

DRAFTING PRACTICES STANDARD

Prepared by
Pipe Fabrication Institute Engineering Committee



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DRAFTING PRACTICES STANDARD

1.0 Scope

- 1.1 This standard describes the basic recommended drafting practices for the pipe fabrication shop.

2.0 Context

- 2.1 The bulk of shop work is made up of prefabricated spools, which are pre-arranged piping components joined between designated field connections. Before fabrication can commence in the workshop the spool has to be detailed on paper. The prime purpose of shop engineering is to transfer configurations and data from customer drawings and specifications in such a way that all possible chance of misunderstanding by shop personnel will be eliminated by the time spool drawings are released for fabrication. It is recommended that the draftsman use his own judgment and experience on whether to rotate the configuration so that clearer definition may be provided to shop personnel.

3.0 Standards

- 3.1 Spool Drawings -- The spool drawings should be detailed on an easy to handle form or paper size. (i.e.; 8½" x 11", 8½"x 14" or 11" 17"). The configurations are drawn in arrangement drawing (single or double line) or in single line/non-scale or isometric projection. Reasonably proportionate dimensioning between components should be used. Table 1 illustrates:

- Figure 1: Arrangement drawing (double line)
- Figure 2: Arrangement drawing (single line)
- Figure 3: Non-scale isometric drawing
- Figure 4: Conventional practice to show non-flanged joints

- 3.2 Spool drawing layout: The spool drawing layout must contain as a minimum, the following information:

- Customer name & Purchase order number
- Project name & Reference number
- Reference customer drawing number
- Assembly mark number
- Quantity required
- Shop job number
- Date & Revision
- Name or initials of draftsman & checker

- 3.3 Miscellaneous notes and spacing :

- Space for material description by quantity, size, item number, schedule & material specification
- Space for labor operations
- Space for code, customer specification, welding procedure, NDE, hydrostatic test, etc.
- Space for surface preparation (inside & outside), color code
- Space for total weight and shipping preparation

- 3.4 Material sequence -- Consistent listing of materials assists the material control department in readily recognizing shortages. The following is a suggested sequence of listing materials :

- Pipe
- Fittings (elbows, tees, reducers, caps, etc.)
- Flanges (weld neck, slip-on, blind, reducing flanges, etc.)
- O'lets & Couplings
- Miscellaneous items
- End protectors

- 3.5 Material Description

- Pipe - 1/8" through 24" inclusive, will be described by Standard Weight (Std. Wt.) Extra Strong (XS) or Double Extra Strong (XXS) where the wall thickness is identical to a schedule number. Schedule numbers will be used to identify all other published material sizes. Special sizes will be specified by O.D. (or I.D.) and nominal (or minimum) wall thickness. (i.e.: 20" O.D. X .750" wall).
- Welding fittings - 1/8" through 24" inclusive, will be described as Standard Weight (Std. Wt.), Extra Strong (XS) or Double Extra Strong (XXS) where the wall thickness is identical to a schedule number. Schedule numbers will be used to identify all other published material sizes. Special size will be specified by O.D. (or I.D.) and nominal (or minimum) wall thickness (i.e.: 20" O.D. X .750" wall)

- Reducing fittings - when different schedules or end preparations are required, both must be listed in the description (i.e.: Std / XS "BE x PE") - with the large size first.
- Flanges will be described by class and type. Socket weld and weldneck flange bores shall be specified as Std., XS., or XXS except in cases where schedule or exact bore is required (i.e.: sch. 120 or 8.265" bore).
- Threaded and/or Socket weld, forged steel fittings will be specified by pound rating and/or schedule number (i.e. 3000# TOL, 3000# Thrd. Cplg., or 3000 SOL).

4.0 Abbreviations

- 4.1 Table 2 lists abbreviation examples used by shop engineering and pipe shop personnel.

5.0 Symbols

- 5.1 Table 3 and Table 4 illustrate miscellaneous drafting symbols.

6.0 Spooling Practices

- 6.1 The following tables illustrate miscellaneous spooling practices:
- Table 5 Dimensioning
 - Table 6 Bubbles & Orientational Leaders
 - Table 7 Vertical Offset
 - Table 8 Horizontal Offset
 - Table 9 Bend Spool

Table 1: Arrangement Drawings

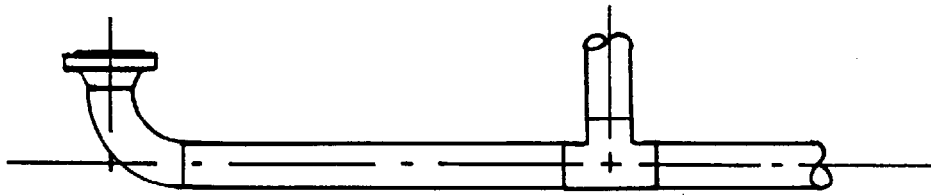


Figure 1 "Double Line"



Figure 2 "Single Line"

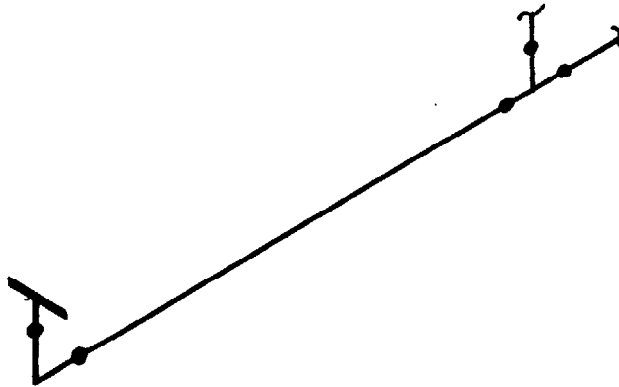
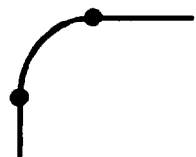
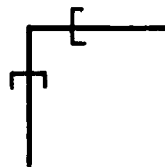


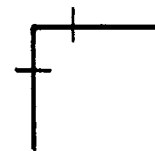
Figure 3 "Non-Scale Isometric"



butt weld



socket weld



threaded joint

Figure 4 "Non-Flanged Joints"

Table 2: Abbreviations

Beveled End	BE	Long Radius Elbow	LR ELL
Beveled Both Ends	BBE	Male National Pipe Thread	MNPT
Beveled Large End	BLE	National Pipe Thread	NPT
Beveled Small End	BSE	Nominal	NOM
Bolt Circle Diameter	BCD	Non Destructive Examination	NDE
Bottom of Pipe	BOP	Not to Scale	NTS
Bottom of Plate	BOPL	Orifice	ORIF
Buttweld	BW	Outside Diameter	OD
Carbon Steel	CS	Plain End	PE
Centerline	CL	Plain Both Ends	PBE
Concentric	CONC	Plain Large End	PLE
Chrome Molybdenum	Cr Mo	Plain Small End	PSE
Coupling	CPLG	Plate	PL
Diameter	DIA	Post weld Heat Treat	PWHT
Double Extra Strong	XXS	Protector	PROT
Double Submerged Arc Welded	DSAW	Quality Control	QC
Dummy Weld	DW	Raised Face	RF
Eccentric	ECC	Radius	RAD
Elbolet	EOL	Reducer or Reducing	RED
Elbow	ELL	Reducing Insert	RED INS
Electric Resistance Welded	ERW	Reducing Tee	RED TEE
Electric Fusion Welded	EFW	Ring Type Joint	RTJ
End Protector	END PROT	Schedule	SCH
Extra Strong	XS	Seamless	SMLS
Female National Pipe Thread	FNPT	Semi-Elliptical Head	SE HEAD
Field Fit Allowance	FFA	Shop Sheet	S/S
Field Weld	FW	Short Radius Elbow	SR ELL
Fitting to Fitting	FTF	Slip-On	SO
Flange	FLG	Socket Weld	SW
Flange Protector	FLG PROT	Sockolet	SOL
Flanged & Dished	F & D	Stainless Steel	STN STL
Flat Face	FF	Standard	STD
Flat on Bottom	FOB	Steel	STL
Flat on Top	FOT	Straight Tee	TEE
Forged Steel	FS	Stress Relieve	SR
GammaRay Opening	GRO	Swage	SWG
Grit Blast	GB	Tangent Point	TP
Grit Blast & Prime	GB & P	Taper Bore	TB
Grooved End	GE	Thread	THRD
Grooved Both Ends	GBE	Thread Both Ends	TBE
Grooved Large End	GLE	Thread Large End	TLE
Grooved Small End	GSE	Thread One End	TOE
Header	HDR	Thread Small End	TSE
Horizontal	HOR	Threadolet	TOL
Inside Diameter	ID	Typical	TYP
Jack Screw	JS	Vertical	VERT
Lap Joint Flange	LJ FLG	Weld Cap	W C
Latrolet	LOL	Weld Neck	WN

Table 3: Flanges and Welding Fittings

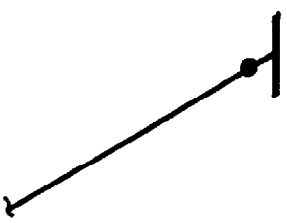
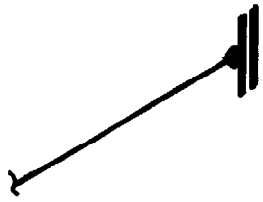
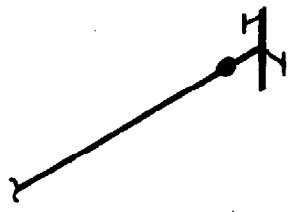
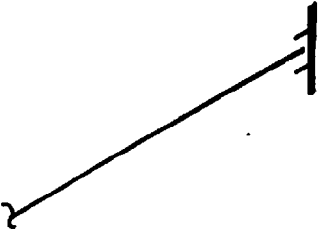
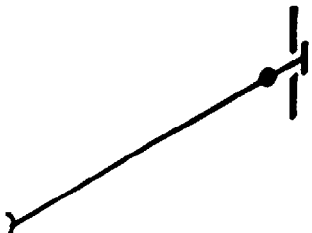
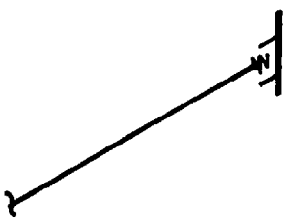
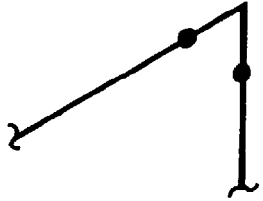
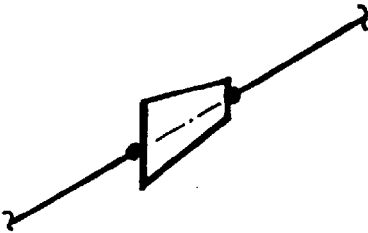
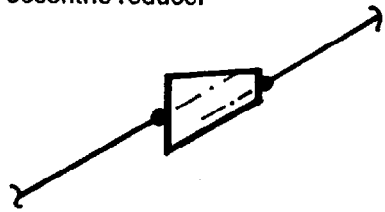
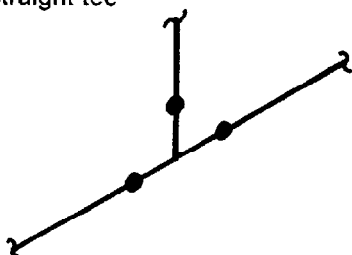
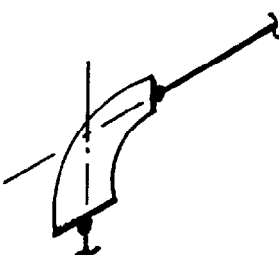
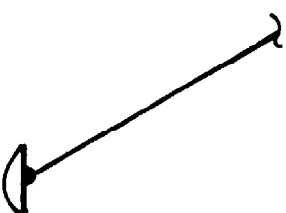
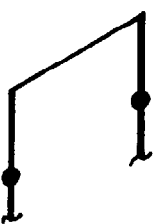
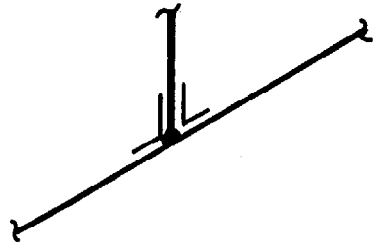
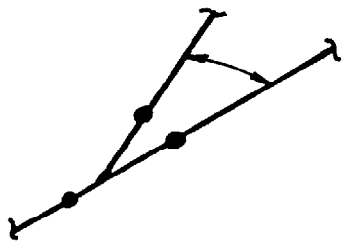
weldneck flange 	slip-on, reducing slip-on & blind flange 	weldneck orifice flange 
socketweld flange 	lapjoint flange with stubend 	screwed flange 
90° weldell 	concentric reducer 	eccentric reducer 
straight tee 	90° reducing weldell 	weldcap 
180° return 	weld saddle 	lateral 

Table 4: Pipe End Preparations, Branch Connections, O'lets and Swages

pipe - plain / beveled end	pipe - threaded / plain with trim allowance	miter cut - plain end
miter cut - beveled end	90° nozzle weld	90° reinforced nozzle weld
90° dummy nozzle weld	dummy nozzle weld on elbow	thredoilet, sockolet, weldolet, sweepolet
coupling	elboilet	latrolet
nipolet	concentric swage	eccentric swage

Table 5: Dimensioning

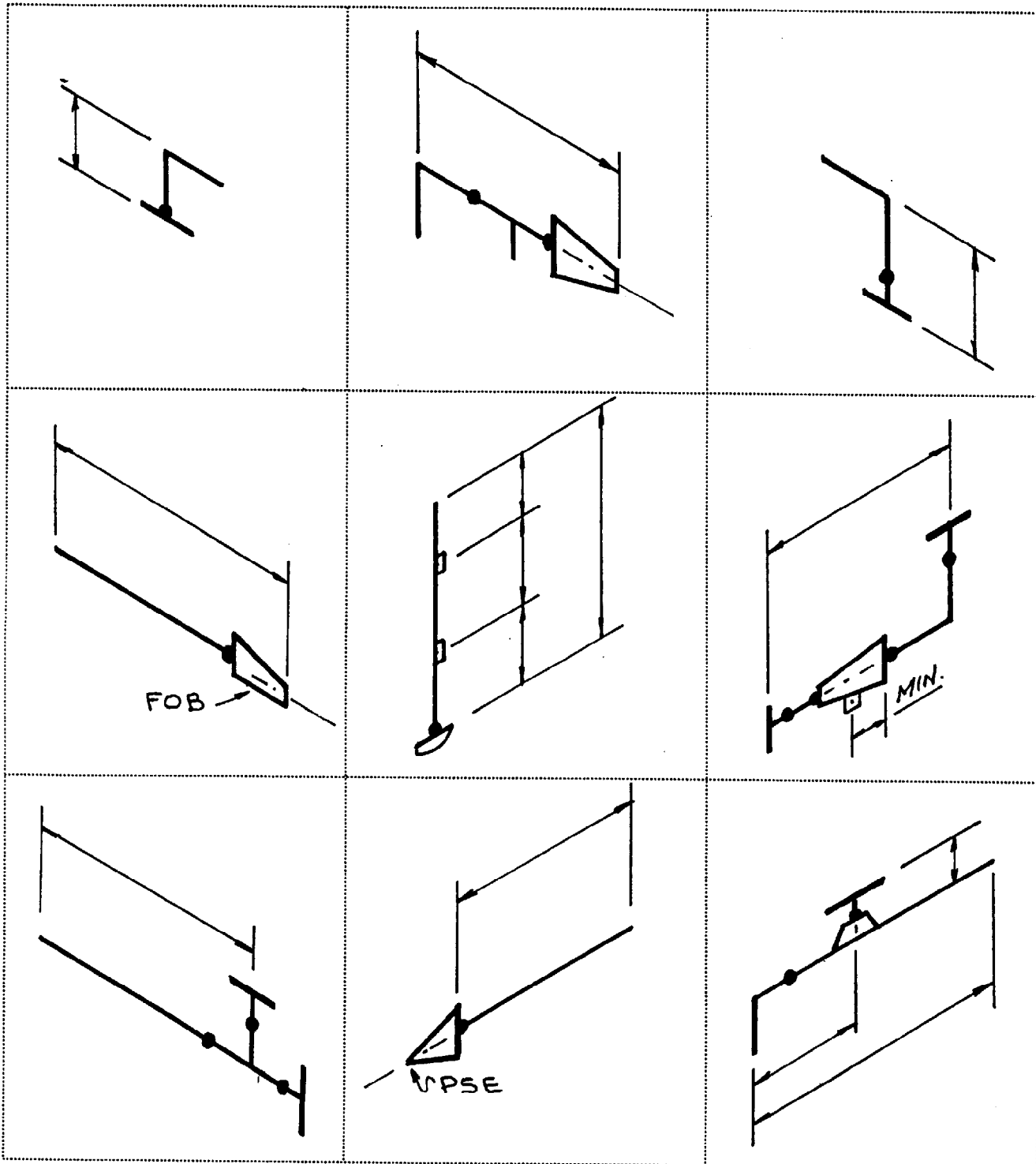
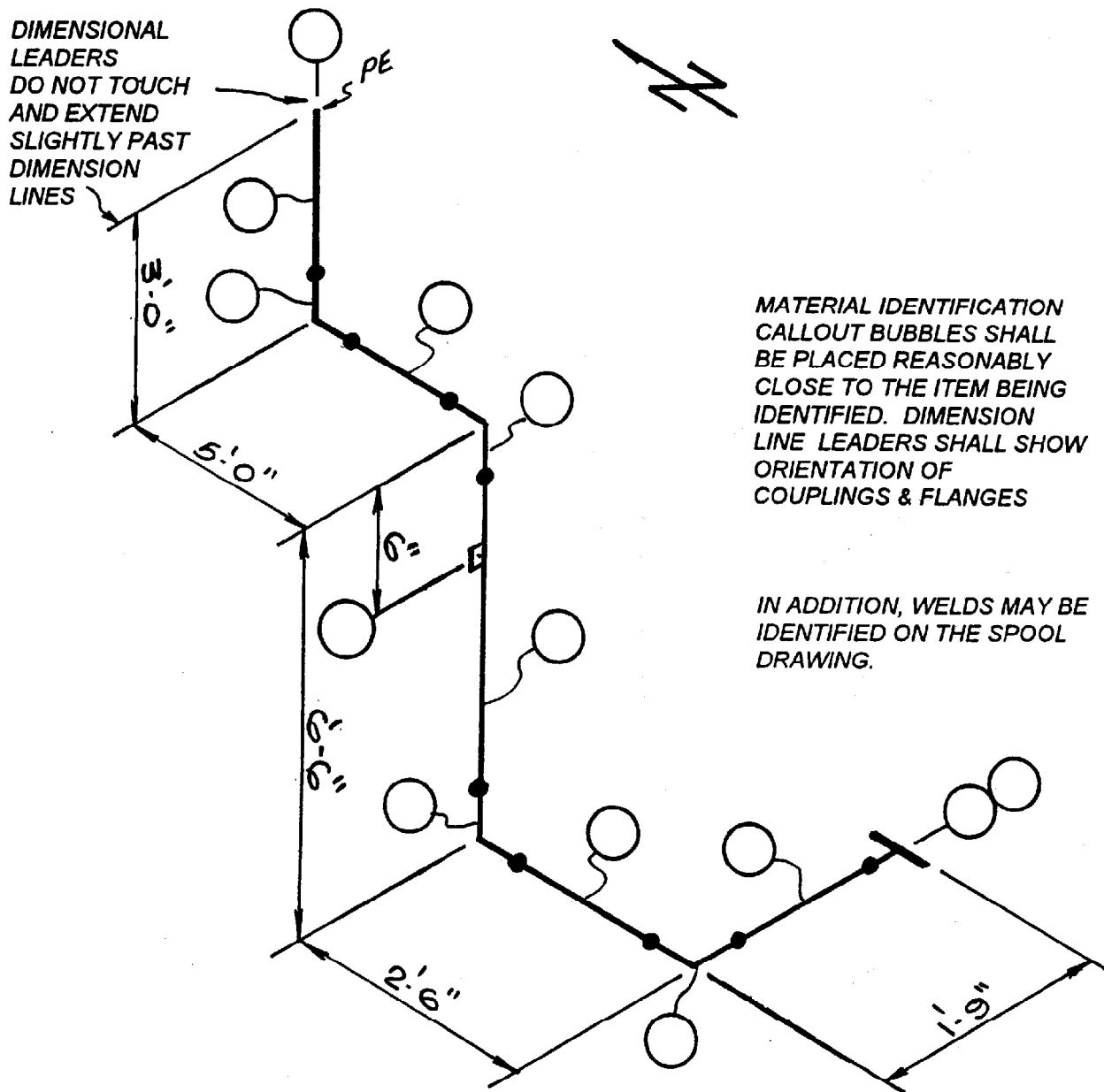


Table 6: Item Bubbles & Orientational Leaders

DIMENSIONAL
LEADERS
DO NOT TOUCH
AND EXTEND
SLIGHTLY PAST
DIMENSION
LINES

MATERIAL IDENTIFICATION
CALLOUT BUBBLES SHALL
BE PLACED REASONABLY
CLOSE TO THE ITEM BEING
IDENTIFIED. DIMENSION
LINE LEADERS SHALL SHOW
ORIENTATION OF
COUPLINGS & FLANGES

IN ADDITION, WELDS MAY BE
IDENTIFIED ON THE SPOOL
DRAWING.

DIMENSION LINES FOLLOW THE
LINE OF THE SUBJECT DRAWING
AND ARE SPACED WELL AWAY TO
ALLOW ADEQUATE ROOM FOR
CLEAR DIMENSIONING

DIMENSIONAL FIGURES "LAY" IN
THE SAME ISOMETRIC PLANE AS
THE DIMENSION LINES.

Table 7: Vertical Offset

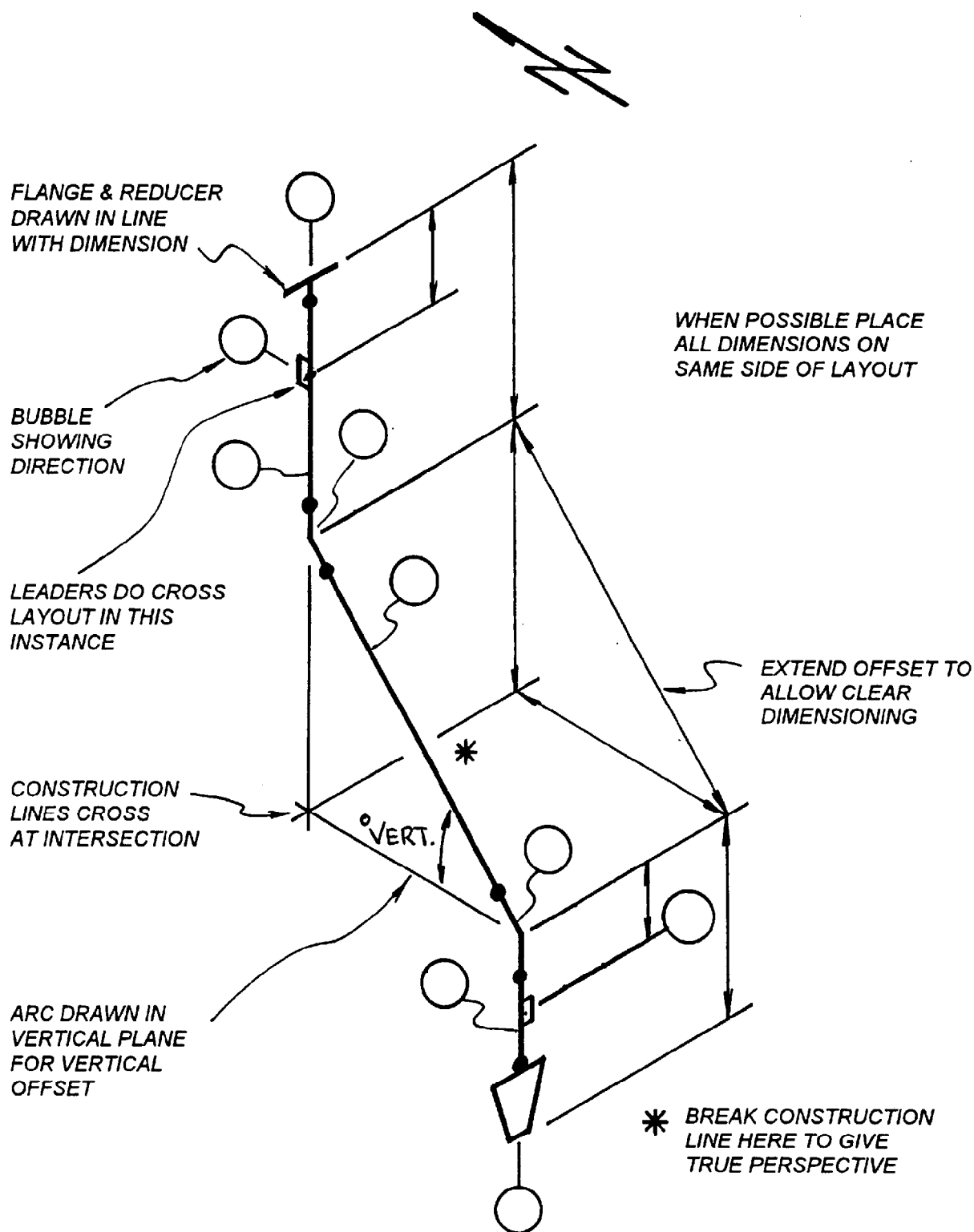


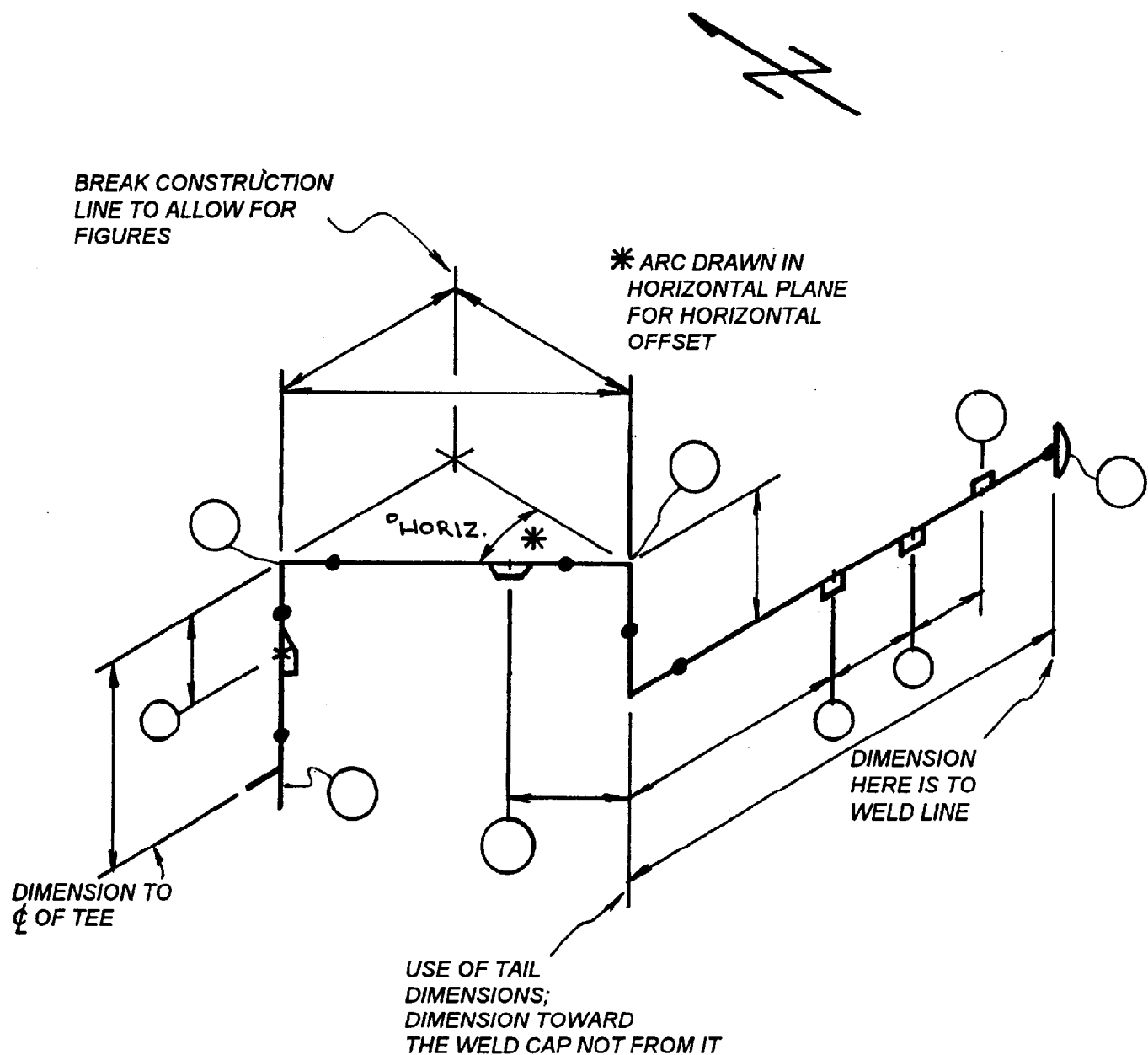
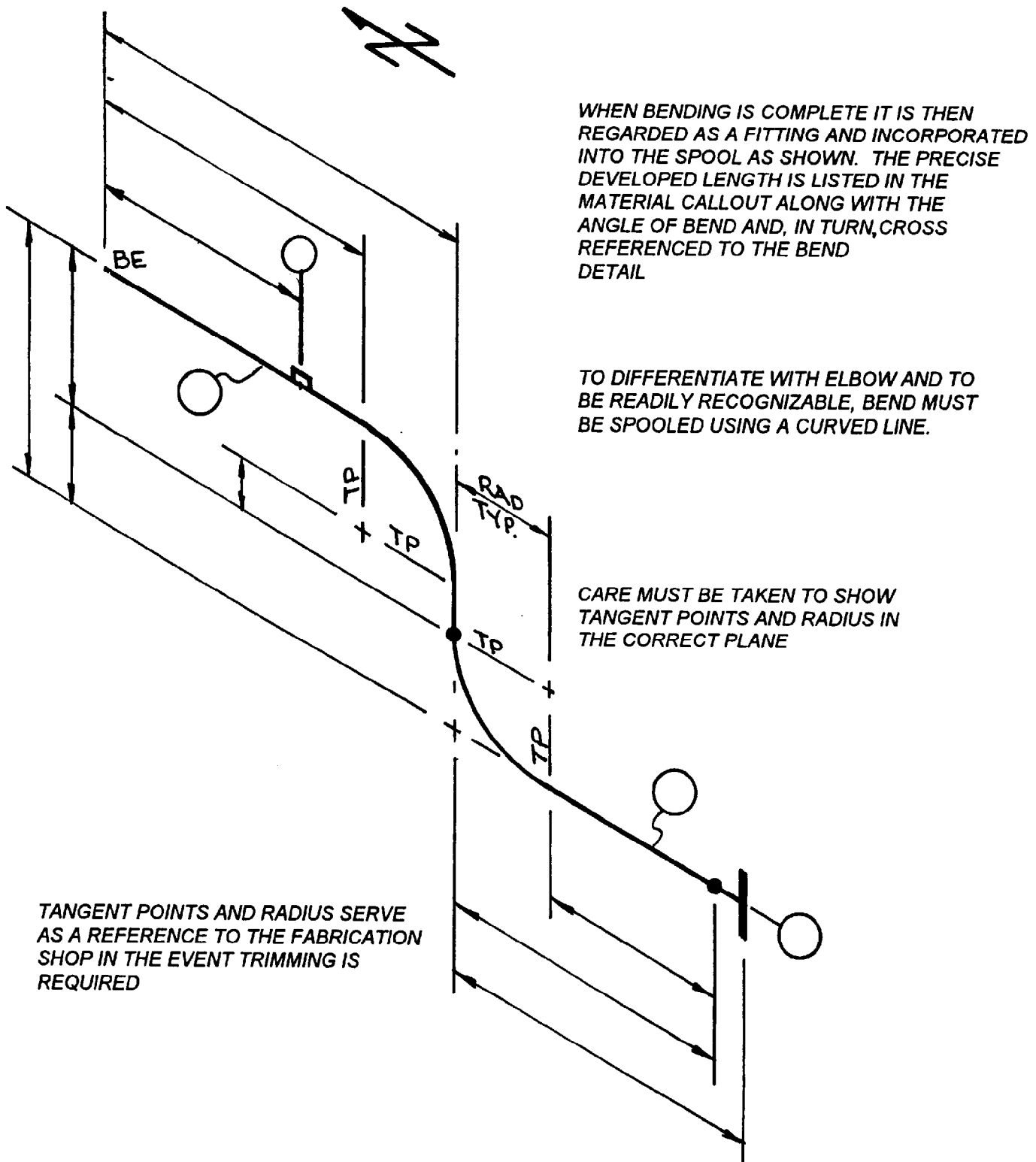
Table 8: Horizontal Offset

Table 9: Bend Spool

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