

SAUDI ARABIAN OIL COMPANY

HOW TO USE THE PREHEAT CURVES

FIRST : DETERMINE THE FOLLOWING INFORMATION

- (1) WELDING PROCESS TO BE USED.
- (2) WELDING HEAT INPUT IN KILOJOULES PER CENTIMETER OF WELD FOR THE SELECTED PROCESS. (THIS CAN BE CALCULATED BY USING THE FORMULA ON SH. 005. THE TABLE OF TYPICAL HEAT INPUT VALUES ON SH. 007, OR THE TABLE FOR FIELD DETERMINATION OF HEAT INPUT VALUE FOR WELDING DONE WITH MANUAL ELECTRODES ON SH. 008)
- (3) THE CARBON EQUIVALENT OF THE STEEL BEING WELDED. (OBTAINED EITHER FROM THE MILL SHEETS SUPPLIED WHEN THE STEEL WAS PURCHASED OR FROM THE TABLE "C.E. VALUES FOR USE WHEN ACTUAL VALUES ARE NOT KNOWN" ON SH. 007)
- (4) THE COMBINED THICKNESS IN CENTIMETERS OF THE PIECES BEING WELDED. (SEE THE EXPLANATION ON SH. 007)

SECOND : USE THIS INFORMATION TO DETERMINE THE REQUIRED PREHEAT TEMPERATURE FROM THE GRAPHS ON SH. 005 AS ILLUSTRATED IN THE EXAMPLE BELOW.

EXAMPLE : WHAT IS THE PREHEAT REQUIREMENT TO BUTT WELD 19mm WALL THICKNESS PIPE WITH C.E.=0.41? WELDING WILL BE DONE WITH 4.0mm DIA. E-6010 (CELLULOSIC) ELECTRODES. ON-SITE WELDING CURRENT AND VOLTAGE ARE NOT KNOWN.

STEP 1. SINCE ON-SITE WELDING PARAMETERS ARE NOT KNOWN, THE HEAT INPUT VALUE IS OBTAINED FROM THE TABLE OF TYPICAL VALUES ON SH. 007. FOR 4.0mm DIA. CELLULOSIC ELECTRODES, THIS IS 8 KJ/cm.

STEP 2. ENTER THE RIGHT-HAND GRAPH ON SH. 005 AT 8 KJ/cm AND DRAW A VERTICAL LINE UPWARDS UNTIL IT INTERSECTS THE CORRECT COMBINED THICKNESS LINE. USING THE GUIDE ON SH. 005, THE COMBINED THICKNESS FOR A 19mm THICK BUTT WELD IS

$$C.T. = t + b + \frac{t}{2} = 19 + 19 + \frac{19}{2} = 38$$
DRAW A HORIZONTAL LINE FROM THIS POINT OVER TO THE LEFT HAND GRAPH.

STEP 3. ENTER THE BOTTOM OF THE LEFT HAND GRAPH AT C.E. = 0.41 USING SCALE "A" BECAUSE CELLULOSIC ELECTRODES WERE SPECIFIED. DRAW A VERTICAL LINE UPWARDS UNTIL IT INTERSECTS THE HORIZONTAL LINE DRAWN IN THE PRECEDING STEP. THIS INTERSECTION FALLS ON THE 95°C PREHEAT LINE. THE CORRECT PREHEAT FOR THIS SITUATION IS, THEREFORE 95°C.

NOTE:

- I. GENERAL REVISION OF AD-036451 & AD-036452 THAT COMBINES THESE TWO, FORMERLY SEPARATE DRAWINGS INTO ONE DRAWING. CHANGED DRAWING SIZE FROM "D" TO "E".

APPD.					SAUDI ARABIAN OIL COMPANY							
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CHKD.												
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THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION OR FOR ORDERING MATERIAL UNTIL CERTIFIED AND DATED.						DRAWING TITLE		PLANT NO.	INDEX	DRAWING NO.	SHT. NO.	REV. NO.
						PREHEAT LEVELS FOR WELDING CARBON STEELS (INCLUDES LOW HYDROGEN PROCESSES) STD. DWG.		990	W	AE-036451	006	02
						METRIC		J.O./EWO-				