



चेन्नै पेट्रोलियम कॉर्पोरेशन लिमिटेड
(इंडियन ऑयल की ग्रुप कम्पनी)

Chennai Petroleum Corporation Limited
(A group company of IndianOil)

Ref: CC 0148 11

Date: October 28, 2011

**NOTICE INVITING TENDER
CORRIGENDUM NO.1**

Dear Sirs,

Sub : Maintenance Jobs In Furnace, Columns / Vessels And Heat Exchangers In Crude Blocks (Units 15, 17 & 18) During Shutdown 2012 At CPCL- Manali, Chennai

Ref. : NIT No. CC 0148 11 dt. 06.10.2011

This has reference to our Notice Inviting tender issued for the above work. A Pre bid meeting was conducted as per the schedule mentioned in the tender document. The scanned copy of the minutes of pre bid meeting which form part of the tender document is enclosed herewith as Annexure 1.

Further, the following clauses of the tender document is modified as mentioned below:

Sl. No.	Page No.	Clause	Description as per tender document	Modified as
1	5	Contract Period	Contract period mentioned as 24 months	Contract Period is 12 days.
2	10 of the techno-commercial bid	1.10 (a)	Schedule of Rates is on item rate basis for subject tender shall be duly filled in both in figures and words, signed and stamped.	Schedule of Rates is on Lumpsum basis and item rate basis for subject tender shall be duly filled in both in figures and words, signed and stamped.
3	17	2.6.4.1 (2)	2. Check list of submission of tender as per Annexure 4.2.	2. Check list of submission of tender as per Annexure 3.2.
4	43	4.8 Utilities:	WATER, POWER AND COMPRESSED AIR: Unless otherwise specified the contractor is entitled to use in the work such supplies of water, power and compressed air (Based on availability) from CPCL's sources from approved tapping points, free of cost.	WATER AND POWER: Unless otherwise specified the contractor is entitled to use in the work such supplies of water and power (Based on availability) from CPCL's sources from approved tapping points, free of cost.

मणली, चेन्नै - 600 068.

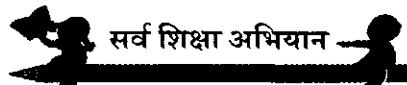
Manali, Chennai - 600 068.

फोन / Phone : 2594 4000 to 009.

फैक्स / Fax : 91-44-25941047, 25941247

वेब साइट / Website : www.cpcl.co.in

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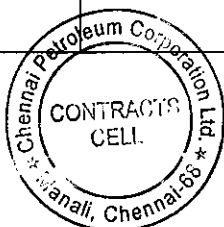
सर्व शिक्षा अभियान

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ISO 9001
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Sl. No.	Page No.	Clause	Description as per tender document	Modified as
5	51	4.46	<p>Bid Evaluation and Award of Contract: Lowest of (L-1) of total PRICES shall be considered for the purpose of evaluation and award of contract. In case more than one agency has quoted the same price any one of the options will be exercised at the discretion of Tender Approval Committee, which will be binding on the tenderers:</p> <ol style="list-style-type: none"> 1. Cancel the present tender and call for re-tender, 2. Equally divide and award the work, or 3. Call for submission of quotations among the equally quoted tenderers. 	<p>TIE: In case of more than one party quoting the same rate / percentage and positioned as L-1, CPCL may adopt selection of successful bidder by drawl of "LOT" in the presence of the concerned bidders. Decision of CPCL will be final and binding on bidders.</p>
6	46	4.22	<p>4.22 Commencement of work: The successful tenderer shall start the work immediately within Twenty One (21) Days from the date of issue of Fax of Acceptance (FOA) and after obtaining gate passes, safety training and clearance from the EIC.</p>	The clause is deleted.
7	59	5.2.1	<p>The payment terms for the contract shall be in the manner detailed below:</p> <p><input type="checkbox"/> 50% (Fifty Percentage) of Lumpsum value shall be paid to contractor upon completion of 75% work as certified by EIC.</p> <p><input type="checkbox"/> 40% (Forty Percentage) of Lumpsum value and 90% of executed Unit Rates value shall be paid to contractor upon completion of 100% work as certified by EIC.</p> <p><input type="checkbox"/> 10% (Ten Percentage) of contract value shall be paid to contractor upon submission of reconciliation statement duly certified by EIC.</p>	<p>The payment terms for the contract shall be in the manner detailed below:</p> <p><input type="checkbox"/> 90% (ninety Percentage) on completion of entire scope</p> <p><input type="checkbox"/> 10% (ten Percentage) after commissioning and material reconciliation.</p>



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Sl. No.	Page No.	Clause	Description as per tender document	Modified as
8	63	5.3.11.3	Stress Relieving Procedure	Stress Relieving procedure is enclosed as Annexure - 2.
9	336	Item no. 00830	Refer Attachment -11 excluded items	List of excluded items is enclosed as Annexure -3.

All other conditions of the tender document modified to the extent of Corrigendum No. 1 remains unaltered.

Bidders are requested to submit a copy of the Corrigendum No.1 duly signed and stamped along with the unpriced offer of the tender.

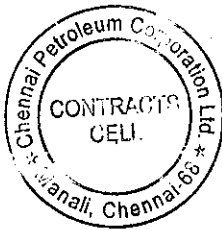
Thanking you,

Very truly yours



R.P.RAJA

Senior Manager (Contracts Cell)



Sub: **Maintenance jobs in Furnace, Columns / Vessels and Heat Exchangers in Crude Blocks (Units 15, 17 & 18) during Shutdown 2012 at CPCL - Manali, Chennai**

Ref : **NIT No. CC 0148 11, dated 06.10.2011**

Minutes of Pre-bid Meeting
held at MM Conference Hall in Administration Block III, CPCL-Manali
on 18.10.2011 at 10.00 AM

Members Present :

M/s. Gopal Engineering Works

Shri. Navin Madhav,
 Shri. M. Sivamalleswara Rao

M/s. CPCL

S/Shri
 A.Poovaraghavan, SM (Maint-Shutdown Planning)
 P.Jeevankumar, CM (Contracts)
 R.P.Raja, Manager (Contracts Cell)

Participated bidders informed that they have visited and acquainted with the site conditions to offer their competitive price. The queries raised by the bidders and the CPCL's reply for the same are as follows:

Sl. No	Reference to Bidding Document			Subject	Bidder's Query	CPCL's Query
	Part / Volume	Page No.	Clause No.			
1	NIT	5		Contract Period	Bidder requested a clarification on the contract period as the period is mentioned as 24 months.	CPCL clarified that the contract period is 12 days as mentioned in Page 58 of the tender document.

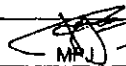


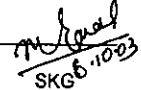
For M/s. Gopal Engineering Works

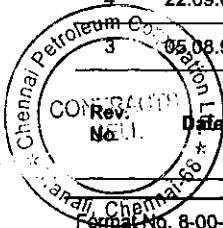
For M/s. CPCL

18/10/11

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वेल्डिंग विनिर्देश सारणियाँ

**WELDING SPECIFICATION CHARTS
FOR PIPING CLASSES**

4	22.09.03	REVISED & REISSUED AS STD. SPECIFICATION				
3	05.08.98	REVISED & REISSUED AS STD. SPECIFICATION	GC	TVD	JRP	AS
		Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	



Abbreviations:

GTAW	:	Gas Tungsten Arc Welding
SMAW	:	Shielded Metal Arc Welding
WPS	:	Welding Procedure Specification
PQR	:	Procedure Qualification Record

Welding Standards Committee

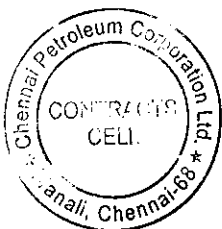
Convenor : Mr. T.V. Deekshitulu

Members : Dr. V.R. Krishnan

Mr. M.P. Jain

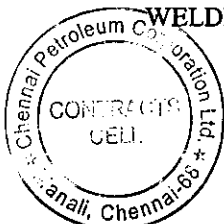
Mr. R. Nanda

Mr. N.C. Gupta



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	WELDING CHART FOR CLASSES A2A, B2A, D2A, E2A, F2A	6
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1.0 GENERAL NOTES**1.1 Scope :**

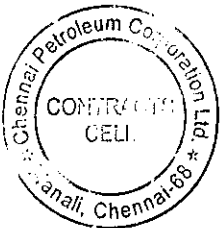
This document covers the Welding Specification for the piping classes covered in the Standard Piping Material Specification (6-44-0005). WPS and PQR for the field fabrication and erection of piping system shall be made in conformity with this document. No deviations are acceptable unless specifically approved through prescribed deviation permit.

1.2 Reference Standards :

This document shall be read in conjunction with the latest revisions/editions of the following documents :

- a. Standard Specification for Non Destructive Examination Requirements of Piping, EIL Spec. No. 6-44-0016
- b. Standard Piping Material Specification, EIL Spec. No. 6-44-0005
- c. ASME Boiler & Pressure Vessel Code -- Sections V, VIII(Div.-1), IX & II-C
- d. ASME B31.3
- e. ASTM E10
- f. Standard Specification for Fabrication & Erection of Piping, EIL Spec.No. 6-44-0012
- g. Welding Specification for Fabrication of Piping, EIL Spec. No. 6-77-0001
- h. Indian Boiler Regulations (IBR)

- 1.3 GTAW process can be applied in place of SMAW process with a corresponding suitable filler metal for the application.



PIPING CLASS: A1A, A6A, A7A, A8A, A9A, A10A, A13A, A15A, A20A, A32A, A4Y, B1A, B6A, B9A, B13A, B32A, D1A, E1A, F1A

MATERIAL SPECIFICATIONS	PIPES	API 5L GR.B PSL1, ASTM A 106 GR.B, ASTM A 872 GR.B60 CL.12
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPBW
	FLANGES	ASTM A 105
	OTHERS	-

BASE METAL 'P' NO	1			
WELDING PROCESS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS SMAW	FILLER PASS SMAW	ROOT PASS SMAW	FILLER PASS SMAW
	GTAW (NOTE-4)			
	FILLET JOINTS / SOCKET JOINTS SMAW			

WELDING MATERIALS	GROOVE JOINTS			
	BUTT		OTHER THAN BUTT	
	ROOT PASS E6010/E6013 (NOTE-2)	FILLER PASS E7016/E7018	ROOT PASS E6010/E6013 (NOTE-2)	FILLER PASS E7016/E7018
	ER70 SG/ER70S-2 (NOTE-4)			
	FILLET JOINTS / SOCKET JOINTS E7016/E7018			
	BACKING RING	-	CONSUMABLE INSERT	-

JOINT PREPN.	ASME B31.3
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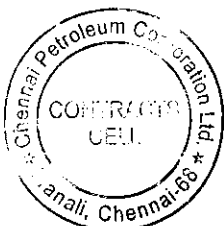
GASES	PURGING	-	SHIELDING	ARGON
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%
PREHEATING NOTE-3	PREHEAT TEMP	10°C MIN./ 100°C (FOR THK>=25.4MM)	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT				
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	-		

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES:

- HEAT TREATMENT SHALL BE DONE AS PER ASME B31.3 FOR WALL THICKNESS EXCEEDING 19MM.
- E6013 MAY BE USED FOR ROOT PASS PROVIDED UNIFORM ROOT PENETRATION IS OBTAINABLE AND IS DEMONSTRATED THROUGH PROCEDURE QUALIFICATION.
- PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK. >=12.7MM & <25.4MM
- GTAW SHALL BE EMPLOYED FOR THE ROOT PASS WELDING FOR SMALL BORE PIPING OF DIAMETER 2" AND SMALLER.

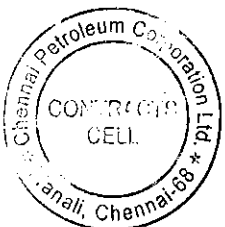


PIPING CLASS: A2A, B2A, D2A, E2A, F2A

MATERIAL SPECIFICATIONS	PIPES	ASTM A 106 GR.B, ASTM A 672 GR.B60 CL.12			
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPBW			
	FLANGES	ASTM A 105			
	OTHERS	-			
BASE METAL 'P' NO	1				
WELDING PROCESS	GROOVE JOINTS				
	BUTT			OTHER THAN BUTT	
	ROOT PASS	SMAW	FILLER PASS	SMAW	ROOT PASS SMAW
		GTAW (NOTE-4)			FILLER PASS SMAW
FILLET JOINTS / SOCKET JOINTS SMAW					
WELDING MATERIALS	GROOVE JOINTS				
	BUTT			OTHER THAN BUTT	
	ROOT PASS	E6010/E6013 (NOTE-2)	FILLER PASS	E7016/E7018	ROOT PASS E6010/E6013 (NOTE-2)
		ER70 SG/ ER70S-2 (NOTE-4)			FILLER PASS E7016/E7018
FILLET JOINTS / SOCKET JOINTS E7016/E7018					
BACKING RING		-		CONSUMABLE INSERT	-
JOINT PREPN.	ASME B31.3 & IBR				
GASES	PURGING	-		SHIELDING	ARGON
GAS COMPOSITION	PURGING	-		SHIELDING	99.995%
PREHEATING NOTE-3	PREHEAT TEMPERATURE	10°C MIN./ 100°C (FOR THK >= 25.4MM)		POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT -					
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	600 ± 20°C		HOLDING TIME	1 HOUR PER INCH THK
	RATE OF HEATING	200°C/HR MAX.		MIN HOLDING TIME	1 HOUR
	METHOD OF COOLING	CONTROLLED		RATE OF COOLING	200°C/HR MAX.
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE					
			MIN	-	AVERAGE -
			AT TEMPERATURE	-	
			HARDNESS	-	
CODE OF FABRICATION	ASME B31.3 & IBR				

TECHNICAL NOTES :

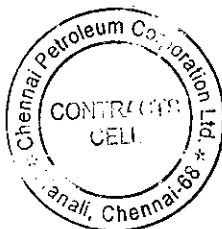
- HEAT TREATMENT SHALL BE DONE AS PER IBR FOR WALL THICKNESS EXCEEDING 19MM.
- E6013 MAY BE USED FOR ROOT PASS PROVIDED UNIFORM ROOT PENETRATION IS OBTAINABLE AND IS DEMONSTRATED THROUGH PROCEDURE QUALIFICATION.
- PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK. >=12.7MM & <25.4MM
- GTAW SHALL BE EMPLOYED FOR THE ROOT PASS WELDING FOR SMALL BORE PIPING OF DIAMETER 2" AND SMALLER.



PIPING CLASS: A3A, A33A, A3Y, A5Y, A33Y, J2A, J3A, J5A

MATERIAL SPECIFICATIONS	PIPES	API 5L GR.B PSL1, ASTM A 108 GR.B, IS 1239, IS 3589 GR.330, IS 3589 GR.410					
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPBW, IS 1239, IS 3589 GR.330, IS 3589 GR.410					
	FLANGES	ASTM A 105, ASTM A 285 GR.C					
	OTHERS	-					
BASE METAL 'P' NO	1						
WELDING PROCESS	GROOVE JOINTS						
	BUTT			OTHER THAN BUTT			
	ROOT PASS	SMAW	FILLER PASS	SMAW	ROOT PASS	SMAW	
FILLET JOINTS / SOCKET JOINTS						SMAW	
WELDING MATERIALS	GROOVE JOINTS						
	BUTT			OTHER THAN BUTT			
	ROOT PASS	E6010/E6013	FILLER PASS	E6013/E7016/ E7018	ROOT PASS	E6010/E6013	
						FILLER PASS E6013/E7016/ E7018	
FILLET JOINTS / SOCKET JOINTS						E6013/E7016/E7018	
BACKING RING			CONSUMABLE INSERT			-	
JOINT PREPN.	ASME B31.3						
GASES	PURGING	-	SHIELDING	-			
GAS COMPOSITION	PURGING	-	SHIELDING	-			
PREHEATING	PREHEAT TEMP	10°C MIN.	POST HEATING	-			
CONTINUITY OF WELDING AND PREHEAT	-						
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-			
	RATE OF HEATING	-	MIN HOLDING TIME	-			
	METHOD OF COOLING	-	RATE OF COOLING	-			
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-			
	AT TEMPERATURE	-					
	HARDNESS	-					
CODE OF FABRICATION	ASME B31.3						

TECHNICAL NOTES :

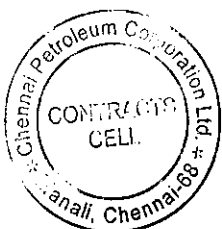


PIPING CLASS: A4A, B4A, D4A

MATERIAL SPECIFICATIONS	PIPES	ASTM A 333 GR.6, ASTM A 671 GR.CC80 CL.32							
	FITTINGS	ASTM A 350 GR.LF2, ASTM A420 GR.WPL6, ASTM A420 GR.WPL6W							
	FLANGES	ASTM A 350 GR.LF2							
	OTHERS	-							
BASE METAL 'P' NO	1								
WELDING PROCESS	GROOVE JOINTS								
	BUTT			OTHER THAN BUTT					
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	
	FILLET JOINTS / SOCKET JOINTS			SMAW					
WELDING MATERIALS	GROOVE JOINTS								
	BUTT			OTHER THAN BUTT					
	ROOT PASS	ER70 SG	FILLER PASS	ER70 SG WIRE/ E7018-1	ROOT PASS	ER70 SG	FILLER PASS	ER70 SG WIRE/ E7018-1	
	NOTE-1		NOTE-1		NOTE-1		NOTE-1		
FILLET JOINTS / SOCKET JOINTS			E7018-1						
BACKING RING			-			CONSUMABLE INSERT		-	
JOINT PREPN.	ASME B31.3								
GASES	PURGING	-			SHIELDING	ARGON			
GAS COMPOSITION	PURGING	-			SHIELDING	99.9995%			
PREHEATING	PREHEAT TEMP	10°C MIN./ 100°C (FOR THK>=25.4MM)			POST HEATING	-			
CONTINUITY OF WELDING AND PREHEAT	-								
POST WELD HEAT TREATMENT NOTE-2	HOLDING TEMP	-			HOLDING TIME	-			
	RATE OF HEATING	-			MIN HOLDING TIME	-			
	METHOD OF COOLING	-			RATE OF COOLING	-			
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	15 lb-ft		AVERAGE	20 lb-ft				
	AT TEMPERATURE	-48.5°C OR DESIGN TEMP. WHICHEVER IS HIGHER							
	HARDNESS	-							
CODE OF FABRICATION	ASME B31.3								

TECHNICAL NOTES :

- ER70 SG WIRE SHALL BE IMPACT TESTED AT -48.5°C OR DESIGN TEMPERATURE, WHICHEVER IS HIGHER.
- HEAT TREATMENT SHALL BE DONE AS PER ASME B31.3 FOR WALL THICKNESS EXCEEDING 19MM.

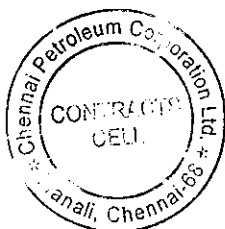


PIPING CLASS: A5A, B5A, D5A, E5A, F5A

MATERIAL SPECIFICATIONS	PIPES	ASTM A 106 GR.B, ASTM A 872 GR.B80 CL.12					
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPBW					
	FLANGES	ASTM A 105					
	OTHERS	-					
BASE METAL 'P' NO	1						
WELDING PROCESS	GROOVE JOINTS						
	BUTT				OTHER THAN BUTT		
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW		
WELDING MATERIALS	GROOVE JOINTS						
	BUTT				OTHER THAN BUTT		
	ROOT PASS	ER70S-2	FILLER PASS	ER70S-2/ E7018	ROOT PASS	ER70S-2	FILLER PASS ER70S-2/ E7018
	FILLET JOINTS / SOCKET JOINTS				E7018		
	BACKING RING	-			CONSUMABLE INSERT	-	
JOINT PREPN.	ASME B31.3						
GASES	PURGING	-			SHIELDING	ARGON	
GAS COMPOSITION	PURGING	-			SHIELDING	99.995%	
PREHEATING	PREHEAT TEMP	10°C MIN / 100°C (FOR THK >= 25.4MM)			POST HEATING	-	
CONTINUITY OF WELDING AND PREHEAT	-						
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	-			HOLDING TIME	-	
	RATE OF HEATING	-			MIN HOLDING TIME	-	
	METHOD OF COOLING	-			RATE OF COOLING	-	
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-			AVERAGE	-	
	AT TEMPERATURE	-					
	HARDNESS	200 BHN MAX.					
CODE OF FABRICATION	ASME B31.3						

TECHNICAL NOTES:

- HEAT TREATMENT SHALL BE DONE AS PER ASME B31.3 FOR WALL THICKNESS EXCEEDING 19MM.



PIPING CLASS: A11A

MATERIAL SPECIFICATIONS	PIPES	ASTM A 106 GR.B, ASTM A 872 GR.B60 CL.12
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPBW
	FLANGES	ASTM A 105
	OTHERS	-

BASE METAL 'P' NO	1							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	SMAW	FILLER PASS	SMAW	ROOT PASS	SMAW	FILLER PASS	SMAW
		GTAW (NOTE-4)						
	FILLET JOINTS / SOCKET JOINTS							SMAW

WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	E6010/E6013 (NOTE-2)	FILLER PASS	E7016/ E7018	ROOT PASS	E6010/E6013 (NOTE-2)	FILLER PASS	E7016/ E7018
		ER70 SG/ ER70S-2 (NOTE-4)						
	FILLET JOINTS / SOCKET JOINTS							E7016/E7018
	BACKING RING	-			CONSUMABLE INSERT	-		

JOINT PREPN.	ASME B31.3							
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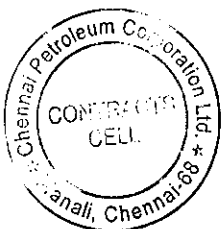
GASES	PURGING	-	SHIELDING	ARGON
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%
PREHEATING NOTE-3	PREHEAT TEMP	10°C MIN/ 100°C (FOR THK>=25.4MM)	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT	-			
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	200 BHN MAX.		

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES :

- HEAT TREATMENT SHALL BE DONE AS PER ASME B31.3 FOR WALL THICKNESS EXCEEDING 19MM.
- E6013 MAY BE USED FOR ROOT PASS PROVIDED UNIFORM ROOT PENETRATION IS OBTAINABLE AND IS DEMONSTRATED THROUGH PROCEDURE QUALIFICATION.
- PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK. >=12.7MM & <25.4MM
- GTAW SHALL BE EMPLOYED FOR THE ROOT PASS WELDING FOR SMALL BORE PIPING OF DIAMETER 2" AND SMALLER.



PIPING CLASS: A16A, B16A

MATERIAL SPECIFICATIONS	PIPES	ASTM A 106 GR.B, ASTM A 672 GR.B60 CL.12
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPBW
	FLANGES	ASTM A 105
	OTHERS	-

BASE METAL 'P' NO	1					
WELDING PROCESS	GROOVE JOINTS					
	BUTT			OTHER THAN BUTT		
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW
					FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS			GTAW/SMAW		

WELDING MATERIALS	GROOVE JOINTS					
	BUTT			OTHER THAN BUTT		
	ROOT PASS	ER70S-2	FILLER PASS	ER70S-2/ E7018	ROOT PASS	ER70S-2
					FILLER PASS	ER70S-2/ E7018
	FILLET JOINTS / SOCKET JOINTS			ER70S-2/E7018		
	BACKING RING	-	CONSUMABLE INSERT	-		

JOINT PREPN.	ASME B31.3					
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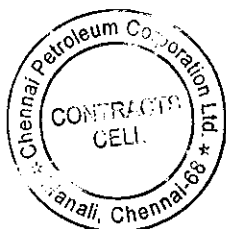
GASES	PURGING	-	SHIELDING	ARGON		
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%		
PREHEATING NOTE-2	PREHEAT TEMP	10°C MIN./ 100°C (FOR THK >=25.4MM)	POST HEATING	-		
CONTINUITY OF WELDING AND PREHEAT	-					
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	595°C-650°C	HOLDING TIME	1 HOUR PER INCH THK.		
	RATE OF HEATING	200°C/HR MAX.	MIN HOLDING TIME	1 HOUR		
	METHOD OF COOLING	CONTROLLED	RATE OF COOLING	200°C/HR MAX.		

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	200 BHN MAX.		

CODE OF FABRICATION	ASME B31.3					
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TECHNICAL NOTES:

- POST WELD HEAT TREATMENT SHALL BE DONE FOR ALL WALL THICKNESSES.
- PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK. >=12.7MM & <25.4MM

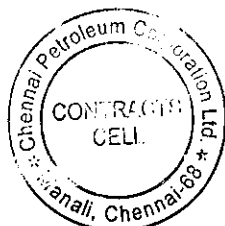


PIPING CLASS: A19A, B19A

MATERIAL SPECIFICATIONS	PIPES	ASTM A 106 GR.B, ASTM A 872 GR.B60 CL.12						
	FITTINGS	ASTM A 105, ASTM A234 GR.WPB, ASTM A234 GR.WPBW						
	FLANGES	ASTM A 105						
	OTHERS	-						
BASE METAL 'P' NO	1							
WELDING PROCESS	GROOVE JOINTS							
	BUTT		OTHER THAN BUTT					
	ROOT PASS	GTAW	FILLER PASS	SMAW	ROOT PASS	GTAW	FILLER PASS	SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			
WELDING MATERIALS	GROOVE JOINTS							
	BUTT		OTHER THAN BUTT					
	ROOT PASS	ER70S-2	FILLER PASS	E7018/E7018	ROOT PASS	ER70-S2	FILLER PASS	E7018/E7018
	FILLET JOINTS / SOCKET JOINTS				E7018/E7018			
	BACKING RING	-	CONSUMABLE INSERT	-				
JOINT PREPN.	ASME B31.3							
GASES	PURGING	-	SHIELDING	ARGON				
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%				
PREHEATING NOTE-2	PREHEAT TEMP	10°C MIN/ 100°C (FOR THK>=25.4MM)	POST HEATING	-				
CONTINUITY OF WELDING AND PREHEAT	-							
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	595°C-650°C	HOLDING TIME	1 HOUR PER INCH THK.				
	RATE OF HEATING	200°C/HR MAX.	MIN HOLDING TIME	1 HOUR				
	METHOD OF COOLING	CONTROLLED	RATE OF COOLING	200°C/HR MAX.				
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-				
	AT TEMPERATURE	-						
	HARDNESS	-						
CODE OF FABRICATION	ASME B31.3							

TECHNICAL NOTES:

- POST WELD HEAT TREATMENT SHALL BE DONE FOR ALL WALL THICKNESSES.
- PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK. >=12.7MM & <25.4MM



PIPING CLASS: A1B, B1B, D1B

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P1, ASTM A 691 GR.CM85 CL.12
	FITTINGS	ASTM A 182 GR.F1, ASTM A234 GR.WP1, ASTM A234 GR.WP1-W
	FLANGES	ASTM A 182 GR.F1
	OTHERS	-

BASE METAL 'P' NO	3					
WELDING PROCESS	GROOVE JOINTS					
	BUTT			OTHER THAN BUTT		
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW
					FILLER PASS	GTAW/ SMAW
FILLET JOINTS / SOCKET JOINTS						SMAW

WELDING MATERIALS	GROOVE JOINTS					
	BUTT			OTHER THAN BUTT		
	ROOT PASS	ER70S-A1	FILLER PASS	ER70S-A1/ E7016-A1/ E7018-A1	ROOT PASS	ER70S-A1
					FILLER PASS	ER70S-A1/ E7016-A1/ E7018-A1
FILLET JOINTS / SOCKET JOINTS						E7016-A1/E7018-A1
BACKING RING			-	CONSUMABLE INSERT		

JOINT PREPN.	ASME B31.3					
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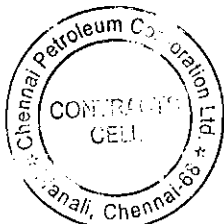
GASES	PURGING	-	SHIELDING	ARGON		
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%		
PREHEATING	PREHEAT TEMP	10°C MIN./ 100°C (FOR THK>=25.4MM)	POST HEATING	-		
CONTINUITY OF WELDING AND PREHEAT	-					
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-		
NOTE-1	RATE OF HEATING	-	MIN HOLDING TIME	-		
	METHOD OF COOLING	-	RATE OF COOLING	-		

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	225 BHN MAX.		

CODE OF FABRICATION	ASME B31.3					
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TECHNICAL NOTES:

- POST WELD HEAT TREATMENT AND MAX.HARDNESS IS NOT MANDATORY ONLY WHEN THE UTS OF THE MATERIAL <= 71,000 PSI AND THK. <= 19MM



PIPING CLASS: D2B

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P1, ASTM A 691 GR.CM65 CL.12
	FITTINGS	ASTM A 182 GR.F1, ASTM A234 GR.WP1, ASTM A234 GR.WP1-W
	FLANGES	ASTM A 182 GR.F1
	OTHERS	-

BASE METAL 'P' NO	3							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			

WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER70S-A1	FILLER PASS	ER70S-A1/ E7018-A1/ E7018-A1	ROOT PASS	ER70S-A1	FILLER PASS	ER70S-A1/ E7018-A1/ E7018-A1
	FILLET JOINTS / SOCKET JOINTS				E7018-A1/E7018-A1			
BACKING RING				CONSUMABLE INSERT				

JOINT PREPN.	ASME B31.3 & IBR							
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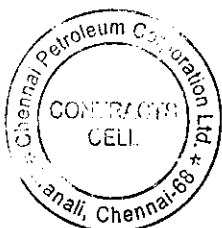
GASES	PURGING	-	SHIELDING	ARGON
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	10°C MIN/ 100°C (FOR THK>=25.4MM)	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT				
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	620°C-650°C	HOLDING TIME	1 HOUR PER INCH THK
	RATE OF HEATING	200°C/HR MAX.	MIN HOLDING TIME	1 HOUR
	METHOD OF COOLING	CONTROLLED	RATE OF COOLING	200°C/HR MAX.

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	225 BHN MAX.		

CODE OF FABRICATION	ASME B31.3 & IBR							
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TECHNICAL NOTES :

- POST WELD HEAT TREATMENT SHALL BE DONE AS PER IBR FOR ALL THICKNESSES.
- PRE-HEAT TEMPERATURE OF ATLEAST 50°C SHALL BE PROVIDED FOR THE FIRST TWO PASSES FOR THK. >=12.7MM & <25.4MM



PIPING CLASS: A1D, B1D, D1D

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P11, ASTM A 891 GR.1.25CR CL.42
	FITTINGS	ASTM A 182 GR.F11 CL.2, ASTM A234 GR.WP11 CL.1, ASTM A234 GR.WP11-W CL.1
	FLANGES	ASTM A 182 GR.F11 CL.2
	OTHERS	-

BASE METAL 'P' NO	4							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			

WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER70S-B2L/ ER80S-B2	FILLER PASS	ER70S-B2L/ ER80S-B2 E7018-B2L/ E7018-B2L	ROOT PASS	ER70S-B2L/ ER80S-B2	FILLER PASS	ER70S-B2L/ ER80S-B2 E7018-B2L/ E7018-B2L
	FILLET JOINTS / SOCKET JOINTS				E7018-B2L/E7018-B2L			
BACKING RING		-		CONSUMABLE INSERT		-		

JOINT PREPN.	ASME B31.3
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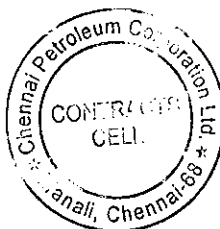
GASES	PURGING	-	SHIELDING	ARGON
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	150°C MIN.	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT		150°C MIN.		
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	705°C-750°C	HOLDING TIME	1 HOUR PER INCH THK
	RATE OF HEATING	200°C/HR MAX.	MIN HOLDING TIME	2 HOURS
	METHOD OF COOLING	CONTROLLED	RATE OF COOLING	200°C/HR MAX.

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	225 BHN MAX.		

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES:

- POST WELD HEAT TREATMENT AND MAX.HARDNESS IS NOT MANDATORY ONLY WHEN THE UTS OF THE MATERIAL <= 71,000 PSI AND THK. <= 12.7MM

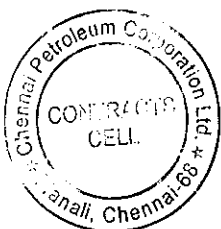


PIPING CLASS: D2D, F2D

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P11, ASTM A 691 GR.1.25CR CL.42						
	FITTINGS	ASTM A 182 GR.F11 CL.2, ASTM A234 GR.WP11 CL.1, ASTM A234 GR.WP11-W CL.1						
	FLANGES	ASTM A 182 GR.F11 CL.2						
	OTHERS	-						
BASE METAL 'P' NO	4							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			
WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER70S-B2L/ ER80S-B2	FILLER PASS	ER70S-B2L/ ER80S-B2 E7018-B2L/ E7018-B2L	ROOT PASS	ER70S-B2L/ ER80S-B2	FILLER PASS	ER70S-B2L/ ER80S-B2 E7018-B2L/ E7018-B2L
	FILLET JOINTS / SOCKET JOINTS				E7018-B2L/E7018-B2L			
	BACKING RING			CONSUMABLE INSERT			-	
JOINT PREPN.	ASME B31.3 & IBR							
GASES	PURGING			SHIELDING			ARGON	
GAS COMPOSITION	PURGING			SHIELDING			99.995%	
PREHEATING	PREHEAT TEMP		150°C MIN.		POST HEATING		-	
CONTINUITY OF WELDING AND PREHEAT	150°C MIN.							
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP		820°C - 660°C		HOLDING TIME		1 HOUR PER INCH THK.	
	RATE OF HEATING		200°C/HR MAX.		MIN HOLDING TIME		1 HOUR	
	METHOD OF COOLING		CONTROLLED		RATE OF COOLING		200°C/HR MAX.	
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN			-			AVERAGE	
	AT TEMPERATURE			-				
	HARDNESS			225 BHN MAX				
CODE OF FABRICATION	ASME B31.3 & IBR							

TECHNICAL NOTES:

- POST WELD HEAT TREATMENT SHALL BE DONE AS PER IBR FOR ALL THICKNESSES.



PIPING CLASS: B5D

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P11, ASTM A 691 GR.1.25CR CL.42
	FITTINGS	ASTM A 182 GR.F11 CL.2, ASTM A234 GR.WP11 CL.1, ASTM A234 GR.WP11-W CL.1
	FLANGES	ASTM A 182 GR.F11 CL.2
	OTHERS	-

BASE METAL 'P' NO	4							
WELDING PROCESS	GROOVE JOINTS							
	BUTT			OTHER THAN BUTT				
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS			SMAW				

WELDING MATERIALS	GROOVE JOINTS							
	BUTT			OTHER THAN BUTT				
	ROOT PASS	ER70S-B2L/ ER80S-B2	FILLER PASS	ER70S-B2L/ ER80S-B2 E7018-B2L/ E7018-B2L	ROOT PASS	ER70S-B2L/ ER80S-B2	FILLER PASS	ER70S-B2L/ ER80S-B2 E7018-B2L/ E7018-B2L
	FILLET JOINTS / SOCKET JOINTS			E7018-B2L/E7018-B2L				
BACKING RING	-			CONSUMABLE INSERT	-			

JOINT PREPN.	ASME B31.3
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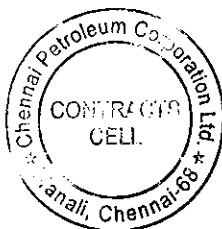
GASES	PURGING	-	SHIELDING	ARGON
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	150°C MIN.	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT		150°C MIN.		
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	705°C-750°C	HOLDING TIME	1 HOUR PER INCH THK.
	RATE OF HEATING	200°C/HR MAX.	MIN HOLDING TIME	2 HOURS
	METHOD OF COOLING	-	RATE OF COOLING	200°C/HR MAX.

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	225 BHN MAX.		

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES:

- POST WELD HEAT TREATMENT SHALL BE DONE FOR ALL WALL THICKNESSES.

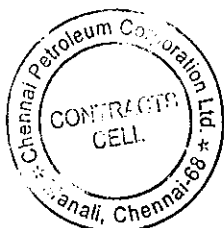


PIPING CLASS: B1E

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P22, ASTM A 691 GR.2.25CR CL.42						
	FITTINGS	ASTM A 182 GR.F22 CL.3, ASTM A234 GR.WP22 CL.1, ASTM A234 GR.WP22-W CL.1						
	FLANGES	ASTM A 182 GR.F22 CL.3						
	OTHERS	-						
BASE METAL 'P' NO	5A							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			
WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER80S-B3L	FILLER PASS	ER80S-B3L/ E8018-B3L	ROOT PASS	ER80S-B3L	FILLER PASS	ER80S-B3L/ E8018-B3L
	FILLET JOINTS / SOCKET JOINTS				E8018-B3L			
	BACKING RING			CONSUMABLE INSERT				
JOINT PREPN.	ASME B31.3							
GASES	PURGING	-			SHIELDING	ARGON		
GAS COMPOSITION	PURGING	-			SHIELDING	99.995%		
PREHEATING	PREHEAT TEMP	150°C MIN.			POST HEATING	-		
CONTINUITY OF WELDING AND PREHEAT	150°C MIN.							
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	705°C-760°C			HOLDING TIME	1 HOUR PER INCH THK.		
	RATE OF HEATING	200°C/HR MAX.			MIN HOLDING TIME	2 HOURS		
	METHOD OF COOLING	-			RATE OF COOLING	200°C/HR MAX.		
MECH. PROPERTY REQUIREMENTS CHАРPY 'V' NOTCH IMPACT TEST VALUE	MIN	-			AVERAGE	-		
	AT TEMPERATURE	-						
	HARDNESS	241 BHN MAX.						
CODE OF FABRICATION	ASME B31.3							

TECHNICAL NOTES :

- POST WELD HEAT TREATMENT AND MAX.HARDNESS IS NOT MANDATORY ONLY WHEN THK. <= 12.7MM



PIPING CLASS: B5E, D5E, E5E

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P22, ASTM A 891 GR.2.25CR CL.42
	FITTINGS	ASTM A 182 GR.F22 CL.3, ASTM A234 GR.WP22 CL.1, ASTM A234 GR.WP22-W CL.1
	FLANGES	ASTM A 182 GR.F22 CL.3
	OTHERS	-

BASE METAL 'P' NO	5A							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			

WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER80S-B3L	FILLER PASS	ER80S-B3L/ E8018-B3L	ROOT PASS	ER80S-B3L	FILLER PASS	ER80S-B3L/ E8018-B3L
	FILLET JOINTS / SOCKET JOINTS				E8018-B3L			
BACKING RING		-		CONSUMABLE INSERT		-		

JOINT PREPN.	ASME B31.3		
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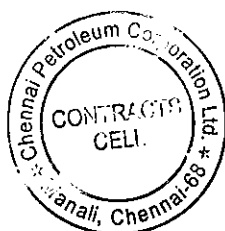
GASES	PURGING	-	SHIELDING	ARGON
GAS COMPOSITION	PURGING	-	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	150°C MIN.	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT	150°C MIN.			
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	705°C-760°C	HOLDING TIME	1 HOUR PER INCH THK.
	RATE OF HEATING	200°C/HR MAX.	MIN HOLDING TIME	2 HOURS
	METHOD OF COOLING	-	RATE OF COOLING	200°C/HR MAX.

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE		-	
	HARDNESS		225 BHN MAX.	

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES :

- POST WELD HEAT TREATMENT SHALL BE DONE FOR ALL WALL THICKNESSES.

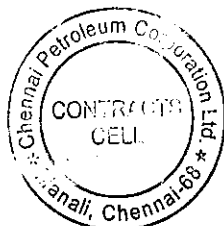


PIPING CLASS: A4F, B3F, B4F

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P5, ASTM A 691 GR.5CR CL.42							
	FITTINGS	ASTM A 182 GR.F5, ASTM A234 GR.WP5, ASTM A234 GR.WP5-W							
	FLANGES	ASTM A 182 GR.F5							
	OTHERS	-							
BASE METAL 'P' NO	5B								
WELDING PROCESS	GROOVE JOINTS								
	BUTT			OTHER THAN BUTT					
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	
	FILLET JOINTS / SOCKET JOINTS				GTAW/SMAW				
WELDING MATERIALS	GROOVE JOINTS								
	BUTT			OTHER THAN BUTT					
	ROOT PASS	ER80S-B6	FILLER PASS	ER80S-B6/ E8018-B6L/ E8018-B6L	ROOT PASS	ER80S-B6	FILLER PASS	ER80S-B6/ E8018-B6L/ E8018-B6L	
	FILLET JOINTS / SOCKET JOINTS				ER80S-B6 / E8018-B6L/E8018-B6L				
BACKING RING			-			CONSUMABLE INSERT		-	
JOINT PREPN.	ASME B31.3								
GASES	PURGING	ARGON		SHIELDING	ARGON				
GAS COMPOSITION	PURGING	99.995%		SHIELDING	99.995%				
PREHEATING	PREHEAT TEMP	150°C MIN.		POST HEATING	300°C MIN. FOR 30 MINUTES FOLLOWED BY ASBESTOS COVER				
	CONTINUITY OF WELDING AND PREHEAT INTERPASS TEMP. 250°C-300°C DURING WELD SHALL BE MAINTAINED								
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	705°C-760°C		HOLDING TIME	1 HOUR PER INCH THK.				
	RATE OF HEATING	200°C/HR MAX.		MIN HOLDING TIME	2 HOURS				
	METHOD OF COOLING	CONTROLLED		RATE OF COOLING	200°C/HR MAX.				
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-		AVERAGE	-				
	AT TEMPERATURE	-							
	HARDNESS	241 BHN MAX.							
CODE OF FABRICATION	ASME B31.3								

TECHNICAL NOTES:

- POST WELD HEAT TREATMENT SHALL BE DONE FOR ALL WALL THICKNESSES.



PIPING CLASS: A4G, B4G

MATERIAL SPECIFICATIONS	PIPES	ASTM A 335 GR.P9, ASTM A 691 GR.9CR CL.42
	FITTINGS	ASTM A 182 GR.F9, ASTM A234 GR.WP9, ASTM A234 GR.WP9-W
	FLANGES	ASTM A 182 GR.F9
	OTHERS	-

BASE METAL 'P' NO	5B					
WELDING PROCESS	GROOVE JOINTS					
	BUTT			OTHER THAN BUTT		
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW
					FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS			GTAW/SMAW		

WELDING MATERIALS	GROOVE JOINTS					
	BUTT			OTHER THAN BUTT		
	ROOT PASS	ER80S-B8	FILLER PASS	ER80S-B8/ E8016-B8L/ E8018-B8L	ROOT PASS	ER80S-B8
					FILLER PASS	ER80S-B8/ E8016-B8L/ E8018-B8L
	FILLET JOINTS / SOCKET JOINTS			ER80S-B8 / E8016-B8L/E8018-B8L		
	BACKING RING	-			CONSUMABLE INSERT	-

JOINT PREPN.	ASME B31.3
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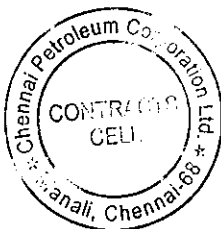
GASES	PURGING	ARGON	SHIELDING	ARGON
GAS COMPOSITION	PURGING	99.995%	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	250°C-300°C	POST HEATING	300°C MIN. FOR 1 HOUR FOLLOWED BY ASBESTOS COVER
CONTINUITY OF WELDING AND PREHEAT	INTERPASS TEMP. 250°C-300°C DURING WELD SHALL BE MAINTAINED			
POST WELD HEAT TREATMENT NOTE-1	HOLDING TEMP	705°C-760°C	HOLDING TIME	1 HOUR PER INCH THK.
	RATE OF HEATING	200°C/HR MAX.	MIN HOLDING TIME	2 HOURS
	METHOD OF COOLING	CONTROLLED	RATE OF COOLING	200°C/HR MAX.

MECH. PROPERTY REQUIREMENTS	CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-			
	HARDNESS	241 BHN MAX.			

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES:

- POST WELD HEAT TREATMENT SHALL BE DONE FOR ALL WALL THICKNESSES.



PIPING CLASS: A1K, B1K, D1K

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP304, ASTM A 358 TP304 CL.1
	FITTINGS	ASTM A 182 GR.F304, ASTM A403 GR.WP304-S, ASTM A403 GR.WP304-WX
	FLANGES	ASTM A 182 GR.F304
	OTHERS	-

BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			

WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER308/ ER308L	FILLER PASS	ER308/ ER308L E308-15/16 / E308L-15/16	ROOT PASS	ER308/ ER308L E308-15/16 / E308L-15/16	FILLER PASS	ER308/ ER308L E308-15/16 / E308L-15/16
	FILLET JOINTS / SOCKET JOINTS				E308-15/16 / E308L-15/16			
BACKING RING		-		CONSUMABLE INSERT		-		

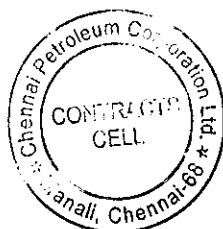
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GASES	PURGING	ARGON	SHIELDING	ARGON
GAS COMPOSITION	PURGING	99.995%	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	10°C	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT				
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	-		

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES :



PIPING CLASS: A2K, B2K, D2K

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP304, ASTM A 358 TP304 CL.1
	FITTINGS	ASTM A 182 GR.F304, ASTM A403 GR.WP304-S, ASTM A403 GR.WP304-WX
	FLANGES	ASTM A 182 GR.F304
	OTHERS	-

BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			

WELDING MATERIALS	GROOVE JOINTS										
	BUTT				OTHER THAN BUTT						
	ROOT PASS	ER308/ ER308L	FILLER PASS	ER308/ ER308L E308-15/16/ E308L-15/16	ROOT PASS	ER308/ ER308L E308-15/16/ E308L-15/16	FILLER PASS	ER308/ ER308L E308-15/16/ E308L-15/16			
	FILLET JOINTS / SOCKET JOINTS				E308-15/16 / E308L-15/16						
BACKING RING				-				CONSUMABLE INSERT		-	

JOINT PREPN.	ASME B31.3	
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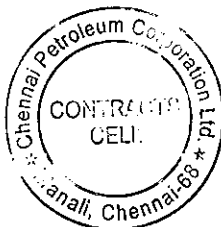
GASES	PURGING	ARGON	SHIELDING	ARGON
GAS COMPOSITION	PURGING	99.995%	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	10°C	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT				
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	0.38MM	AVERAGE	0.38MM
	AT TEMPERATURE	-198°C OR DESIGN TEMPERATURE, WHICHEVER IS HIGHER		
HARDNESS		-		

CODE OF FABRICATION	ASME B31.3
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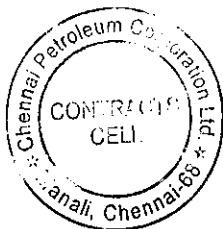
TECHNICAL NOTES :

- THE FILLER METAL/ELECTRODES SHALL HAVE GUARANTEED MINIMUM AS WELDED IMPACT VALUE OF 0.38MM LATERAL EXPANSION AT -198°C OR DESIGN TEMPERATURE, WHICHEVER IS HIGHER. (ALL THE FIVE VALUES SHALL BE OVER 0.38MM)



PIPING CLASS: A3K

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP304						
	FITTINGS	ASTM A 182 GR.F304, ASTM A403 GR.WPCR304, ASTM A403 GR.WP304-WX						
	FLANGES	ASTM A 182 GR.F304						
	OTHERS	-						
BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT			OTHER THAN BUTT				
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS			SMAW				
WELDING MATERIALS	GROOVE JOINTS							
	BUTT			OTHER THAN BUTT				
	ROOT PASS	ER308/ ER308L	FILLER PASS	ER308/ ER308L E308-15/16/ E308L-15/16	ROOT PASS	ER308/ ER308L E308-15/16/ E308L-15/16	FILLER PASS	ER308/ ER308L E308-15/16/ E308L-15/16
	FILLET JOINTS / SOCKET JOINTS			E308-15/16 / E308L-15/16				
	BACKING RING	-			CONSUMABLE INSERT	-		
JOINT PREPN.	ASME B31.3							
GASES	PURGING	ARGON			SHIELDING	ARGON		
GAS COMPOSITION	PURGING	99.995%			SHIELDING	99.995%		
PREHEATING	PREHEAT TEMP	10°C			POST HEATING	-		
CONTINUITY OF WELDING AND PREHEAT	-							
POST WELD HEAT TREATMENT	HOLDING TEMP	-			HOLDING TIME	-		
	RATE OF HEATING	-			MIN HOLDING TIME	-		
	METHOD OF COOLING	-			RATE OF COOLING	-		
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-			AVERAGE	-		
	AT TEMPERATURE	-						
	HARDNESS	-						
CODE OF FABRICATION	ASME B31.3							
TECHNICAL NOTES :								



PIPING CLASS: B4K, B5K

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP304H
	FITTINGS	ASTM A 182 GR.F304H, ASTM A403 GR.WP304H-S
	FLANGES	ASTM A 182 GR.F304H
	OTHERS	-

BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			

WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER308H	FILLER PASS	ER308H/ E308H-15/16	ROOT PASS	ER308H/ E308H-15/16	FILLER PASS	ER308H/ E308H-15/16
	FILLET JOINTS / SOCKET JOINTS				E308H-15/16			
BACKING RING				CONSUMABLE INSERT				

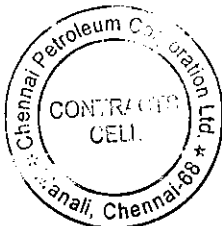
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GASES	PURGING	ARGON	SHIELDING	ARGON
GAS COMPOSITION	PURGING	99.995%	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	10°C	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT	-			
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	-		

CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES :



PIPING CLASS: A6K, B6K

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP304L, ASTM A 358 TP304L CL.1
	FITTINGS	ASTM A 182 GR.F304L, ASTM A403 GR.WP304L-S, ASTM A403 GR.WP304L-WX
	FLANGES	ASTM A 182 GR.F304L
	OTHERS	-

BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
FILLET JOINTS / SOCKET JOINTS								SMAW

WELDING MATERIALS	GROOVE JOINTS								
	BUTT				OTHER THAN BUTT				
	ROOT PASS	ER308L	FILLER PASS	ER308L/ E308L-15/16	ROOT PASS	ER308L/ E308L-15/16	FILLER PASS	ER308L/ E308L-15/16	
FILLET JOINTS / SOCKET JOINTS								E308L-15/16	
BACKING RING				-				CONSUMABLE INSERT	
								-	

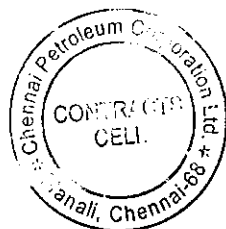
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GASES	PURGING	ARGON	SHIELDING	ARGON
GAS COMPOSITION	PURGING	99.995%	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	10°C	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT				
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE			
	HARDNESS			

CODE OF FABRICATION	ASME B31.3							
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TECHNICAL NOTES :



PIPING CLASS: A1M, B1M

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP316, ASTM A 358 TP316 CL.1
	FITTINGS	ASTM A 182 GR.F316, ASTM A403 GR.WP316-S, ASTM A403 GR.WP316-WX
	FLANGES	ASTM A 182 GR.F316
	OTHERS	-

BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			

WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER316/ ER316L	FILLER PASS	ER316/ ER316L E316-15/16 / E316L-15/16	ROOT PASS	ER316/ ER316L E316-15/16 / E316L-15/16	FILLER PASS	ER316/ ER316L E316-15/16 / E316L-15/16
	FILLET JOINTS / SOCKET JOINTS				E316-15/16 / E316L-15/16			
BACKING RING		-		CONSUMABLE INSERT		-		

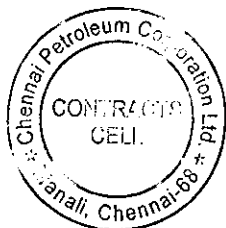
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GASES	PURGING	ARGON	SHIELDING	ARGON
GAS COMPOSITION	PURGING	99.995%	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	10°C	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT		-		
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
	HARDNESS	-		

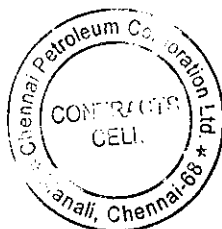
CODE OF FABRICATION	ASME B31.3
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TECHNICAL NOTES :



PIPING CLASS: B3M

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP321, ASTM A 358 TP321 CL.1						
	FITTINGS	ASTM A 182 GR.F321, ASTM A403 GR.WP321-S, ASTM A403 GR.WP321-WX						
	FLANGES	ASTM A 182 GR.F321						
	OTHERS	-						
BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
	FILLET JOINTS / SOCKET JOINTS				SMAW			
WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER347	FILLER PASS	ER347/ E347-15/16	ROOT PASS	ER347/ E347-15/16	FILLER PASS	ER347/ E347-15/16
	FILLET JOINTS / SOCKET JOINTS				E347-15/16			
	BACKING RING	-			CONSUMABLE INSERT	-		
JOINT PREPN.	ASME B31.3							
GASES	PURGING	ARGON			SHIELDING	ARGON		
GAS COMPOSITION	PURGING	99.995%			SHIELDING	99.995%		
PREHEATING	PREHEAT TEMP	10°C			POST HEATING	-		
CONTINUITY OF WELDING AND PREHEAT	-							
POST WELD HEAT TREATMENT	HOLDING TEMP	-			HOLDING TIME	-		
	RATE OF HEATING	-			MIN HOLDING TIME	-		
	METHOD OF COOLING	-			RATE OF COOLING	-		
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-			AVERAGE	-		
	AT TEMPERATURE	-						
	HARDNESS	-						
CODE OF FABRICATION	ASME B31.3							
TECHNICAL NOTES :								



PIPING CLASS: B5M

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP316H
	FITTINGS	ASTM A 182 GR.F316H, ASTM A403 GR.WP316H-S
	FLANGES	ASTM A 182 GR.F316H
	OTHERS	-

BASE METAL 'P' NO	B							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
FILLET JOINTS / SOCKET JOINTS								SMAW

WELDING MATERIALS	GROOVE JOINTS								
	BUTT				OTHER THAN BUTT				
	ROOT PASS	ER316H	FILLER PASS	ER316H/ E316H-15/16	ROOT PASS	ER316H/ E316H-15/16	FILLER PASS	ER316H/ E316H-15/16	
FILLET JOINTS / SOCKET JOINTS								E316H-15/16	
BACKING RING				-	CONSUMABLE INSERT				-

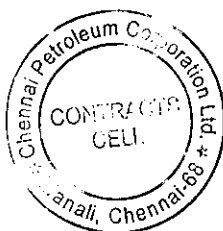
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GASES	PURGING	ARGON	SHIELDING	ARGON
GAS COMPOSITION	PURGING	99.995%	SHIELDING	99.995%
PREHEATING	PREHEAT TEMP	10°C	POST HEATING	-
CONTINUITY OF WELDING AND PREHEAT	-			
POST WELD HEAT TREATMENT	HOLDING TEMP	-	HOLDING TIME	-
	RATE OF HEATING	-	MIN HOLDING TIME	-
	METHOD OF COOLING	-	RATE OF COOLING	-

MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-	AVERAGE	-
	AT TEMPERATURE	-		
HARDNESS		-		

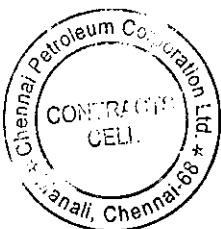
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TECHNICAL NOTES :



PIPING CLASS: A1N, B1N, B6N

MATERIAL SPECIFICATIONS	PIPES	ASTM A 312 TP316L, ASTM A 358 TP316L CL.1						
	FITTINGS	ASTM A 182 GR.F316L, ASTM A403 GR.WP316L-S, ASTM A403 GR.WP316L-WX						
	FLANGES	ASTM A 182 GR.F316L						
	OTHERS	-						
BASE METAL 'P' NO	8							
WELDING PROCESS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	GTAW	FILLER PASS	GTAW/ SMAW	ROOT PASS	GTAW/ SMAW	FILLER PASS	GTAW/ SMAW
	Fillet Joints / Socket Joints				SMAW			
WELDING MATERIALS	GROOVE JOINTS							
	BUTT				OTHER THAN BUTT			
	ROOT PASS	ER316L	FILLER PASS	ER316L/ E316L-15/16	ROOT PASS	ER316L E316L-15/16	FILLER PASS	ER316L/ E316L-15/16
	Fillet Joints / Socket Joints				E316L-15/16			
	BACKING RING	-			CONSUMABLE INSERT	-		
JOINT PREPN.	ASME B31.3							
GASES	PURGING	ARGON			SHIELDING	ARGON		
GAS COMPOSITION	PURGING	99.995%			SHIELDING	99.995%		
PREHEATING	PREHEAT TEMP	10°C			POST HEATING	-		
CONTINUITY OF WELDING AND PREHEAT	-							
POST WELD HEAT TREATMENT	HOLDING TEMP	-			HOLDING TIME	-		
	RATE OF HEATING	-			MIN HOLDING TIME	-		
	METHOD OF COOLING	-			RATE OF COOLING	-		
MECH. PROPERTY REQUIREMENTS CHARPY 'V' NOTCH IMPACT TEST VALUE	MIN	-			AVERAGE	-		
	AT TEMPERATURE	-						
	HARDNESS	-						
CODE OF FABRICATION	ASME B31.3							
TECHNICAL NOTES :								



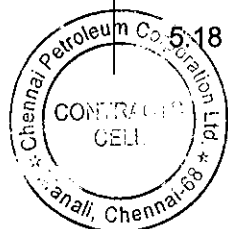
CHENNAI PETROLEUM CORPORATION LIMITED

(A Group Company of IndianOil)

CRUDE DISTILLATION UNIT-II (UNITS-15, 17 & 18) SHUTDOWN JOBS-2011
(FURNACES, COLUMNS / VESSELS & PIPING)

Exempted from LS Scope

Sl.No	Equipment	Work detail Sl. No.	Description
1	15F-01A	5.14	Anticipate replacement of 3 or 4 Nos. of Radiant tubes Size: 6.625" OD x 0.28" AW – Material - A335 Gr.P5 as per the attached Welding Procedure
2		5.16	Attend minor refractory repair in floor, stack, radiant and convection section header boxes as per Inspection
3		5.17	Carry out patch work externally at leaky and holed area on Heater casing involving radiant shell, arch roof, convection box, plenum box and floor plate as per Inspection. Use 6mm Thk. IS 2062 Gr.B plates
4		5.18	Cut and remove the externally provided box on the west side of the arch
5		5.19	Replace the west side arch roof (with castable lining) with a new roof casing as per the site dimensions. Carry out welding of necessary anchors and paint the inner surface with Painting system-VII. Fix the ceramic fibre modules along with 175mm thick modules with 25mm thick back up ceramic fibre blanket
6		5.20	Replace Leaky PG point as per Inspection Worklist
7		5.22	Attend repairs to the stack castable refractory lining
8		5.27	Anticipate replacement of snuffing steam lines and tees as per Inspection. (Pipe Size : 2" Sch 40, Matl. : SS 304- (Material code- 4140020954) and "T" Size : 2" Sch 40, Matl.: SS 304- (Material code - 4392400914))
7	15F-01B	5.14	Attend minor refractory repair in floor, radiant section, stack as per Inspection.
8		5.15	Anticipate replacement of radiant tube spigot – 3 Nos. Size : 1.5" NB Sch 40 – 442mm long. Matl: A312 TP310 (Material code – 4140140794) – Use E 309 Mo electrode. Offer for DP test of the weld joints.
9		5.16	Carry out Shell patch work externally at the holed location as marked by Inspection. Size : 6mm Thk., Matl: IS 2062 Gr.B (Material code – 6702711024)
10		5.18	Attend repairs to the stack refractory castable lining



CRUDE DISTILLATION UNIT-II (UNITS-15, 17 & 18) SHUTDOWN JOBS-2011
(FURNACES, COLUMNS / VESSELS & PIPING)

Exempted from LS Scope

Sl.No	Equipment	Work detail Sl. No.	Description
11		5.17	Anticipate replacement of snuffing steam lines and tees as per Inspection. (Pipe Size : 2" Sch 40, Matl. : SS 304- (Material code- 4140020954) and "T" Size : 2" Sch 40, Matl.: SS 304- (Material code - 4392400914))
12	15F-02A	5.16	Carryout replacement of North end radiant wall casing along with brick lining.
13		5.17	Carryout replacement of east side hip section and south end wall castable refractory work by providing necessary shuttering.
14		5.18	Attend minor refractory repair in floor, radiant and convection section header boxes as per Inspection. Job includes removal of old damaged anchors and welding of new refractory anchors.
15		5.19	Carry out Shell patch work externally at leaky and holed area as per Inspection. Use 6mm Thk. IS 2062 Gr.B plates.
16		5.20	Anticipate replacement of snuffing steam lines and tees as per Inspection. (Pipe Size : 2" Sch 40, Matl. : SS 304- (Material code- 4140020954) and "T" Size : 2" Sch 40, Matl.: SS 304- (Material code - 4392400914))
17		5.21	Attend minor repairs to the stack lining.
18		5.31	Anticipate patch plate welding on APH ducts using 6mm, IS 2062 Gr. B Plates. Use E 7018 electrode for welding. Approximate area – 5.0 Sq.Mtr
19		15C-02	5.7
20	15C-16	5.8	Carryout repairs (Grinding & Welding) to internal baffle plates as per Inspection. (Use electrode E 7018)
21		5.9	Carryout replacement of diplegs (extended portion inside the vessel - (Pipes of 4" Sch 80, 3" Sch 80 and 8" Sch 80) and its support plates / clamps as per Inspection.
22	18C-09	5.5	Carry out patch repair on the shell as per Inspection

