In x mm
15	4	330.1	3/4 x 110			333.1	3/4 x 125			
20	4	331.1	3/4 x 115			335.1	3/4 x 140			
25	4	402.1	7/8 x 125			405.1	7/8 x 145			
40	4	469.1	1 x 140			472.1	1 x 160			
50	8	405.1	7/8 x 145	67.417.1	7/8 x 220	409.1	7/8 x 170		407.1	7/8 x 160
80	8	405.1	7/8 x 145	67.*01.2	7/8 x 235	410.1	7/8 x 180		407.1	7/8 x 160
100	8	532.1	11/8 x 170	67.551.1	11/8 x 290	537.1	11/8 x 205		533.1	11/8 x 180
150	12	536.1	11/8 x 195	67.562.1	11/8 x 360	542.1	11/8 x 235		537.1	11/8 x 205
200	12	643.1	13/8 x 220	67.*01.3	13/8 x 435	651.1	13/8 x 275		645.1	13/8 x 235
250	16	645.1	13/8 x 235	67.*01.4	13/8 x 485	655.1	13/8 x 300		647.1	13/8 x 250
300	20	648.1	13/8 x 255	94.217.1	13/8 x 560	657.1	13/8 x 330		650.1	13/8 x 265
350	20	692.1	11/2 x 275	94.295.1	11/2 x 640	703.1	11/2 x 345		694.1	11/2 x 285
400	20	723.1	15/8 x 285	94.370.1	15/8 x 690	738.1	15/8 x 370		725.1	15/8 x 300
450										
500										
600										

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79.06
50 - 400	15	*56.1	821.1	-	-
80 - 400	20	*56.2	823.1	-	-
80 - 100	25	*56.3	825.1	-	-
150 - 400	25	*56.4	826.1	-	-
150 - 400	40	*56.5	831.1	-	-
150	50	-	837.1	-	184.1
200	50	-	837.1	-	186.1
250	50	-	837.1	-	188.1
300	50	-	838.1	-	190.1
350	50	-	838.1	-	192.1
400	50	-	838.1	-	194.1
200	80	-	-	*77.0	360.1
250	80	-	-	*77.1	362.1
300	80	-	-	*77.2	364.1
350	80	-	-	*77.3	366.1
400	80	-	-	*77.4	368.1
300	100	-	-	*77.8	676.1
350	100	-	-	*77.9	678.1
400	100	-	-	*78.0	680.1

** Dimensions to SIPM standard drawing S-38.090

COMPONENTS	Nos reqd	Run Pipe Size	ORIFICE INSTRUMENT CONNECTIONS											
			50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450	500	600
DBB Valve	2	77.85.46	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4			
Flange WN RF	2	76.62.86	670.1	472.1	414.1	416.1	418.1	420.1	422.1	424.1	426.1			
Jackscrews**		81.86.35	*01.6	*01.1	*00.2	*00.5	*01.7	*01.2	*00.4	*00.3	*02.7			
NOL plain end	2	76.80.31	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4			
Bolting		81.38.67	407.1	407.1	533.1	5337.1	645.1	647.1	650.1	694.1	725.1			
Number of bolts			8	8	8	12	12	16	20	20	20			
Gskt Sp.WD	2	85.41.36	214.1	168.1	170.1	174.1	176.1	178.1	180.1	182.1	184.1			

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.462.1	356	Valve, Gate	1	77.20.33.203.1
76.80.60.464.1	813	Valve, Ball	2	77.00.82.208.1
76.80.60.466.1	1219	Flange blind	2	76.62.12.662.1
76.80.60.468.1	1524	Flange WN	1	76.62.86.664.1
76.80.60.470.1	1829	Gasket Sp.WD	1	85.41.36.170.1
76.80.60.472.1	2134	Gasket Sp.WD	4	85.41.36.214.1
76.80.60.474.1	2438	Gasket Sp.WD	3	85.41.36.206.1
76.80.60.476.1	2743	Bolting	8	81.38.67.532.1
76.80.60.478.1	3048	Bolting	32	81.38.67.405.1
		Bolting	12	81.38.67.331.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket Sp.WD					

NOT USED

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket Sp.WD					

NOT USED

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1				
Bolting	4	81.38.67	469.1	469.1	469.1
Gasket Sp.WD	1	85.41.36	212.1	212.1	212.1

SUPPLIED BY INSTRUMENTS

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*00.6
Bolting	8	81.38.67	402.1
Gasket Sp.WD	1	85.41.36	208.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-20	38	50	75	100	120
PRESSURE BAR GA	153	153	150	144	139.2	137.8

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.1.1
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- FLANGES, GASKETS AND FLANGED VALVES DN15 UP TO AND INCLUDING DN50 ARE CLASS 1500.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- FOR WATER INJECTION THE USE OF HIGH PERFORMANCE BUTTERFLY VALVES IS PREFERRED IN LIEU OF BALL VALVES. GATE VALVES ONLY WHEN NECESSARY FOR PROCESS/OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE.
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130
- BOLTING SHALL NOT BE DIRECTLY EXPOSED TO SOUR ENVIRONMENT AND NOT BE COVERED, INSULATED OR EQUIPED WITH FLANGE PROTECTORS OR OTHERWISE DENIED DIRECT ATMOSPHERIC EXPOSURE.

BRANCH CONNECTIONS 90 DEG																
NOMINAL BRANCH SIZE																
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500
	600															
	500															
	450															
	400	C	C	C	C	D	E	E	B	B	B	B	B	A		
	350	C	C	C	C	D	E	E	B	B	B	B	A			
	300	C	C	C	C	D	E	E	B	B	B	A				
	250	C	C	C	C	D	E	B	B	B	A					
	200	C	C	C	C	D	E	B	B	A						
	150	C	C	C	C	D	B	B	A							
	100	C	C	C	B	B	B	A								
	80	C	C	C	B	B	A									
	50	C	B	B	B	A										
	40	B	B	B	A											
	25	B	B	A												
	20	B	A													
	15	A														

TABLE OF SCHEDULES	
DN	SCHEDULE
15	XXS
20	XXS
25	XXS
40	XXS
50	XXS
80	XXS
100	XXS
150	160
200	160
250	160
300	160
350	160
400	160

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

FIRST ISSUE : DECEMBER 1998		REV LETTER	00			
		DATE	04/12/98			
		SIGN	M.H.			
PLANT	PS - 1	CARBON STEEL		PIPING GENERAL		
CONSIGNEE	-	SOUR SERVICE		CLASS No. : 9151G		
ENG BY	AKER MARITIME	CON. JOB NO -		ANSI RATING : 900		
PRINCIPAL	OPQL	PROJECT NO -		CORR. ALL : 6mm		

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 400	ASTM A106 - B
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FLANGES

BLIND FLANGE RTJ	DN	15 - 400	ASTM A105
BLIND FLANGE RF	DN	15 - 50	ASTM A105
SPECTACLE BLIND FLANGE RTJ	DN	15 - 400	ASTM A285 - C
SPACER RING RTJ	DN	15 - 400	ASTM A285 - C
SPADE BLIND RTJ	DN	15 - 400	ASTM A285 - C
WELDING NECK FLANGE RTJ	DN	15 - 400	ASTM A105
WELDING NECK FLANGE RF	DN	15 - 50	ASTM A105

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 400	ASTM A234 - WPB
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB

REDUCING FITTINGS

BRANCH OUTLET. FLG END RF (NOF)	DN	15 - 40	ASTM A105N
BRANCH OUTLET. FLG END RTJ (NOF)	DN	15 - 50	ASTM A105N
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A105N
BRANCH OUTLET FLG END RTJ (WOF)	DN	80 - 100	ASTM A105N
BRANCH OUTLET BW END (WOL)	DN	50 - 100	ASTM A105N
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234 - WPB

MISCELLANEOUS

GASKET, RING JOINT	DN	15 - 400	SOFT IRON (OCTAGONAL RING)
GASKET, SPIRAL WOUND	DN	15 - 400	AISI 316, GRAPHITE FILLED. CS CENTRING AND INNER RING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A193-B7 NUTS: ASTM A194-2H ASTM A193-B8MA
JACKSCREWS			ASTM A193-B8MA
ORIFICE FLANGE SET RAISED FACE	DN	50 - 400	FLANGES: ASTM A105

VALVES

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED RTJ.	DN	50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182-F6a or 316(L) SEATS: NYLON PA12, DEVLON V
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED RTJ.	DN	50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A TRIM: ASTM A182-F6a or 316(L) SEATS: NYLON PA12, DEVLON V
BUTTERFLY VALVE, HIGH PERFORM. DOUBLE FLANGED RTJ.	DN	100 - 400	BODY: ASTM A216 WCB/WCC DISC: ASTM A216 WCB/WCC TRIM: SUPER DUPLEX UNS S32760 SEATS: SUPER DUPLEX/GRAPHITE LAMINATE
CHECK VALVE, PISTON, FLANGED RTJ.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + AISI 410 or STELLITE
DUAL PL. CHECK VALVE WAFER, RTJ	DN	50 - 400	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: BODY + AISI 410 or STELLITE SEAT/SEAL: VITON AED
GATE VALVE, FLANGED RTJ.	DN	15 - 400	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, FLANGED RTJ.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, NEEDLE TYPE, FLANGED RTJ.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED RF - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED RTJ - FULL BORE (2 ball + needle vent)	DN	50	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12

SCHD	Nominal Pipe Size	PIPE		FLANGES							STRAINERS	
		74.30.03		Blind RTJ 76.62.11	Blind RF 76.62.10	WN RF 76.62.80	WN RTJ 76.62.80	Spect RTJ 76.88.36	Spacer RTJ 76.88.46	Spade RTJ 76.88.42		
XXS	15	022.1		612.1	408.1	032.1	286.1	*00.5	*00.5	*01.7		
XXS	20	032.1		614.1	412.1	034.1	288.1	*00.6	*00.6	*01.8		
XXS	25	042.1		616.1	416.1	036.1	290.1	*00.3	*00.7	*01.9		
XXS	40	062.1		618.1	418.1	038.1	292.1	*00.7	*00.8	*02.0		
XXS	50	075.1		620.1	420.1	040.1	294.1	*00.4	*00.9	*02.1		
XXS	80	115.1		522.1			296.1	*02.0	*03.1	*04.1		
XXS	100	163.1		524.1			298.1	*02.1	*03.2	*04.2		
160	150	227.1		526.1			266.1	*02.2	*03.3	*04.3		
160	200	267.1		528.1			268.1	*02.3	*03.4	*04.4		
160	250	309.1		530.1			270.1	*02.4	*03.5	*04.5		
160	300	349.1		532.1			272.1	*02.5	*03.6	*04.6		
160	350	399.1		534.1			274.1	*02.6	*03.7	*04.7		
160	400	453.1		536.1			276.1	*02.7	*03.8	*04.8		
	450	502.1										
	500	552.1										
	600	599.1										

SCHD	Nominal Pipe Size	FITTINGS						GASKETS		
		Cap 76.30.17	Elbow 45 76.30.34	Elbow 90 SR	Elbow 90 LR 76.30.42	Equal Tee 76.30.81		Ring Joint 85.37.20	Spiral Wound 85.41.36	
XXS	15	573.1	573.1		573.1	573.1		212.1	204.1	
XXS	20	579.1	579.1		579.1	579.1		216.1	206.1	
XXS	25	583.1	583.1	NOT USED	583.1	583.1		216.1	208.1	
XXS	40	593.1	593.1		593.1	593.1		220.1	212.1	
XXS	50	613.1	613.1		613.1	613.1		224.1	214.1	
XXS	80	633.1	633.1		633.1	633.1		231.1	168.1	
XXS	100	653.1	653.1		653.1	653.1		237.1	170.1	
160	150	672.1	672.1		672.1	672.1		245.1	174.1	
160	200	695.1	695.1		695.1	695.1		249.1	176.1	
160	250	715.1	715.1		715.1	715.1		253.1	178.1	
160	300	737.1	737.1		737.1	737.1		257.1	180.1	
160	350	757.1	757.1		757.1	757.1		262.1	182.1	
160	400	777.1	777.1		777.1	777.1		266.1	184.1	
	450									
	500									
	600									

Nominal Pipe Size	VALVES										
	Ball RB Trunnion mounted Flanged	Ball FB Trunnion mounted Flanged	Butterfly High Integrity Flanged	Gate Flanged	Globe Flanged	Globe needle Flanged	Check Dual PI Wafer	Check Piston Flanged	DB & B 2 ball + needle vent Flanged	DB & B 3 ball Flanged	DB & B Full Bore Flanged
	77.00.73	77.00.73	77.57.00	77.20.23	77.30.23	77.30.23	77.67.06	77.10.23	77.85.46	77.85.45	77.85.50
15				403.1	403.1	503.1		403.1	*00.4	*00.4	
20				404.1	404.1	504.1		404.1	*00.5	*01.3	
25				405.1	405.1	505.1		405.1	*00.6	*00.1	
40				407.1	407.1	507.1		407.1			
50	408.1	908.1			408.1		408.1				*00.1
80	360.1	860.1			360.1		360.1				
100	362.1	862.1	*01.3		362.0		362.1				
150	364.1	864.1	*01.4		364.1		364.1				
200	365.1	865.1	*01.5				365.1				
250	366.1	866.1	*01.6				366.1				
300	367.1	867.1	*01.7				367.1				
350	368.1	868.1	*01.8				368.1				
400	369.1	869.1	*01.9				369.1				
450											
500											
600											

SCHD	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer 76.30.66	Ecc reducer 76.30.67	Reducing Tee 76.30.88	
XXS	20 x 15	142.1	142.1	040.1	
XXS	25 x 15	152.1	152.1	050.1	
XXS	25 x 20	162.1	162.1	060.1	
XXS	40 x 15	172.1	172.1	070.1	
XXS	40 x 20	182.1	182.1	080.1	
XXS	40 x 25	192.1	192.1	090.1	
XXS	50 x 20	-	-	099.1	
XXS	50 x 25	202.1	202.1	108.1	
XXS	50 x 40	212.1	212.1	117.1	
XXS	80 x 40	232.1	232.1	126.1	
XXS	80 x 50	242.1	242.1	135.1	
XXS	100 x 40	-	-	144.1	
XXS	100 x 50	272.1	272.1	156.1	
XXS	100 x 80	282.1	282.1	168.1	
160/XXS	150 x 80	294.1	294.1	188.1	
160/XXS	150 x 100	-	-	204.1	
160/XXS	200 x 100	332.1	332.1	222.1	
160	200 x 150	341.1	341.1	228.1	
160	250 x 100	349.1	349.1	256.1	
160	250 x 150	360.1	360.1	274.1	
160	250 x 200	370.1	370.1	296.1	
160	300 x 150	389.1	389.1	313.1	
160	300 x 200	400.1	400.1	333.1	
160	300 x 250	410.1	410.1	355.1	
160	350 x 150	419.1	419.1	376.1	
160	350 x 200	428.1	428.1	395.1	
160	350 x 250	441.1	441.1	420.1	
160	350 x 300	451.1	451.1	446.1	
160	400 x 150	-	-	466.1	
160	400 x 200	459.1	459.1	484.1	
160	400 x 250	468.1	468.1	510.1	
160	400 x 300	480.1	480.1	536.1	
160	400 x 350	491.1	491.1	561.1	
120	400 x 350	490.1	490.1	560.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, globe	1	77.30.23	405.1	405.1	405.1	405.1	405.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.30.88	-	090.1	108.1	-	-
Flange blind	1	76.62.11	616.1	616.1	616.1	616.1	616.1
Flange WN RTJ	1	76.62.80	290.1	290.1	290.1	-	-
NOF RTJ	1	76.80.37	-	-	-	*04.6	*04.4
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket RTJ	2	85.37.20	216.1	216.1	216.1	216.1	216.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, gate	1	77.20.23	405.1	405.1	405.1	405.1	405.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	108.1	-	-
Flange blind	1	76.62.11	616.1	616.1	616.1	616.1	616.1
Flange WN RTJ	1	76.62.80	290.1	290.1	290.1	-	-
NOF RTJ	1	76.80.37	-	-	-	*046.1	*044.1
Bolting	8	81.38.61	402.1	402.1	402.1	402.1	402.1
Gasket RTJ	2	85.37.20	216.1	216.1	216.1	216.1	216.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
DBB Valve	1	77.85.46	*00.6	*00.6	*00.6	*00.6	*00.6
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	108.1	-	-
Flange WN RF	1	76.62.80	036.1	036.1	036.1	-	-
NOF RF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.61	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 - 400 40			
Flange WN RF	1	76.62.80	038.1	-			
Tee reducing	1	76.30.88	144.1	-			
NOF RF	1	76.80.37	-	351.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.61	469.1	469.1			
Gasket Sp.WD	1	85.41.36	212.1	212.1			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS RTJ		WAFER TYPE VALVES RTJ		SPECTACLES / SPACERS RTJ		Number of Bolts	ORIFICE FLANGES RF	
		81.38.61	Dia x L In x mm	81.38.61	Dia x L In x mm	81.38.61	Dia x L In x mm		81.38.61	Dia x L In x mm
15	4	330.1	3/4 x 110			334.1	3/4 x 130			
20	4	331.1	3/4 x 115			335.1	3/4 x 140			
25	4	402.1	7/8 x 125			407.1	7/8 x 160			
40	4	469.1	1 x 140			474.1	1 x 160			
50	8	405.1	7/8 x 145	417.1	7/8 x 220	411.1	7/8 x 185		407.1 7/8 x 160	
80	8	405.1	7/8 x 145	419.1	7/8 x 235	411.1	7/8 x 185		407.1 7/8 x 160	
100	8	532.1	11/8 x 170	549.1	11/8 x 280	538.1	11/8 x 210		533.1 11/8 x 180	
150	12	536.1	11/8 x 195	562.1	11/8 x 360	543.1	11/8 x 240		537.1 11/8 x 205	
200	12	643.1	13/8 x 220	672.1	13/8 x 435	651.1	13/8 x 275		645.1 13/8 x 235	
250	16	645.1	13/8 x 235	675.1	13/8 x 485	655.1	13/8 x 300		647.1 13/8 x 250	
300	20	648.1	13/8 x 255	*00.1	13/8 x 560	657.1	13/8 x 330		650.1 13/8 x 265	
350	20	692.1	11/2 x 275	*00.2	11/2 x 640	705.1	11/2 x 355		694.1 11/2 x 285	
400	20	723.1	15/8 x 285	*00.3	15/8 x 690	738.1	15/8 x 370		725.1 15/8 x 300	
450										
500										
600										

BRANCH OUTLETS							
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** RF 76.80.37	NOF** RTJ 76.80.37	WOF RTJ 76.80.37	WOL 76.79.03	
50 - 400	15	*55.1	341.1	*04.9	-	-	
80 - 400	20	*55.2	343.1	*04.0	-	-	
80 - 100	25	*55.3	345.1	*04.6	-	-	
150 - 400	25	*55.4	346.1	*04.4	-	-	
150 - 400	40	*55.6	351.1	*04.3	-	-	
150	50	-	-	*00.2	-	*01.1	
200	50	-	-	*00.2	-	103.1	
250	50	-	-	*00.2	-	104.1	
300	50	-	-	*05.2	-	105.1	
350	50	-	-	*05.2	-	106.1	
400	50	-	-	*05.2	-	107.1	
200	80	-	-	-	*23.1	116.1	
250	80	-	-	-	23.2	117.1	
300	80	-	-	-	23.3	118.1	
350	80	-	-	-	23.4	119.1	
400	80	-	-	-	23.5	120.1	
300	100	-	-	-	23.6	121.1	
350	100	-	-	-	23.7	122.1	
400	100	-	-	-	23.8	124.1	

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450	500	600
DBB Valve	2	77.85.46	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4			
Flange WN RF	2	76.62.80	040.1	*10.1	*10.2									
Flange WN RF	2	76.62.79	-	-	-	888.1	889.1	890.1	891.1	892.1	893.1			
Jackscrews**		81.86.35	*01.6	*01.1	*00.2	*00.5	*01.7	*01.2	*00.4	*00.3	*02.7			
NOL plain end	2	76.80.31	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3			
Bolting		81.38.61	407.1	407.1	533.1	537.1	545.1	647.1	660.1	694.1	725.1			
Number of bolts			8	8	8	12	12	16	20	20	20			
Gasket Sp.WD	2	85.41.36	214.1	168.1	170.1	174.1	176.1	178.1	180.1	182.1	184.1			

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONECTIONS	
		COMPONENTS	Nos reqd
76.80.60.462.1	356	Valve, Gate	1
76.80.60.464.1	813	Valve, Ball	2
76.80.60.466.1	1219	Flange blind	2
76.80.60.468.1	1524	Flange WN	1
76.80.60.470.1	1829	Gasket Sp.WD	1
76.80.60.472.1	2134	Gasket Sp.WD	4
76.80.60.474.1	2438	Gasket Sp.WD	3
76.80.60.476.1	2743	Bolting	8
76.80.60.478.1	3048	Bolting	32
		Bolting	12

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind		NOT USED			
Bolting					
Gasket Sp.WD					

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind		NOT USED			
Bolting					
Gasket Sp.WD					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.61	469.1	469.1	469.1
Gasket Sp.WD	1	85.41.36	212.1	212.1	212.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*00.6
Bolting	8	81.38.61	402.1
Gasket Sp.WD	1	85.41.36	208.1

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 200	ASTM A312-TP316L
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 200	ASTM A182-F316
SPECTACLE BLIND FLANGE	DN	15 - 200	ASTM A240-TP316
SPACER RING	DN	15 - 200	ASTM A240-TP316
SPADE BLIND	DN	15 - 200	ASTM A240-TP316
WELDING NECK FLANGE	DN	15 - 200	ASTM A182-F316

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 200	ASTM A403-WP316L
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L

REDUCING FITTINGS

BRANCH OUTLET, FLG. RF (NOF)	DN	15 - 50	ASTM A182-F316
BRANCH OUTLET PLAIN END (NOL)	DN	15 - 40	ASTM A182-F316
BRANCH OUTLET FLG. RF (WOF)	DN	80	ASTM A182-F316
BRANCH OUTLET BW END (WOL)	DN	50 - 80	ASTM A182-F316
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 200	AISI 316, GRAPHITE FILLED WITH SS CENTRING & INNER RING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M
JACKSCREWS			ASTM A193-B8MA
LEVEL DISPLACER CHAMBER	DN	100 - 100	ASTM A312-TP316
ORIFICE FLANGE SET, RAISED FACE	DN	50 - 200	FLANGES: ASTM A182-F316

VALVES - RAISED FACE

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 200	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : PCTFE
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 200	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : PCTFE
CHECK VALVE, PISTON, FLANGED.	DN	15 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
DUAL PL. CHECK VALVE WAFER	DN	50 - 200	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM: AISI 316, 316L SEATS : VITON AED
GATE VALVE, FLANGED	DN	15 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
GLOBE VALVE, FLANGED	DN	15 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
DOUBLE BLOCK & BLEED FLANGED - BORE 10 mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A182 F316 or ASTM A351-CF8M TRIM: AISI 316 SEATS : PTFE/PCTFE
DOUBLE BLOCK & BLEED FLANGED - FULL BORE (2 ball + needle vent)	DN	50	BODY : ASTM A182 F316 or ASTM A351-CF8M TRIM: AISI 316 SEATS : PTFE/PCTFE

TEMPERATURE DEG C	SERVICE LIMITS					
	-100	38	50	75	100	120
PRESSURE BAR GA	149	149	144.4	135	126.7	122.3

NOTES

- DESIGN LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.2.2
- FOR DESIGN TEMPERATURES ABOVE 50 DEG.C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.
- WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 DEG.C, TO PREVENT CHLORIDE CORROSION CRACKING
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- FLANGES, GASKETS AND FLANGED VALVES DN15 UP TO AND INCLUDING DN50 ARE CLASS 1500.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWINGS S38.130

		BRANCH CONNECTIONS 90 DEG												
		NOMINAL BRANCH SIZE												
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400
	600													
	500													
	450													
	400													
	350													
	300													
	250													
	200	C	C	C	C	D	E	B	B	A				
	150	C	C	C	C	D	B	B	A					
	100	C	C	C	B	B	B	A						
	80	C	C	C	B	B	A							
	50	C	B	B	B	A								
	40	B	B	B	A									
	25	B	B	A										
	20	B	A											
	15	A												

TABLE OF SCHEDULES

DN	SCHEDULE
15	40S
20	40S
25	40S
40	40S
50	80S
80	80S
100	80S
150	80S
200	80S

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch outlet - Plain/ Flanged (NOL / NOF)
- D Branch outlet - Butt weld / Flanged (WOL / NOF)
- E Branch outlet - Butt weld / Flanged (WOL / WOF)

- NOF - Nippoflange
- NOL - Nippolet
- WOF - Weldoflange
- WOL - Weldolet

ISSUE DATE	DECEMBER 1998	REV LETTER	00			
		DATE	04/12/98			
		SIGN	M.H.			
PLANT	PS - 1	STAINLESS STEEL (16Cr-12Ni-2Mo)		PIPING GENERAL		
CONSIGNEE	-	LOW TEMP. SOUR SERVICE		CLASS No. :	9346G	
ENG BY	AKER MARITIME	CONTR. No.	-	ASME RATING :	900	
PRINCIPAL	OPQL	PROJECT No.	-	CORR. ALL :	0 mm	

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74.36.33			Blind 76.65.10	WN 76.65.80	Spect. 76.88.10	Spacer 76.88.19	Spade 76.88.43		
40S	15	018.1			500.1	582.1	458.1	558.1	372.1		
40S	20	026.1			501.1	584.1	460.1	562.1	374.1		
40S	25	034.1			502.1	586.1	466.1	566.1	376.1		
40S	40	050.1			503.1	588.1	468.1	568.1	378.1		
80S	50	060.1			504.1	609.1	470.1	570.1	380.1		
80S	80	068.1			489.1	572.1	472.1	572.1	382.1		
80S	100	076.1			490.1	574.1	474.1	574.1	384.1		
80S	150	087.1			491.1	576.1	476.1	576.1	386.1		
80S	200	097.1			492.1	578.1	478.1	578.1	388.1		
	250										
	300										
	350										
	400										
	450										
	500										
	600										

SCHD	Nominal Pipe Size	FITTINGS						GASKETS	
		Cap 76.33.19	Elbow 45 LR 76.33.37	Elbow 90 SR	Elbow 90 LR 76.33.41	Equal Tee 76.33.84		Spiral Wound 85.41.36	
40S	15	286.1	286.1		286.1	786.1		*34.1	
40S	20	296.1	296.1		296.1	796.1		*34.2	
40S	25	306.1	306.1	NOT	306.1	806.1		*34.3	
40S	40	326.1	326.1	USED	326.1	826.1		*34.4	
80S	50	338.1	338.1		338.1	838.1		*34.5	
80S	80	358.1	358.1		358.1	858.1		*28.2	
80S	100	378.1	378.1		378.1	878.1		*28.3	
80S	150	398.1	398.1		398.1	898.1		*28.4	
80S	200	412.1	412.1		412.1	412.1		*28.5	
	250								
	300								
	350								
	400								
	450								
	500								
	600								

Nominal Pipe Size	VALVES										
	Ball RB	Ball RB	Ball FB	Ball FB	Gate	Globe	Check	Check	DB & B	DB & B	DB & B
	Floating ball Flanged	Trunnion mounted Flanged 77.03.73	Floating ball Flanged	Trunnion mounted Flanged 77.03.73	Flanged 77.23.09	Flanged 77.33.09	dual pl. Wafer 77.68.00	Piston Flanged 77.13.09	2 ball + needle vent Flanged 77.85.46	3 ball Flanged 77.85.45	Full Bore Flanged 77.85.50
15	NOT USED	208.1 160.1 162.1 164.1 165.1	NOT USED	708.1 660.1 662.1 664.1 666.1	203.1	203.1		203.1	*10.4	*11.1	
20					204.1	204.1		204.1	*10.5	*10.7	
25					205.1	205.1		205.1	*10.6	*10.9	
40					207.1	207.1		207.1			
50						208.1	208.1				*00.3
80						160.1	160.1				
100						162.1	162.1				
150						164.1	164.1				
200						165.1	166.1				
250											
300											
350											
400											
450											
500											
600											

REDUCING FITTINGS					
SCHED	Nominal Pipe Size	Conc reducer 76.33.70	Ecc reducer 76.33.72	Reducing Tee 76.33.85	Reducing Tee 76.33.89
40S	20 x 15	566.1	566.1	618.1	-
40S	25 x 15	576.1	576.1	628.1	-
40S	25 x 20	586.1	586.1	638.1	-
40S	40 x 15	596.1	596.1	642.1	-
40S	40 x 20	616.1	616.1	648.1	-
40S	40 x 25	626.1	626.1	658.1	-
80S/40S	50 x 20	-	-	667.1	-
80S/40S	50 x 25	*00.3	*00.3	677.1	-
80S/40S	50 x 40	*00.4	*00.4	687.1	-
80S/40S	80 x 40	*00.5	*00.5	697.1	-
80S	80 x 50	688.1	688.1	-	356.1
80S/40S	100 x 40	-	-	-	367.1
80S/40S	100 x 50	708.1	708.1	-	372.1
80S/40S	100 x 80	718.1	718.1	-	380.1
80S	150 x 80	751.1	751.1	-	389.1
80S	150 x 100	761.1	761.1	-	397.1
80S	200 x 100	770.1	770.1	-	405.1
80S	200 x 150	784.1	784.1	-	415.1

ORIFICE INSTRUMENT CONNECTIONS												
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15					
DBB Valve	2	77.85.46	*10.4	*10.4	*10.4	*10.4	*10.4					
Flange WN RF	2	76.65.80	609.1	572.1	574.1	576.1	578.1					
Jackscrews**		81.86.35	*01.6	*01.1	*00.2	*00.5	*01.7					
NOL plain end	2	76.80.31	*00.6	*00.6	*00.6	*00.6	*00.6					
Bolting		81.38.67	407.1	407.1	533.1	537.1	645.1					
Number of bolts			8	8	8	12	12					
Gasket Sp.WD	2	85.41.36	*34.5	*28.2	*28.3	*28.4	*28.5					

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.502.1	356	Valve, Gate	1	77.23.09.204.1
76.80.60.504.1	813	Valve, Ball	2	77.30.73.208.1
76.80.60.506.1	1219	Flange blind	2	76.62.10.501.1
76.80.60.508.1	1524	Flange WN	1	76.62.80.584.1
76.80.60.510.1	1829	Gasket Sp.WD	1	85.41.36.*28.2 DN 100
76.80.60.512.1	2134	Gasket Sp.WD	4	85.41.36.*34.5 DN 50
76.80.60.514.1	2438	Gasket Sp.WD	3	85.41.36.*34.2 DN 20
76.80.60.516.1	2743	Bolting	8	81.38.67.532.1
76.80.60.518.1	3048	Bolting	32	81.38.67.405.1
		Bolting	12	81.38.67.331.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge					
Valve, gate					
Flange blind			NOT USED		
Bolting					
Gasket Sp.WD					

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge					
Valve, gate					
Flange blind			NOT USED		
Bolting					
Gasket Sp.WD					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	469.1	469.1	469.1
Gasket Sp.WD	1	85.41.36	*34.4	*34.4	*34.4

PRESSURE INST. CONNECTIONS ON EQUIPMENT				
COMPONENTS	Nos reqd	Class Size	25	
Double Block & Bleed Valve	1	77.85.46	*10.6	
Bolting	4	81.38.67	402.1	
Spiral Wound Gasket	1	85.41.36	*34.3	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25	40	50	80-100	150-200
			25	25	25	25	25
Valve, globe	1	77.33.09	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.33.84	806.1				
Tee reducing	1	76.33.85		658.1	677.1		
Flange blind	1	76.65.10	502.1	502.1	502.1	502.1	502.1
Flange WN	1	76.65.80	586.1	586.1	586.1		
NOF	1	76.80.39				127.1	128.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	*34.3	*34.3	*34.3	*34.3	*34.3

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25	40	50	80-100	150-200
			25	25	25	25	25
Valve, gate	1	77.23.09	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.33.84	806.1				
Tee reducing	1	76.33.85		658.1	674.1		
Flange blind	1	76.65.10	502.1	502.1	502.1	502.1	502.1
Flange WN	1	76.65.80	586.1	586.1	586.1		
NOF	1	76.80.39				127.1	128.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.31.02	*34.3	*34.3	*34.3	*34.3	*34.3

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25	40	50	80-100	150-200
			25	25	25	25	25
DBB Valve	1	77.85.46	*10.6	*10.6	*10.6	*10.6	*10.6
Tee equal	1	76.33.84	806.1				
Tee reducing	1	76.33.85		658.1	677.1		
Flange WN	1	76.65.80	586.1	586.1	586.1		
NOF	1	76.80.39				127.1	128.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	*34.3	*34.3	*34.3	*34.3	*34.3

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	80	100	150-200		
			40	40	40		
Flange WN	1	76.65.80	588.1	588.1			
Tee Reducing	1	76.33.85	697.1				
Tee Reducing	1	76.33.89		367.1			
NOF	1	76.80.39			133.1		
Thermowell	1		BY INSTRUMENTS				
Bolting	4	81.38.67	469.1	469.1	469.1		
Gasket Sp.WD	1	85.41.36	*34.4	*34.4	*34.4		

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number off Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm		81.38.67	Dia x L In x mm
15	4	330.1	3/4 x 110			333.1	3/4 x 125			
20	4	331.1	3/4 x 115			335.1	3/4 x 140			
25	4	402.1	7/8 x 125			405.1	7/8 x 145			
40	4	469.1	1 x 140			472.1	1 x 160			
50	8	405.1	7/8 x 145	417.1	7/8 x 220	409.1	7/8 x 170		407.1	7/8 x 160
80	8	405.1	7/8 x 145	*01.2	7/8 x 235	410.1	7/8 x 180		407.1	7/8 x 160
100	8	532.1	11/8 x 170	551.1	11/8 x 290	537.1	11/8 x 205		533.1	11/8 x 180
150	12	536.1	11/8 x 195	562.1	11/8 x 360	542.1	11/8 x 235		537.1	11/8 x 205
200	12	643.1	13/8 x 220	*01.3	13/8 x 435	651.1	13/8 x 275		645.1	13/8 x 235
250										
300										
350										
400										
450										
500										
600										

BRANCH NIPPLES					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.39	WOF 76.80.37	WOL 76.79.70
50-150	15	451.1	121.1		
200	15	452.1	122.1		
80	20	453.1	123.1		
100-300	20	454.1	124.1		
80-100	25	457.1	127.1		
150-200	25	458.1	128.1		
150-200	40	462.1	133.1		
150	50			*55.5	360.1
200	50			*55.6	490.1
200	80			*55.7	514.1

** Dimensions to SIPM standard drawing S-38.090

TEMPERATURE DEG C	SERVICE LIMITS					
	-20	38	50	75	100	120
PRESSURE BAR GA	208	208	208	208	208	208

NOTES :

- SERVICE LIMITS ARE BASED ON B7M BOLTING LIMITS
- COLD BENDING OF PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE.
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS FOR DN 15 - 150 ONLY WHERE SPACE RESTRICTIONS DICTATE.
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130

		BRANCH CONNECTIONS 90 DEG												
		NOMINAL BRANCH SIZE												
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400
	600													
	500													
	450													
	400	C	C	C	C	D	E	E	E	B	B	B	B	A
	350	C	C	C	C	D	E	E	E	B	B	B	B	A
	300	C	C	C	C	D	E	E	E	B	B	B	A	
	250	C	C	C	C	D	E	E	E	B	B	B	A	
	200	C	C	C	C	D	E	E	E	B	B	B	A	
	150	C	C	C	C	D	B	B	A					
	100	C	C	C	B	B	B	A						
	80	C	C	C	B	B	A							
	50	C	B	B	B	A								
	40	B	B	B	A									
	25	B	B	A										
	20	B	A											
	15	A												

TABLE OF SCHEDULES

DN	SCHEDULE
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	160
100	160
150	160
200	160
250	160
300	160
350	160
400	160

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF)
 E Branch outlet - Butt weld / Flanged (WOL / WOF)

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

FIRST ISSUE : DECEMBER 1998		REV LETTER	00		
		DATE	04/12/98		
		SIGN	M.H		
PLANT	PS - 1	CARBON STEEL		PIPING GENERAL	
CONSIGNEE	-	SOUR SERVICE		CLASS No.:	15144G
ENG BY	AKER MARITIME	CONTR. No.	-	ASME RATING:	1500
PRINCIPAL	OPQL	PROJECT No.	-	CORR.ALL.:	3mm

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC description)

PIPE

PIPE, SEAMLESS	DN 15 - 400	ASTM A106-B
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FLANGES - RAISED FACE

BLIND FLANGE	DN 15 - 400	ASTM A105
SPECTACLE BLIND FLANGE	DN 15 - 150	ASTM A285 - C
SPACER RING	DN 15 - 400	ASTM A285 - C
SPADE BLIND	DN 15 - 400	ASTM A516-60
WELDING NECK FLANGE	DN 15 - 400	ASTM A105

FITTINGS

CAP, BUTT - WELD. END	DN 15 - 400	ASTM A234-WPB
ELBOW 45°, BUTT - WELD. ENDS	DN 15 - 400	ASTM A234-WPB
ELBOW 90°, BUTT - WELD. ENDS	DN 15 - 400	ASTM A234-WPB
EQUAL TEE, BUTT - WELD. ENDS	DN 15 - 400	ASTM A234-WPB

REDUCING FITTINGS

BRANCH OUTLET, FLG END RF (NOF)	DN 15 - 50	ASTM A105N
BRANCH OUTLET BW END (NOL)	DN 15 - 40	ASTM A105N
BRANCH OUTLET FLG END RF (WOF)	DN 80 - 150	ASTM A105N
BRANCH OUTLET BW END (WOL)	DN 50 - 150	ASTM A105N
REDUCER CONC. BUTT - WELD. ENDS	DN 15 - 400	ASMT A234-WPB
REDUCER ECC. BUTT - WELD. ENDS	DN 15 - 400	ASMT A234-WPB
TEE REDUCING, BUTT - WELD. ENDS	DN 15 - 400	ASMT A234-WPB

ISCELLANEOUS

GASKET, SPIRAL WOUND	DN 15 - 400	AISI 316 GRAPHITE FILLED CS CENTRING AND INNER RING
STUD BOLTS / HEX NUTS	-	BOLTS :ASTM A193-B7MBOLTS NUTS :ASTM A194-2HM
JACKSCREWS		ASTM A193-B8MA

VALVES - RAISED FACE

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN 50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A BALL/SEAT RINGS: ASTM A182-F6a or 316(L) SEATS : NYLON PA12, DEVLON V
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED	DN 50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or F316(L) or F6A BALL/SEAT RINGS: ASTM A182-F6a or 316(L) SEATS : NYLON PA12, DEVLON V
CHECK VALVE, PISTON, FLANGED.	DN 15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + AISI 410 or STELLITE
CHECK VALVE WAFER TYPE.	DN 50 - 400	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: BODY + AISI 410 or STELLITE SEATS : VITON AED
GATE VALVE, FLANGED.	DN 15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, FLANGED.	DN 15 - 100	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, NEEDLE TYPE, FLANGED.	DN 15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN 15 - 25	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED - FULL BORE (2 ball + needle vent)	DN 50	BODY: ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12

SCHD	Nominal Pipe Size	PIPE		FLANGES						STRAINERS	
		74.30.03		Blind 76.62.10	WN. R.F 76.62.80	WN. R.F 76.62.79	Spect. 76.88.36	Spacer 76.88.46	Spade 76.88.42		
XXS	15	022.1		408.1	032.1		608.1	708.1	162.1		
XXS	20	032.1		412.1	034.1		612.1	712.1	164.1		
XXS	25	042.1		416.1	036.1		616.1	716.1	166.1		
XXS	40	062.1		418.1	038.1		618.1	718.1	168.1		
160	50	073.1		420.1		970.1	620.1	720.1	170.1		
160	80	113.1		422.1		972.1	622.1	722.1	172.1		
160	100	161.1		424.1		974.1	624.1	724.1	174.1		
160	150	227.1		426.1		976.1	626.1	726.1	176.1		
160	200	267.1		428.1		978.1		728.1	178.1		
160	250	309.1		430.1		980.1		730.1	180.1		
160	300	349.1		432.1		982.1		732.1	182.1		
160	350	399.1		434.1		984.1		734.1	184.1		
160	400	453.1		436.1		986.1		736.1	186.1		

SCHD	Nominal Pipe Size	FITTINGS						GASKETS	
		Cap 76.30.17	Elbow 45 76.30.34	Elbow 90 LR 76.30.42	Equal Tee 76.30.81			Spiral Wound 85.41.36	
XXS	15	573.1	573.1	573.1	573.1			204.1	
XXS	20	579.1	579.1	579.1	579.1			206.1	
XXS	25	583.1	583.1	583.1	583.1			208.1	
XXS	40	593.1	593.1	593.1	593.1			212.1	
160	50	612.1	612.1	612.1	612.1			214.1	
160	80	632.1	632.1	632.1	632.1			218.1	
160	100	652.1	652.1	652.1	652.1			220.1	
160	150	672.1	672.1	672.1	672.1			224.1	
160	200	695.1	695.1	695.1	695.1			226.1	
160	250	715.1	715.1	715.1	715.1			228.1	
160	300	737.1	737.1	737.1	737.1			230.1	
160	350	757.1	757.1	757.1	757.1			232.1	
160	400	777.1	777.1	777.1	777.1			234.1	

Nominal Pipe Size	VALVES									
	Ball RB Trunnion mounted Flanged 77.00.73	Ball FB Trunnion mounted Flanged 77.00.73	Gate Flanged 77.20.23	Globe Flanged 77.30.23	Globe needle Flanged 77.30.23	Check Dual PI Wafer 77.67.06	Check Piston Flanged 77.10.23	DB & B 2 ball + needle vent Flanged 77.85.46	DB & B 3 ball Flanged 77.85.45	DB & B Full Bore Flanged 77.85.50
15			203.1	203.1	753.1		203.1	*00.4	*00.4	
20			204.1	204.1	754.1		204.1	*00.5	*01.3	
25			205.1	205.1	755.1		205.1	*00.6	*00.1	
40			207.1	207.1	757.1		207.1			
50	208.1	708.1		208.1		208.1			*00.2	
80	210.1	710.1		210.1		210.1				
100	212.1	712.1		212.1		212.1				
150	214.1	714.1				214.1				
200	215.1	715.1				215.1				
250	216.1	716.1				216.1				
300	217.1	717.1				217.1				
350	218.1	718.1				218.1				
400	219.1	719.1				219.1				

REDUCING FITTINGS				
SCHD	Nominal Pipe Size	Conc reducer 76.30.66	Ecc reducer 76.30.67	Reducing Tee 76.30.88
XXS	20 x 15	142.1	142.1	040.1
XXS	25 x 15	152.1	152.1	050.1
XXS	25 x 20	162.1	162.1	060.1
XXS	40 x 15	172.1	172.1	070.1
XXS	40 x 20	182.1	182.1	080.1
XXS	40 x 25	192.1	192.1	090.1
160/XXS	50 x 20	-	-	103.1
160/XXS	50 x 25	202.1	202.1	112.1
160/XXS	50 x 40	212.1	212.1	121.1
160/XXS	80 x 40	232.1	232.1	130.1
160	80 x 50	242.1	242.1	134.1
160/XXS	100 x 40	-	-	151.1
160	100 x 50	273.1	273.1	155.1
160	100 x 80	282.1	282.1	167.1
160	150 x 80	302.1	302.1	179.1
160	150 x 100	312.1	312.1	192.1
160	200 x 100	332.1	332.1	208.1
160	200 x 150	342.1	342.1	228.1
160	250 x 100	-	-	256.1
160	250 x 150	360.1	360.1	274.1
160	250 x 200	370.1	370.1	296.1
160	300 x 150	-	-	313.1
160	300 x 200	400.1	400.1	333.1
160	300 x 250	410.1	410.1	355.1
160	350 x 150	-	-	376.1
160	350 x 200	428.1	428.1	395.1
160	350 x 250	441.1	441.1	420.1
160	350 x 300	451.1	451.1	446.1
160	400 x 200	459.1	459.1	484.1
160	400 x 250	468.1	468.1	510.1
160	400 x 300	480.1	480.1	536.1
160	400 x 350	491.1	491.1	561.1

ORIFICE INSTRUMENT CONNECTIONS											
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15
DBB Valve	2	77.85.46	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4
Flange WN RF	2	76.62.79	970.1	972.1	974.1	976.1	978.1	980.1	982.1	984.1	986.1
Jackscrews**		81.86.35	*01.6	*00.2	*00.5	*02.5	*00.4	*01.5	*01.4	*03.0	*03.1
NOL plain end	2	76.80.31	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3
Bolting		81.38	66.407.1	66.534.1	66.594.1	66.651.1	66.734.1	66.798.1	66.829.1	66.861.1	66.705.1
Number of bolts			8	8	8	12	12	12	16	16	16
Gasket Sp.WD	2	85.41.36	214.1	218.1	220.1	224.1	226.1	228.1	230.1	232.1	234.1

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS	
		COMPONENTS	Nos reqd
			NOT USED

LEVEL GAUGE CONNECTIONS THROUGH VISION				
COMPONENTS	Nos reqd	Length		
Level Gauge				
Valve, gate				
Flange blind			NOT USED	
Bolting				
Gasket Sp.WD				

LEVEL GAUGE CONNECTIONS REFLEX				
COMPONENTS	Nos reqd	Length		
Level Gauge				
Valve, gate				
Flange blind			NOT USED	
Bolting				
Gasket Sp.WD				

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT				
COMPONENTS	Nos reqd	Length		
Thermowell				
Bolting			NOT USED	
Gasket Sp.WD				

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.88.46	*00.4
Bolting	4	81.38.66	402.1
Gasket Sp.WD	1	85.41.36	208.1

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, globe	1	77.30.23	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	106.1	-	-
Flange blind	1	76.62.10	616.1	616.1	616.1	616.1	616.1
Flange WN	1	76.62.80	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, gate	1	77.20.23	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	106.1	-	-
Flange blind	1	76.62.10	616.1	616.1	616.1	616.1	616.1
Flange WN	1	76.62.80	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
DBB Valve	1	77.85.46	*00.6	*00.6	*00.6	*00.6	*00.6
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	106.1	-	-
Flange WN	1	76.62.80	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 - 400 40			
Flange WN	1	76.6.80	038.1	-			
Tee reducing	1	76.30.88	144.1	-			
NOF	1	76.80.37	-	351.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.66	469.1	469.1			
Gasket Sp.WD	1	85.41.36	212.1	212.1			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.66		81.38	Dia x L In x mm	81.38	Dia x L In x mm		81.38	Dia x L In x mm
15	4	330.1	3/4 x 110			66.334.1	3/4 x 130			
20	4	331.1	3/4 x 115			66.335.1	3/4 x 140			
25	4	402.1	7/8 x 125			66.405.1	7/8 x 145			
40	4	469.1	1 x 140			66.473.1	1 x 165			
50	8	405.1	7/8 x 145	66.417.1	7/8 x 220	66.410.1	7/8 x 180		66.407.1	7/8 x 160
80	8	533.1	11/8 x 180	66.547.1	11/8 x 265	66.539.1	11/8 x 215		66.534.1	11/8 x 185
100	8	593.1	11/4 x 195	66.610.1	11/4 x 300	66.599.1	11/4 x 235		66.594.1	11/4 x 205
150	12	649.1	13/8 x 260	66.670.1	13/8 x 425	66.656.1	13/8 x 310		66.651.1	13/8 x 275
200	12	724.1	15/8 x 290	86.356.1	15/8 x 550	66.734.1	15/8 x 350		66.734.1	15/8 x 350
250	12	786.1	17/8 x 330	86.505.1	17/8 x 640	66.798.1	17/8 x 400		66.798.1	17/8 x 400
300	16	820.1	2 x 375	86.585.1	2 x 740	66.830.1	2 x 455		66.829.1	2 x 440
350	16	849.1	21/4 x 405	86.663.1	21/4 x 830	66.861.1	21/4 x 480		66.861.1	21/4 x 480
400	16	865.1	21/2 x 445	86.738.1	21/2 x 905	86.705.1	21/2 x 540		86.705.1	21/2 x 540

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF RF** 76.80.37	WOF 76.80.37	WOL 76.79.03
50 - 400	15	072.1	341.1	-	-
80 - 400	20	078.1	343.1	-	-
80 - 100	25	080.1	345.1	-	-
150 - 400	25	084.1	346.1	-	-
150 - 400	40	088.1	351.1	-	-
150	50	-	337.1	-	182.1
200	50	-	337.1	-	186.1
250	50	-	337.1	-	188.1
300	50	-	338.1	-	190.1
350	50	-	338.1	-	192.1
400	50	-	338.1	-	194.1
200	80	-	-	*15.7	210.1
250	80	-	-	*15.8	212.1
300	80	-	-	*15.9	214.1
350	80	-	-	*16.0	216.1
400	80	-	-	*16.1	128.1
300	100	-	-	*16.2	226.1
350	100	-	-	*16.3	238.1
400	100	-	-	*16.4	240.1
400	150	-	-	*16.5	260.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-50	38	50	75	100	120
PRESSURE BAR GA	208	208	208	208	208	208

NOTES

- 1) SERVICE LIMITS ARE BASED ON B7M BOLTING LIMITS [01]
- 2) COLD BENDING OF PIPE IS NOT ALLOWED.
- 3) WELDS SHALL BE POST -WELD HEAT TREATED FOR WALL THICKNESS EQUAL OR > 12mm.
- 4) THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- 5) PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- 6) CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- 7) ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE
- 8) ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- 9) ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- 10) DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE. [01]
- 11) THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS FOR DN 15 - 150 OLY WHERE SPACE RESTRICTIONS DICTATE. [01]
- 12) FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130 [01]

BRANCH CONNECTIONS 90 DEG																	
NOMINAL BRANCH SIZE																	
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400	C	C	C	C	D	E	E	E	B	B	B	B	A			
	350	C	C	C	C	D	E	E	E	B	B	B	B	A			
	300	C	C	C	C	D	E	E	E	B	B	B	B	A			
	250	C	C	C	C	D	E	E	E	B	B	B	B	A			
	200	C	C	C	C	D	E	E	E	B	B	B	B	A			
	150	C	C	C	C	D	E	E	E	B	B	B	B	A			
	100	C	C	C	B	B	B	B	A								
	80	C	C	C	B	B	B	A									
	50	C	B	B	B	A											
	40	B	B	B	A												
	25	B	B	A													
	20	B	A														
	15	A															

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF) [01]
 E Branch outlet - Butt weld / Flanged (WOL / WOF) [01]

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

TABLE OF SCHEDULES	
DN	SCHEDULE
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	160
100	160
150	160
200	160
250	160
300	160
350	160
400	160

FIRST ISSUE : MAY 1998	REV LETTER	00	01		
	DATE	18/05/98	04/12/98		
	SIGN	M.H.	M.H.		
PLANT PS - 1	LOW TEMP. CARBON STEEL		PIPING GENERAL		
CONSIGNEE -	SOUR SERVICE		CLASS No. : 15150G		
ENG BY AKER MARITIME	CON. JOB NO -		ASME RATING : 1500		
PRINCIPAL OPQL	PROJECT NO -		CORR. ALL : 3mm		

SCHD	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74.30.16			Blind 76.62.12	WN 76.62.86	Spect. 76.88.35	Spacer 76.88.47	Spade 76.88.42		
XXS	15	025.1			658.1	702.1	608.1	608.1	162.1		
XXS	20	032.1			662.1	704.1	612.1	612.1	164.1		
XXS	25	040.1			666.1	706.1	616.1	616.1	166.1		
XXS	40	056.1			668.1	708.1	618.1	618.1	168.1		
160	50	063.1			670.1	709.1	620.1	620.1	170.1		
160	80	071.1			672.1	712.1	622.1	622.1	172.1		
160	100	079.1			674.1	714.1	624.1	624.1	174.1		
160	150	088.1			676.1	716.1	626.1	626.1	176.1		
160	200	101.1			678.1	718.1	628.1	628.1	178.1		
160	250	113.1			680.1	720.1	630.0	630.0	180.1		
160	300	125.1			682.1	722.1	632.1	632.1	182.1		
160	350	138.1			684.1	724.1	634.1	634.1	184.1		
160	400	147.1			686.1	726.1	636.1	636.1	186.1		
[01]	500										
[01]	600										

SCHD	Nominal Pipe Size	FITTINGS						GASKETS		
		Cap 76.31.17	Elbow 45 76.31.34	Elbow 90 SR	Elbow 90 LR 76.31.43	Equal Tee 76.31.80		Spiral Wound 85.41.36		
XXS	15	173.1	173.1		173.1	173.1		204.1		
XXS	20	179.1	179.1		179.1	179.1		206.1		
XXS	25	183.1	183.1		183.1	183.1		208.1		
XXS	40	193.1	193.1	NOT USED	193.1	193.1		212.1		
160	50	212.1	212.1		212.1	212.1		214.1		
160	80	232.1	232.1		232.1	232.1		218.1		
160	100	252.1	252.1		252.1	252.1		220.1		
160	150	272.1	272.1		272.1	272.1		224.1		
160	200	292.0	292.0		292.0	292.0		226.1		
160	250	315.1	315.1		315.1	315.1		228.1		
160	300	337.1	337.1		337.1	337.1		230.1		
160	350	357.1	357.1		357.1	357.1		232.1		
160	400	377.1	377.1		377.1	377.1		234.1		
[01]	450									
[01]	500									
[01]	600									

Nominal Pipe Size	VALVES									
	Ball RB Trunnion mounted Flanged 77.00.83	Ball FB Trunnion mounted Flanged 77.00.83	Gate Flanged 77.20.33	Globe Flanged 77.30.33	Globe needle Flanged	Check Dual Pl Wafer 77.67.52	Check Piston Flanged 77.10.33	DB & B 2 ball + needle vent Flanged 77.85.46	DB & B 3 ball Flanged 77.85.45	DB & B Full Bore Flanged 77.85.50
15			203.1	203.1			203.1	*00.4		
20			204.1	204.1			204.1	*00.5		
25			205.1	205.1			205.1	*00.6		
40			207.1	207.1	NOT USED		207.1			
50	208.1	708.1		208.1		208.1				*00.2
80	210.1	710.1		210.1		210.1				
100	212.1	712.1		212.1		212.1				
150	214.1	714.1		214.1		214.1				
200	215.1	715.1		215.1		215.1				
250	216.1	716.1		216.1		216.1				
300	217.1	717.1		217.1		217.1				
350	218.1	718.1		218.1		218.1				
400	219.1	719.1		219.1		219.1				
450										
500										
600										

REDUCING FITTINGS					
SCHED	Nominal Pipe Size	Conc reducer 76.31.66	Ecc reducer 76.31.71	Reducing Tee 76.31.88	
XXS	20 x 15	142.1	142.1	040.1	
XXS	25 x 15	152.1	152.1	050.1	
XXS	25 x 20	162.1	162.1	060.1	
XXS	40 x 15	172.1	172.1	070.1	
XXS	40 x 20	182.1	182.1	080.1	
XXS	40 x 25	192.1	192.1	090.1	
[01]	160/XXS	196.1	196.1	103.1	
[01]	160/XXS	203.1	203.1	112.1	
[01]	160/XXS	213.1	213.1	121.1	
[01]	160/XXS	233.1	233.1	130.1	
[01]	160	242.1	242.1	134.1	
[01]	160/XXS	-	-	151.1	
[01]	160	271.1	271.1	155.1	
[01]	160	281.1	281.1	167.1	
[01]	160	301.1	301.1	179.1	
[01]	160	311.1	311.1	192.1	
[01]	160	331.1	331.1	208.1	
[01]	160	341.1	341.1	228.1	
[01]	160	349.1	349.1	256.1	
[01]	160	360.1	360.1	274.1	
[01]	160	370.1	370.1	296.1	
[01]	160	389.1	389.1	313.1	
[01]	160	400.1	400.1	333.1	
[01]	160	410.1	410.1	355.1	
[01]	160	419.1	419.1	376.1	
[01]	160	428.1	428.1	395.1	
[01]	160	441.1	441.1	428.1	
[01]	160	451.1	451.1	446.1	
[01]	160	459.1	459.1	484.1	
[01]	160	468.1	468.1	510.1	
[01]	160	480.1	480.1	536.1	
[01]	160	491.1	491.1	561.1	

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS	DN	15 - 400	ASTM A333-6
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 400	ASTM A350-LF2	
SPECTACLE BLIND FLANGE	DN	15 - 150	ASTM A516-60	[01]
SPACER RING	DN	15 - 400	ASTM A516-60	
SPADE BLIND	DN	15 - 400	ASTM A516-60	
WELDING NECK FLANGE	DN	15 - 400	ASTM A350-LF2	

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 400	ASTM A420-WPL6
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6

REDUCING FITTINGS

BRANCH OUTLET, FLG END RF (NOF)	DN	15 - 50	ASTM A350-LF2	[01]
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A350-LF2	
BRANCH OUTLET FLG END RF (WOF)	DN	80 - 150	ASTM A350-LF2	[01]
BRANCH OUTLET BW END (WOL)	DN	50 - 150	ASTM A350-LF2	
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6	
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6	
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6	

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 - 400	AISI 316, GRAPHITE FILLED, CS CENTRING & INNER RING	
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M ASTM A193-B8MA	[01]
JACKSCREWS				
LEVEL DISPACER CHAMBER	DN	100 - 100	ASTM A333 - 6 (SEAMLESS)	
LEVEL GAUGE REFLEX	DN	20 - 20	BODY :ASTM A350-GR.LF2 BOLTS: ASTM A320-L7M/A194-7M GASKET: GRAPHITE	
LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY: ASTM A350-GR.LF2 BOLTS: ASTM A320-L7M/A194-7M GASKET: GRAPHITE	

VALVES - RAISED FACE

BALL VALVE, TRUNNION MOUNTED, FULL BORE FLANGED.	DN	50 - 400	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : NYLON PA12, DEVLON V BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : NYLON PA12, DEVLON V
BALL VALVE, TRUNNION MOUNTED, RED BORE FLANGED.	DN	50 - 400	BODY : ASTM A352-LCC + ENP or ASTM A350-LF2 + ENP TRIM : BODY MAT.+ENP or ASTM A182 F316(L) SEATS : NYLON PA12, DEVLON V
CHECK VALVE, PISTON, FLANGED	DN	15 - 40	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316 or STELLITE BODY : ASTM A352M-LCB/LCC or A350M-LF2 PLATE : BODY + STELLITE SEATS : WELDED ON WITH AISI 316(L) or STELLITE
DUAL PL. CHECK VALVE, WAFER	DN	50 - 400	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316 or STELLITE BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE
GATE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE
GLOBE VALVE, FLANGED.	DN	15 - 100	BODY : ASTM A350-LF2 or ASTM A352-LCB/LCC TRIM : AISI 316(L) or STELLITE BODY : ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KELF or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED - Bore 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 40	BODY : ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KELF or NYLON PA12
DOUBLE BLOCK & BLEED VALVE FLANGED - FULL BORE (2 ball + needle vent)	DN	50	BODY : ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON PA12

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, globe	1	77.30.33	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.31.80	183.1	-	-	-	-
Tee reducing	1	76.31.88	-	090.1	108.1	-	-
Flange blind	1	76.62.12	666.1	666.1	666.1	666.1	666.1
Flange WN	1	76.62.86	706.1	706.1	706.1	-	-
NOF	1	76.80.37	-	-	-	845.1	845.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, gate	1	77.20.33	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.31.80	183.1	-	-	-	-
Tee reducing	1	76.31.88	-	090.1	108.1	-	-
Flange blind	1	76.62.12	666.1	666.1	666.1	666.1	666.1
Flange WN	1	76.62.86	706.1	706.1	706.1	-	-
NOF	1	76.80.37	-	-	-	845.1	845.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
DBB Valve	1	77.85.46	*00.6	*00.6	*00.6	*00.6	*00.6
Tee equal	1	76.31.80	183.1	-	-	-	-
Tee reducing	1	76.31.88	-	090.1	108.1	-	-
Flange WN	1	76.62.86	666.1	666.1	666.1	-	-
NOF	1	76.80.37	-	-	-	845.1	845.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 - 400 40			
Flange WN	1	76.62.86	668.1	-			
Tee reducing	1	76.31.88	144.1	-			
NOF	1	76.80.37	-	851.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.67	469.1	469.1			
Gasket Sp.WD	1	85.41.36	212.1	212.1			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFLER TYPE VALVES		SPECTACLES / SPACERS		Number of Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm	81.38	Dia x L In x mm		81.38	Dia x L In x mm
15	4	330.1	3/4 x 110			67.334.1	3/4 x 130			
20	4	331.1	3/4 x 115			67.335.1	3/4 x 140			
25	4	402.1	7/8 x 125			67.405.1	7/8 x 145			
40	4	469.1	1 x 140			67.473.1	1 x 165			
50	8	405.1	7/8 x 145	417.1	7/8 x 220	67.407.1	7/8 x 180		67.407.1	7/8 x 160
80	8	533.1	1 1/8 x 180	547.1	1 1/8 x 265	67.539.1	1 1/8 x 215		67.534.1	1 1/8 x 185
100	8	593.1	1 1/4 x 195	610.1	1 1/4 x 300	67.599.1	1 1/4 x 235		67.594.1	1 1/4 x 205
150	12	649.1	1 3/8 x 260	*00.1	1 3/8 x 425	67.656.1	1 3/8 x 310		67.651.1	1 3/8 x 275
200	12	724.1	1 5/8 x 290	*00.7	1 5/8 x 550	67.734.1	1 5/8 x 350		67.734.1	1 5/8 x 350
250	12	786.1	1 7/8 x 330	*00.8	1 7/8 x 640	67.798.1	1 7/8 x 400		67.798.1	1 7/8 x 400
300	16	820.1	2 x 375	*00.9	2 x 740	67.832.1	2 x 455		67.829.1	2 x 440
350	16	849.1	2 1/4 x 405	*01.0	2 1/4 x 830	67.861.1	2 1/4 x 480		67.861.1	2 1/4 x 480
400	16	865.1	2 1/2 x 445	*01.1	2 1/2 x 900	94.705.1	2 1/2 x 540		94.705.1	2 1/2 x 540
450										
500										
600										

BRANCH OUTLETS					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.37	WOF 76.80.37	WOL 76.79.07
50 - 400	15	129.1	841.1	-	-
80 - 400	20	130.1	843.1	-	-
80 - 100	25	131.1	845.1	-	-
150 - 400	25	133.1	846.1	-	-
150 - 400	40	135.1	851.1	-	-
150	50	-	837.1	-	184.1
200	50	-	837.1	-	186.1
250	50	-	837.1	-	188.1
300	50	-	838.1	-	190.1
350	50	-	838.1	-	192.1
400	50	-	838.1	-	194.1
200	80	-	-	*65.7	210.1
250	80	-	-	*65.8	212.1
300	80	-	-	*65.9	214.1
350	80	-	-	*66.0	216.1
400	80	-	-	*66.1	218.1
300	100	-	-	*66.2	236.1
350	100	-	-	*66.3	238.1
400	100	-	-	*66.4	240.1
400	150	-	-	*66.5	242.1

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15	450	500	600
DBB Valve	2	77.85.46	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4			
Flange WN RF	1	76.62.86	6701.0	672.1	674.1	676.1	678.1	680.1	682.1	684.1	686.1			
Jackscrews**		81.86.35	*01.6	*00.2	*00.5	*02.5	*00.4	*01.5	*01.4	*03.0	*03.1			
NOL plain end	2	76.80.31	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5	*00.5			
Bolting		81.38	67.407.1	67.534.1	67.594.1	67.651.1	67.734.1	67.798.1	67.829.1	67.861.1	94.705.1			
Number of bolts			8	8	8	12	12	12	16	16	16			
Gasket Sp.WD	2	85.41.36	214.1	218.1	220.1	224.1	226.1	228.1	230.1	232.1	234.1			

** 1 Jackscrew for DN50 to 100 [01]

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.462.1	356	Valve, Gate	1	77.20.33.203.1
76.80.60.464.1	813	Valve, Ball	2	77.00.82.208.1
76.80.60.466.1	1219	Flange blind	2	76.62.12.662.1
76.80.60.468.1	1524	Flange WN	1	76.62.86.664.1
76.80.60.470.1	1829	Gasket Sp.WD	1	85.41.36.220.1 DN 100
76.80.60.472.1	2134	Gasket Sp.WD	4	85.41.36.214.1 DN 50
76.80.60.474.1	2438	Gasket Sp.WD	3	85.41.36.206.1 DN 20
76.80.60.476.1	2743	Bolting	8	81.38.67.593.1
76.80.60.478.1	3048	Bolting	32	81.38.67.405.1
		Bolting	12	81.38.67.331.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind			NOT USED		
Bolting					
Gasket Sp.WD					

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length			
Level gauge					
Valve, gate					
Flange blind			NOT USED		
Bolting					
Gasket Sp.WD					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	469.1	469.1	469.1
Gasket Sp.WD	1	85.41.36	212.1	212.1	212.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*00.6 [01]
Bolting	8	81.38.67	402.1
Gasket Sp.WD	1	85.41.36	208.1

TEMPERATURE DEG C	SERVICE LIMITS					
	-20	38	50	75	100	150
PRESSURE BAR GA	228	228	228	228	228	226

NOTES :

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP. 1.1 AND TO ALLOWABLE INTERNAL PRESSURE ACC. ASME B31.3.
- PRESSURE, TEMPERATURE, ORIFICE FLANGE SETS ARE TO BE RAISED [01] FACE FLANGES WITH SPIRAL WOUND GASKETS.
- COLD BENDING OF PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE.
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE.
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 20mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE. [01]
- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS FOR DN 15 - 150 ONLY WHERE SPACE RESTRICTIONS DICTATE. [01]
- FOR ORIFICE FLANGE ASSEMBLIES REFER TO STANDARD DRAWING S38.130. [01]
- FOR WATER INJECTION THE USE OF HIGH PERFORMANCE BUTTERFLY VALVES IS PREFERRED IN LIEU OF BALL VALVES. GATE VALVES ONLY WHERE NECESSARY FOR PROCESS/OPERATING REQUIREMENTS.

		BRANCH CONNECTIONS 90 DEG												
		NOMINAL BRANCH SIZE												
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400
	600													
	500													
	450													
	400	C	C	C	C	D	E	E	E	B	B	B	B	A
	350	C	C	C	C	D	E	E	E	B	B	B	B	A
	300	C	C	C	C	D	E	E	E	B	B	B	B	A
	250	C	C	C	C	D	E	E	E	B	B	B	B	A
	200	C	C	C	C	D	E	E	E	B	B	B	B	A
	150	C	C	C	C	D	E	E	E	B	B	B	B	A
	100	C	C	C	B	B	B	B	A					
	80	C	C	C	B	B	B	A						
	50	C	B	B	B	A								
	40	B	B	B	A									
	25	B	B	A										
	20	B	A											
	15	A												

TABLE OF SCHEDULES	
DN	SCHEDULE
15	XXS
20	XXS
25	XXS
40	XXS
50	XXS
80	XXS
100	XXS
150	XXS
200	160
250	160
300	160
350	160
400	160

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Butt weld / Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF) [01]
 E Branch outlet - Butt weld / Flanged (WOL / WOF) [01]

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

[01] FIRST ISSUE : APRIL 1998	REV LETTER	00	01		
	DATE	22/4/98	04/12/98		
	SIGN	M.H	M.H		
PLANT PS - 1	CARBON STEEL		PIPING GENERAL		
CONSIGNEE -	SOUR SERVICE		CLASS No.: 15151G		
ENG BY AKER MARITIME	CONTR. No. -		ASME RATING: 1500		
PRINCIPAL OPQL	PROJECT No. -		CORR.ALL.: 3mm		

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC description)

PIPE

PIPE, SEAMLESS	DN	15 - 400	ASTM A106-B
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FLANGES

BLIND FLANGE, RTJ.	DN	15 - 400	ASTM A105N
BLIND FLANGE, RF.	DN	15 - 50	ASTM A105 [01]
SPECTACLE BLIND FLANGE, RTJ	DN	15 - 150	ASTM A285 - C [01]
SPACER RING, RTJ	DN	15 - 400	ASTM A285 - C
SPADE BLIND, RTJ	DN	15 - 400	ASTM A285 - C
WELDING NECK FLANGE, RF.	DN	15 - 50	ASTM A105N [01]
WELDING NECK FLANGE, RTJ.	DN	15 - 400	ASTM A105N

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 400	ASTM A234-WPB
ELBOW 45, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234-WPB
ELBOW 90, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234-WPB
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A234-WPB

REDUCING FITTINGS

BRANCH OUTLET, FLG. RF/ RTJ (NOF)	DN	15 - 50	ASTM A105N
BRANCH OUTLET BW END (NOL)	DN	15 - 40	ASTM A105N
BRANCH OUTLET FLG. RTJ (WOF)	DN	80 - 150	ASTM A105N
BRANCH OUTLET BW END (WOL)	DN	50 - 150	ASTM A105N
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 400	ASMT A234-WPB
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 400	ASMT A234-WPB
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 400	ASMT A234-WPB

ISCELLANEOUS

BLIND HUB FOR CLAMP COUPLING	DN	15 - 300	ASTM A350-LF2
CLAMP FOR CLAMP COUPLING	DN	15 - 200	ASTM A193-B7M
	DN	250 - 300	ASTM A487-GR 2 CLASS C [01]
HUB, BW END, FOR CLAMP COUPLING	DN	15 - 300	ASTM A350-LF2
SEAL RING FOR CLAMP COUPLING	DN	15 - 300	AISI 4140 with PTFE COATING
GASKET, RING JOINT.	DN	15 - 400	SOFT IRON (OCTAGONAL RING)
GASKET, SPIRAL WOUND	DN	15 - 400	AISI 316 GRAPHITE FILLED
			CS CENTRING AND INNER RING
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A193-B7M
			NUTS: ASTM A194-2HM
JACKSCREWS			ASTM A193-B8MA [01]

VALVES

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED RTJ.	DN	50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or ASTM A182 F316(L) or F6A TRIM : ASTM A182-F6a or 316(L) SEATS : NYLON PA12, DEVLON V BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or ASTM A182 F316(L) or F6A TRIM : ASTM A182-F6a or 316(L) SEATS : NYLON PA12, DEVLON V
BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED RTJ.	DN	50 - 400	BODY : ASTM A216 - WCB/WCC+ENP or ASTM A105N+ENP STEM: BODY MAT + ENP or ASTM A182 F316(L) or F6A TRIM : ASTM A182-F6a or 316(L) SEATS : NYLON PA12, DEVLON V BODY : ASTM A216 WCB/WCC [01] DISC: ASTM A216 WCB/WCC TRIM : SUPER DUPLEX UNS32760 SEATS : SUPER DUPLEX/GRAPHITE LAMINATE
BUTTERFLY VALVE, HIGH PERFORMANCE DOUBLE FLANGED RTJ	DN	150 - 400	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + AISI 410 or STELLITE
[01] CHECK VALVE, PISTON, FLANGED RTJ.	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : BODY + AISI 410 or STELLITE
DUAL PL. CHECK VALVE, WAFER RTJ	DN	50 - 400	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM: BODY + AISI 410 or STELLITE
[01] GATE VALVE, FLANGED RTJ.	DN	15 - 40	SEAT/ SEAL: VITON AED BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, FLANGED RTJ	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
GLOBE VALVE, NEEDLE TYPE FLANGED RTJ	DN	15 - 40	BODY : ASTM A216-WCB/WCC or ASTM A105N TRIM : AISI 410 or STELLITE
DOUBLE BLOCK & BLEED VALVE FLANGED RF - Bore 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A350-LF2 TRIM : AISI 316 SEATS: PTFE/KEL 'F' or NYLON / A12 [01]
DOUBLE BLOCK & BLEED VALVE FLANGED RTJ - FULL BORE (2 ball + needle vent)	DN	50	BODY : ASTM A350-LF2 TRIM : AISI 316 SEATS : PTFE/KEL 'F' or NYLON / A12 [01]

SCHD	Nominal Pipe Size	PIPE		[01] FLANGES						STRAINERS	
		74.30.03		Blind, RTJ	Blind, RF	WN, RTJ	WN, R.F	Spect, RTJ	Spacer, RTJ	Spade, RTJ	
				76.62.11	76.62.10	76.62.80	76.62.80	76.88.36	76.88.46	76.88.46	
XXS	15	022.1		612.1	408.1	286.1	032.1	*00.5	*00.5	*01.7	
XXS	20	032.1		614.1	412.1	288.1	034.1	*00.6	*00.6	*01.8	
XXS	25	042.1		616.1	416.1	290.1	036.1	*00.3	*00.7	*01.9	
XXS	40	062.1		618.1	418.1	292.1	038.1	*00.7	*00.8	*02.0	
XXS	50	075.1		620.1	420.1	294.1	040.1	*00.4	*00.9	*02.1	
XXS	80	115.1		622.1	-	296.1	-	*00.8	*01.0	*02.2	
XXS	100	163.1		624.1	-	298.1	-	*00.9	*01.1	*02.3	
XXS	150	229.1		626.1	-	300.1	-	*00.2	*01.2	*02.4	
160	200	267.1		628.1	-	268.1	-	-	*01.3	*02.5	
160	250	309.1		630.1	-	270.1	-	-	*00.4	*00.3	
160	300	349.1		632.1	-	272.1	-	-	*01.4	*02.6	
160	350	399.1		634.1	-	274.1	-	-	*01.5	*02.7	
160	400	453.1		636.1	-	276.1	-	-	*01.6	*02.8	
450											
500											
600											

SCHD	Nominal Pipe Size	[01] FITTINGS						GASKETS			
		Cap	Elbow 45	Elbow 90 LR	Equal Tee	Hub Blind	Hub	Hub Clamp	Ring Joint	Spiral Wound	Seal Ring
		76.30.17	76.30.34	76.30.42	76.30.81	76.81.09	76.81.13	76.81.01	85.37.20	85.41.36	76.81.05
XXS	15	5573.1	573.1	573.1	573.1	028.1	008.1	006.1	212.1	204.1	006.1
XXS	20	579.1	579.1	579.1	579.1	028.1	016.1	006.1	214.1	206.1	006.1
XXS	25	583.1	583.1	583.1	583.1	026.1	026.1	006.1	216.1	208.1	012.1
XXS	40	593.1	593.1	593.1	593.1	034.1	036.1	008.1	220.1	212.1	024.1
XXS	50	613.1	613.1	613.1	613.1	048.1	048.1	010.1	224.1	214.1	030.1
XXS	80	633.1	633.1	633.1	633.1	086.1	088.1	012.1	235.1	218.1	060.1
XXS	100	653.1	653.1	653.1	653.1	110.1	110.1	014.1	239.1	220.1	078.1
XXS	150	673.1	673.1	673.1	673.1	148.1	150.1	018.1	246.1	224.1	126.1
160	200	695.1	695.1	695.1	695.1	204.1	204.1	020.1	250.1	226.1	192.1
160	250	715.1	715.1	715.1	715.1	252.1	252.1	024.1	254.1	228.1	246.1
160	300	737.1	737.1	737.1	737.1	302.1	302.1	028.1	258.1	230.1	312.1
160	350	757.1	757.1	757.1	757.1				263.1	232.1	
160	400	777.1	777.1	777.1	777.1				267.1	234.1	
450											
500											
600											

Nominal Pipe Size	VALVES										
	Ball RB Trunnion	Ball FB Trunnion	Gate	Globe	Globe	Check	Check	DB & B 2 ball + needle vent	DB & B	DB & B	Butterfly High Integrity
	mounted Flanged 77.00.73	mounted Flanged 77.00.73	RTJ Flanged 77.20.23	RTJ Flanged 77.30.23	needle RTJ Flanged 77.30.23	Dual PI RTJ Wafer 77.67.06	Piston RTJ Flanged 77.10.23	Flanged 77.85.46	3 ball Flanged 77.85.45	Full Bore RTJ Flanged 77.85.50	Flanged 77.57.00
15			403.1	403.1	403.1		403.1	*00.4			
20			404.0	404.1	504.1		404.1	*00.5			
25			405.1	405.1	505.1		405.1	*00.6			
40			407.1	407.1	507.1		407.1				
50	408.1	908.1	408.1	408.1		408.1				*00.1	
80	410.1	910.1		410.1		410.1					
100	412.1	912.1		411.1		412.1					
150	414.1	914.1				414.1					*02.4
200	415.1	915.1				415.1					*02.5
250	416.1	916.1				416.1					*02.6
300	417.1	917.1				417.1					*02.7
350	418.1	918.1				418.1					*02.8
400	419.1	919.1				419.1					*02.9
450											
500											
600											

REDUCING FITTINGS					
SCHD	Nominal Pipe Size	Conc reducer 76.30.66	Ecc reducer 76.30.67	Reducing Tee 76.30.88	
XXS	20 x 15	142.1	142.1	040.1	
XXS	25 x 15	152.1	152.1	050.1	
XXS	25 x 20	162.1	162.1	060.1	
XXS	40 x 15	172.1	172.1	070.1	
XXS	40 x 20	182.1	182.1	080.1	
XXS	40 x 25	192.1	192.1	090.1	
XXS	50 x 20	-	-	099.1	
XXS	50 x 25	202.1	202.1	108.1	
XXS	50 x 40	212.1	212.1	117.1	
XXS	80 x 40	232.1	232.1	126.1	
XXS	80 x 50	242.1	242.1	135.1	
XXS	100 x 40	-	-	144.1	
XXS	100 x 50	272.1	272.1	156.1	
XXS	100 x 80	282.1	282.1	168.1	
XXS	150 x 80	302.1	302.1	180.1	
XXS	150 x 100	312.1	312.1	193.1	
160/XXS	200 x 100	332.1	332.1	222.1	
160/XXS	200 x 150	342.1	342.1	242.1	
160/XXS	250 x 100	-	-	268.1	
160/XXS	250 x 150	357.1	357.1	286.1	
160	250 x 200	370.1	370.1	296.1	
160/XXS	300 x 150	-	-	325.1	
160	300 x 200	400.1	400.1	333.1	
160	300 x 250	410.1	410.1	355.1	
160/XXS	350 x 150	-	-	378.1	
160	350 x 200	428.1	428.1	395.1	
160	350 x 250	441.1	441.1	420.1	
160	350 x 300	451.1	451.1	446.1	
160	400 x 200	459.1	459.1	484.1	
160	400 x 250	468.1	468.1	510.1	
160	400 x 300	480.1	480.1	536.1	
160	400 x 350	491.1	491.1	561.1	

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, globe	1	77.30.23	405.1	405.1	405.1	405.1	405.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	108.1	-	-
Flange blind	1	76.62.11	616.1	616.1	616.1	616.1	616.1
Flange WN	1	76.62.80	290.1	290.1	-	-	-
NOF	1	76.80.37	-	-	-	*04.6	*04.4
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket RTJ	2	85.37.20	216.1	216.1	216.1	216.1	216.1

[01]

[01]

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
Valve, gate	1	77.20.23	405.1	405.1	405.1	405.1	405.1
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	106.1	-	-
Flange blind	1	76.62.11	616.1	616.1	616.1	616.1	616.1
Flange WN	1	76.62.80	290.1	290.1	-	-	-
NOF	1	76.80.37	-	-	-	*04.6	*04.4
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket RTJ	2	85.37.20	216.1	216.1	216.1	216.1	216.1

[01]

[01]

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80 - 100 25	150 - 400 25
DBB Valve	1	77.85.46	*00.6	*00.6	*00.6	*00.6	*00.6
Tee equal	1	76.30.81	583.1	-	-	-	-
Tee reducing	1	76.80.88	-	090.1	106.1	-	-
Flange WN	1	76.62.77	036.1	036.1	036.1	-	-
NOF	1	76.80.37	-	-	-	345.1	346.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	208.1	208.1	208.1	208.1	208.1

[01]

[01]

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150 - 400 40			
Flange WN	1	76.62.80	036.1	-			
Tee reducing	1	76.30.88	144.1	-			
NOF	1	76.80.37	-	351.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.66	156.1	156.1	469.1		
Gasket Sp WD	1	85.41.36	212.1	212.1			

[01]

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS, RTJ		WAFER TYPE VALVES, RTJ		SPADES / SPACERS, RTJ		Number of Bolts	ORIFICE FLANGES, RF	
		81.38.66	Dia x L	81.38.66	Dia x L	81.38.66	Dia x L		81.38	Dia x L
			In x mm		In x mm		In x mm			In x mm
15	4	330.1	3/4 x 110			334.1	3/4 x 130			
20	4	331.1	3/4 x 115			335.1	3/4 x 140			
25	4	402.1	7/8 x 125			407.1	7/8 x 160			
40	4	469.1	1 x 140			474.1	1 x 170			
50	8	405.1	7/8 x 145	417.1	7/8 x 220	411.1	7/8 x 185		66.407.1	7/8 x 160
80	8	533.1	1 1/8 x 180	547.1	1 1/8 x 265	541.1	1 1/8 x 230		66.534.1	1 1/8 x 185
100	8	594.1	1 1/4 x 205	611.1	1 1/4 x 310	603.1	1 1/4 x 260		66.594.1	1 1/4 x 205
150	12	650.1	1 3/8 x 265	671.1	1 3/8 x 430	657.1	1 3/8 x 330		66.651.1	1 3/8 x 275
200	12	725.1	1 5/8 x 300	357.1	1 5/8 x 560	*03.1	1 5/8 x 385		66.734.1	1 5/8 x 350
250	12	788.1	1 7/8 x 345	*02.6	1 7/8 x 655	805.1	1 7/8 x 445		66.798.1	1 7/8 x 400
300	16	823.1	2 x 395	*02.7	2 x 755	*03.2	2 x 510		66.829.1	2 x 440
350	16	852.1	2 1/4 x 420	*02.8	2 1/4 x 850	*03.3	2 1/4 x 545		66.861.1	2 1/4 x 480
400	16	868.1	2 1/2 x 460	*02.9	2 1/2 x 930	*03.4	2 1/2 x 600		86.705.1	2 1/2 x 540

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BRANCH OUTLET						
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF RF** 76.80.37	NOF RTJ** 76.80.37	WOF RTJ 76.80.37	WOL 76.79.03
50 - 400	15	072.1	341.1	*04.9	-	-
80 - 400	20	078.1	343.1	*04.0	-	-
80 - 100	25	080.1	345.1	*04.6	-	-
150 - 400	25	084.1	346.1	*04.4	-	-
150 - 400	40	088.1	351.1	*04.3	-	-
150	50	-	357.1	04.2	-	684.1
200	50	-	357.1	04.2	-	103.1
250	50	-	357.1	04.2	-	104.1
300	50	-	358.1	05.2	-	105.1
350	50	-	358.1	05.2	-	106.1
400	50	-	358.1	05.2	-	107.1
200	80	-	-	-	*21.7	116.1
250	80	-	-	-	*21.8	117.1
300	80	-	-	-	*21.9	118.1
350	80	-	-	-	*22.0	119.1
400	80	-	-	-	*22.1	120.1
300	100	-	-	-	*22.2	129.1
350	100	-	-	-	*22.3	130.1
400	100	-	-	-	*22.4	131.1
400	150	-	-	-	*22.5	142.1

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** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15	250 15	300 15	350 15	400 15			
DBB Valve	2	77.85.46	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4	*00.4			
Flange WN RF	2	76.62.80	040.1	044.1	046.1	048.1	-	-	-	-	-			
Flange WN RF	2	76.62.79	-	-	-	-	978.1	980.1	982.1	984.1	986.1			
Jackscrews**		81.86.35	*01.6	*00.2	*00.5	*02.5	*00.4	*01.5	*01.4	*03.0	*03.1			
NOL plain end	2	76.80.31	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3	*00.3			
Bolting		81.38	66.407.1	66.534.1	66.594.1	66.651.1	66.734.1	66.798.1	66.829.1	66.861.1	66.705.1			
Number of bolts			8	8	8	12	12	12	16	16	16			
Gasket Sp.WD	2	85.41.36	214.1	218.1	220.1	224.1	226.1	228.1	230.1	232.1	234.1			

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** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
			NOT USED	

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length			
Level Gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket Sp.WD					

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length			
Level Gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket Sp.WD					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length			
Well Bolting Gasket Sp.WD			NOT USED		

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	
Double Block & Bleed Valve		NOT USED	
Bolting			
Gasket Sp.WD			

TEMPERATURE DEG C	SERVICE LIMITS					
	-100	38	50	75	100	120
PRESSURE BAR GA						
DN 15 - 100	248.3	248.3	240.7	224.9	210.8	203.3
DN 150	236.7	236.7	236.7	224.9	210.8	203.3
DN 200	228.5	228.5	228.5	224.9	210.8	203.3

NOTES

- SERVICE LIMITS ARE ACC. FLANGE RATING ASME B16.5 MAT.GRP.2.2 AND TO ALLOWABLE INTERNAL PRESSURE ACC. ASME B31.3.
- IN SOME INSTANCES ALLOWABLE STRESSES AT DESIGN PRESSURE MAY REACH 90% OF YIELD STRENGTH AT TEMPERATURE.
- FOR DESIGN TEMPERATURES ABOVE 50 DEG.C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.
- WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 DEG.C, TO PREVENT CHLORIDE CORROSION CRACKING.
- COLD BENDING OF THE PIPE IS NOT ALLOWED.
- THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.
- PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.
- CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE. HYDROTEST DRAINS SHALL BE FITTED WITH PIPING CLASS VALVE AND BLIND FLANGE
- ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE.
- ALL BRANCH CONNECTIONS DN 25 AND BELOW SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.
- ADD 15mm TO FLANGED JOINT BOLT LENGTHS FOR INSULATION JOINT ASSEMBLIES.
- DB & B VALVE WITH 2 BALL + NEEDLE VENT PREFERRED, 3 BALL TYPE MAY BE USED AS AN ALTERNATIVE.
- VALVES FOR GAS BLOWDOWN SERVICE ONLY

		BRANCH CONNECTIONS 90 DEG													
		NOMINAL BRANCH SIZE													
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450
	600														
	500														
	450														
	400														
	350														
	300														
	250														
	200	C	C	C	C	D	E	B	B	A					
	150	C	C	C	C	D	B	B	A						
	100	C	C	C	B	B	B	A							
	80	C	C	C	B	B	A								
	50	C	B	B	B	A									
	40	B	B	B	A										
	25	B	B	A											
	20	B	A												
	15	A													

EXPLANATION OF CHARACTERS

- A Equal tee
 B Reducing tee
 C Branch outlet - Plain/ Flanged (NOL / NOF)
 D Branch outlet - Butt weld / Flanged (WOL / NOF) [01]
 E Branch outlet - Butt weld / Flanged (WOL / WOF) [01]

NOF - Nippoflange
 NOL - Nippolet
 WOF - Weldoflange
 WOL - Weldolet

- THE USE OF SPEC. BLINDS IS PREFERRED, USE SPADES AND SPACERS FOR DN 15 - 150 ONLY WHERE SPACE RESTRICTIONS DICTATE. [01]

TABLE OF SCHEDULES	
DN	SCHEDULE
15	80S
20	80S
25	80S
40	160
50	160
80	160
100	160
150	160
200	160

ISSUE DATE	APRIL 1998	REV LETTER	00	01		
		DATE	22/04/98	04/12/98		
		SIGN	M.H.	M.H.		
PLANT	PS - 1	STAINLESS STEEL (16Cr-12Ni-2Mo)		PIPING GENERAL		
CONSIGNEE	-	LOW TEMP. SOUR SERVICE		CLASS No. : 15346G		
ENG BY	AKER MARITIME	CONTR. No. -		ASME RATING : 1500		
PRINCIPAL	OPQL	PROJECT No. -		CORR. ALL : 0 mm		

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

PIPE

PIPE, SEAMLESS / WELDED	DN	15 - 200	ASTM A312-TP316L
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FLANGES - RAISED FACE

BLIND FLANGE	DN	15 - 200	ASTM A182-F316	[01]
SPECTACLE BLIND FLANGE	DN	15 - 150	ASTM A240-TP316	
SPACER RING	DN	15 - 200	ASTM A240-TP316	
SPADE BLIND	DN	15 - 200	ASTM A240-TP316	
WELDING NECK FLANGE	DN	15 - 200	ASTM A182-F316	

FITTINGS

CAP, BUTT - WELD. END	DN	15 - 200	ASTM A403-WP316L
ELBOW 45°, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
ELBOW 90°, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L
EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L

REDUCING FITTINGS

BRANCH OUTLET. FLG. RF (NOF)	DN	15 - 50	ASTM A182-F316	[01]
BRANCH OUTLET PLAIN END (NOL)	DN	15 - 40	ASTM A182-F316	[01]
BRANCH OUTLET FLG. RF (WOF)	DN	80	ASTM A182-F316	
BRANCH OUTLET BW END (WOL)	DN	50 - 80	ASTM A182-F316	
REDUCER CONC. BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L	
REDUCER ECC. BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L	
TEE REDUCING, BUTT - WELD. ENDS	DN	15 - 200	ASTM A403-WP316L	

MISCELLANEOUS

GASKET, SPIRAL WOUND	DN	15 -200	AISI 316,GRAPHITE FILLED WITH SS CENTRING & INNER RING	
STUD BOLTS / HEX NUTS	-		BOLTS: ASTM A320-L7M NUTS: ASTM A194-7M	
JACKSCREWS			ASTM A193-B8MA	[01]
LEVEL DISPLACER CHAMBER	DN	100 - 100	ASTM A312-TP316	

VALVES - RAISED FACE

BALL VALVE, TRUNNION MOUNTED, FULL BORE, FLANGED.	DN	50 - 200	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L SEATS : PCTFE
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BALL VALVE, TRUNNION MOUNTED, RED BORE, FLANGED.	DN	50 - 200	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L SEATS : PCTFE
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CHECK VALVE, PISTON, FLANGED.	DN	15 -40	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L
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DUAL PL. CHECK VALVE, WAFER	DN	50 - 200	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM: AISI 316, 316L SEATS : VITON AED
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GATE VALVE, FLANGED.	DN	15 -40	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L
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GLOBE VALVE, FLANGED.	DN	15 - 100	BODY : ASTM A351-CF8M or ASTM A182-F316 TRIM : AISI 316, 316L
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DOUBLE BLOCK & BLEED FLANGED - BORE 10mm (2 ball + needle vent or 3 ball alternative)	DN	15 - 25	BODY : ASTM A182-F316 TRIM : AISI 316 SEATS : PTFE / PCTFE
DOUBLE BLOCK & BLEED FLANGED - FULL BORE (2 ball + needle vent)	DN	50	BODY : ASTM A182-F316 TRIM : AISI 316 SEATS : PTFE / PCTFE

SCHED	Nominal Pipe Size	PIPE			FLANGES					STRAINERS	
		74.36.33			Blind 76.65.10	WN 76.65.80	Spect. 76.88.10	Spacer 76.88.19	Spade 76.88.43		
80S	15	020.1			500.1	602.1	*00.5	608.1	412.1		
80S	20	028.1			501.1	604.1	512.1	612.1	414.1		
80S	25	036.1			502.1	606.1	*00.4	616.1	416.1		
160	40	054.1			503.1	611.1	518.1	618.1	418.1		
160	50	063.1			504.1	610.1	*00.3	620.1	420.1		
160	80	071.1			505.1	612.1	522.1	622.1	422.1		
160	100	079.1			506.1	614.1	524.1	624.1	424.1		
160	150	088.1			507.1	616.1	526.1	626.1	426.1		
160	200	100.1			508.1	618.1	-	628.1	428.1		
	250						[01]				
	300										
	350										
	400										
	450										
	500										
	600										

SCHED	Nominal Pipe Size	FITTINGS					GASKETS		
		Cap 76.33.19	Elbow 45 76.33.37	Elbow 90 SR	Elbow 90 LR 76.33.41	Equal Tee 76.33.84			Spiral Wound 85.41.36
80S	15	288.1	288.1		288.1	788.1			*34.1
80S	20	298.1	298.1		298.1	798.1			*34.2
80S	25	308.1	308.1	NOT USED	308.1	808.1			*34.3
160	40	330.1	330.1		330.1	830.1			*34.4
160	50	340.1	340.1		340.1	840.1			*34.5
160	80	360.1	360.1		360.1	860.1			*34.7
160	100	380.1	380.1		380.1	880.1			*34.8
160	150	399.1	399.1		399.1	899.1			*34.9
160	200	413.1	413.1		413.1	913.1			*35.0
	250								
	300								
	350								
	400								
	450								
	500								
	600								

Nominal Pipe Size	VALVES									NOTE 13			
	Ball RB	Ball FB	Gate	Globe	Check	Check	DB & B	DB & B	DB & B	Ball RB	Ball FB	Globe	Gate
	Trunnion mounted Flanged 77.03.73	Trunnion mounted Flanged 77.03.73	Flanged 77.23.09	Flanged 77.33.09	dual pl. Wafer 77.68.00	Piston Flanged 77.13.09	2 ball + needle vent Flanged 77.85.46	3 ball Flanged 77.85.45	Full Bore Flanged 77.85.50	Floating Ball Flanged 77.03.74	Full Bore Flanged 77.03.74	Flanged 77.33.00	Flanged 77.23.00
15			203.1	203.1		203.1	*10.4	*11.1					
20			204.1	204.1		204.1	*10.5	*10.7					
25			205.1	205.1		205.1	*10.6	*10.9					205.1
40			207.1	207.1		207.1							
50	208.1	708.1		208.1	208.1				*00.3	208.1	708.1	208.1	
80	210.1	710.1		210.1	210.1								
100	212.1	712.1		212.1	212.1								
150	214.1	714.1			214.1					[01]	[01]	[01]	[01]
200	215.1	715.1			215.1								
250													
300													
350													
400													
450													
500													
600													

SCHED	Nominal Pipe Size	REDUCING FITTINGS			
		Conc reducer 76.33.70	Ecc reducer 76.33.72	Reducing Tee	
80S	20 x 15	568.1	568.1	620.1	-
80S	25 x 15	578.1	578.1	630.1	-
80S	25 x 20	588.1	588.1	640.1	-
160/80S	40 x 15	-	-	645.1	-
160/80S	40 x 20	623.1	623.1	653.1	-
160/80S	40 x 25	633.1	633.1	661.1	-
160/80S	50 x 20	-	-	669.1	-
160/80S	50 x 25	639.1	639.1	679.1	-
160	50 x 40	650.1	650.1	688.1	-
160	80 x 40	680.1	680.1	698.1	-
160	80 x 50	690.1	690.1	-	358.1
160	100 x 40	-	-	-	366.1
160	100 x 50	710.1	710.1	-	374.1
160	100 x 80	720.1	720.1	-	382.1
160	150 x 80	750.1	750.1	-	390.1
160	150 x 100	760.1	760.1	-	398.1
160	200 x 100	771.1	771.1	-	406.1
160	200 x 150	783.1	783.1	-	414.1

VENT POINTS							
COMPONENTS	Nos reqd	Run Pipe Vent Size	25 25	40 25	50 25	80-100 25	150-200 25
Valve, globe	1	77.33.09	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.33.84	808.1				
Tee reducing	1	76.33.85		661.1	679.1		
Flange blind	1	76.65.10	502.1	502.1	502.1	502.1	502.1
Flange WN	1	76.65.80	606.1	606.1	606.1		
NOF	1	76.80.39				147.1	148.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	*34.3	*34.3	*34.3	*34.3	*34.3

DRAIN POINTS							
COMPONENTS	Nos reqd	Run Pipe Drain Size	25 25	40 25	50 25	80-100 25	150-200 25
Valve, gate	1	77.23.09	205.1	205.1	205.1	205.1	205.1
Tee equal	1	76.33.84	808.1				
Tee reducing	1	76.33.85		661.1	679.1		
Flange blind	1	76.65.10	502.1	502.1	502.1	502.1	502.1
Flange WN	1	76.65.80	606.1	606.1	606.1		
NOF	1	76.80.39				147.1	148.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	*34.3	*34.3	*34.3	*34.3	*34.3

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	25 25	40 25	50 25	80-100 25	150-200 25
DBB Valve	1	77.85.46	*10.6	*10.6	*10.6	*10.6	*10.6
Tee equal	1	76.33.84	808.1				
Tee reducing	1	76.33.85		661.1	679.1		
Flange WN	1	76.65.80	606.1	606.1	606.1		
NOF	1	76.80.39				147.1	148.1
Bolting	8	81.38.67	402.1	402.1	402.1	402.1	402.1
Gasket Sp.WD	2	85.41.36	*34.3	*34.3	*34.3	*34.3	*34.3

TEMPERATURE INSTRUMENT CONNECTIONS							
COMPONENTS	Nos reqd	Run Pipe Conn Size	100 40	150-200 40			
Flange WN	1	76.65.80	611.1				
Tee Reducing	1	76.33.85					
Tee Reducing	1	76.33.89	366.1				
NOF	1	76.80.39		171.1			
Thermowell	1		SUPPLIED BY INSTRUMENTS				
Bolting	4	81.38.67	469.1	469.1			
Gasket Sp.WD	1	85.41.36	*34.4	*34.4			

BOLTING										
Nominal Pipe Size	Number of Bolts	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		Number off Bolts	ORIFICE FLANGES	
		81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm	81.38.67	Dia x L In x mm		81.38.67	Dia x L In x mm
15	4	330.1	3/4 x 110			332.1	3/4 x 120			
20	4	331.1	3/4 x 115			333.1	3/4 x 125			
25	4	402.1	7/8 x 125			404.1	7/8 x 140			
40	4	469.1	1 x 140			471.1	1 x 150			
50	8	405.1	7/8 x 145	417.1	7/8 x 220	409.1	7/8 x 170		407.1	7/8 x 160
80	8	533.1	11/8 x 180	547.1	11/8 x 265	537.1	11/8 x 205		536.1	11/8 x195
100	8	593.1	11/4 x 195	610.1	11/4 x 300	597.1	11/4 x 220		594.1	11/4 x 205
150	12	649.1	13/8 x 260	*00.1	13/8 x 425	655.1	13/8 x 300		651.1	13/8 x 275
200	12	724.1	15/8 x 290	*00.2	15/8 x 550	741.1	15/8 x 400		734.1	15/8 x 350
250										
300										
350										
400										
450										
500										
600										

[01]

BRANCH OUTLET					
Nominal Run Pipe	Nominal Branch	NOL 76.80.31	NOF** 76.80.39	WOF 76.80.37	WOL 76.79.71
50-150	15	632.1	141.1	-	-
200	15	634.1	142.1	-	-
80	20	635.1	143.1	-	-
100-200	20	638.1	144.1	-	-
80-100	25	641.1	147.1	-	-
150-200	25	642.1	148.1	-	-
150-200	40	647.1	171.1	-	-
150	50	-	177.1	-	184.1
200	50	-	177.1	-	186.1
200	80	-	-	*55.3	210.1

[01]

[01]

** Dimensions to SIPM standard drawing S-38.090

ORIFICE INSTRUMENT CONNECTIONS												
COMPONENTS	Nos reqd	Run Pipe Size	50 15	80 15	100 15	150 15	200 15					
DBB Valve	2	77.85.46	*10.4	*10.4	*10.4	*10.4	*10.4					
Flange WN RF	2	76.65.80	610.1	612.1	614.1	616.1	618.1					
Jackscrews**		81.86.35	*01.6	*00.2	*00.5	*02.5	*00.4					
NOL plain end	2	76.80.31	*00.6	*00.6	*00.6	*00.6	*00.6					
Bolting		81.38.67	407.1	536.1	594.1	651.1	734.1					
Number of bolts			8	8	8	12	12					
Gasket Sp.WD	2	85.41.36	*34.5	*34.7	*34.8	*34.9	*35.0					

** 1 Jackscrew for DN50 to 100

2 Jackscrews for DN150 & over

DISPLACER CHAMBER	Std Length L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	Nos reqd	
76.80.60.522.1	356	Valve, Gate	1	77.23.09.204.1
76.80.60.524.1	813	Valve, Ball	2	77.30.73.208.1
76.80.60.526.1	1219	Flange blind	2	76.65.10.501.1
76.80.60.528.1	1524	Flange WN	1	76.65.80.604.1
76.80.60.530.1	1829	Gasket Sp.WD	1	85.41.36.*34.8 DN 100
76.80.60.532.1	2134	Gasket Sp.WD	4	85.41.36.*34.5 DN 50
76.80.60.534.1	2438	Gasket Sp.WD	3	85.41.36.*34.2 DN 20
76.80.60.536.1	2743	Bolting	8	81.38.67.593.1
76.80.60.538.1	3048	Bolting	32	81.38.67.405.1
		Bolting	12	81.38.67.331.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge					
Valve, gate		NOT USED			
Flange blind					
Bolting					
Gasket Sp.WD					

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	Nos reqd	Length	450	840	1230
Level Gauge					
Valve, gate		NOT USED			
Flange blind					
Bolting					
Gasket Sp.WD					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	Nos reqd	Length Size	355 40	405 40	455 40
Thermowell	1	SUPPLIED BY INSTRUMENTS			
Bolting	4	81.38.67	469.1	469.1	469.1
Gasket Sp.WD	1	85.41.36	*34.4	*34.4	*34.4

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	Nos reqd	Class Size	25
Double Block & Bleed Valve	1	77.85.46	*10.6
Bolting	4	81.38.67	402.1
Gasket Sp.WD	1	85.41.36	*34.3



9.0

SUPERSEDED SPECIFICATIONS

9.1

ADDITIONAL SPECIFICATIONS FOR GAS COMPRESSION UPGRADE

**1144X
1343X
3144X
6144X
6343X
9144X
9150X
15144X
15151X
15346X**

TEMPERATURE DEG C	DESIGN LIMITS						
	-20	38	50	75	100	120	150
PRESSURE BAR GA	19.6	19.6	19.2	18.5	17.6	16.9	15.8

NOTES

DESIGN LIMITS ARE ACC. FLANGE RATING ANSI B16.5 MAT.GRP.1.1.

COLD BENDING OF THE PIPE IS NOT ALLOWED.

FOR ORIFICE FLANGES, LEVEL INSTRUMENT CONNECTIONS, PRESSURE INSTRUMENT TAPPING, TEMPERATURE INSTRUMENT CONNECTIONS AND CLASS 300# CONTROL VALVES, USE PIPING CLASS 300 FOR FLANGES, FITTINGS,BOLTS AND GASKETS.

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

MAXIMUM SERVICE TEMPERATURE OF BALL VALVES IS 150 DEG C, VALVES SUPPLIED FOR HIGHER SERVICE TEMPERATURES , SHALL HAVE SEAT MATERIALS OF PROVEN TEMPERATURE / PRESSURE RATING, SUITABLE FOR THAT SERVICE.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE

SHORT RADIUS BENDS ARE SPECIAL ITEMS. DESIGN AND DIMS. TO B16.28 TABLE A2.

ALL METTALIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE

ALL DN 25 FLANGED CONNECTIONS SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.

		BRANCH CONNECTIONS 90 DEG														
		NOMINAL BRANCH SIZE														
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500
	600	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	500	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	450	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	400	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	350	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	300	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	250	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	200	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	150	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	100	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	80	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	50	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	40	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A
	25	B	B	A												
	20	B	A													
	15	A														

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- R Reducing branch fitting

DN	SCHEDULE
15	160
20	160
25	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	40
450	30
500	30
600	30

ISSUE DATE : FEB 1997		REV LETTER	00		
		DATE	FEB 1997		
		SIGN	P.H.		
PLANT	PS - 1	CARBON STEEL (SOUR)		PIPING GENERAL	
CONSIGNEE	-	NACE		CLASS No. :	1144X
ENG BY	MMCL	CONTR. No.		ANSI RATING :	150
PRINCIPAL	OPCQL	PROJECT No.		CORR. ALL :	3 mm

ISSUE DATE FEB 1997

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

*PIPE

PIPE	SEAMLESS SRL SOUR SERVICE	DN	5 - 600	ASTM A106 - B
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*FLANGES

BLFL	BLIND FLANGE	DN	5 - 600	ASTM A105
COFL	COVER FLANGE THERMOWELL NOZZLE		-	ASTM A105
SBFL	SPECTACLE BLIND FLANGE	DN	5 - 600	ASTM A285 - C
SPRT	SPACER RING TYPE (ANS FLANGES)	DN	5 - 600	ASTM A285 - C
WNFL	WELDING NECK FLANGE	DN	5 - 600	ASTM A105

*FITTINGS

CAPB	CAP BUTT - WELD. END	DN	5 - 600	ASTM A234 - WPB
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	5 - 600	ASTM A234 - WPB
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	5 - 600	ASTM A234 - WPB
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	5 - 600	ASTM A234 - WPB

*REDUCING FITTINGS

BNIF	BRANCH FITTING, OUTL. FLANGED	DN	15 - 40	ASTM A105
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A105
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	0 - 600	ASTM A105
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	0 - 600	ASTM A234 - WPB
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	0 - 600	ASTM A234 - WPB
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	0 - 600	ASTM A234 - WPB

*MISCELLANEOUS

GKRF	GASKET, RAISED FACE	DN	5 - 600	COMPRESSED NON-ASBESTOS FIBRE, OIL RESISTANT 1.5 mm
STBT	STUD BOLTS / HEX NUTS		-	STUDS : ASTM A193-B7M NUTS : ASTM A194-2HM
LDPC	LEVEL DISPLACER CHAMBER	DN	00 - 100	ASTM A106
LEGR	LEVEL GAUGE REFLEX TYPE	DN	20 - 20	BODY : ASTM A105 BOLTS : ASTM A193-B7M/A194-2HM GASKET : NON ASBESTOS
LEGT	LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY : ASTM A105 BOLTS : ASTM A193-B7M/A194-2HM GASKET : NON ASBESTOS
TWTG	THERMOWELL, STRAIGHT	DN	40 - 40	ASTM B164 (MONEL)
MTRR	METER RUN	DN	15 - 40	FLANGES: ASTM B564- (ORIF) UNS N0400 L.J. FLANGES : ASTM A350-LF2 PIPE : MONEL 400 STUB ENDS : ASTM B366-CL.WPN
ORMS	ORIFICE METER RUN SET	DN	0 - 300	FLANGES : ASTM A105 PIPE : ASTM A106-B

*VALVES

BAFF	BALL VALVE, FULL BORE, FLANGED.	DN	15 - 150	BODY : ASTM A216 ASTM A105 BALL / STEM : AISI 316, 316L SEATS : PTFE
BARF	BALL VALVE, RED. BORE, FLANGED	DN	15 - 250	BODY : ASTM A216 ASTM A105 BALL / STEM : AISI 316, 316L SEATS : PTFE
BTFF	BALL VALVE, TRUNN, FULL BORE, FL.	DN	50 - 600	BODY : ASTM A216 + ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : PTFE
BTRF	BALL VALVE, TRUN, RED.BORE, FL	DN	300 - 600	BODY : ASTM A216+ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : PTFE
CHVF	CHECK VALVE, FLANGED	DN	15 - 600	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
CVWL	DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 600	BODY : ASTM A216-WCB/WCC ASTM A105 PLATE : AISI 410 SEATS : PTFE OR FKM
GAVF	GATE VALVE, FLANGED	DN	15 - 40	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
GLVF	GLOBE VALVE, FLANGED	DN	15 - 200	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
NEVF	NEEDLE TYPE GLOBE VALVE, FL.	DN	15 - 40	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410

SCHED	NOM. PIPE SIZE	PIPE		FLANGES				STRAINERS	
		74.30.03		Blind	WN	Spect	Spacer		
				76.62.11	76.62.77	6.88.36	76.88.46		
160	15	020.1		058.1	412.9	108.1	308.1		
160	20	030.1		062.1	414.9	112.1	312.1		
160	25	040.1		066.1	416.9	116.1	316.1		
160	40	060.1		068.1	418.9	118.1	318.1		
80	50	071.1		070.1	390.9	120.1	320.1		
80	80	109.1		072.1	392.9	122.1	322.1		
80	100	157.1		074.1	394.9	124.1	324.1		
80	150	219.1		076.1	396.9	126.1	326.1		
40	200	245.1		078.1	368.9	128.1	328.1		
40	250	287.1		080.1	370.9	130.1	330.1		
40	300	331.1		082.1	372.9	132.1	332.1		
40	350	379.1		084.1	374.9	134.1	334.1		
40	400	431.1		086.1	376.9	136.1	336.1		
30	450	477.1		088.1	318.9	138.1	338.1		
30	500	529.1		090.1	320.9	140.1	340.1		
30	600	579.1		092.1	324.9	144.1	344.1		

SCHED	NOM. PIPE SIZE	FITTINGS				GASKETS	
		Cap	Elbow 45	Elbow 90 LR	Tee	COMPRESSED FIBRE NON ASBESTOS	
		76.30.17	76.30.34	76.30.42	76.30.81	85.30.02	
160	15	572.1	572.1	572.1	572.1	004.1	
160	20	578.1	578.1	578.1	578.1	006.1	
160	25	582.1	582.1	582.1	582.1	008.1	
160	40	592.1	592.1	592.1	592.1	012.1	
80	50	608.1	608.1	608.1	608.1	014.1	
80	80	628.1	628.1	628.1	628.1	018.1	
80	100	648.1	648.1	648.1	648.1	020.1	
80	150	668.1	668.1	668.1	668.1	024.1	
40	200	685.1	685.1	685.1	685.1	026.1	
40	250	705.1	705.1	705.1	705.1	028.1	
40	300	728.1	728.1	728.1	728.1	030.1	
40	350	747.1	747.1	747.1	747.1	032.1	
40	400	768.1	768.1	768.1	768.1	034.1	
30	450	786.1	786.1	786.1	786.1	036.1	
30	500	807.1	807.1	807.1	807.1	038.1	
30	600	828.1	828.1	828.1	828.1	042.1	

NOM. PIPE SIZE	VALVES										Check dual pl. FLGD	Check FLGD
	Ball red bore FLGD	Ball red bore FLGD	Ball red trunn FLGD	Ball full bore FLGD	Ball full bore FLGD	Ball full trunn FLGD	Gate FLGD	Globe FLGD	Needle FLGD			
	77.00.03	77.00.23	77.00.73	77.00.03	77.00.23	77.00.73	7.20.23	77.30.23	77.30.23	77.67.06		
15	003.1			553.1			003.1	003.1	603.1			003.1
20	004.1			554.1			004.1	004.1	604.1			004.1
25	005.1			555.1			005.1	005.1	605.1			005.1
40	007.1			557.1			007.1	007.1	607.1			007.1
50	008.1			558.1			008.1	008.1		508.1		
80	010.1			560.1			010.1	010.1		510.1		
100	012.1			562.1			012.1	012.1		512.1		
150		064.1			564.1		014.1	014.1		514.1		
200		065.1				515.1	015.1	015.1		515.1		
250		066.1				516.1	016.1			516.1		
300			017.1			517.1	017.1			517.1		
350			018.1			518.1	018.1			518.1		
400			019.1			519.1	019.1			519.1		
450			020.1			520.1	020.1			520.1		
500			021.1			521.1	021.1			521.1		
600			023.1			523.1	023.1			523.1		

SCHED	NOM PIPE SIZE	REDUCING FITTINGS			
		Conc reducer 76.30.66	Ecc reducer 76.30.67	Tee 76.30.88	
		76.30.66	76.30.67	76.30.88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
80/160	50 x 25	199.1	199.1	111.1	
80/160	50 x 40	208.1	208.1	120.1	
80/160	80 x 40	229.1	229.1	129.1	
80	80 x 50	237.1	237.1	133.1	
80	100 x 50	267.1	267.1	154.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
40/80	200 x 100	326.1	326.1	212.1	
40/80	200 x 150	336.1	336.1	232.1	
40/80	250 x 100			260.1	
40/80	250 x 150	356.1	356.1	278.1	
40	250 x 200	365.1	365.1	291.1	
40/80	300 x 150	380.1	380.1	317.1	
40	300 x 200	396.1	396.1	328.1	
40	300 x 250	404.1	404.1	350.1	
40/80	350 x 150			379.1	
40	350 x 200	422.1	422.1	390.1	
40	350 x 250	438.1	438.1	415.1	
40	350 x 300	447.1	447.1	441.1	
40/80	400 x 150			469.1	
40	400 x 200	453.1	453.1	479.1	
40	400 x 250	462.1	462.1	505.1	
40	400 x 300	474.1	474.1	531.1	
40	400 x 350	487.1	487.1	556.1	
30/40	450 x 200			589.1	
30/40	450 x 250	534.1	534.1	613.1	
30/40	450 x 300	564.1	564.1	637.1	
30/40	450 x 350	596.1	596.1	661.1	
30/40	450 x 400	626.1	626.1	685.1	
30/40	500 x 200			709.1	
30/40	500 x 250			733.1	
30/40	500 x 300	654.1	654.1	757.1	
30/40	500 x 350	686.1	686.1	781.1	
30/40	500 x 400	716.1	716.1	805.1	
30	500 x 450	732.1	732.1	819.1	
30/40	600 x 250			853.1	
30/40	600 x 300			877.1	
30/40	600 x 350			901.1	
30/40	600 x 400	896.1	896.1	925.1	
30	600 x 450	912.1	912.1	939.1	
30	600 x 500	942.1	942.1	963.1	

VENT POINTS					
COMPONENTS	NOS REQD	RUNPIPE VENT SIZE	DN 25	DN 40-100	DN 150-600
Valve, globe	1	77.30.23	005.1	005.1	005.1
Tee equal	1	76.30.81	582.1		
Tee reducing	1	76.30.88			
Flange blind	1	76.62.11	066.1	066.1	066.1
Flange WN	1	76.62.77	416.9	416.9	416.9
Branch Nipple	1	76.80.31		020.1	024.1
Bolting	8	81.38.66	155.1	155.1	155.1
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25

DRAIN POINTS					
COMPONENTS	NOS REQD	RUNPIPE DRAIN SIZE	DN 25	DN 40-100	DN 150-600
Valve, gate	1	77.20.23	005.1	005.1	005.1
Tee equal	1	76.30.81	582.1		
Tee reducing	1	76.30.88			
Flange blind	1	76.62.10	066.1	066.1	066.1
Flange WN	1	76.62.77	416.9	416.9	416.9
Branch Nipple	1	76.80.31		020.1	024.1
Bolting	8	81.38.66	155.1	155.1	155.1
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25

PRESSURE INSTRUMENT CONNECTIONS 300#						
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 25	DN 40	DN 50	DN 150-600
DBB Valve	1	77.85.46	DN 25	DN 25	DN 25	DN 25
Tee equal	1	76.30.81	572.1			
Tee reducing	1	76.30.85		089.1	107.1	
Flange WN	1	76.62.78	256.9	256.9	256.9	256.9
Branch Nipple	1	76.80.31				024.1
Bolting	8	81.38.66	269.1	269.1	269.1	269.1
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25	DN 25

TEMPERATURE INSTRUMENT CONNECTIONS 300#				
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 80-100	DN 150-600
Cover flange	1	76.62.60	533.1	533.1
Flange WN	1	76.62.78	258.9	258.9
Branch nipple	1	76.80.31	026.1	028.1
Well	1	76.83.40	551.1	552.1
Bolting	4	81.38.66	330.1	330.1
Gasket SpW	1	85.41.42	DN 40	DN 40

BOLTING									
NOM PIPE SIZE	NUMBER OF BOLTS	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		METER RUN	
		81.38.66	DIA x L In x mm	81.38	DIA x L In x mm	81.38	DIA x L In x mm	81.38	DIA x L In x mm
15	4	154.1	1/2 x 65			66.156.1	1/2 x 75	66.154.1	1/2 x 65
20	4	154.1	1/2 x 65			66.156.1	1/2 x 75	66.155.1	1/2 x 70
25	4	155.1	1/2 x 70			66.157.1	1/2 x 80	66.156.1	1/2 x 75
40	4	156.1	1/2 x 75			66.158.1	1/2 x 85	66.157.1	1/2 x 80
50	4	269.1	5/8 x 80	66.280.1	5/8 x 145	66.272.1	5/8 x 95		
80	4	272.1	5/8 x 95	66.284.1	5/8 x 170	66.274.1	5/8 x 110		
100	8	272.1	5/8 x 95	66.284.1	5/8 x 170	66.274.1	5/8 x 110		
150	8	329.1	3/4 x 100	66.345.1	3/4 x 205	66.332.1	3/4 x 120		
200	8	330.1	3/4 x 110	66.351.1	3/4 x 240	63.334.1	3/4 x 130		
250	12	401.1	7/8 x 120	66.427.1	7/8 x 285	66.405.1	7/8 x 145		
300	12	401.1	7/8 x 120	66.431.1	7/8 x 305	66.406.1	7/8 x 150		
350	12	468.1	1 x 130	66.500.1	1 x 330	66.472.1	1 x 160		
400	16	469.1	1 x 140	66.500.1	1 x 330	66.474.1	1 x 170		
450	16	529.1	1 1/8 x 150	66.561.1	1 1/8 x 355	66.534.1	1 1/8 x 185		
500	20	530.1	1 1/8 x 160	66.565.1	1 1/8 x 385	66.537.1	1 1/8 x 205		
600	20	590.1	1 1/4 x 180	66.625.1	1 1/4 x 400	66.598.1	1 1/4 x 230		

BRANCH NIPPLES			
NOM. SIZE	NOM. SIZE	PLAIN	FLGD
RUN PIPE	BRANCH	76.80.31	76.80.37
40-600	15	016.1	021.1
40-600	20	018.1	023.1
40-100	25	020.1	025.1
150-600	25	024.1	026.1
50-100	40	026.1	030.1
150-600	40	028.1	031.1

RED. BRANCH FITTINGS			
NOM	NOM	BW	BW
RUN PIPE	BRANCH	76.79	76.79
200	50		01.066.1
250	50		01.068.1
300	50		01.070.1
350	50		01.072.1
400	50		01.074.1
450	50		01.268.1
500	50		01.269.1
600	50		01.271.1
150	50		01.364.1
200	80		01.090.1
250	80		01.092.1
300	80		01.094.1
350	80		01.096.1
400	80		01.098.1
450	80		01.280.1
500	80		01.281.1
600	80		01.283.1
300	100		01.116.1
350	100		01.118.1
400	100		01.120.1
450	100		01.292.1
500	100		01.293.1
600	100		01.295.1
450	150		01.303.1
500	150		01.304.1
600	150		01.306.1
600	200	00.194.1	
600	250	00.425.1	

ORIFICE INSTRUMENT CONNECTIONS 300#														
COMPONENTS	NOS REQD	RUNPIPE SIZE	50	80	100	150	200	250	300	350	400	450	500	600
DBB Valve	2	77.85.45	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
Flange WN	2	76.62.77	252.9	252.9	252.9	252.9	252.9	252.9	252.9	252.9	252.9	252.9	252.9	252.9
Flange set	1	76.62.95	610.1	612.1	614.1	616.1	568.1	570.1	572.1	574.1	576.1	518.1	520.1	524.1
Spacer	1	76.88.16	050.1	052.1	054.1	056.1	058.1	060.1	062.1	064.1	066.1	068.1	070.1	072.1
Bolting	16	81.38.66	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1
Gasket SpW	4	85.41.42	204.1	204.1	204.1	204.1	204.1	204.1	204.1	204.1	204.1	204.1	204.1	204.1
Gasket SpW	2	85.41.42	214.1	218.1	120.1	124.1	126.1	128.1	130.1	132.1	134.1	136.1	138.1	142.1

DISPLACER CHAMBER	STD LGTH L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	NOS REQD	
76.80.60.422.1	356	GATE VALVE	1	77.20.23.004.1
76.80.60.424.1	813	BALL VALVE	2	77.00.03.104.1
76.80.60.426.1	1219	BLIND FLANGE	2	76.62.09.512.9
76.80.60.428.1	1524	WN FLANGE	1	76.62.77.254.9
76.80.60.430.1	1829	GASKET SP W	1	85.41.42 DN 100
76.80.60.432.1	2134	GASKET SP W	4	85.41.42 DN 50
76.80.60.434.1	2438	GASKET SP W	3	85.41.42 DN 20
76.80.60.436.1	2743	BOLTING	8	81.38.66.331.1
76.80.60.438.1	3048	BOLTING	32	81.38.66.271.1
		BOLTING	12	81.38.66.268.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	NOS REQD	LENGTH	450	840	1230
Level Gauge	1	76.81.66	062.1	064.1	066.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket SpW	6	85.41.42	206.1	206.1	206.1

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	NOS REQD	LENGTH	450	840	1230
Level Gauge	1	76.81.66	562.1	564.1	566.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket SpW	6	85.41.42	206.1	206.1	206.1

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	NOS REQD	LENGTH	355	405	455
Cover flange	1	76.62.60	533.1	533.1	533.1
Well	1	76.83.40	555.1	556.1	557.1
Bolting	4	81.38.66	330.1	330.1	330.1
Gasket SpW	1	85.41.42	212.1	212.1	212.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD	CLASS SIZE	300# DN 15
Double Block & Bleed Valve	1	77.85.45	DN 15
Bolting	4	81.38.66	155.1
Spiral Wound Gasket	1	85.41.42	204.1

TEMPERATURE °C	DESIGN LIMITS				
	50	60	80	100	140
PRESSURE BAR GA DN 20 - 50	18.4	17.9	17.1	16.2	15.0

NOTES :

DESIGN LIMITS ARE ACC. FLANGE RATING ANSI B16.5 MAT.GRP.2.2

FOR DESIGN TEMPERATURES ABOVE 50 DEGR. C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.

WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 DEGR. C, TO PREVENT CHLORIDE STRESS CORROSION CRACKING.

COLD BENDING OF PIPE IS NOT ALLOWED.

FOR CLASS 300# CONTROL VALVES, ORIFICE FLANGES AND LEVEL EQUIPMENT TOP CONNECTIONS, USE THE 300# VERSION OF THIS PIPING CLASS FOR FLANGE GASKET AND BOLTING SELECTION.

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED.

PISTON TYPE CHECK VALVES (DN 20 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE.

FLANGE GASKETS ARE TO BE FROM NON-ASBESTOS COMPRESSED FIBRE AND OIL RESISTANT.

ALL WETTED PARTS TO CONFORM TO NACE MR-01-75 (LATEST EDITION)

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400																
	350																
	300																
	250																
	200																
	150																
	100																
	80																
	50	C	C	C	C	A											
	40	C	C	C	A												
	25	B	B	A													
	20	B	A														
	15	A															

TABLE OF SCHEDULES	
DN	SCHEDULE
15	40S
20	40S
25	10S
40	10S
50	10S
80	10S
100	10S
150	10S
200	10S

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- R Reducing branch fitting

ISSUE DATE : JUNE 1997	REV LETTER	00			
	DATE	Jun '97			
	SIGN	JFS			
PLANT : PS-1	STAINLESS STEEL(16Cr-12Ni-2Mo)				PIPING GENERAL
CONSIGNEE :	SOUR SERVICE				CLASS No : 1343x
ENG BY : MEEL	CONTR No :				ANSI RATING : 150
PRINCIPAL : OPCQL	PROJECT No :				CORR ALL : 0mm

COMPONENT / MATERIAL DESCRIPTION

*PIPE				*VALVES			
PIPE	PIPE	-	ASTM A312-TP316L (SEAMLESS)	BAFF	BALL VALVE, FULL BORE, FLANGED.	DN 20 - 50	BODY : ASTM A351-CF8M ASTM A182-F316
PNPP	PIPE NIPPLE 50mm	-	ASTM A312-TP316L (SEAMLESS)				BALL / STEM : AISI 316, 316L SEATS : PTF(LT -80)
*FLANGES				BARF	BALL VALVE, RED.BORE, FLANGED	DN 20 - 50	BODY : ASTM A351-CF8M ASTM A182-F316
							BALL / STEM : AISI 316, 316L SEATS : PTF(LT -80)
BLFL	BLIND FLANGE	-	ASTM A182-F316				
COFL	COVER FLANGE THERMOWELL NOZZLE	-	ASTM A182-F316				
FLBT	BLIND FLANGE, TAPPED	-	ASTM A182-F316				
SBFL	SPECTACLE BLIND FLANGE	-	ASTM A204-TP316				
SPRT	SPACER RING TYPE (ANS FLANGES)	-	ASTM A204-TP316				
WNFL	WELDING NECK FLANGE	-	ASTM A182-F316				
*FITTINGS							
CAPB	CAP BUTT - WELD. END	-	A403-WPS316L	CHVF	CHECK VALVE, FLANGED	DN 15 - 600	BODY : ASTM A351-CF8M ASTM A182-F316
E45B	ELBOW 45, BUTT - WELD. ENDS	-	A403-WPS316L				TRIMASIS 316, 316L
E90B	ELBOW 90, BUTT - WELD. ENDS	-	A403-WPS316L				
TEEB	EQUAL TEE, BUTT - WELD. ENDS	-	A403-WPS316L	CVWL	DUAL PL. CHECK VALVE WAFER LUG	DN 50 - 50	BODY : ASTM A351-CF8M ASTM A182-F316
*REDUCING FITTINGS							PLATE : AISI 316, 316L SEATS : METAL TO METAL
BNIF	BRANCH FITTING, OUTL. FLANGED	DN 20 - 40	ASTM A182-F316L				
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN 20 - 40	ASTM A182-F316L	GLVF	GLOBE VALVE, FLANGED	DN 20 - 50	BODY : ASTM A351-CF8M ASTM A182-F316
							TRIMASIS 316, 316L
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN 20 - 50	A403-WPS316L				
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN 20 - 50	A403-WPS316L				
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN 20 - 50	A403-WPS316L				
*MISCELLANEOUS							
GKSW	GASKET, RAISED FACE	-	COMPRESSED FIBRE 1.5 mm THK. (NON-ASBESTOS) OIL RESISTANT				
STBT	STUD BOLTS / HEX NUTS	-	STUDS : ASTM A193-B7M NUTS : ASTM A194-2HM				
TWTG	THERMOWELL, TAPERED	DN 40 - 40	ASTM B164 (MONEL)				

VENT POINTS							
COMPONENTS	NOS REQD	RUNPIPE FIG NO	15 1	20 1	25 1	40 - 50 1	
Valve, globe	1	77.33.09		004.1	004.1	004.1	
Tee	1	76.30.84					
Tee	1	76.30.84					
Flange blind	1	76.35.10		314.1	314.1	314.1	
Flange WN	1	76.65.79					
Branch Nipple	1	76.33.57		946.1	946.1	946.1	
Bolting	8	81.38.66		154.1	154.1	154.1	
Gasket Non-CAF	2	85.31.02					

DRAIN POINTS							
COMPONENTS	NOS REQD	RUNPIPE FIG NO	15 1	20 1	25 1	40 - 50 1	
Valve, ball	1	77.03.07		004.1	004.1	004.1	
Tee	1	76.30.84					
Tee	1	76.30.84					
Flange blind	1	76.62.10		314.1	314.1	314.1	
Flange WN	1	76.62.79					
Branch Nipple	1	76.33.57		946.1	946.1	946.1	
Bolting	8	81.38.66		154.1	154.1	154.1	
Gasket Non-CAF	2	85.31.02					

BOLTING								
NOM PIPE SIZE	NUMBER OF BOLTS	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		
		81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm	
20	4	154.1	1/2 x 65			156.1	1/2 x 75	
25	4	155.1	1/2 x 70			157.1	1/2 x 80	
40	4	156.1	1/2 x 75			158.1	1/2 x 85	
50	4	269.1	5/8 x 80			272.1	5/8 x 95	

DESIGN LIMITS							
TEMPERATURE DEG C	-20	38	50	75	100	120	150
PRESSURE BAR GA	51	51	50	48	46.3	45.8	45

NOTES

DESIGN LIMITS ARE ACC. FLANGE RATING ANSI B16.5 MAT.GRP.1.1.

COLD BENDING OF THE PIPE IS NOT ALLOWED

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE

SHORT RADIUS BENDS ARE SPECIAL ITEMS.DESIGN AND DIMS. TO B16.28 TABLE A2. MATERIAL TO BE AS PER MESC 76.30.42.

ALL METTALIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE

ALL DN 25 FLANGED CONNECTIONS SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.

BRANCH CONNECTIONS 90 DEG																
NOMINAL RUN PIPE SIZE	NOMINAL BRANCH SIZE															
	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500
600	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
500	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
450	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
400	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
350	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
300	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
250	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
200	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
150	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
100	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
80	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
50	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
40	C	C	C	C	R	R	R	R	R	B	B	B	B	B	B	A
25	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A
20	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
15	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- R Reducing branch fitting

DN	SCHEDULE
15	160
20	160
25	160
40	160
50	80
80	80
100	80
150	80
200	40
250	40
300	40
350	40
400	40
450	40
500	40
600	40

FIRST ISSUE : FEB 97		REV LETTER	00		
		DATE	06/02/97		
		SIGN	P. H.		
PLANT	PS - 1	CARBON STEEL (SOUR)		PIPING GENERAL	
CONSIGNEE	-	NACE		CLASS No. : 3144X	
ENG BY	MMCL	CON. JOB NO		ANSI RATING : 300	
PRINCIPAL	OPCQL	PROJECT NO		CORR. ALL : 3 mm	

ISSUE DATE FEB 1997

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description.)

*PIPE

PIPE PIPE SEAMLESS SRL SOUR SERVICE DN 15 - 600 ASTM A106 - B

*FLANGES

BLFL BLIND FLANGE DN 15 - 600 ASTM A105
COFL COVER FLANGE THERMOWELL NOZZLE - ASTM A105
SBFL SPECTACLE BLIND FLANGE DN 15 - 600 ASTM A285 - C
SPRT SPACER RING TYPE (ANS FLANGES) DN 15 - 600 ASTM A285 - C
WNFL WELDING NECK FLANGE DN 15 - 600 ASTM A105

*FITTINGS

CAPB CAP BUTT - WELD. END DN 15 - 600 ASTM A234 - WPB
E45B ELBOW 45, BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB
E90B ELBOW 90, BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB
TEEB EQUAL TEE, BUTT - WELD. ENDS DN 15 - 600 ASTM A234 - WPB

*REDUCING FITTINGS

BNIF BRANCH FITTING, OUTL. FLANGED DN 15 - 40 ASTM A105
BNIP BRANCH FITTING, OUTL. PLAIN ENDS DN 15 - 40 ASTM A105
BROB BRANCH OUTLET, BUTT - WELD. ENDS DN 80 - 600 ASTM A105
RECB REDUCER CONC. BUTT - WELD. ENDS DN 20 - 600 ASTM A234 - WPB
REEB REDUCER ECC. BUTT - WELD. ENDS DN 20 - 600 ASTM A234 - WPB
TERB TEE REDUCING, BUTT - WELD. ENDS DN 20 - 600 ASTM A234 - WPB

*MISCELLANEOUS

GKSW GASKET, SPIRAL WOUND DN 15 - 600 AISI 316, 316L, NON ASBESTOS
FILLED. SS CENTRING AND
INNER RING
LDPC LEVEL DISPACER CHAMBER DN 100 - 100 ASTM A333 - 6 (SEAMLESS)
LEGR LEVEL GAUGE REFLEX DN 20 - 20 BODY : ASTM A105
BOLTS : ASTM A193-B7M/A194-2HM
GASKET : NON ASBESTOS FIBRE
LEGT LEVEL GAUGE THROUGH VISION DN 20 - 20 BODY : ASTM A105
BOLTS : ASTM A193-B7M/A194-2HM
GASKET : NON ASBESTOS FIBRE
STBT STUD BOLTS / HEX NUTS - STUDS : ASTM A193-B7M
NUTS : ASTM A194-2HM
TWTG THERMOWELL, STRAIGHT DN 40 - 40 ASTM B164 (MONEL)
MTRR METER RUN DN 15 - 40 FLANGES: ASTM B564-
(ORIF) UNS N0400
L.J. FLANGES : ASTM A350-LF2
PIPE : MONEL 400
STUB ENDS : ASTM B366-CL.WPN
FLANGES : ASTM A350 - LF2
ORMS ORIFICE METER RUN SET DN 50 - 300 PIPE : ASTM A333 - 6

*VALVES

BTFF BALL VALVE, TRUNN, FULL BORE, FL. DN 50 - 600 BODY : ASTM A216+ENP
ASTM A105+ENP
BALL : AISI 316, 316L
STEM : BODY MAT.+ENP, 316
SEATS : PTFE
BTRF BALL VALVE, TRUN, RED.BORE, FL DN 300 - 600 BODY : ASTM A216+ENP
ASTM A105+ENP
BALL : AISI 316, 316L
STEM : BODY MAT.+ENP, 316
SEATS : PTFE
CHVF CHECK VALVE, FLANGED DN 15 - 600 BODY : ASTM A216-WCB/WCC
ASTM A105
TRIM : AISI 410
CVWL DUAL PL. CHECK VALVE WAFER LUG DN 50 - 600 BODY : ASTM A216-WCB/WCC
ASTM A105
PLATE : AISI 410
SEATS : PTFE OR FKM
BODY : ASTM A105M OR N
BALL/STEM : AISI 316
SEATS : PTFE OR NYLON
GLVF GLOBE VALVE, FLANGED DN 15 - 200 BODY : ASTM A351-CF8M
ASTM A182-F316
GAVF GATE VALVE, FLANGED. DN 15 - 40 BODY : ASTM A216-WCB/WCC
ASTM A105
TRIM : AISI 410
GLVF GLOBE VALVE, FLANGED. DN 15 - 200 BODY : ASTM A216-WCB/WCC
ASTM A105
TRIM : AISI 410
NEVF NEEDLE TYPE GLOBE VALVE, FL. DN 15 - 40 BODY : ASTM A216-WCB/WCC
ASTM A105
TRIM : AISI 410
PLVF PLUG VALVE, FLANGED. DN 150 - 600 BODY : ASTM A216, A105
PLUG : ASTM A182 - F6A+ENP

SCHED	NOM. PIPE SIZE	PIPE			FLANGES				STRAINERS	
		74.30.03			Blind	WN	Spect	Spacer		
					76.62.09	76.62.77	76.88.36	76.88.46		
160	15	020.1			508.9	252.9	258.1	458.1		
160	20	030.1			512.9	254.9	262.1	462.1		
160	25	040.1			516.9	256.9	266.1	466.1		
160	40	060.1			518.9	258.9	268.1	468.1		
80	50	071.1			520.9	210.9	270.1	470.1		
80	80	109.1			522.9	212.9	272.1	472.1		
80	100	157.1			524.9	214.9	274.1	474.1		
80	150	219.1			526.9	216.9	276.1	476.1		
40	200	245.1			528.9	168.9	278.1	478.1		
40	250	287.1				170.9	280.1	480.1		
40	300	331.1				172.9	282.1	482.1		
40	350	379.1				174.9	284.1	484.1		
40	400	431.1				176.9	286.1	486.1		
40	450	483.1				178.9	288.1	488.1		
40	500	533.1				180.9	290.1	490.1		
40	600	583.1			542.9	184.9	294.1	494.1		

SCHED	NOM. PIPE SIZE	FITTINGS					GASKETS	
		Cap	Elbow 45	Elbow 90 LR	Tee		SPIRAL WOUND	
		76.30.17	76.30.34	76.30.42	76.30.81		85.41.42	
160	15	572.1	572.1	572.1	572.1			
160	20	578.1	578.1	578.1	578.1			
160	25	582.1	582.1	582.1	582.1			
160	40	592.1	592.1	592.1	592.1			
80	50	608.1	608.1	608.1	608.1			
80	80	628.1	628.1	628.1	628.1			
80	100	648.1	648.1	648.1	648.1			
80	150	668.1	668.1	668.1	668.1			
40	200	685.1	685.1	685.1	685.1			
40	250	705.1	705.1	705.1	705.1			
40	300	728.1	728.1	728.1	728.1			
40	350	747.1	747.1	747.1	747.1			
40	400	768.1	768.1	768.1	768.1			
40	450	790.1	790.1	790.1	790.1			
40	500	810.1	810.1	810.1	810.1			
40	600	830.1	830.1	830.1	830.1			

NOM. PIPE SIZE	VALVES						
	Ball red bore FLGD	Ball red bore FLGD	Ball Full Bore FLGD	Globe FLGD	Gate FLGD	Check hor. pist FLGD	Check Dual Plate WAFER
	77.00.03	77.00.73	77.00.73	77.30.23	77.20.23	77.10.23	77.67.06
15	103.1			653.1	053.1	053.1	
20	104.1			654.1	054.1	054.1	
25	105.1			655.1	055.1	055.1	
40	106.1			657.1	057.1	057.1	
50		058.1	558.1	058.1			558.1
80		060.1	560.1	060.1			560.1
100		062.1	562.1	062.1			562.1
150		064.1	564.1	064.1			564.1
200		065.1	565.1	065.1			565.1
250		066.1	566.1				566.1
300		067.1	567.1				567.1
350		068.1	568.1				568.1
400		069.1	569.1				569.1
450		070.1	570.1				570.1
500		071.1	571.1				571.1
600		073.1	573.1				573.1

SCHED	NOM PIPE SIZE	REDUCING FITTINGS			Tee 76.30.88
		Conc reducer	Ecc reducer		
		76.30.66	76.30.67		
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
160	50 x 25	201.1	201.1	107.1	
160	50 x 40	211.1	211.1	116.1	
160	80 x 40	231.1	231.1	125.1	
80	80 x 50	237.1	237.1	133.1	
80	100 x 50	267.1	267.1	154.1	
80	100 x 80	277.1	277.1	166.1	
80	150 x 80	297.1	297.1	178.1	
80	150 x 100	307.1	307.1	190.1	
80	200 x 100	327.1	327.1	206.1	
80	200 x 150	337.1	337.1	226.1	
80	250 x 100	345.1	345.1	254.1	
80	250 x 150	358.1	358.1	272.1	
40	250 x 200	365.1	365.1	291.1	
80	300 x 150	385.1	385.1	311.1	
40	300 x 200	396.1	396.1	328.1	
40	300 x 250	404.1	404.1	350.1	
80	350 x 150	415.1	415.1	374.1	
40	350 x 200	422.1	422.1	390.1	
40	350 x 250	438.1	438.1	415.1	
40	350 x 300	447.1	447.1	441.1	
80	400 x 150			464.1	
40	400 x 200	453.1	453.1	479.1	
40	400 x 250	462.1	462.1	505.1	
40	400 x 300	474.1	474.1	531.1	
40	400 x 350	487.1	487.1	556.1	
40	450 x 200			580.1	
40	450 x 250	523.1	523.1	604.1	
40	450 x 300	553.1	553.1	628.4	
40	450 x 350	584.1	584.1	652.1	
40	450 x 400	614.1	614.1	676.1	
40	500 x 200			700.1	
40	500 x 250			724.1	
40	500 x 300	643.1	643.1	748.1	
40	500 x 350	674.1	674.1	772.1	
40	500 x 400	704.1	704.1	796.1	
40	500 x 450	734.1	734.1	820.1	
40	600 x 250			844.1	
40	600 x 300			868.1	
40	600 x 350			892.1	
40	600 x 400	884.1	884.1	916.1	
40	600 x 450	914.1	914.1	940.1	
40	600 x 500	944.1	944.1	964.1	

VENT POINTS						
COMPONENTS	NOS REQD	RUNPIPE VENT SIZE	DN 25	DN 40-100	DN 150-600	
Valve, globe	1	77.30.23	655.1	655.1	655.1	
Tee equal	1	76.30.81	582.1			
Tee reducing	1	76.30.88				
Flange blind	1	76.62.09	516.9	516.9	516.9	
Flange WN	1	76.62..78	256.9	256.9	256.9	
Branch Nipple	1	76.80.31		020.1	024.1	
Bolting	8	81.38.66	269.1	269.1	269.1	
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25	

DRAIN POINTS						
COMPONENTS	NOS REQD	RUNPIPE DRAIN SIZE	DN 25	DN 40-100	DN 150-600	
Valve, gate	1	77.20.23	655.1	655.1	655.1	
Tee equal	1	76.30.81	582.1			
Tee reducing	1	76.30.88				
Flange blind	1	76.62.09	516.9	516.9	516.9	
Flange WN	1	76.62..78	256.9	256.9	256.9	
Branch Nipple	1	76.80.31		020.1	024.1	
Bolting	8	81.38.66	269.1	269.1	269.1	
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25	

PRESSURE INSTRUMENT CONNECTIONS						
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 25	DN 40	DN 50	DN 150-600
DBB Valve	1	77.85.46	DN 25	DN 25	DN 25	DN 25
Tee equal	1	76.30.81	582.1			
Tee reducing	1	76.30.88		089.1	107.1	
Flange WN	1	76.62..77	256.9	256.9	256.9	256.9
Branch Nipple	1	76.80.31				024.1
Bolting	8	81.38.66	269.1	269.1	269.1	269.1
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25	DN 25

TEMPERATURE INSTRUMENT CONNECTIONS				
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 80-100	DN 150-600
Cover flange	1	76.62.60	533.1	533.1
Flange WN	1	76.62..78	258.9	258.9
Branch nipple	1	76.80.31	026.1	028.1
Well	1	76.83.40	551.1	552.1
Bolting	4	81.38.66	330.1	330.1
Gasket SpW	1	85.41.42	DN 40	DN 40

BOLTING									
NOM PIPE SIZE	NUMBER OF BOLTS	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		ORIFICE FLANGES	
		81.38.66	DIA x L In x mm	81.38.	DIA x L In x mm	81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm
15	4	155.1	1/2 x 70			158.1	1/2 x 85		
20	4	268.1	5/8 x 75			271.1	5/8 x 90		
25	4	269.1	5/8 x 80			272.1	5/8 x 95		
40	4	328.1	3/4 x 95			331.1	3/4 x 115		
50	8	271.1	5/8 x 90	66.282.1	5/8 x 155	275.1	5/8 x 115	278.1	5/8 x 130
80	8	330.1	3/4 x 110	66.342.1	3/4 x 185	335.1	3/4 x 140	335.1	3/4 x 140
100	8	331.1	3/4 x 115	66.343.1	3/4 x 190	336.1	3/4 x 145	335.1	3/4 x 140
150	12	333.1	3/4 x 125	66.349.1	3/4 x 230	338.1	3/4 x 160	335.1	3/4 x 140
200	12	404.1	7/8 x 140	66.425.1	7/8 x 270	410.1	7/8 x 180	406.1	7/8 x 150
250	16	472.1	1 x 160	66.496.1	1 x 310	479.1	1 x 205	474.1	1 x 170
300	16	532.1	1 1/8 x 170	66.562.1	1 1/8 x 360	539.1	1 1/8 x 215	534.1	1 1/8 x 185
350	20	533.1	1 1/8 x 180	66.569.1	1 1/8 x 405	541.1	1 1/8 x 230	535.1	1 1/8 x 190
400	20	592.1	1 1/4 x 190	66.631.1	1 1/4 x 435	600.1	1 1/4 x 240	594.1	1 1/4 x 205
450	24	893.1	1 1/4 x 195	66.634.1	1 1/4 x 470	601.1	1 1/4 x 245	596.1	1 1/4 x 215
500	24	595.1	1 1/4 x 210	86.142.1	1 1/4 x 510	604.1	1 1/4 x 265	598.1	1 1/4 x 230
600	24	686.1	1 1/2 x 235	86.288.1	1 1/2 x 570	697.1	1 1/2 x 305	688.1	1 1/2 x 250

BRANCH NIPPLES			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	PLAIN END	FLGD END
40 - 600	15	012.1	121.1
40-600	20	018.1	123.1
40-100	25	020.1	125.1
150-600	25	024.1	126.1
50-100	40	026.1	130.1
150-600	40	028.1	131.1

RED. BRANCH FITTINGS			
NOM SIZE RUN PIPE	NOM SIZE BRANCH		
200	50	76.79.00	066.1
250	50		068.1
300	50		070.1
350	50		072.1
400	50		074.1
450	50		076.1
500	50		078.1
600	50		082.1
150	50		364.1
200	80		090.1
250	80		092.1
300	80		094.1
350	80		096.1
400	80		098.1
450	80		100.1
500	80		102.1
600	80		106.1
300	100		116.1
350	100		118.1
400	100		120.1
450	100		122.1
500	100		124.1
600	100		128.1
450	150		142.1
500	150		144.1
600	150		148.1
600	200	916.1	

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	NOS REQD	RUNPIPE SIZE	50 DN 15	80 DN 15	100 DN 15	150 DN 15	200 DN 15	250 DN 15	300 DN 15	350 DN 15	400 DN 15	450 DN 15	500 DN 15	600 DN 15
DBB Valve	2	77.85.45	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
Flange WN	2	76.62.77	508.9	508.9	508.9	508.9	508.9	508.9	508.9	508.9	508.9	508.9	508.9	508.9
Flange set	1	76.62.95	610.1	612.1	614.1	616.1	568.1	570.1	572.1	574.1	576.1	578.1	580.1	584.1
Spacer	1	76.88.46	470.1	472.1	474.1	476.1	478.1	480.1	482.1	484.1	486.1	488.1	490.1	494.1
Bolting	16	81.38.66	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1	156.1
Gasket SpW	4	85.41.42	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
Gasket SpW	2	85.41.42	DN 50	DN 80	DN 100	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	DN 450	DN 500	DN 600

DISPLACER CHAMBER	STD LGTH L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	NOS REQD	
76 80 60 422.1	356	GATE VALVE	1	77.20.23.054.1
76 80 60 424.1	813	BALL VALVE	2	77.20.23.558.1
76 80 60 426.1	1219	BLIND FLANGE	2	76.62.09.512.9
76 80 60 428.1	1524	WN FLANGE	1	76.62.77.254.9
76 80 60 430.1	1829	GASKET SP W	1	85.41.42 DN 100
76 80 60 432.1	2134	GASKETSP W	4	85.41.42 DN 50
76 80 60 434.1	2438	GASKET SP W	3	85.41.42 DN 20
76 80 60 436.1	2743	BOLTING	8	81.38.66.331.1
76 80 60 438.1	3048	BOLTING	32	81.38.66.271.1
		BOLTING	12	81.38.66.268.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	NOS REQD	LENGTH	450	840	1230
Level Gauge	1	76.81.66	062.1	064.1	066.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.11	112.1	112.1	112.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket SpW	6	85.41.42			

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	NOS REQD	LENGTH	450	840	1230
Level Gauge	1	76.81.66	562.1	564.1	566.1
Valve, gate	3	77.20.23	054.1	054.1	054.1
Flange blind	2	76.62.09	512.1	512.1	512.1
Bolting	24	81.38.66	268.1	268.1	268.1
Gasket SpW	6	85.41.42			

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	NOS REQD	LENGTH	355	405	455
Cover flange	1	76.62.60	533.1	533.1	533.1
Well	1	76.83.40	555.1	556.1	557.1
Bolting	4	81.38.66	330.1	330.1	330.1
Gasket SpW	1	85.41.42			

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD		
Double Block & Bleed Valve	1	77.85.45	DN 15
Bolting	8	81.38.66	155.1
Spiral Wound Gasket	1	85.41.42	DN 15

		DESIGN LIMITS						
TEMPERATURE DEG C		-20	38	50	75	100	125	135
PRESSURE BAR GA		86	86	86	86	86	86	86

NOTES

DESIGN LIMITS ARE BASED ON B7M BOLTING LIMITS

COLD BENDING OF THE PIPE IS NOT ALLOWED.

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED.

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE.

DUAL PLATE CHECK VALVES IN NON - INSULATED PIPELINES ARE TO BE PROTECTED WITH FIRE SHIELDS.

ALL METTALIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE

ALL DN 25 FLANGED CONNECTIONS SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600	C	C	C	C	R	R	R	R	B	B	B	B	B	B	B	A
	500	C	C	C	C	R	R	R	R	B	B	B	B	B	B	B	A
	450	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A	
	400	C	C	C	C	R	R	R	R	B	B	B	B	B	B	A	
	350	C	C	C	C	R	R	R	R	B	B	B	B	B	A		
	300	C	C	C	C	R	R	R	R	B	B	B	B	A			
	250	C	C	C	C	R	R	R	R	B	B	B	A				
	200	C	C	C	C	R	R	R	R	B	B	A					
	150	C	C	C	C	R	R	R	B	B	A						
	100	C	C	C	C	B	B	A									
	80	C	C	C	C	B	A										
	50	C	C	C	C	A											
	40	C	C	C	A												
	25	B	B	A													
	20	B	A														
	15	A															

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- R Reducing branch fitting

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	160
80	80
100	80
150	80
200	80
250	80
300	80
350	80
400	80
450	80
500	80
600	80

FIRST ISSUE : FEB 97		REV LETTER	00		
		DATE	06/02/97		
		SIGN	P. H.		
PLANT	PS - 1	CARBON STEEL (SOUR)			PIPING GENERAL
CONSIGNEE	-	NACE			CLASS No. : 6144X
ENG BY	MMCL	CON. JOB NO			ANSI RATING : 600
PRINCIPAL	OPCQL	PROJECT NO			CORR. ALL : 3 mm

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESG buying description)

PIPE				*VALVES								
SEAMLESS SRL SOUR SERVICE								DN				
PIPE		DN	15 - 600	ASTM A106 - B	BTFB	BALL VALVE, TRUNN, FULL BORE, FL.			DN	50 - 600	BODY : ASTM A216 + ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : NYLON PA12	
*FLANGES										BODY : ASTM A216+ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : NYLON PA12		
BLFL	BLIND FLANGE	DN	15 - 600	ASTM A105	BTRF	BALL VALVE, TRUN, RED.BORE, FL		DN	300 - 600	BODY : ASTM A216+ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : NYLON PA12		
COFL	COVER FLANGE THERMOWELL NOZZLE		-	ASTM A105							BODY : ASTM A216-WCB/WCC ASTM A105	
SBFL	SPECTACLE BLIND FLANGE	DN	15 - 600	ASTM A285 - C							TRIM : AISI 410	
SPRT	SPACER RING TYPE (ANS FLANGES)	DN	15 - 600	ASTM A285 - C							BODY : ASTM A216-WCB/WCC ASTM A105	
WNFL	WELDING NECK FLANGE	DN	15 - 600	ASTM A105	CHVF	CHECK VALVE, FLANGED		DN	15 - 600	TRIM : AISI 410 BODY : ASTM A216-WCB/WCC ASTM A105		
*FITTINGS										BODY : ASTM A216-WCB/WCC ASTM A105		
CAPB	CAP BUTT - WELD. END	DN	15 - 600	ASTM A234 - WPB			CVWL	DUAL PL. CHECK VALVE WAFER LUG		DN	50 - 600	PLATE : AISI 410 SEATS : PTFE OR FKM BODY : ASTM A105M OR N
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB								
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB							BODY : ASTM A216-WCB/WCC ASTM A105	
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB							TRIM : AISI 410	
*REDUCING FITTINGS										BODY : ASTM A216-WCB/WCC ASTM A105		
BNIF	BRANCH FITTING, OUTL. FLANGED	DN	15 - 40	ASTM A105	GAVF	GATE VALVE, FLANGED.		DN	15 - 40	TRIM : AISI 410 BODY : ASTM A216-WCB/WCC ASTM A105		
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A105								
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	80 - 600	ASTM A105								
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB								
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB	GLVF	GLOBE VALVE, FLANGED.		DN	15 - 200	BODY : ASTM A216-WCB/WCC ASTM A105		
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB							TRIM : AISI 410	
*MISCELLANEOUS										BODY : ASTM A216-WCB/WCC ASTM A105		
GKSW	GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, 316L, NON ASBESTOS FILLED. CS CENTRING AND SS INNER RING			NEVF	NEEDLE TYPE GLOBE VALVE, FL.		DN	15 - 40	TRIM : AISI 410
LDPC	LEVEL DISPACER CHAMBER	DN	100 - 100	ASTM								
LEGR	LEVEL GAUGE REFLEX	DN	20 - 20	BODY : ASTM A105 BOLTS : ASTM A193.B7M GASKET : CNAF OIL RESISTANT								
LEGT	LEVEL GAUGE THROUGH VISION	DN	20 - 20	BODY : ASTM A105 BOLTS : ASTM A193.B7M GASKET : CNAF OIL RESISTANT								
STBT	STUD BOLTS / HEX NUTS		-	STUDS : ASTM A193.B7M NUTS : ASTM A194-2HM								
TWTG	THERMOWELL, STRAIGHT	DN	40 - 40	ASTM B164 (MONEL)								
MTRR	METER RUN	DN	15 - 40	FLANGES: ASTM B564- (ORIF) UNS N0400 L.J. FLANGES : ASTM A350-LF2 PIPE : MONEL 400 STUB ENDS : ASTM B366-CL.WPN								
ORMS	ORIFICE METER RUN SET	DN	50 - 300	FLANGES : ASTM A350 - LF2 PIPE : ASTM A333 - 6								

SCHED	NOM PIPE SIZE	PIPE		FLANGES				STRAINERS	
		74.30.03		Blind	WN	Spect	Spacer		
				76.62.10	76.62.79	76.68.36	76.88.46		
160	15	020.1		208.1	802.1	408.1	308.1		
160	20	030.1		212.1	804.1	412.1	312.1		
160	25	040.1		216.1	806.1	416.1	316.1		
160	40	060.1		218.1	808.1	418.1	318.1		
160	50	073.1		220.1	810.1	420.1	320.1		
80	80	109.1		222.1	762.1	422.1	322.1		
80	100	157.1		224.1	764.1	424.1	324.1		
80	150	219.1		226.1	766.1	426.1	326.1		
80	200	255.1		228.1	768.1	428.1	328.1		
80	250	295.1		230.1	770.1	430.1	330.1		
80	300	341.1		232.1	772.1	432.1	332.1		
80	350	391.1		234.1	774.1	434.1	334.1		
80	400	445.1		236.1	776.1	436.1	336.1		
80	450	497.1		238.1	778.1	438.1	338.1		
80	500	548.1		240.1	780.1	440.1	340.1		
80	600	597.1		242.1	784.1	444.1	344.1		

SCHED	NOM PIPE SIZE	FITTINGS						GASKETS	
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Tee		SPIRAL WOUND	
		76.30.17	76.30.34		76.30.42	76.30.81		85.41.42	
160	15				572.1	572.1		804.1	
160	20				578.1	578.1		806.1	
160	25				582.1	582.1		808.1	
160	40				592.1	592.1		812.1	
160	50	612.1	612.1		612.1	612.1		814.1	
80	80	628.1	628.1		628.1	628.1		818.1	
80	100	648.1	648.1		648.1	648.1		820.1	
80	150	668.1	668.1		668.1	668.1		824.1	
80	200	689.1	689.1		689.1	689.1		826.1	
80	250	710.1	710.1		710.1	710.1		828.1	
80	300	733.1	733.1		733.1	733.1		830.1	
80	350	752.1	752.1		752.1	752.1		832.1	
80	400	772.1	772.1		772.1	772.1		834.1	
80	450	794.1	794.1		794.1	794.1		836.1	
80	500	814.1	814.1		814.1	814.1		838.1	
80	600	834.1	834.1		834.1	834.1		842.1	

NOM PIPE SIZE	VALVES							
	Gate	Globe	Check hor. pist	Needle	Check dual pl.	Ball red bore	Ball full bore	Check
	FLGD	FLGD	FLGD	FLGD	WAFER	FLGD	FLGD	FLGD
15	77.20.23	77.30.23	77.10.23	77.30.23	77.67.06	77.00.73	77.00.73	77.10.23
20	103.1	103.1	103.1	703.1				
25	104.1	104.1	104.1	704.1				
40	105.1	105.1	105.1	705.1				
50	107.1	107.1	107.1	707.1				
80	108.1	108.1			108.1	108.1	608.1	108.1
100		110.1			110.1	110.1	610.1	110.1
150		112.1			112.1	112.1	612.1	112.1
200		114.1			114.1	114.1	614.1	114.1
250					115.1	115.1	615.1	115.1
300					116.1	116.1	616.1	116.1
350					117.1	117.1	617.1	117.1
400					118.1	118.1	618.1	118.1
450					119.1	119.1	619.1	119.1
500					120.1	120.1	620.1	120.1
600					121.1	121.1	621.1	121.1
					123.1	123.1	623.1	123.1

SCHED	NOM PIPE SIZE	REDUCING FITTINGS			Tee	76.30.88
		Conc reducer	Ecc reducer			
		76.30.66	76.30.67			
160	20 x 15	141.1	141.1		039.1	
160	25 x 15	151.1	151.1		049.1	
160	25 x 20	161.1	161.1		059.1	
160	40 x 15	171.1	171.1		069.1	
160	40 x 20	181.1	181.1		079.1	
160	40 x 25	191.1	191.1		089.1	
160	50 x 25	201.1	201.1		107.1	
160	50 x 40	211.1	211.1		116.1	
160	80 x 40	231.1	231.1		125.1	
160	80 x 50	241.1	241.1		134.1	
160	100 x 50	271.1	271.1		155.1	
80	100 x 80	277.1	277.1		166.1	
80	150 x 80	297.1	297.1		178.1	
80	150 x 100	307.1	307.1		190.1	
80	200 x 100	327.1	327.1		206.1	
80	200 x 150	337.1	337.1		226.1	
80	250 x 100	345.1	345.1		254.1	
80	250 x 150	358.1	358.1		272.1	
80	250 x 200	368.1	368.1		293.1	
80	300 x 150	385.1	385.1		311.1	
80	300 x 200	398.1	398.1		330.1	
80	300 x 250	408.1	408.1		352.1	
80	350 x 150	415.1	415.1		374.1	
80	350 x 200	424.1	424.1		392.1	
80	350 x 250	439.1	439.1		417.1	
80	350 x 300	449.1	449.1		443.1	
80	400 x 150				464.1	
80	400 x 200	455.1	455.1		481.1	
80	400 x 250	464.1	464.1		507.1	
80	400 x 300	475.1	475.1		533.1	
80	400 x 350	489.1	489.1		558.1	
80	450 x 200				582.1	
80	450 x 250	526.1	526.1		606.1	
80	450 x 300	556.1	556.1		630.1	
80	450 x 350	587.1	587.1		654.1	
80	450 x 400	617.1	617.1		678.1	
80	500 x 200				702.1	
80	500 x 250				726.1	
80	500 x 300	646.1	646.1		750.1	
80	500 x 350	677.1	677.1		774.1	
80	500 x 400	707.1	707.1		798.1	
80	500 x 450	737.1	737.1		822.1	
80	600 x 250				846.1	
80	600 x 300				870.1	
80	600 x 350				894.1	
80	600 x 400	887.1	887.1		918.1	
80	600 x 450	917.1	917.1		942.1	
80	600 x 500	947.1	947.1		966.1	

VENT POINTS				
COMPONENTS	NOS REQD	RUNPIPE VENT SIZE	DN 25	DN 40-600
Valve, globe	1	77.30.23	105.1	105.1
Tee equal	1	76.30.81	582.1	
Tee reducing	1	76.30.88		
Flange blind	1	76.62.10	216.1	216.1
Flange WN	1	76.62.79	806.1	806.1
Branch Nipple	1	76.80.31		018.1
Bolting	8	81.38.66	272.1	272.1
Gasket SpW	2	85.41.42	808.1	808.1

DRAIN POINTS				
COMPONENTS	NOS REQD	RUNPIPE DRAIN SIZE	DN 25	DN 40-600
Valve, gate	1	77.20.23	105.1	105.1
Tee equal	1	76.30.81	582.1	
Tee reducing	1	76.30.88		
Flange blind	1	76.62.10	216.1	216.1
Flange WN	1	76.62.79	806.1	806.1
Branch Nipple	1	76.80.31		018.1
Bolting	8	81.38.66	272.1	272.1
Gasket SpW	2	85.41.42	808.1	808.1

PRESSURE INSTRUMENT CONNECTIONS						
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 25	DN 40	DN 50	N 150-600
DBB Valve	1	77.85.46	075.1	075.1	075.1	075.1
Equal tee	1	76.30.81	578.1			
Reducing tee	1	76.30.88		089.1	107.1	
Flange WN	1	76.62.79	806.1	806.1	806.1	806.1
Branch Nipple	1	76.80.31				024.1
Bolting	8	81.38.66	272.1	272.1	272.1	272.1
Gasket SpW	2	85.41.42	808.1	808.1	808.1	808.1

TEMPERATURE INSTRUMENT CONNECTIONS				
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 80-100	N 150-600
Cover flange	1	76.62.60	535.1	535.1
Flange WN	1	76.62.79	808.1	808.1
Branch nipple	1	76.80.31	026.1	028.1
Well	1	76.83.40	551.1	552.1
Bolting	4	81.38.66	333.1	333.1
Gasket SpW	1	85.41.42	812.1	812.1

BOLTING									
NOM PIPE SIZE	NUMBER OF BOLTS	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		ORIFICE FLANGES	
		81.38.66	DIA x L In x mm	81.38	DIA x L In x mm	81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm
15	4	157.1	1/2 x 80			160.1	1/2 x 9		
20	4	271.1	5/8 x 90			274.1	5/8 x 110		
25	4	272.1	5/8 x 95			275.1	5/8 x 115		
40	4	330.1	3/4 x 110			334.1	3/4 x 130		
50	8	274.1	5/8 x 110	66.284.1	5/8 x 170	279.1	5/8 x 135	278.1	5/8 x 130
80	8	333.1	3/4 x 125	66.345.1	3/4 x 205	337.1	3/4 x 150	335.1	3/4 x 140
100	8	405.1	7/8 x 145	66.418.1	7/8 x 230	410.1	7/8 x 180	407.1	7/8 x 160
150	12	474.1	1 x 170	66.500.1	1 x 330	479.1	1 x 205	475.1	1 x 180
200	12	536.1	1 1/8 x 195	66.563.1	1 1/8 x 370	543.1	1 1/8 x 240	537.1	1 1/8 x 205
250	16	596.1	1 1/4 x 215	66.631.1	1 1/4 x 435	604.1	1 1/4 x 265	598.1	1 1/4 x 230
300	20	597.1	1 1/4 x 220	66.633.1	1 1/4 x 455	606.1	1 1/4 x 275	599.1	1 1/4 x 235
350	20	645.1	1 3/8 x 235	86.213.1	1 3/8 x 520	655.1	1 3/8 x 300	647.1	1 3/8 x 250
400	20	689.1	1 1/2 x 255	86.288.1	1 1/2 x 565	700.1	1 1/2 x 320	692.1	1 1/2 x 275
450	20	721.1	1 5/8 x 275	86.366.1	1 5/8 x 645	734.1	1 5/8 x 350	724.1	1 5/8 x 290
500	24	724.1	1 5/8 x 290	86.368.1	1 5/8 x 665	738.1	1 5/8 x 370	726.1	1 5/8 x 305
600	24	786.1	1 7/8 x 330	86.519.1	1 7/8 x 775	801.1	1 7/8 x 425	789.1	1 7/8 x 350

BRANCH NIPPLES			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	PLAIN END	FLGD END
40 - 600	15	016.1	222.1
40 - 600	20	018.1	223.1
40-100	25	020.1	225.1
150- 600	25	024.1	226.1
50-100	40	026.1	230.1
150- 600	40	028.1	231.1

RED. BRANCH FITTINGS			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	76.79.01	76.79.02
150	50		184.1
200	50		186.1
250	50		188.1
300	50		190.1
350	50		192.1
400	50		194.1
450	50		196.1
500	50		198.1
600	50		200.1
200	80	390.1	
250	80	392.1	
300	80	394.1	
350	80	396.1	
400	80	398.1	
450	80	400.1	
500	80	402.1	
600	80	406.1	
300	100	416.1	
350	100	418.1	
400	100	420.1	
450	100	422.1	
500	100	424.1	
600	100	428.1	
450	150	442.1	
500	150	444.1	
600	150	448.1	
600	200	466.1	

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	NOS REQD	UNPIPE SIZE	50 DN 15	80 DN 15	100 DN 15	150 DN 15	200 DN 15	250 DN 15	300 DN 15	350 DN 15	400 DN 15	450 DN 15	500 DN 15	600 DN 15
DBB Valve	2	77.85.45	023.1	023.1	023.1	023.1	023.1	023.1	023.1	023.1	023.1	023.1	023.1	023.1
Flange WN	2	76.62.79	802.1	802.1	802.1	802.1	802.1	802.1	802.1	802.1	802.1	802.1	802.1	802.1
Flange set	1	76.62.95	810.1	762.1	764.1	766.1	768.1	770.1	772.1	774.1	776.1	778.1	780.1	784.1
Spacer	1	76.88.16	090.1	092.1	094.1	096.1	098.1	100.1	102.1	104.1	106.1	108.1	110.1	112.1
Bolting	16	81.38.66	158.1	158.1	158.1	158.1	158.1	158.1	158.1	158.1	158.1	158.1	158.1	158.1
Gskt SpW	4	85.41.42	804.1	804.1	804.1	804.1	804.1	804.1	804.1	804.1	804.1	804.1	804.1	804.1
Gskt SpW	2	85.41.42	814.1	818.1	820.1	824.1	826.1	828.1	830.1	832.1	834.1	836.1	838.1	842.1

DISPLACER CHAMBER	STD LGTH L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	NOS REQD	
76.80.60.442.1	356	BALL VALVE	2	77.00.73.108.1
76.80.60.444.1	813	GATE VALVE	1	77.20.23.104.1
76.80.60.446.1	1219	BLIND FLANGE	2	76.62.10.212.1
76.80.60.448.1	1524	WN FLANGE	1	76.62.79.804.1
76.80.60.450.1	1829	GASKET SP W	1	85.41.42.820.1
76.80.60.452.1	2134	GASKETSP W	4	85.41.42.814.1
76.80.60.454.1	2438	GASKET SP W	3	85.41.42.806.1
76.80.60.456.1	2743	BOLTING	8	81.38.66.405.1
76.80.60.458.1	3048	BOLTING	32	81.38.66.274.1
		BOLTING	12	81.38.66.271.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	NOS REQD	LENGTH	450	840	1230
Level gauge	1	77.81.65	122.1	124.1	126.1
Valve, gate	3	77.20.23	104.1	104.1	104.1
Flange blind	2	76.62.11	212.1	212.1	212.1
Bolting	24	81.38.66	331.1	331.1	331.1
Gasket SpW	6	85.41.42	806.1	806.1	806.1

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	NOS REQD	LENGTH	450	840	1230
Level gauge	1	77.81.65	572.1	574.1	576.1
Valve, gate	3	77.20.23	104.1	104.1	104.1
Flange blind	2	76.62.11	212.1	212.1	212.1
Bolting	24	81.38.66	331.1	331.1	331.1
Gasket SpW	6	85.41.42			

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	NOS REQD	LENGTH	355	405	455
Cover flange	1	76.62.60	535.1	535.1	535.1
Well	1	76.83.37	505.1	506.1	507.1
Bolting	4	81.38.66	333.1	333.1	333.1
Gasket SpW	1	85.41.42	812.1	812.1	812.1

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD		
Double Block & Bleed Valve	1	77.85.45	023.1
Blind Flange	1	76.62.10.	208.1
Bolting	8	81.38.66	157.1
Spiral Wound Gasket	2	85.41.42	804.1

TEMPERATURE DEG C	DESIGN LIMITS					
	0	50	60	80	100	200
PRESSURE BAR GA DN 20 - 50	99.3	96.3	94.1	89.2	84.4	71.3

NOTES :

DESIGN LIMITS ARE ACC. FLANGE RATING ANSI B16.5 MAT.GRP.2.2

FOR DESIGN TEMPERATURES ABOVE 50 deg.C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.

WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 deg.C, TO PREVENT CHLORIDE STRESS CORROSION CRACKING.

COLD BENDING OF PIPE IS NOT ALLOWED.

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED.

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE.

ALL WETTED PARTS TO COMPLY WITH NACE MR-01-75 (LATEST EDITION).

BRANCH CONNECTIONS 90 DEG																	
NOMINAL BRANCH SIZE																	
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400																
	350																
	300																
	250																
	200																
	150																
	100																
	80																
	50	C	C	C	C	A											
	40	C	C	C	A												
	25	B	B	A													
	20	B	A														
	15	A															

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- E Branch Outlet, Butt-weld End

BRANCH NIPPLES			
NOM. SIZE	NOM. SIZE	PLAIN END	FLANGED
RUN PIPE	BRANCH	76.80.31	76.80.39
40 - 50	20	666.1	
40	25	669.1	
50	25	670.1	
50	40	674.1	090.1

ISSUE DATE: JUNE 1997		REV LETTER	0		
		DATE	Jun '97		
		SIGN	JFS		
PLANT	PS - 1	STAINLESS STEEL (16Cr - 12Ni-2Mo)		PIPING GENERAL	
CONSIGNEE		SOUR SERVICE		CLASS 6343x	
ENG BY	MEEL	CONTRACT JOB NO		ANSI RATING : 600	
PRINCIPAL	OPQL	PROJECT NO		CORR ALL : 0mm	

ISSUE DATE : AUG 1996

COMPONENT / MATERIAL DESCRIPTION

*PIPE

PIPE	PIPE	DN	20 - 50	ASTM A312-TP316L (SEAML / WELD.)
PNPP	PIPE NIPPLE 50mm		-	ASTM A312-TP316L (SEAMLESS)

*FLANGES

BLFL	BLIND FLANGE	DN	20 - 50	ASTM A182-F316
COFL	COVER FLANGE THERMOWELL NOZZLE		-	ASTM A182-F316
FLBT	BLIND FLANGE, TAPPED		-	ASTM A182-F316
SBFL	SPECTACLE BLIND FLANGE	DN	20 - 50	ASTM A204-TP316
SPRT	SPACER RING TYPE (ANSI FLANGES)	DN	20 - 50	ASTM A204-TP316
WNFL	WELDING NECK FLANGE	DN	20 - 50	ASTM A182-F316

*FITTINGS

CAPB	CAP BUTT - WELD. END	DN	20 - 50	A403-WPS316L
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	20 - 50	A403-WPS316L
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	20 - 50	A403-WPS316L
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	20 - 50	A403-WPS316L

*REDUCING FITTINGS

BNIF	BRANCH FITTING, OUTL. FLANGED	DN	15 - 40	ASTM A182-F316
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A182-F316L
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	80 - 200	ASTM A182-F316L
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	20 - 200	A403-WP316L
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	20 - 200	A403-WP316L
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	20 - 200	A403-WP316L

*VALVES

BTFF	BALL VALVE, TRUNN, FULL BORE, FL.	DN	50 - 50	BODY : ASTM A351-CF8M ASTM A182-F316 BALL / STEM : AISI 316, 316L SEATS : PCTFE
BTRF	BALL VALVE, TRUN, RED.BORE, FL	DN	50 - 50	BODY : ASTM A351-CF8M ASTM A182-F316 BALL / STEM : AISI 316, 316L SEATS : PCTFE
CHVF	CHECK VALVE, FLANGED	DN	20 - 50	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
CVWL	DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 50	BODY : ASTM A351-CF8M ASTM A182-F316 PLATE : AISI 316, 316L SEATS : METAL TO METAL
GAVF	GATE VALVE, FLANGED	DN	20 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
GLVF	GLOBE VALVE, FLANGED	DN	20 - 50	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L

*MISCELLANEOUS

GKSW	GASKET, SPIRAL WOUND	DN	20 - 50	AISI 316, 316L, NON-ASB FILLED, CS CENT-RING, SS INNER- RING
STBT	STUD BOLTS / HEX NUTS	-		TUDS : ASTM A193-B7M NUTS : ASTM A194-2HM

SCHED	NOM PIPE SIZE	PIPE			FLANGES					STRAINERS	
					Blind	WN	Spect.				
		74.36.33			76.65.10	76.65.80	76.88.10				
	15										
80S	20	028.1			464.1	544.1	412.1				
80S	25	036.1			466.1	546.1	416.1				
40S	40	050.1			468.1	488.1	418.1				
40S	50	058.1			470.1	490.1	420.1				
	80										
	100										
	150										
	200										

SCHED	NOM. PIPE SIZE	FITTINGS						GASKETS		SPAC
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Tee		Sp.W.		Ring Type
		76.33.19	76.33.37		76.33.41	76.33.84		85.41.42		76.88.19
	15									
80S	20	298.1	298.1		298.1	798.1		806.1		512.1
80S	25	308.1	308.1		308.1	808.1		808.1		516.1
40S	40	326.1	326.1		326.1	826.1		812.1		518.1
40S	50	336.1	336.1		336.1	836.1		814.1		520.1
	80									
	100									
	150									
	200									

NOM. PIPE SIZE	VALVES						
	Ball, turnn Full bore	Ball, turnn Red. bore	Gate	Globe	Check	Check dual pl	
	FLGD	FLGD	FLGD	FLGD	FLGD	WAFFER	
	77.03.73	77.03.73	77.23.09	77.33.09	77.13.09	77.68.00	
15							
20			104.1	104.1	104.1		
25			106.1	106.1	106.1		
40			107.1	107.1	107.1		
50	608.1	108.1		108.1	108.1	108.1	
80							
100							
150							
200							

REDUCING FITTINGS						
SCHED	NOM PIPE SIZE	Conc reducer	Ecc reducer	Tee reducer		
		76.33.70	76.33.72	76.33.85		
	20 x 15					
	25 x 15					
80S	25 x 20	588.1	588.1	640.1		
	40 x 15					
40S/80S	40 x 20	617.1	617.1			
40S/80S	40 x 25					
40S/80S	50 x 20			667.1		
40S/80S	50 x 25			677.1		
40S	50 x 40	646.1	646.1	684.1		
	80 x 40					
	80 x 50					
	100 x 40					
	100 x 50					
	100 x 80					
	150 x 50					
	150 x 80					
	150 x 100					
	200 x 50					
	200 x 80					
	200 x 100					
	200 x 150					

VENT POINTS							
COMPONENTS	NOS REQD	RUNPIPE	15	20	25	40 - 50	80 - 200
		FIG NO	1	1	1	2	
Valve, globe	1	77.33.09		104.1	104.1	104.1	
Tee	1						
Tee	1						
Flange blind	1	76.65.10		464.1	464.1	464.1	
Flange WN	1	76.65.80		484.1	484.1	484.1	
Branch Nipple	1	76.33.57		946.1	946.1	946.1	
Bolting	8	81.38.66		270.1	270.1	270.1	
Gasket SpW	2	85.41.42		806.1	806.1	806.1	

DRAIN POINTS							
COMPONENTS	NOS REQD	RUNPIPE	15	20	25	40 - 50	80 - 200
		FIG NO	1	1	1	2	
Valve, gate	1	77.23.09		104.1	104.1	104.1	
Tee	1						
Tee	1						
Flange blind	1	76.65.10		464.1	464.1	464.1	
Flange WN	1	76.65.80		484.1	484.1	484.1	
Branch Nipple	1	76.33.57		946.1	946.1	946.1	
Bolting	8	81.38.66		270.1	270.1	270.1	
Gasket SpW	2	85.41.42		806.1	806.1	806.1	

BOLTING								
NOM PIPE SIZE	NUMBER OF BOLTS	FLANGED JOINTS		WAFFER TYPE VALVES		SPECTACLES / SPACERS		
		81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm	
15								
20	4	270.1	5/8 x 85			273.1	5/8 x 100	
25	4	270.1	5/8 x 85			273.1	5/8 x 100	
40	4	330.1	3/4 x 110			332.1	3/4 x 120	
50	8	274.1	5/8 x 110			276.1	5/8 x 120	
80								
100								
150								
200								

DESIGN LIMITS						
TEMPERATURE DEG C	-20	38	50	75	100	125
PRESSURE BAR GA	130	130	130	130	130	130

NOTES

DESIGN LIMITS ARE BASED ON B7M BOLTING LIMITS

COLD BENDING OF THE PIPE IS NOT ALLOWED.

FLANGES, GASKETS AND FLANGED VALVES DN 15 UP TO AND INCLUDING DN 50 ARE CLASS 1500.

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED.

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE.

DUAL PLATE CHECK VALVES IN NON - INSULATED PIPELINES ARE TO BE PROTECTED WITH FIRE SHIELDS.

ALL METTALIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE

ALL DN 25 FLANGED CONNECTIONS SHALL BE SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400	C	C	C	C	R	R	R	B	B	B	B	B	A			
	350	C	C	C	C	R	R	R	B	B	B	B	A				
	300	C	C	C	C	R	R	R	B	B	B	A					
	250	C	C	C	C	R	R	B	B	B	A						
	200	C	C	C	C	R	R	B	B	A							
	150	C	C	C	C	R	B	B	A								
	100	C	C	C	C	B	B	A									
	80	C	C	C	C	B	A										
	50	C	C	C	C	A											
	40	C	C	C	A												
	25	B	B	A													
	20	B	A														
	15	A															

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- R Reducing branch fitting

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	160
80	160
100	120
150	120
200	100
250	100
300	100
350	100
400	100
450	100
500	100
600	100

FIRST ISSUE : FEB 97		REV LETTER	00			
		DATE	06/02/97			
		SIGN	P. H.			
PLANT	PS - 1	CARBON STEEL (SOUR)			PIPING GENERAL	
CONSIGNEE	-	NACE			CLASS No. : 9144X	
ENG BY	MMCL	CON. JOB NO			ANSI RATING : 900	
PRINCIPAL	OPCQL	PROJECT NO			CORR. ALL : 3 mm	
						ISSUE DATE FEB 1997

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

*PIPE

PIPE	SEAMLESS SRL SOUR SERVICE	DN	15 - 600	ASTM A106 - B
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*FLANGES

BLFL	BLIND FLANGE	DN	15 - 600	ASTM A105
COFL	COVER FLANGE THERMOWELL NOZZLE		-	ASTM A105
SBFL	SPECTACLE BLIND FLANGE	DN	15 - 600	ASTM A285 - C
SPRT	SPACER RING TYPE (ANS FLANGES)	DN	15 - 600	ASTM A285 - C
WNFL	WELDING NECK FLANGE	DN	15 - 600	ASTM A105

*FITTINGS

CAPB	CAP BUTT - WELD. END	DN	15 - 600	ASTM A234 - WPB
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB

*REDUCING FITTINGS

BNIF	BRANCH FITTING, OUTL. FLANGED	DN	15 - 40	ASTM A105
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A105
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	80 - 600	ASTM A105
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB

*MISCELLANEOUS

GKSW	GASKET, SPIRAL WOUND	DN	15 - 600	AISI 316, 316L, NON ASBESTOS FILLED. SS CENTRING AND INNER RING
STBT	STUD BOLTS / HEX NUTS		-	STUDS : ASTM A193.B7M NUTS : ASTM A194-2HM
TWTG	THERMOWELL, STRAIGHT	DN	40 - 40	ASTM B164 (MONEL)
MTRR	METER RUN	DN	15 - 40	FLANGES: ASTM B564- (ORIF) UNS N0400 L.J. FLANGES : ASTM A350-LF2 PIPE : MONEL 400 STUB ENDS : ASTM B366-CL.WPN
ORMS	ORIFICE METER RUN SET	DN	50 - 300	FLANGES : ASTM A105 PIPE : ASTM A106-B

*VALVES

BAFF	BALL VALVE, FULL BORE, FLANGED.	DN	15 - 150	BODY : ASTM A216 ASTM A105 BALL / STEM : AISI 316, 316L SEATS : PTFE
BARF	BALL VALVE, RED. BORE, FLANGED	DN	15 - 250	BODY : ASTM A216 ASTM A105 BALL / STEM : AISI 316, 316L SEATS : PTFE
BTFF	BALL VALVE, TRUNN, FULL BORE, FL.	DN	50 - 600	BODY : ASTM A216 + ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : PCTFE
BTRF	BALL VALVE, TRUN, RED.BORE, FL	DN	300 - 600	BODY : ASTM A216+ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : PCTFE
CHVF	CHECK VALVE, FLANGED	DN	15 - 600	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
CVWL	DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 600	BODY : ASTM A216-WCB/WCC ASTM A105 PLATE : AISI 410 SEATS : PTFE OR FKM
DBBV	DOUBLE BLOCK & BLEED VALVE	DN	-	BODY : ASTM A105M OR N BALL / STEM : ; SEAT : PTFE OR NYLON
GAVF	GATE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
GLVF	GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
NEVF	NEEDLE TYPE GLOBE VALVE, FL.	DN	15 - 40	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410

SCHED	NOM. PIPE SIZE	PIPE			FLANGES				STRAINERS		
		74 30 03			Blind	WN	Spect	Spacer			
					76 62 10	76 62 79	76 88 36	76 88 46			
160	15	020.1			408.1	962.1	508.1	608.1			
160	20	030.1			412.1	964.1	512.1	612.1			
160	25	040.1			416.1	966.1	516.1	616.1			
160	40	060.1			418.1	968.1	518.1	618.1			
160	50	073.1			420.1	970.1	520.1	620.1			
160	80	113.1			322.1	886.1	522.1	622.1			
120	100	159.1			324.1	884.1	524.1	624.1			
120	150	223.1			326.1	886.1	526.1	626.1			
100	200	259.1			328.1	848.1	528.1	628.1			
100	250	299.1			330.1	850.1	530.1	630.0			
100	300	345.1			332.1	852.1	532.1	632.1			
100	350	393.1			334.1	854.1	534.1	634.1			
100	400	447.1			336.1	856.1	536.1	636.1			

SCHED	NOM PIPE SIZE	FITTINGS						GASKETS		
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Tee		SPIRAL WOUND		
		76 30 17	76 30 34	76 30 42	76 30 42	76 30 81		85.41.42		
160	15				572.1	572.1				
160	20				578.1	578.1				
160	25				582.1	582.1				
160	40				592.1	592.1				
160	50	612.1	612.1	612.1	612.1	612.1				
160	80	632.1	632.1	632.1	632.1	632.1				
120	100	650.1	650.1	650.1	650.1	650.1				
120	150	670.1	670.1	670.1	670.1	670.1				
100	200	690.1	690.1	690.1	690.1	690.1				
100	250	711.1	711.1	711.1	711.1	711.1				
100	300	734.1	734.1	734.1	734.1	734.1				
100	350	754.1	754.1	754.1	754.1	754.1				
100	400	774.1	774.1	774.1	774.1	774.1				

NOM PIPE SIZE	VALVES							
	Gate	Globe	Check hor. pist	Needle	Check dual pl.	Ball red bore		
	FLGD	FLGD	FLGD	FLGD	WAFER	FLGD		
15	77 20 90	77 30 90	77 10 23	77 30 23	77 67 06	77 00 72		
20	043.1	043.1	203.1	753.1				
25	044.1	044.1	204.1	754.1				
40	045.1	045.1	205.1	755.1				
50	047.1	047.1	207.1	757.1				
80	048.1	048.1						
100					160.1	160.1		
150					162.1	162.1		
200					164.1	164.1		
250					165.1	165.1		
300					166.1	166.1		
350					167.1	167.1		
400					168.1	168.1		
450					169.1	169.1		
500								
600								

REDUCING FITTINGS					
SCHED	NOM PIPE SIZE	Conc reducer	Ecc reducer	Tee	
		76 30 66	76 30 67	76 30 88	
160	20 x 15	141.1	141.1	039.1	
160	25 x 15	151.1	151.1	049.1	
160	25 x 20	161.1	161.1	059.1	
160	40 x 15	171.1	171.1	069.1	
160	40 x 20	181.1	181.1	079.1	
160	40 x 25	191.1	191.1	089.1	
160	50 x 25	201.1	201.1	107.1	
160	50 x 40	211.1	211.1	116.1	
160	80 x 40	231.1	231.1	125.1	
160	80 x 50	241.1	241.1	134.1	
160	100 x 50	271.1	271.1	155.1	
160	100 x 80	281.1	281.1	167.1	
160	150 x 80	301.1	301.1	179.1	
120	150 x 100	309.1	309.1	191.1	
120	200 x 100	329.1	329.1	207.1	
120/100	200 x 150	338.1	338.1	227.1	
120	250 x 100	347.1	347.1	255.1	
120	250 x 150	359.1	359.1	273.1	
100	250 x 200	367.1	367.1	294.1	
120	300 x 150	387.1	387.1	312.1	
100	300 x 200	397.1	397.1	331.1	
100	300 x 250	407.1	407.1	353.1	
120	350 x 150	417.1	417.1	375.1	
100	350 x 200	425.1	425.1	393.1	
100	350 x 250	437.1	437.1	418.1	
100	350 x 300	448.1	448.1	444.1	
120	400 x 150			465.1	
100	400 x 200	456.1	456.1	482.1	
100	400 x 250	465.1	465.1	508.1	
100	400 x 300	477.1	477.1	534.1	
100	400 x 350	488.1	488.1	559.1	

VENT POINTS					
COMPONENTS	NOS REQD	RUNPIPE VENT SIZE	DN 25	DN 40-100	DN 150-400
Valve, globe	1	77.30.90	045.1	045.1	045.1
Tee equal	1	76.30.81	582.1		
Tee reducing	1	76.30.88			
Flange blind	1	76.62.10	416.1	416.1	416.1
Flange WN	1	76.62.79	966.1	966.1	966.1
Branch Nipple	1	76.80.31		020.1	024.1
Bolting	8	81.38.66	402.1	402.1	402.1
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25

DRAIN POINTS					
COMPONENTS	NOS REQD	RUNPIPE DRAIN SIZE	DN 25	DN 40-100	DN 150-400
Valve, gate	1	77.20.90	045.1	045.1	045.1
Tee equal	1	76.30.81	582.1		
Tee reducing	1	76.30.88			
Flange blind	1	76.62.10	416.1	416.1	416.1
Flange WN	1	76.62.79	966.1	966.1	966.1
Branch Nipple	1	76.80.31		020.1	024.1
Bolting	8	81.38.66	402.1	402.1	402.1
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25

PRESSURE INSTRUMENT CONNECTIONS						
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 25	DN 40	DN 50-100	DN150-400
DBB Valve	1	77.85.46	DN 25	DN 25	DN 25	DN 25
Tee equal	1	76.30.81	582.1			
Tee reducing	1	76.30.88		089.1		
Flange WN	1	76.62.79	966.1	966.1	966.1	966.1
Branch Nipple	1	76.80.31			026.1	028.1
Bolting	8	81.38.66	402.1	402.1	402.1	402.1
Gasket SpW	2	85.41.42	DN 25	DN 25	DN 25	DN 25

TEMPERATURE INSTRUMENT CONNECTIONS				
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 80-100	DN 150-400
Cover flange	1	76.62.60	537.1	537.1
Flange WN	1	76.62.79	968.1	962.1
Branch nipple	1	76.80.31	026.1	028.1
Well	1	76.83.40	551.1	552.1
Bolting	4	81.38.66	471.1	471.1
Gasket SpW	1	85.41.42	DN 40	DN 40

BOLTING								
NOM PIPE SIZE	FLANGED JOINTS		WAFFER TYPE VALVES		SPECTACLES / SPACERS		ORIFICE FLANGES	
		DIA x L		DIA x L		DIA x L		DIA x L
	81.38.66	In x mm	81.38	In x mm	81.38.66	In x mm	81.38.66	In x mm
15	330.1	3/4 x 110			333.1	3/4 x 125		
20	331.1	3/4 x 115			335.1	3/4 x 140		
25	402.1	7/8 x 125			405.1	7/8 x 145		
40	469.1	1 x 140			472.1	1 x 160		
50	405.1	7/8 x 145	66.417.1	7/8 x 220	409.1	7/8 x 170	407.1	7/8 x 160
80	405.1	7/8 x 145	66.418.1	7/8 x 230	410.1	7/8 x 180	407.1	7/8 x 160
100	532.1	1 1/8 x 170	66.548.1	1 1/8 x 275	537.1	1 1/8 205	533.1	1 1/8 x 180
150	536.1	1 1/8 x 195	66.562.1	1 1/8 x 360	542.1	1 1/8 x 235	537.1	1 1/8 x 205
200	643.1	1 3/8 x 220	66.672.1	1 3/8 x 435	651.1	1 3/8 x 275	645.1	1 3/8 x 235
250	645.1	1 3/8 x 235	66.675.1	1 3/8 x 485	655.1	1 3/8 x 300	647.1	1 3/8 x 250
300	648.1	1 3/8 x 255	86.217.1	1 3/8 x 555	657.1	1 3/8 x 330	650.1	1 3/8 x 265
350	692.1	1 1/2 x 275	86.295.1	1 1/2 x 635	703.1	1 1/2 x 345	694.1	1 1/2 x 285
400	723.1	1 5/8 x 285	86.370.1	1 5/8 x 685	738.1	1 5/8 x 370	725.1	1 5/8 x 300

BRANCH NIPPLES			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	PLAIN END	FLGD END
		76.80.31	76.80.37
40 - 400	15	016.1	322.1
40 - 400	20	018.1	323.1
40-100	25	020.1	325.1
150- 400	25	024.1	326.1
50-100	40	026.1	330.1
150 - 400	40	028.1	331.1

RED. BRANCH FITTINGS			
NOM. SIZE RUN PIPE	NOM SIZE BRANCH	76.79.02	76.79.03
200	50	800.1	
250	50	801.0	
300	50	802.1	
350	50	803.1	
400	50	804.1	
150	50		002.1
200	80	810.1	
250	80	811.1	
300	80	812.1	
350	80	813.1	
400	80	814.1	
300	100		
350	100		
400	100		

ORIFICE INSTRUMENT CONNECTIONS											
COMPONENTS	NOS REQD	RUNPIPE	50	80	100	150	200	250	300	350	400
		SIZE	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
DBB Valve	2	77.85.45	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
Flange WN	2	76.62.79	962.1	962.1	962.1	962.1	962.1	962.1	962.1	962.1	962.1
Flange set	1	76.62.95	970.1	886.1	864.1	866.1	848.1	850.1	852.1	854.1	856.1
Spacer	1	76.88.46	620.1	622.1	624.1	626.1	628.1	630.1	632.1	634.1	636.1
Bolting	16	81.38.66	331.1	331.1	331.1	331.1	331.1	331.1	331.1	331.1	331.1
Gskt SpW	4	85.41.42	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
Gskt SpW	2	85.41.42	DN 50	DN 80	DN 100	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400

DISPLACER CHAMBER	STD LGTH L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	NOS REQD	
76.80.60.462.1	356	BALL VALVE	2	77.00.72.160.1
76.80.60.464.1	813	GATE VALVE	1	77.20.90.044.1
76.80.60.466.1	1219	BLIND FLANGE	2	76.62.10.412.1
76.80.60.468.1	1524	WN FLANGE	1	76.62.79.964.1
76.80.60.470.1	1829	GASKET SP W	1	85.41.42
76.80.60.472.1	2134	GASKETSP W	4	85.41.42
76.80.60.474.1	2438	GASKET SP W	3	85.41.42
76.80.60.476.1	2743	BOLTING	8	81.38.66.532.1
76.80.60.478.1	3048	BOLTING	32	81.38.66.405.1
		BOLTING	12	81.38.66.331.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	NOS REQD	LENGTH			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket SpW					

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	NOS REQD	LENGTH			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket SpW					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	NOS REQD	LENGTH	355	405	455
Cover flange	1	76.62.60	535.1	535.1	535.1
Well	1	76.83.37	505.1	506.1	507.1
Bolting	4	81.38.66	469.1	469.1	469.1
Gasket SpW	1	85.41.42	DN 40	DN 40	DN 40

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD		
Double Block & Bleed Valve	1	77.85.46	DN 15
Bolting	8	81.38.66	330.1
Spiral Wound Gasket	1	85.41.42	DN 15

DESIGN LIMITS					
TEMPERATURE DEG C	-50	38	50	75	100
PRESSURE BAR GA	138	138	138	138	135

NOTES

DESIGN LIMITS ARE ACC. MAX STRENGTH OF L7M BOLTING MATERIAL AND ACC. FLANGE RATING ANSI B16.5 MATL. GRP 1.3

COLD BENDING OF THE PIPE IS NOT ALLOWED

WELDS SHALL BE POST-WELD HEAT TREATED FOR WALL THICKNESS EQUAL OR MORE THAN 12mm. SEE DEP 30.10.02.31-GEN

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE

		BRANCH CONNECTIONS 90 DEG													
		NOMINAL BRANCH SIZE													
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450
	600														
	500														
	450														
	400	C	C	C	C	E	E	E	B	B	B	B	B	A	
	350	C	C	C	C	E	E	E	B	B	B	B	A		
	300	C	C	C	C	E	E	E	B	B	B	A			
	250	C	C	C	C	E	E	E	B	B	B	A			
	200	C	C	C	C	E	E	E	B	B	A				
	150	C	C	C	C	E	B	B	A						
	100	C	C	C	C	B	B	A							
	80	C	C	C	C	B	A								
	50	C	C	C	C	A									
	40	C	C	C	A										
	25	B	B	A											
	20	B	A												
	15	A													

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- E Reducing branch fitting

TABLE OF SCHEDULES	
DN	SCHEDULE
15	160
20	160
25	160
40	160
50	160
80	160
100	120
150	120
200	100
250	100
300	100
350	100
400	100

ISSUE DATE : JAN 1997		REV LETTER	A1		
		DATE	28/01/97		
		SIGN	P. H.		
PLANT	PS - 1	CARBON STEEL (SOUR)		PIPING GENERAL	
CONSIGNEE		LOW TEMP SERVICE		CLASS No. : 9150X	
ENG BY	MMCL	CONTRACT JOB NO		ANSI RATING : 900	
PRINCIPAL	OPCQL	PROJECT NO		CORR. ALL : 3 mm	

ISSUE DATE : JAN 1997

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description.

*PIPE

PIPE	PIPE	DN	15 - 400	ASTM A333-6 (SEAMLESS)
PNPP	PIPE NIPPLE	DN	-	ASTM A333-6 (SEAMLESS)

*FLANGES

BLFL	BLIND FLANGE	DN	15 - 400	ASTM A350-LF2
COFL	COVER FLANGE THERMOWELL NOZZLE		-	ASTM A350-LF2
SBFL	SPECTACLE BLIND FLANGE	DN	15 - 400	ASTM A516-60
SPRT	SPACER RING TYPE (ANS FLANGES)	DN	15 - 400	ASTM A516-60
WNFL	WELDING NECK FLANGE	DN	15 - 400	ASTM A350-LF2

*FITTINGS

CAPB	CAP BUTT - WELD. END	DN	15 - 400	ASTM A420-WPL6
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASTM A420-WPL6

*REDUCING FITTINGS

BNIF	BRANCH FITTING, OUTL. FLANGED	DN	15 - 40	ASTM A350-LF2
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A350-LF2
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	80 - 400	ASTM A350-LF2
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	20 - 400	ASTM A420-WPL6
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	20 - 400	ASTM A420-WPL6
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	20 - 400	ASTM A420-WPL6

*VALVES

BTFB	BALL VALVE, TRUNN, FULL BORE, FL.	DN	50 - 400	BODY : ASTM A352 , ASTM A350+ENP BALL : AISI 316 STEM : BODY MAT.+ENP, AISI 316 SEATS : NYLON PA12
BTRF	BALL VALVE, TRUNN, RED.BORE, FL	DN	50 - 400	BODY : ASTM A352 , ASTM A350+ENP BALL : AISI 316 STEM : BODY MAT.+ENP, AISI 316 SEATS : NYLON PA12
CHVF	CHECK VALVE, FLANGED	DN	15 - 400	BODY : ASTM A352,350 TRIM : AISI 316, 316L
CVWL	DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 400	BODY : ASTM A352,350 PLATE : AISI 316, 316L SEATS : AISI 316 OR STELLITE
DBBV	DOUBLE BLOCK & BLEED VALVE	DN	-	BODY : ASTM A350-LF2 BALL / STEM : AISI 316 SEAT : PTFE OR NYLON
GAVF	GATE VALVE, FLANGED.	DN	15 - 400	BODY : ASTM A352,350 TRIM : AISI 316, 316L
GLVF	GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A352,350 TRIM : AISI 316, 316L

*MISCELLANEOUS

GKRF	GASKET, RAISED FACE	DN	15 - 400	AISI 316, 316L NON ASBESTOS FILLED, SS CENTRING RING.SS INNER RING
LDPC	LEVEL DISPACER CHAMBER	DN	00 - 100	ASTM A333 - 6 (SEAMLESS)
LEGR	LEVEL GAUGE REFLEX	DN	20 - 20	BODY:ASTM A350-GR.LF2 BOLTS : ASTM A320-L7M/A194-7M GASKET : CNAF OIL RESISTANT BODY : ASTM A350-GR.LF2 BOLTS : ASTM A320-L7M/A194-7M GASKET : CNAF OIL RESISTANT STUDS : ASTM A320-L7M NUTS : ASTM A194-7M ASTM B164 (MONEL)
LEGT	LEVEL GAUGE THROUGH VISION	DN	20 - 20	FLANGES: ASTM B564- (ORIF) UNS N0400 L.J. FLANGES : ASTM A350-LF2 PIPE : MONEL 400 STUB ENDS : ASTM B366-CL.WPN
STBT	STUD BOLTS / HEX NUTS		-	FLANGES : ASTM A350 - LF2 PIPE : ASTM A333 - 6 FLANGES : ASTM A350 - LF2
TWTG	THERMOWELL, TAPERED	DN	40 - 40	
MTRR	METER RUN	DN	15 - 40	
ORMS	ORIFICE METER RUN SET	DN	50 - 300	
ORFS	ORIFICE FLANGE SET	DN	50-400	

SCHED	NOM PIPE SIZE	PIPE			FLANGES				STRAINERS	
		74.30.16			Blind	WN	Spect	Spacer		
					76 62.12	76 62.86	76 88.35	76 88.46		
160	15	023.1			658.1	662.1	508	608.1		
160	20	030.1			662.1	664.1	512	612.1		
160	25	038.1			666.1	666.1	516	616.1		
160	40	054.1			668.1	668.1	518	618.1		
160	50	063.1			670.1	670.1	520	620.1		
160	80	071.1			622.1	472.1	522	622.1		
120	100	078.1			624.1	414.1	524	624.1		
120	150	087.1			626.1	416.1	526	626.1		
100	200	099.1			628.1	388.1	528	628.1		
100	250	111.1			630.1	390.1	530	630.1		
100	300	123.1			632.1	392.1	532	632.1		
100	350	136.1			634.1	394.1	534	634.1		
100	400	145.1			636.1	396.1	536	636.1		

SCHED	NOM. PIPE SIZE	FITTINGS						GASKETS	
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Tee		SpW	
		76 31.17	76 31.34		76 31.43	76 31.80		85.41.42	
160	15				172.1	172.1			
160	20				178.1	178.1			
160	25				182.1	182.1			
160	40				192.1	192.1			
160	50	212.1	212.1		212.1	212.1			
160	80	232.1	232.1		232.1	232.1			
120	100	250.1	250.1		250.1	250.1			
120	150	270.1	270.1		270.1	270.1			
100	200	290.1	290.1		290.1	290.1			
100	250	311.1	311.1		311.1	311.1			
100	300	334.1	334.1		334.1	334.1			
100	350	354.1	354.1		354.1	354.1			
100	400	374.1	374.1		374.1	374.1			

NOM PIPE SIZE	VALVES						
	Ball red bore	Ball full bore	Check hor. pist	Check swing	Check dual pl.	Gate	Globe
	FLGD	FLGD	FLGD	FLGD	WAFER	FLGD	FLGD
15	77 00.83	77 00.83	77 10.33	77 10.33	77 67.52	77 20.33	77 30.33
20			203.1			203.1	203.1
25			204.1			204.1	204.1
40			205.1			205.1	205.1
50			207.1			207.1	207.1
80	208.1	708.1		208.1	208.1		
100	160.1	660.1		160.1	160.1		
150	162.1	662.1		162.1	162.1		
200	164.1	664.1		164.1	164.1		
250	165.1	665.1		165.1	165.1		
300	166.1	666.1		166.1	166.1		
350	167.1	667.1		167.1	167.1		
400	168.1	668.1		168.1	168.1		
450	169.1	669.1		169.1	169.1		
500							
600							

SCHED	NOM PIPE SIZE	REDUCING FITTINGS		
		Conc reducer	Ecc reducer	Tee
		76 31.66	76 31.75	76 31.88
160	20 x 15	141.1	141.1	039.1
160	25 x 15	151.1	151.1	049.1
160	25 x 20	161.1	161.1	059.1
160	40 x 15	171.1	171.1	
160	40 x 20	181.1	181.1	
160	40 x 25	191.1	191.1	
160	50 x 25	201.1	201.1	
160	50 x 40	211.1	211.1	
160	80 x 40	231.1	231.1	
160	80 x 50	241.1	241.1	161.1
160	100 x 50	270.1	270.1	178.1
160	100 x 80	280.1	280.1	166.1
160	150 x 80	300.1	300.1	178.1
120	150 x 100	309.1	309.1	190.1
120	200 x 100	328.1	328.1	206.1
120	200 x 150	338.1	338.1	226.1
120	250 x 100			258.1
120	250 x 150	351.1	351.1	268.1
100	250 x 200	368.1	368.1	277.1
120	300 x 150			288.1
100	300 x 200	398.1	039.1	297.1
100	300 x 250	407.1	407.1	307.1
120	350 x 150			318.1
100	350 x 200			327.1
100	350 x 250	437.1	437.1	337.1
100	350 x 300	448.1	448.1	347.1
120	400 x 150			358.1
100	400 x 200			367.1
100	400 x 250			377.1
100	400 x 300	477.1	477.1	387.1
100	400 x 350	488.1	488.1	397.1

VENT POINTS					
COMPONENT	NOS REQD	RUNPIPE VENT SIZE	25 DN 25	40 - 400 DN 25	
Valve globe	1	77 30 33	203.1	203.1	
Flange blind	1	76 62.12	666.1	666.1	
Flange WN	1	76 62.86	666.1	666.1	
Equal tee	1	76 31.80	182.1		
Nipple	1	76 31.57	651.1	651.1	
Branch Nipple	1	76 80.31		120.1	
Bolting	8	81 38 67	402.1	402.1	
Gasket SpW	2	85 41 42	DN 25	DN 25	

DRAIN POINTS					
COMPONENT	NOS REQD	RUNPIPE VENT SIZE	25 DN 25	40 - 400 DN 25	
Valve gate	1	77 20.33	203.1	203.1	
Flange blind	1	76 62.12	666.1	666.1	
Flange WN	1	76 62.86	666.1	666.1	
Equal tee	1	76 31.80	182.1		
Nipple	1	76 31.57	651.1	651.1	
Branch Nipple	1	76 80.31		120.1	
Bolting	8	81 38 67	402.1	402.1	
Gasket SpW	2	85 41 42	DN 25	DN 25	

PRESSURE INSTRUMENT CONNECTIONS					
COMPONENT	NOS REQD	RUNPIPE CONN SIZE	DN 25	DN 40-600	
DBB Valve	1	77 85.46	DN 15	DN 15	
Reducing tee	1	76 31.88	049.1		
Flange WN	1	76 62.86	662.1	662.1	
Branch Nipple	1	76 80.31		116.1	
Bolting	8	81 38 67	330.1	330.1	
Gasket SpW	2	85 41 42	DN 15	DN 15	

TEMPERATURE INSTRUMENT CONNECTIONS					
COMPONENTS	NOS REQD	RUNPIPE LENGTH	80 - 100 230 mm	150 - 400 255 mm	
Cover flange	1	76 62.52	537.1	537.1	
Branch nipple	1	76 80.31	126.1	128.1	
Flange WN	1	76 62.86	668.1	668.1	
Well	4	76 83.37	501.1	502.1	
Bolting	1	81 38 67	471.1	471.1	
Gasket SpW	1	85 41.42	DN 40	DN 40	

BOLTING									
NOM PIPE SIZE	NUMBER OF BOLTS	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		ORIFICE FLANGES	
		81 36.66	DIA x L In x mm	81.38	DIA x L In x mm	81 38.66	DIA x L In x mm	81 38.66	DIA x L In x mm
15	4	330.1	3/4 x 110			333.1	3/4 x 125		
20	4	331.1	3/4 x 115			335.1	3/4 x 140		
25	4	402.1	7/8 x 125			405.1	7/8 x 145		
40	4	469.1	1 x 140			472.1	1 x 160		
50	8	405.1	7/8 x 145	66 417.1	7/8 x 220	409.1	7/8 x 170	407.1	7/8 x 160
80	8	405.1	7/8 x 145	66 418.1	7/8 x 230	410.1	7/8 x 180	407.1	7/8 x 160
100	8	532.1	1 1/8 x 170	66 548.1	1 1/8 x 275	537.1	1 1/8 205	533.1	1 1/8 x 180
150	12	536.1	1 1/8 x 195	66 562.1	1 1/8 x 360	542.1	1 1/8 x 235	537.1	1 1/8 x 205
200	12	643.1	1 3/8 x 220	66 673.1	1 3/8 x 435	651.1	1 3/8 x 275	645.1	1 3/8 x 235
250	16	645.1	1 3/8 x 235	66 675.1	1 3/8 x 485	655.1	1 3/8 x 300	647.1	1 3/8 x 250
300	20	648.1	1 3/8 x 255	66 512.1	1 3/8 x 555	657.1	1 3/8 x 330	650.1	1 3/8 x 265
350	20	692.1	1 1/2 x 275	86 778.1	1 1/2 x 635	703.1	1 1/2 x 345	694.1	1 1/2 x 285
400	20	723.1	1 5/8 x 285	87 038.1	1 5/8 x 685	738.1	1 5/8 x 370	725.1	1 5/8 x 300

BRANCH NIPPLES			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	PLAIN END	FLANGED
40-400	15	76.80.31	76.80.37
40-400	20	116.1	821.1
40-100	25	118.1	823.1
150-400	25	120.1	825.1
50-100	40	124.1	826.1
150-400	40	126.1	830.1
	40	128.1	831.1

RED. BRANCH FITTINGS			
NOM SIZE RUN PIPE	NOM BRANCH	76 79.05	76 79.06
100	50		182.1
150	50		184.1
200	50		186.1
250	50		188.1
300	50		190.1
350	50		192.1
400	50		194.1
100	80	386.1	
150	80	388.1	
200	80	390.1	
250	80	392.1	
300	80	394.1	
350	80	396.1	
400	80	398.1	
100	100	410.1	
150	100	412.1	
200	100	414.1	
300	100	416.1	
350	100	418.1	
400	100	420.1	

ORIFICE INSTRUMENT CONNECTIONS												
COMPONENTS	NOS REQD	UNPIPE SIZE	50 DN 15	80 DN 15	100 DN 15	150 DN 15	200 DN 15	250 DN 15	300 DN 15	350 DN 15	400 DN 15	
DBB Valve	2	77.85.46	DN 15	DN 15	DN 15	DN 15	662.1	662.1	662.1	662.1	662.1	
Flange WN	2	76.62.86	662.1	662.1	662.1	662.1	662.1	662.1	662.1	662.1	662.1	
Flange set	1	76.62.97	970.1	886.1	864.1	866.1	848.1	850.1	852.1	854.1	856.1	
Spacers	1	76.88.16	120.1	122.1	124.1	126.1	128.1	130.1	132.1	134.1	136.1	
Bolting	16	81.38.65	333.1	333.1	333.1	333.1	333.1	333.1	333.1	333.1	333.1	
Gasket SpW	4	85.41.42	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	
Gasket SpW	2	85.41.42	DN 50	DN 80	DN 100	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	

DISPLACER CHAMBER	STD LGTH L-MM DN100	LEVEL CONTR. CONNECTIONS		
		COMPONENTS	NOS REQD	
76.80.60.642.1	356	BALL VALVE	2	77.00.83.208.1
76.80.60.644.1	813	GATE VALVE	1	77.30.23.204.1
76.80.60.646.1	1219	BLIND FLANGE	2	76.62.12.662.1
76.80.60.648.1	1524	WN FLANGE	1	76.62.86.664.1
76.80.60.650.1	1829	GASKET SP W	1	85.41.42 DN 100
76.80.60.652.1	2134	GASKETSP W	4	85.41.42 DN 50
76.80.60.654.1	2438	GASKET SP W	3	85.41.42 DN 20
76.80.60.654.1	2743	BOLTING	8	81.38.67.532.1
76.80.60.656.1	3048	BOLTING	32	81.38.67.405.1
76.80.60.658.1		BOLTING	12	81.38.67.331.1

LEVEL GAUGE CONNECTIONS THROUGH VISION					
COMPONENTS	NOS REQD	LENGTH SIZE			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket SpW					

LEVEL GAUGE CONNECTIONS REFLEX					
COMPONENTS	NOS REQD	LENGTH SIZE			
Level gauge					
Valve, gate					
Flange blind					
Bolting					
Gasket SpW					

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	NOS REQD	LENGTH SIZE	355 DN 40	405 DN 40	455 DN 40
Cover flange	1	76.62.52	537.1	537.1	537.1
Well	1	76.83.37	503.1	506.1	557.1
Bolting	4	81.38.67	471.1	471.1	471.1
Gasket SpW	1	85.41.42	DN 40	DN 40	DN 40

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD	SIZE	DN 15
DBB Valve	1	77.84.46	
Blind Flange	1	76.62.12	662
Bolting	8	81.38.67	331.1
Gasket SpW	2	85.41.42	DN 15

TEMPERATURE DEG C	DESIGN LIMITS					
	-20	50	75	100	120	135
PRESSURE BAR GA DN 15 - 400	208	208	208	208	208	208

NOTES

DESIGN LIMITS ARE BASED ON B7M BOLTING LIMITS

COLD BENDING OF THE PIPE IS NOT ALLOWED.

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED.

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE.

DUAL PLATE CHECK VALVES IN NON - INSULATED PIPELINES ARE TO BE PROTECTED WITH FIRE SHIELDS.

ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE

MAXIMUM SERVICE TEMPERATURE OF SOFT SEATED BALL VALVES IS 120 DEG C.
VALVES SUPPLIED FOR HIGHER SERVICE TEMPERATURES, SHALL HAVE SEAT MATERIALS OF PROVEN TEMPERATURE / PRESSURE RATING, SUITABLE FOR THAT SERVICE.

ALL DN 25 FLANGED CONNECTIONS SHALL SUPPORTED WITH A STIFFENER FROM THE PARENT PIPE.

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400	C	C	C	C	R	R	R	B	B	B	B	B	A			
	350	C	C	C	C	R	R	R	B	B	B	B	A				
	300	C	C	C	C	R	R	R	B	B	B	A					
	250	C	C	C	C	R	R	B	B	B	A						
	200	C	C	C	C	R	R	B	B	A							
	150	C	C	C	C	R	B	B	A								
	100	C	C	C	C	B	B	A									
	80	C	C	C	C	B	A										
	50	C	C	C	C	A											
	40	C	C	C	A												
	25	B	B	A													
	20	B	A														
	15	A															

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- R Reducing branch fitting

TABLE OF SCHEDULES	
DN	SCHEDULE
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	160
100	160
150	160
200	160
250	160
300	160
350	160
400	160

FIRST ISSUE : APRIL 97		REV LETTER	00		
		DATE	15/04/97		
		SIGN	P. H.		
PLANT	PS - 1	CARBON STEEL (SOUR)		PIPING GENERAL	
CONSIGNEE	-	NACE		CLASS No. : 15144X	
ENG BY	MMCL	CON. JOB NO		ANSI RATING : 1500	
PRINCIPAL	OPCQL	PROJECT NO		CORR. ALL : 3 mm	

ISSUE DATE: APRIL 1997

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC buying description)

*PIPE

PIPE	SEAMLESS SRL SOUR SERVICE	DN	15 - 600	ASTM A106 - B
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*FLANGES

BLFL	BLIND FLANGE	DN	15 - 600	ASTM A105
COFL	COVER FLANGE THERMOWELL NOZZLE		-	ASTM A105
SBFL	SPECTACLE BLIND FLANGE	DN	15 - 600	ASTM A285 - C
SPRT	SPACER RING TYPE (ANS FLANGES)	DN	15 - 600	ASTM A285 - C
WNFL	WELDING NECK FLANGE	DN	15 - 600	ASTM A105

*FITTINGS

CAPB	CAP BUTT - WELD. END	DN	15 - 600	ASTM A234 - WPB
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 600	ASTM A234 - WPB

*REDUCING FITTINGS

BNIF	BRANCH FITTING, OUTL. FLANGED	DN	15 - 40	ASTM A105
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A105
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	80 - 600	ASTM A105
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	20 - 600	ASTM A234 - WPB

*MISCELLANEOUS

GKSW	GASKET, SPIRAL WOUND	DN	15 - 600	ASTM A240 316L / A285 Gr C, VIRGIN PTFE FILLED. CS CENTRING / SS INNER RING
STBT	STUD BOLTS / HEX NUTS		-	STUDS : ASTM A193.B7M NUTS : ASTM A194-2HM
MTRR	METER RUN	DN	15 - 40	FLANGES : ASTM B564- (ORIF) UNS N0400 L.J. FLANGES : ASTM A350-LF2 PIPE : MONEL 400 STUB ENDS : ASTM B366-CL.WPN
ORMS	ORIFICE METER RUN SET	DN	50 - 300	FLANGES : ASTM A105 PIPE : ASTM A106 -B
LDPC	LEVEL DISPACER CHAMBER	DN	100	ASTM A106-B (SEAMLESS)
TWTG	THERMOWELL, STRAIGHT	DN	40 - 40	ASTM B164 (MONEL)

*VALVES

BTFF	BALL VALVE, TRUNN, FULL BORE, FL.	DN	50 - 600	BODY : ASTM A216 + ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : NYLON PA12
BTRF	BALL VALVE, TRUN, RED.BORE, FL	DN	300 - 600	BODY : ASTM A216+ENP ASTM A105+ENP BALL : AISI 316, 316L STEM : BODY MAT.+ENP, 316 SEATS : NYLON PA12
CHVF	CHECK VALVE, FLANGED	DN	15 - 600	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
CVWL	DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 600	BODY : ASTM A216-WCB/WCC ASTM A105 PLATE : AISI 410 SEATS : PTFE OR FKM BODY : ASTM A350-LF2
DBBV	DOUBLE BLOCK & BLEED VALVE	DN	-	BALL / STEM : AISI 316 SEAT : PTFE OR NYLON
GAVF	GATE VALVE, FLANGED.	DN	15 - 40	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 316L
GLVF	GLOBE VALVE, FLANGED.	DN	15 - 200	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 316L
NEVF	NEEDLE TYPE GLOBE VALVE, FL.	DN	15 - 40	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 316L

SCHED	NOM. PIPE SIZE	PIPE			FLANGES			Spect.	Spacer	STRAINERS	
		74 30.03			Blind	WN	WN				
					76 62.10	76 62.79	76 62.80	76 88.36	76 88.46		
XXS	15	022.1			408.1		032.1	608.1	708.1		
XXS	20	032.1			412.1		034.1	612.1	712.1		
XXS	25	042.1			416.1		036.1	616.1	716.1		
XXS	40	062.1			418.1		038.1	618.1	718.1		
160	50	073.1			420.1	970.1		620.1	720.1		
160	80	113.1			422.1	972.1		622.1	722.1		
160	100	161.1			424.1	974.1		624.1	724.1		
160	150	227.1			426.1	976.1		626.1	726.1		
160	200	267.1			428.1	978.1		628.1	728.1		
160	250	309.1			430.1	980.1		630.1	730.1		
160	300	349.1			432.1	982.1		632.1	732.1		
160	350	399.1			434.1	984.1		634.1	734.1		
160	400	453.1			436.1	986.1		636.1	736.1		

SCHED	NOM. PIPE SIZE	FITTINGS						GASKETS	
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Equal Tee		SpW	
		76 30.17	76 30.34	76 30.42	76 30.42	76 30.81		85 41.42	
XXS	15				573.1	573.1		904.1	
XXS	20				579.1	579.1		906.1	
XXS	25				583.1	583.1		908.1	
XXS	40				593.1	593.1		912.1	
160	50	612.1	612.1	612.1	612.1	612.1		914.1	
160	80	632.1	632.1	632.1	632.1	632.1		918.1	
160	100	652.1	652.1	652.1	652.1	652.1		920.1	
160	150	672.1	672.1	672.1	672.1	672.1		924.1	
160	200	695.1	695.1	695.1	695.1	695.1		926.1	
160	250	715.1	715.1	715.1	715.1	715.1		928.1	
160	300	737.1	737.1	737.1	737.1	737.1		930.1	
160	350	757.1	757.1	757.1	757.1	757.1		932.1	
160	400	777.1	777.1	777.1	777.1	777.1		934.1	

NOM. PIPE SIZE	VALVES							
	Gate	Globe	Check hor. pist	Needle	Check dual pl.	Ball red bore	Ball Full bore	
	FLGD	FLGD	FLGD	FLGD	WAFER	FLGD	FLGD	
	77 20.90	77 30.90	77 10.23	77 30.21	77 67.06	77 00.73	77 00.73	
15	043.1	043.1	203.1	203.1				
20	044.1	044.1	204.1	204.1				
25	045.1	045.1	205.1	205.1				
40	047.1	047.1	207.1	207.1				
50	048.1	048.1			208.1	208.1	708.1	
80					210.1	210.1	710.1	
100					212.1	212.1	712.1	
150					214.1	214.1	714.1	
200					215.1	215.1	715.1	
250					216.1	216.1	716.1	
300					217.1	217.1	717.1	
350					218.1	218.1	718.1	
400					219.1	219.1	719.1	

REDUCING FITTINGS					
SCHED	NOM PIPE SIZE	Conc reducer 76 30.66	Ecc reducer 76 30.67	Tee 76 30.88	
XXS	20 x 15	142.1	142.1	040.1	
XXS	25 x 15	152.1	152.1	050.1	
XXS	25 x 20	162.1	162.1	060.1	
XXS	40 x 15	172.1	172.1	070.1	
XXS	40 x 20	182.1	182.1	080.1	
XXS	40 x 25	192.1	192.1	090.1	
XXS	50 x 25	202.1	202.1	108.1	
XXS	50 x 40	212.1	212.1	117.1	
XXS	80 x 40	232.1	232.1	126.1	
160	80 x 50	241.1	241.1	134.1	
160	100 x 50	271.1	271.1	155.1	
160	100 x 80	281.1	281.1	167.1	
160	150 x 80	301.1	301.1	179.1	
160	150 x 100	311.1	311.1	192.1	
160	200 x 100	331.1	331.1	208.1	
160	200 x 150	341.1	341.1	228.1	
160	250 x 100	349.1	349.1	256.1	
160	250 x 150	360.1	360.1	274.1	
160	250 x 200	370.1	370.1	296.1	
160	300 x 150	389.1	389.1	313.1	
160	300 x 200	400.1	400.1	333.1	
160	300 x 250	410.1	410.1	355.1	
160	350 x 150	419.1	419.1	376.1	
160	350 x 200	428.1	428.1	395.1	
160	350 x 250	441.1	441.1	420.1	
160	350 x 300	451.1	451.1	446.1	
160	400 x 150			466.1	
160	400 x 200	459.1	459.1	484.1	
160	400 x 250	468.1	468.1	510.1	
160	400 x 300	480.1	480.1	536.1	
160	400 x 350	491.1	491.1	561.1	

VENT POINTS						
COMPONENTS	NOS REQD	RUNPIPE VENT SIZE	DN 25	DN 40-100	DN 150-400	
Valve, globe	1	77.30.90	045.1	045.1	045.1	
Flange blind	1	76.62.10	416.1	416.1	416.1	
Flange WN	1	76.62.80	036.1	036.1	036.1	
Tee equal	1	76.30.81	583.1			
Tee reducing	1	76.80.88				
Branch Nipple	1	76.80.31		080.1	084.1	
Bolting	8	81.38.66	402.1	402.1	402.1	
Gasket SpW	2	85.41.42	908.1	908.1	908.1	

DRAIN POINTS						
COMPONENTS	NOS REQD	RUNPIPE VENT SIZE	DN 25	DN 40-100	DN 150-400	
Valve, gate	1	77.20.90	045.1	045.1	046.1	
Flange blind	1	76.62.10	416.1	416.1	416.1	
Flange WN	1	76.62.80	036.1	036.1	036.1	
Tee equal	1	76.30.81	583.1			
Tee reducing	1	76.30.88				
Branch Nipple	1	76.80.31		080.1	084.1	
Bolting	8	81.38.66	402.1	402.1	402.1	
Gasket SpW	2	85.41.42	908.1	908.1	908.1	

PRESSURE INSTRUMENT CONNECTIONS						
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 25	DN 40-100	DN 150-400	
DBB Valve	1	77.85.46	DN 25	DN 25	DN 25	
Flange blind	1	76.62.10	416.1	416.1	416.1	
Flange WN	1	76.62.80	036.1	036.1	036.1	
Tee equal	1	76.30.81	583.1			
Tee reducing	1	76.30.88				
Branch Nipple	1	76.80.31		080.1	084.1	
Bolting	8	81.38.66	402.1	402.1	402.1	
Gasket SpW	2	85.41.42	908.1	908.1	908.1	

TEMPERATURE INSTRUMENT CONNECTIONS				
COMPONENTS	NOS REQD	RUNPIPE CONN SIZE	DN 80-100	DN 150-400
Cover flange	1	76.62.60	537.1	537.1
Flange WN	1	76.62.80	038.1	038.1
Branch nipple	1	76.80.31	086.1	088.1
Well	1	76.83.37	121.1	122.1
Bolting	4	81.38.66	471.1	471.1
Gasket SpW	1	85.41.42	912.1	912.1

NOM PIPE SIZE	NUMBER OF BOLTS	FLANGED JOINTS		WAFER TYPE VALVES		SPECTACLES / SPACERS		ORIFICE FLANGES	
		81.38.66	DIA x L In x mm	81.38.	DIA x L In x mm	81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm
15	4	330.1	3/4 x 110			333.1	3/4 x 125		
20	4	331.1	3/4 x 115			335.1	3/4 x 140		
25	4	402.1	7/8 x 125			405.1	7/8 x 145		
40	4	469.1	1 x 140			472.1	1 x 160		
50	8	405.1	7/8 x 145	66.417.1	7/8 x 220	409.1	7/8 x 170	407.1	7/8 x 160
80	8	533.1	1 1/8 x 180	66.547.1	1 1/8 x 265	539.1	1 1/8 x 215	536.1	1 1/8 x 195
100	8	593.1	1 1/4 x 195	66.610.1	1 1/4 x 300	598.1	1 1/4 x 230	594.1	1 1/4 x 205
150	12	649.1	1 3/8 x 260	66.670.1	1 3/8 x 425	655.1	1 3/8 x 300	651.1	1 3/8 x 270
200	12	724.1	1 5/8 x 290	86.352.1	1 5/8 x 505	733.1	1 5/8 x 345	726.1	1 5/8 x 305
250	16	787.1	1 7/8 x 335	86.500.1	1 7/8 x 585	798.1	1 7/8 x 400	789.1	1 7/8 x 350
300	16	820.1	2 x 375	86.580.1	2 x 675	832.1	2 x 450	822.1	2 x 385
350	16	849.1	2 1/4 x 405	86.658.1	2 1/4 x 765	871.1	2 1/4 x 475	852.1	2 1/4 x 415
400	16	865.1	2 1/2 x 445	86.734.1	2 1/2 x 845	86.706.1	2 1/2 x 530	868.1	2 1/2 x 460

BRANCH NIPPLES			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	PLAIN END	FLGD END
		76.80.31	76.80.37
40 - 400	15	072.1	041.1
40 - 400	20	078.1	043.1
40-100	25	080.1	045.1
150- 400	25	084.1	046.1
50-100	40	086.1	050.1
150 - 400	40	088.1	051.1

RED BRANCH FITTINGS			
NOM. SIZE RUN PIPE	NOM SIZE BRANCH	76.79.03	
200	50	186.1	
250	50	188.1	
300	50	190.1	
350	50	192.1	
400	50	194.1	
150	50	184.1	
200	80	210.1	
250	80	212.1	
300	80	214.1	
350	80	216.1	
400	80	218.1	
300	100	236.1	
350	100	238.1	
400	100	240.1	

ORIFICE INSTRUMENT CONNECTIONS													
COMPONENTS	NOS REQD	RUNPIPE	50	80	100	150							
		SIZE	DN 15	DN 15	DN 15	DN 15							
DBB Valve	2	77.85.45	*004	*004	*004	*004							
Flange WN	2	76.62.80	032.1	032.1	032.1	032.1							
Flange set	1	76.62.95	140.1	144.1	146.1	148.1							
Spacer	1	76.88.46	720.1	722.1	724.1	726.1							
Bolting	16	81.38.66	330.1	330.1	330.1	330.1							
Bolting	16	81.38.66	330.1	330.1	330.1	330.1							
Bolting	8	81.38.66	407.1										
Bolting	8	81.38.66		536.1									
Bolting	8	81.38.66			594.1								
Bolting	12	81.38.66				651.1							
Gskt SpW	4	85.41.42	904.1	904.1	904.1	904.1							
Gskt SpW	2	85.41.42	914.1	918.1	920.1	924.1							

[illegible]

LEVEL GAUGE CONNECTIONS					
COMPONENT	NOS REQD	LENGTH	450	840	1230
		SIZE	DN 40	DN 40	DN 40
Level Gauge					
Valve Gate					
Flange Blind					
Bolting					
Gasket SpW					

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD	SIZE	DN 15
Double Block & Bleed Valve	1	77.85.45	*004
Bolting	4	81.38.66	330.1
Spiral Wound Gasket	1	85.41.42	904.1

TEMPERATURE DEG C	DESIGN LIMITS					
	-20	50	75	100	120	200
PRESSURE BAR GA DN 15 - 400	222	222	222	222	222	219

NOTES :

DESIGN LIMITS ARE ACC. FLANGE RATING ANSI B16.5 MAT.GRP. 1.1
AND TO ALLOWABLE INTERNAL PRESSURE ACC. ANSI B31.3.

COLD BENDING OF PIPE IS NOT ALLOWED.

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL
MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS
VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING
CLASS VALVE.

PRESSURE AND TEMPERATURE CONNECTIONS ARE RAISED FACE
FLANGES WITH SPIRAL WOUND GASKETS . TO EQUIVALENT 1500# RF
PIPING SPECIFICATION.

ALL METALLIC MATERIALS ARE TO BE SUPPLIED CERTIFIED
IN ACCORDANCE WITH NACE -MR-01-75 LATEST ISSUE

MAXIMUM SERVICE TEMPERATURE OF SOFT SEATED BALL
VALVES IS 120 DEG C.
VALVES SUPPLIED FOR HIGHER SERVICE TEMPERATURES , SHALL
HAVE SEAT MATERIALS OF PROVEN TEMPERATURE / PRESSURE
RATING, SUITABLE FOR THAT SERVICE.

ALL DN 25 FLANGED CONNECTIONS SHALL BE SUPPORTED WITH
A STIFFENER FROM THE PARENT PIPE.

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400	C	C	C	C	C	C	C	E	E	B	B	B	A			
	350	C	C	C	C	C	C	E	E	B	B	B	A				
	300	C	C	C	C	C	E	E	B	B	B	A					
	250	C	C	C	C	E	E	B	B	B	A						
	200	C	C	C	C	E	E	B	B	A							
	150	C	C	C	C	E	B	B	A								
	100	C	C	C	C	B	B	A									
	80	C	C	C	C	B	A										
	50	C	C	C	C	A											
	40	C	C	C	A												
	25	B	B	A													
	20	B	A														
	15	A															

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- E Branch Outlet, Butt-weld. End

TABLE OF SCHEDULES	
DN	SCHEDULE
15	XXS
20	XXS
25	XXS
40	XXS
50	160
80	160
100	160
150	160
200	160
250	160
300	160
350	160
400	160

FIRST ISSUE : APRIL 97		REV LETTER	00			
		DATE	09/04/97			
		SIGN	P. H.			
PLANT	PS - 1	CARBON STEEL (SOUR) RTJ			PIPING GENERAL	
CONSIGNEE	-	NACE			CLASS No. : 15151X	
ENG BY	MMCL	CON. JOB NO			ANSI RATING : 1500	
PRINCIPAL	OPCQL	PROJECT NO			CORR. ALL : 3 mm	

COMPONENT / MATERIAL DESCRIPTIONS

(For full material description see relevant MESC description)

*PIPE

PIPE	SEAMLESS SRL SOUR SERVICE	DN	15 - 400	ASTM A106-B
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*FLANGES

BLFL	BLIND FLANGE, RTJ FACE.	DN	15 - 400	ASTM A105
FLBT	BLIND FLANGE, TAPPED, RTJ.		-	ASTM A105
WNFL	WELDING NECK FLANGE, RTJ.	DN	15 - 400	ASTM A105

*FITTINGS

CAPB	CAP BUTT - WELD. END	DN	15 - 400	ASMT A234-WPB
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	15 - 400	ASMT A234-WPB
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	15 - 400	ASMT A234-WPB
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 400	ASMT A234-WPB

*REDUCING FITTINGS

BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A105
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	80 - 400	ASTM A105
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	20 - 400	ASMT A234-WPB
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	20 - 400	ASMT A234-WPB
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	20 - 400	ASMT A234-WPB

*MISCELLANEOUS

GKSW	GASKET, RING JOINT.	DN	15 - 400	OFT IRON : (OCTAGONAL RING)
STBT	STUD BOLTS / HEX NUTS		-	STUDS : ASTM A193-B7M NUTS : ASTM A194-2HM
TWTG	THERMOWELL, STRAIGHT	DN	40 - 40	ASTM B164 (MONEL)

*VALVES

BTFF	BALL VALVE, FULL BORE, FLGD RTJ.	DN	50 - 400	BODY : ASTM A216-WCB/WCC BALL : A182-F316L STEM : A182-F316L SEATS : NYLON PA12
BTRF	BALL VALVE, RED BORE, FLGD RTJ.	DN	50 - 400	BODY : ASTM A216-WCB/WCC BALL : A182-F316L STEM : A182-F316L SEATS : NYLON PA12
CHVF	CHECK VALVE, FLANGED, RTJ.	DN	15 - 400	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
CVWL	CHECK VALVE WAFER TYPE, RTJ.	DN	50 - 400	BODY : ASTM A216-WCB/WCC ASTM A105 PLATE : AISI 410 SEATS : PTFE OR FKM
GAVF	GATE VALVE, FLANGED, RTJ.	DN	15 - 400	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
GLVF	GLOBE VALVE, FLANGED	DN	15 - 100	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
NEVR	GLOBE VALVE, NEEDLE TYPE, FL, RTJ.	DN	15 - 40	BODY : ASTM A216-WCB/WCC ASTM A105 TRIM : AISI 410
DBBV	DOUBLE BLOCK & BLEED VALVE	DN	15	BODY : ASTM A350-LF2 BALL / STEM : AISI 316 SEAT : PTFE OR NYLON

SCHED	NOM PIPE SIZE	PIPE			FLANGES				STRAINERS	
		74 30.03			Blind	WN	Spect.	Spacer		
					76.62.11	76.62.80	76.88.36	76.88.46		
XXS	15	022.1			612.1	286.1				
XXS	20	032.1			614.1	288.1				
XXS	25	042.1			616.1	290.1				
XXS	40	062.1			618.1	292.1				
160	50	073.1			620.1	260.1				
160	80	113.1			622.1	262.1				
160	100	161.1			624.1	264.1				
160	150	227.1			626.1	266.1				
160	200	267.1			628.1	268.1				
160	250	309.1			630.1	270.1				
160	300	349.1			632.1	272.1				
160	350	399.1			634.1	274.1				
160	400	453.1			636.1	276.1				

SCHED	NOM. PIPE SIZE	FITTINGS						GASKETS	
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Tee		Ring joint	
		76.30.17	76.30.34		76.30.42	76.30.81		85.37.20	
XXS	15		573.1		573.1	573.1		012.1	
XXS	20		579.1		579.1	579.1		014.1	
XXS	25		583.1		583.1	583.1		016.1	
XXS	40		593.1		593.1	593.1		020.1	
160	50	612.1	612.1		612.1	612.1		024.1	
160	80	632.1	632.1		632.1	632.1		035.1	
160	100	652.1	652.1		652.1	652.1		039.1	
160	150	672.1	672.1		672.1	672.1		046.1	
160	200	695.1	695.1		695.1	695.1		050.1	
160	250	715.1	715.1		715.1	715.1		054.1	
160	300	737.1	737.1		737.1	737.1		058.1	
160	350	757.1	757.1		757.1	757.1		063.1	
160	400	777.1	777.1		777.1	777.1		067.1	

NOM. PIPE SIZE	VALVES						
	Ball Red Bore	Ball Full Bore	Globe RTJ	Globe needle	Gate RTJ	Check RTJ	Check RTJ
	FLGD	FLGD	FLGD	FLGD	FLGD	FLGD	WAFER
	77.00.73	77.00.73	77.30.23	77.30.23	77.20.23	77.10.23	77.67.06
15			403.1	503.1	403.1	403.1	
20			404.1	504.1	404.0	404.1	
25			405.1	505.1	405.1	405.1	
40			407.1	507.1	407.1	407.1	
50	408.1	908.1	408.1		408.1	408.1	408.1
80	410.1	910.1	410.1		410.1	410.1	410.1
100	412.1	912.1	412.1		412.1	412.1	412.1
150	414.1	914.1			414.1	414.1	414.1
200	415.1	915.1			415.1	415.1	415.1
250	416.1	916.1			416.1	416.1	416.1
300	417.1	917.1			417.1	417.1	417.1
350	418.1	918.1			418.1	418.1	418.1
400	419.1	919.1			419.1	419.1	419.1

REDUCING FITTINGS						
SCHED	NOM PIPE SIZE	Conc reducer 76.30.66	Ecc reducer 76.30.67	Tee reducer 76.30.88		
XXS	20 x 15	142.1	142.1	040.1		
XXS	25 x 15	152.1	152.1	050.1		
XXS	25 x 20	162.1	162.1	060.1		
XXS	40 x 15	172.1	172.1	070.1		
XXS	40 x 20	182.1	182.1	080.1		
XXS	40 x 25	192.1	192.1	090.1		
160 / XXS	50 x 20			103.1		
160 / XXS	50 x 25	203.1	203.1	112.1		
160 / XXS	50 x 40	213.1	213.1	121.1		
160 / XXS	80 x 40	233.1	233.1	130.1		
160	80 x 50	241.1	241.1	134.1		
160 / XXS	100 x 40			151.1		
160	100 x 50	271.1	271.1	155.1		
160	100 x 80	281.1	281.1	167.1		
160	150 x 50					
160	150 x 80	301.1	301.1	179.1		
160	150 x 100	311.1	311.1	192.1		
160	200 x 100	331.1	331.1	208.1		
160	200 x 150	341.1	341.1	228.1		
160	250 x 100	349.1	349.1	256.1		
160	250 x 150	360.1	360.1	274.1		
160	250 x 200	370.1	370.1	296.1		
160	300 x 150	389.1	389.1	313.1		
160	300 x 200	400.1	400.1	333.1		
160	300 x 250	410.1	410.1	355.1		
160	350 x 150	419.1	419.1	376.1		
160	350 x 200	428.1	428.1	395.1		
160	350 x 250	441.1	441.1	420.1		
160	350 x 300	451.1	451.1	446.1		
160	400 x 150			466.1		
160	400 x 200	459.1	459.1	484.1		
160	400 x 250	468.1	468.1	510.1		
160	400 x 300	480.1	480.1	536.1		
160	400 x 350	491.1	491.1	561.1		

VENT POINTS					
COMPONENTS	NOS REQD	RUNPIPE	DN 25	DN 40-400	
		VENT SIZE	DN 25	DN 25	
Valve, globe	1	77.30.23	405.1	405.1	
Flange blind	1	76.62.11	616.1	616.1	
Flange WN	1	76.62.80	290.1	290.1	
Tee equal	1	76.30.81	583.1		
Tee reducing	1	76.80.88			
Branch Nipple	1	76.80.31		078.1	
Bolting	8	81.38.66	402.1	402.1	
Gasket RTJ	2	85.37.20	016.1	016.1	

DRAIN POINTS					
COMPONENTS	NOS REQD	RUNPIPE	DN 25	DN 40-400	
		DRAIN SIZE	DN 25	DN 25	
Valve, gate	1	77.20.23	405.1	405.1	
Flange blind	1	76.62.10	616.1	616.1	
Flange WN	1	76.62.80	290.1	290.1	
Tee equal	1	76.30.81	583.1		
Tee reducing	1	76.80.88			
Branch Nipple	1	76.80.31		078.1	
Bolting	8	81.38.66	402.1	402.1	
Gasket RTJ	2	85.37.20	016.1	016.1	

RESSURE INSTRUMENT CONNECTIONS						
COMPONENTS	NOS REQD	RUNPIPE	DN 15	DN 20	DN 25	DN 40-400
		CONN SIZE	DN 15	DN 15	DN 15	DN 15
DBB Valve	1	77.85.45	*004	*004	*004	*004
Flange blind	1	76.62.10	408.1	408.1	408.1	408.1
Flange WN	1	76.62.80	032.1	032.1	032.1	032.1
Tee equal	1	76.30.81	573.1			
Tee reducing	1	76.80.88		40.1	50.1	
Branch Nipple	1	76.80.31	072.1			078.1
Bolting	8	81.38.66	330.1	330.1	330.1	330.1
Gasket SpW	2	85.41.42				

TEMPERATURE INSTRUMENT CONNECTIONS				
COMPONENTS	NOS REQD	RUNPIPE	DN 15-40	DN 50-600
		CONN SIZE	DN 40	DN 40
Cover flange	1	76.62.60	537.1	537.1
Flange WN	1	76.62.79	968.1	962.1
Branch nipple	1	76.80.31	026.1	026.1
Well	1	76.83.40	551.1	552.1
Bolting	4	81.38.66	471.1	471.1
Gasket SpW	1	85.41.45	412.1	412.1

NOM PIPE SIZE	NUMBER OF BOLTS	BOLTING					
		FLANGED JOINTS		WAFFER TYPE VALVES		SPECTACLES / SPACERS	
		81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm	81.38.66	DIA x L In x mm
15	4	330.1	3/4 x 110				
20	4	331.1	3/4 x 115				
25	4	402.1	7/8 x 125				
40	4	469.1	1 x 140				
50	8	405.1	7/8 x 145				
80	8	533.1	1 1/8 x 180				
100	8	594.1	1 1/4 x 200				
150	12	650.1	1 3/8 x 265				
200	12	725.1	1 5/8 x 300				
250	12	788.1	1 7/8 x 345				
300	16	823.1	2 x 390				
350	16	858.1	2 1/4 x 425				
400	16	871.1	2 1/2 x 470				

BRANCH NIPPLES				
NOM. SIZE	NOM. SIZE	PLAIN END	FLGD END	
RUN PIPE	BRANCH	BW	RF	
40 - 600	15	072.1	341.1	
40 - 600	20	078.1	343.1	
40-100	25	080.1	345.1	
150- 600	25	084.1	346.1	
50-100	40	086.1	350.1	
150 - 600	40	088.1	351.1	

BRANCH NIPPLES				
NOM. SIZE	NOM. SIZE	FLGD END		
RUN PIPE	BRANCH	RTJ		
40 - 600	15	*04.9		
40 - 600	20	*04.0		
40	25	*04.5		
50- 100	25	*04.6		
150-600	25	*04.4		
50	40	*05.0		
80-100	40	*05.1		
150 - 600	40	*04.3		

RED BRANCH FITTINGS			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	76.79.03	
200	50	103.1	
250	50	104.1	
300	50	105.1	
350	50	106.1	
400	50	107.1	
150	50	684.1	
200	80	116.1	
250	80	117.1	
300	80	118.1	
350	80	119.1	
400	80	120.1	
300	100	129.1	
350	100	130.1	
400	100	131.1	

ORIFICE INSTRUMENT CONNECTIONS													
COMPONENTS	NOS REQD	UNPIPE	50	80	100	150							
		SIZE	DN 15	DN 15	DN 15	DN 15							
DBB Valve	2	77.85.45	*004	*004	*004	*004							
Flange WN	2	76.62.80	032.1	032.1	032.1	032.1							
Flange set	1	76.62.95	140.1	144.1	146.1	148.1							
Spacer	1	76.88.46	720.1	722.1	724.1	726.1							
Bolting	16	81.38.66	330.1	330.1	330.1	330.1							
Bolting	16	81.38.66	330.1	330.1	330.1	330.1							
Bolting	8	81.38.66	407.1										
Bolting	8	81.38.66		536.1									
Bolting	8	81.38.66			594.1								
Bolting	12	81.38.66				651.1							
Gskt SpW	4	85.41.42	904.1	904.1	904.1	904.1							
Gskt SpW	2	85.41.42	914.1	918.1	920.1	924.1							

[illegible]

LEVEL GAUGE CONNECTIONS				
COMPONENTS	NOS REQD	LENGTH		
Level gauge				
Valve, gate				
Flange blind				
Bolting				
Gasket SpW				
Gasket SpW				

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT				
COMPONENTS	NOS REQD	LENGTH		
Cover flange				
Well				
Bolting				
Gasket SpW				

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD	SIZE	DN 15
Double Block & Bleed Valve	1	77 85 45	*004
Bolting	4	81 38.66	330.1
Spiral Wound Gasket	1	85 41 42	904.1

TEMPERATURE DEG C	DESIGN LIMITS					
	-100	38	50	75	100	138
PRESSURE BAR GA						
DN 15 - 100	248.2	248.2	240.6	224.9	210.9	196.8
DN 150 - 150	236.7	236.7	236.7	224.9	210.9	196.8

NOTES :

DESIGN LIMITS ARE BASED ON MAXIMUM ALLOWABLE STRESS OF B7M / L7M BOLTING MATERIAL AND TO ALLOWABLE INTERNAL PRESSURE ACC. ANSI B31.3.

IN SOME INSTANCES ALLOWABLE STRESSES AT DESIGN PRESSURE MAY REACH 90% OF YIELD STRENGTH AT TEMPERATURE.

FOR DESIGN TEMPERATURES ABOVE 50 deg.C. IN SALIFEROUS ATMOSPHERES, EXTERNAL PROTECTION IS REQUIRED TO PREVENT CHLORIDE CORROSION CRACKING.

WHEN CHLORIDES ARE PRESENT IN CONJUNCTION WITH FREE OXYGEN IN THE PROCESS FLUID, THIS CLASS IS LIMITED TO AN UPPER DESIGN TEMPERATURE OF 50 deg.C, TO PREVENT CHLORIDE STRESS CORROSION CRACKING.

COLD BENDING OF PIPE IS NOT ALLOWED.

THE USE OF RED. BORE BALL VALVES IS PREFERRED, USE FULL BORE BALL VALVES ONLY WHEN NECESSARY FOR PROCESS / OPERATING REQUIREMENTS.

THE USE OF DUAL PLATE CHECK VALVES IS PREFERRED, ONLY USE SWING TYPE CHECK VALVES WHEN REQUIRED.

PISTON TYPE CHECK VALVES (DN 15 - 40), FOR HORIZONTAL MOUNTING ONLY.

CONNECTIONS FOR HYDROTEST ONLY, THAT ARE NOT ALSO PROCESS VENT AND DRAIN POINTS, SHALL NOT BE FITTED WITH A PIPING CLASS VALVE.

		BRANCH CONNECTIONS 90 DEG															
		NOMINAL BRANCH SIZE															
NOMINAL RUN PIPE SIZE	DN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
	600																
	500																
	450																
	400																
	350																
	300																
	250																
	200																
	150	C	C	C	C	R	B	B	A								
	100	C	C	C	C	B	B	A									
	80	C	C	C	C	B	A										
	50	C	C	C	C	A											
	40	C	C	C	A												
	25	B	B	A													
	20	B	A														
	15	A															

EXPLANATION OF CHARACTERS

- A Equal tee
- B Reducing tee
- C Branch nipple
- R Reducing branch fitting

TABLE OF SCHEDULES	
DIN	SCHEDULE
15	80S
20	80S
25	80S
40	160
50	160
80	160
100	160
150	160

FIRST ISSUE : JAN 1997	REV LETTER	01				
	DATE	Jul-97				
	SIGN	JFS				
PLANT PS - 1	STAINLESS STEEL (16Cr - 12Ni - 2Mo)					PIPING GENERAL
CONSIGNEE	CLASS 1500-Low temp serv. Sour					CLASS: 15346x
ENG BY MEEL	CONTRACT JOB NO					ANSI RATING: 1500
PRINCIPAL OPCQL	PROJECT NO					CORR ALL: 0mm

COMPONENT / MATERIAL DESCRIPTION***PIPE**

PIPE	PIPE	DN	15 - 150	ASTM A312-TP316L (SEAML./ WELD.)
PNPP	PIPE NIPPLE 50mm		-	ASTM A312-TP316L (SEAMLESS)

***FLANGES**

BLFL	BLIND FLANGE	DN	15 - 150	ASTM A182-F316
COFL	COVER FLANGE THERMOWELL NOZZLE		-	ASTM A182-F316
FLBT	BLIND FLANGE, TAPPED		-	ASTM A182-F316
SBFL	SPECTACLE BLIND FLANGE	DN	15 - 150	ASTM A240-TP316
SPRT	SPACER RING TYPE (ANSI FLANGES)	DN	15 - 150	ASTM A240-TP316
WNFL	WELDING NECK FLANGE	DN	15 - 150	ASTM A182-F316

***FITTINGS**

CAPB	CAP BUTT - WELD. END	DN	15 - 150	A403-WP316L
E45B	ELBOW 45, BUTT - WELD. ENDS	DN	15 - 150	A403-WP316L
E90B	ELBOW 90, BUTT - WELD. ENDS	DN	15 - 150	A403-WP316L
TEEB	EQUAL TEE, BUTT - WELD. ENDS	DN	15 - 150	A403-WP316L

***REDUCING FITTINGS**

BNIF	BRANCH FITTING, OUTL. FLANGED	DN	15 - 40	ASTM A182-F316
BNIP	BRANCH FITTING, OUTL. PLAIN ENDS	DN	15 - 40	ASTM A182-F316
BROB	BRANCH OUTLET, BUTT - WELD. ENDS	DN	80 - 150	ASTM A182-F316
RECB	REDUCER CONC. BUTT - WELD. ENDS	DN	20 - 150	A403-WP316L
REEB	REDUCER ECC. BUTT - WELD. ENDS	DN	20 - 150	A403-WP316L
TERB	TEE REDUCING, BUTT - WELD. ENDS	DN	20 - 150	A403-WP316L

***VALVES**

BTFF	BALL VALVE, TRUNN, FULL BORE, FL.	DN	50 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 BALL / STEM : AISI 316, 316L SEATS : PCTFE
BTRF	BALL VALVE, TRUN, RED.BORE, FL	DN	50 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 BALL / STEM : AISI 316, 316L SEATS : PCTFE
CHVF	CHECK VALVE, FLANGED	DN	15 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
CVWL	DUAL PL. CHECK VALVE WAFER LUG	DN	50 - 150	BODY : ASTM A351-CF8M ASTM A182-F316 PLATE : AISI 316, 316L SEATS : METAL TO METAL
GAVF	GATE VALVE, FLANGED	DN	15 - 40	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
GLVF	GLOBE VALVE, FLANGED	DN	15 - 100	BODY : ASTM A351-CF8M ASTM A182-F316 TRIM : AISI 316, 316L
*MISCELLANEOUS				
GKSW	GASKET, SPIRAL WOUND	DN	15 - 150	AISI 316L, NON-ASBESTOS FILLED, CS CENTRING AND S.STL. INNER- RING
LDPC	LEVEL DISPACER CHAMBER	DN	00 - 100	ASTM A312-TP316
MTRR	METER RUN	DN	15 - 40	FLANGES : ASTM B564- (ORIF) UNS N0400 L.J. FLANGES : ASTM A182-F316 PIPE : MONEL 400 STUB ENDS : ASTM B366-CL.WPN
ORFS	ORIFICE FLANGE SET	DN	200	ASTM A182-F316
ORMS	ORIFICE METER RUN SET	DN	50 - 150	FLANGES : ASTM A182-F316 PIPE : ASTM A312-TP316
STBT	STUD BOLTS / HEX NUTS		-	STUDS : ASTM A320-L7M NUTS : ASTM A194-7M
TWTG	THERMOWELL, TAPERED	DN	40 - 40	ASTM B164 (MONEL)

SCHED	NOM PIPE SIZE	PIPE			FLANGES			STRAINERS		
		74.36.33			Blind	WN	Spect.			
					76.65.10	76.65.80	76.88.10			
80S	15	020.1			500.1	602.1				
80S	20	028.1			501.1	604.1	512.1			
80S	25	036.1			502.1	606.1				
160	40	054.1			503.1	611.1	518.1			
160	50	063.1			504.1	610.1				
160	80	071.1			505.1	612.1	522.1			
160	100	079.1			506.1	614.1	524.1			
160	150	088.1			507.1	616.1	526.1			

SCHED	NOM. PIPE SIZE	FITTINGS						GASKETS		SPACERS
		Cap	Elbow 45	Elbow 90 SR	Elbow 90 LR	Tee		Sp.W.		Ring Type
		76.33.19	76.33.37		76.33.41	76.33.84		85.41.42		76.88.19
80S	15	288.1	288.1		288.1	788.1				612.1
80S	20	298.1	298.1		298.1	798.1				616.1
80S	25	308.1	308.1		308.1	808.1				618.1
160	40	330.1	330.1		330.1	830.1				620.1
160	50	340.1	340.1		340.1	840.1				622.1
160	80	360.1	360.1		360.1	860.1				624.1
160	100	380.1	380.1		380.1	880.1				626.1
160	150	399.1	399.1		399.1	899.1				

NOM PIPE SIZE	VALVES					
	Ball, trunn	Ball, trunn	Gate	Globe	Check	Check dual pl
	Full bore	Red bore				
	FLGD	FLGD	FLGD	FLGD	FLGD	WAFER
	77.03.73	77.03.73	77.23.09	77.33.09	77.13.09	77.68.63
15			203.1	203.1	203.1	
20			204.1	204.1	204.1	
25			205.1	205.1	205.1	
40			207.1	207.1	207.1	
50	708.1	208.1		208.1	208.1	708.1
80	710.1	210.1		210.1	210.1	710.1
100	712.1	212.1		212.1	212.1	712.1
150	714.1	214.1			214.1	714.1

REDUCING FITTINGS						
SCHED	NOM PIPE SIZE	Conc reducer	Ecc reducer	Tee	Bra. outlet butt - weld	
		76.33.70	76.33.72	76.33	76.79.71	
80S	20 x 15	568.1	568.1	85.620.1		
80S	25 x 15	578.1	578.1	85.630.1		
80S	25 x 20	588.1	588.1	85.640.1		
80S	40 x 15			85.645.1		
80S	40 x 20	623.1	623.1	85.653.1		
80S	40 x 25	633.1	633.1	85.661.1		
160	50 x 20			85.669.1		
160	50 x 25	639.1	639.1	85.679.1		
160	50 x 40	650.1	650.1	85.688.1		
160	80 x 40	680.1	680.1	85.698.1		
160	80 x 50	690.1	690.1	89.358.1	180.1	
160	100 x 40			89.366.1		
160	100 x 50	710.1	710.1	89.374.1	182.1	
160	100 x 80	720.1	720.1	89.382.1	206.1	
160	150 x 50				184.1	
160	150 x 80	750.1	750.1	89.390.1	208.1	
160	150 x 100	760.1	760.1	89.398.1	230.1	
		BNIF	BNIP			
BRANCH	RUN PIPE	76.80.39	76.80.31			
15	40 - 150	141.1	632.1			
20	40 - 80	143.1	636.1			
	100 - 150	144.1	638.1			
25	40	145.1	639.1			
	50	146.1	640.1			
	80 - 100	147.1	641.1			
	150	148.1	642.1			
40	50 - 100	170.1	658.1			
	150	171.1	660.1			

BRANCH NIPPLES			
NOM. SIZE RUN PIPE	NOM. SIZE BRANCH	PLAIN END	
		76.80.31	
40 - 150	15	632.1	
40 - 80	20	636.1	
100 - 900	20	638.1	
40	25	639.1	
50	25	640.1	
80 - 100	25	641.1	
150 - 900	25	642.1	
50	40	644.1	
80	40	645.1	
100	40	646.1	
150 - 300	40	647.1	

VENT POINTS							
COMPONENTS	NOS REQD	RUNPIPE FIG NO	15	20	25	40 - 50	80 - 150
Valve globe	1	77.33.09	203.1	203.1	203.1	204.1	204.1
Tee	1						
Tee	1						501.1
Flange blind	1	76.65.10	500.1	500.1	500.1	501.1	
Flange WN	1	76.65.80	602.1	602.1	602.1	604.1	
Branch Nipple	1	76.33.57	936.1	936.1	936.1	946.1	piping comp.
Bolting	8	81.38.67	330.1	330.1	330.1	331.1	331.1
Gasket SpW	2	85.41.42					

		DRAIN POINTS					
COMPONENTS	NOS REQD	RUNPIPE	15	20	25	40 - 50	80 - 150
		FIG NO	1	1	1	2	
Valve, gate	1	77 23.09	203.1	203.1	203.1	204.1	
Tee	1						
Tee	1						
Flange blind	1	76 65.10	500.1	500.1	500.1	501.1	501.1
Flange WN	1	76 65.80	602.1	602.1	602.1	604.1	
Branch Nipple	1	76 33.57	936.1	936.1	936.1	946.1	pipng comp.
Bolting	8	81.38 67	330.1	330.1	330.1	331.1	331.1
Gasket SpW	2	85.41.42					

PRESSURE INSTRUMENT CONNECTIONS							
COMPONENTS	NOS REQD	RUNPIPE FIG NO	15 1	20 1	25 1	40 1	50 - 150 203.1
Valve, gate	1	77.23.09	203.1	203.1	203.1	203.1	203.1
Tee	1						
Tee	1						
Flange lap	1	76.85.20	808.1	808.1	808.1	808.1	808.1
Flange WN	1	76.65.80	602.1	602.1	602.1	602.1	
Branch Nipple	1	76.33.57	936.1	936.1	936.1	936.1	936.1
Bolting	8	81.38.67	330.1	330.1	330.1	330.1	330.1
Gasket SpW	2	85.41.42					

TEMPERATURE INSTRUMENT CONNECTIONS					
COMPONENTS	NOS REQD	RUNPIPE	80	100	150
		FIG NO	31	31	31
Cover flange	1	76.65.60	787.1	787.1	787.1
Branch nipple	1	pipng comp.			
Well	1	76.83.37	501.1	501.1	502.1
Bolting	4	81.38.67	472.1	472.1	472.1
Gasket SpW	1	85.41.42			

DISPLACER CHAMBER		THERMOWELL	
LEVEL			
LENGTH	FIG NO	LENGTH	FIG NO
356	76 80 61.522 1	230	76.83.37.501 1
813	76 80 61.524 1	255	76.83.37.502 1
1219	76 80 61.526 1	305	76.83.37.503 1
1524	76 80 61.528 1	355	76.83.37.504 1
1829	76 80 61.530 1	405	76.83.37.505 1
2134	76 80 61.532 1	455	76.83.37.506 1
2438	76 80 61.534 1		
2743	76 80 61.536 1		
3048	76 80 61.538 1		

[illegible]

ORIFICE INSTRUMENT CONNECTIONS														
COMPONENTS	NOS REQD	RUNPIPE FIG NO	50 45	80 45	100 45	150 45	200 45	250 45	300 45	350 45	400 45	450 45	500 45	600 45
Valve, gate	2	77.23.09	203.1	203.1	203.1	203.1								
Flange lap	2	76.65.20	808.1	808.1	808.1	808.1								
Flange WN	2	76.65.80	602.1	602.1	602.1	602.1								
Flange set														
Spacer	1	76.88.16	162.1	162.1	162.1	162.1								
Bolting	16	81.38.67	330.1	330.1	330.1	330.1								
Gasket CAF														
Gasket SpW	2	85.41.42												

COMPONENTS	NOS REQD	RUNPIPE												
		FIG NO												

CONTROL VALVE CONNECTIONS - FLANGED													
COMPONENTS	NOS REQD	RUNPIPE											
		FIG NO											

CONTROL VALVE CONNECTIONS - FLANGELESS													
COMPONENTS	NOS REQD	RUNPIPE											
		FIG NO											

DISPLACER CHAMBER S38.044				STD	PIPE	LEVEL CONTR. CONNECTIONS			
COMPONENTS	NOS REQD	ITEM NO	FIG NO 51	LGTH L-MM DN100	LGTH MM DN100	COMPONENTS	NOS REQD	ITEM NO	FIG NO 52
Pipe	1	01	74.13.12.069.1	356	610	Valve, gate	1	01	77.23.09.204.1
Pipe	1	02	74.13.12.149.1	559	815	Valve ball, trunn, R	2	02	77.03.73.208.1
Cap	1	03	76.30.18.645.1	813	1070	Flange blind	2	03	76.62.10.501.1
Flange WN	1	04	76.62.78.564.1	1219	1475	Bolting	12	05	81.38.67.331.1
Flange WN	2	05	76.62.79.310.1	1524	1780	Bolting	32	06	81.38.67.405.1
Flange WN	1	06	76.62.79.354.1	1829	2085	Bolting	8	07	81.38.67.593.1
Branch nipple	2	07	78.80.31.018.1	2134	2390	Gasket SpW	3	08	85.41.42
				2438	2695	Gasket SpW	4	09	85.41.42
				2743	3000	Gasket SpW	1	10	85.41.42
				3048	3305				

LEVEL GAUGE CONNECTIONS					
COMPONENTS	NOS REQD	LENGTH	450	840	1230
		FIG NO	50	50	50
Level gauge	1	75.16.50	114.1	118.1	122.1
Valve, gate	1	77.23.09	204.1	204.1	204.1
Flange blind	2	76.65.10	501.1	501.1	501.1
Bolting	26	81.38.67			
Gasket SpW	3	85.41.42			
Gasket SpW	1	85.41.42			

TEMPERATURE INST. CONNECTIONS ON EQUIPMENT					
COMPONENTS	NOS REQD	LENGTH	355	405	455
		FIG NO	37	37	37
Cover flange	1	76.62.60	787.1	787.1	787.1
Well					
Bolting	4	81.38.67	472.1	472.1	472.1
Gasket SpW	1	85.41.42			

PRESSURE INST. CONNECTIONS ON EQUIPMENT			
COMPONENTS	NOS REQD	FIG NO	38
Valve, gate	1	77.23.09.203.1	
Flange lap	1	76.65.12.262.9	
Bolting	8	81.38.67.330.1	
Gasket SpW	2	85.41.42	



9.2

REV A SPECIFICATIONS

1141
1142
1144
1147
1150
1341
1541
1841
1842
3141
3144
3150
6141
6144
9141
9144
9147
15141
15144
15150
15151



9.3

BASE SPECIFICATIONS

1101
1102
1108
1117
1121
1501
1609X
1701
1803
1806
1807
1808
3101
3107
3609X
6101
6117
9101
9117X
9177 Not Included
15101
15117X
15177 Not Included



APPENDIX 1.0

ORIGINAL STATION SPECIFICATIONS McDERMOTT INTERNATIONAL LIMITED

CLASS A	150#	RATED OIL AND GAS
CLASS B	300#	RATED OIL AND GAS
CLASS H	1500#	RATES OIL AND GAS