MATERIAL DATA SHEET FOR CATALYST TUBES

					E. FORMILLI
D0	2-May-2023	Issued for Information	E.F.	S.CH.	E.F.
Rev.	**Issue Date**	**Purpose of Issue**	**Prepared**	**Checked**	**Approved**

	Eslam Abad Gharb(NPC) **Gas To Methanol and PVM Complex**	
Page	**MATERIAL DATA SHEET FOR CATALYST TUBES**	**Rev.** / **Class**
2 of 5	**GTP-VD-10-20-ME-DSH-SH504**	**D0** / **B**

TABULATION OF REVISED PAGES

Page	Revision				
	D0				
1	X				
2	X				
3	X				
4	X				
5	X				
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Project No23057 (NH25-35MIC)

Qingdao NPA Industry Co,.Ltd	Material Data Sheet NH25-35MIC	Doc. No: NH25-35MIC Rev.: 01

Alloy: NH25-35MIC

Service: Centricast tubes sections

Reducer section (Static cast)

Grid plate (Static cast)

1. Chemical Analysis As Shown

Element	Mini-Max	Remarks
C	0.35-0.45	
Mn	≤1.25	
Si	0.75-1.5	
S	≤0.03	
P	≤0.03	
Cr	24.0-28.0	
Ni	32.0-36.0	
Nb	0.7-1.6	
Ti	0.05-0.25	
Pb	≤0.01	
Sn	≤0.01	
Zr	0.01-0.25	
Fe	Blance	
Mo	≤0.5	
Cu	≤0.25	
As	≤0.01	
V	≤0.10	
Al	≤0.05	
W	≤0.30	
Zn	≤0.01	

2. Mechanical Property at Room Temperature

Tensile strength : ≥450 MPa

Yield strength (Rp 0,2): ≥ 250 MPa

Elongation (4d): ≥8% for tube, ≥6% for static casting

Rev.	Date	Description	Orignated	Checked	Approved
1.0	02/May/23	REVISED WHERE INDICATED.	E. Formilli	S. Chegini	E. Formilli
0.0	18/Apr/23	FIRST ISSUE	E. Formilli	S. Chegini	E. Formilli

Project No23057 (NH25-35MIC)

3. Mechanical Property at Room Temperature after Aging at 1100℃ for 1000hrs

(Typical value) 1

Tensile strength : 575 MPa

Yield strength (Rp 0,2): 260 MPa

Elongation (5d): 13%

4. Typical Mechanical Property at High Temperatures 1

(80% of typical value as the criteria)

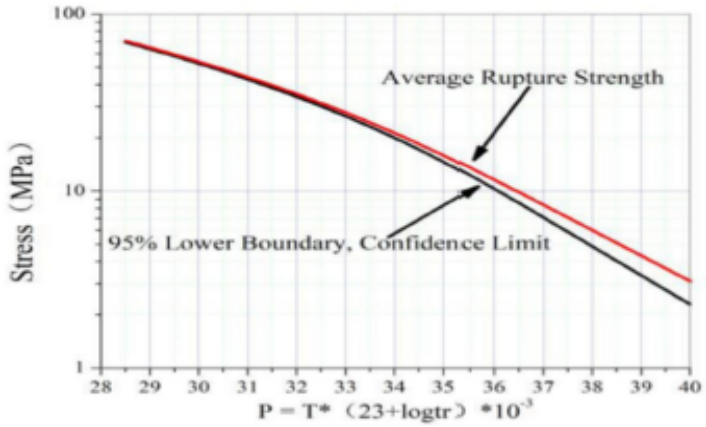
Temperature (℃)	Ultimate Strength (MPa)	Yield Strength (MPa)	Elongation (5d,%)
200	466	211	12.5
400	442	191	12.5
600	435	167	16.5
800	244	133	27.5
900	155	86	37.5
1000	101	59	50.0
1100	70	45	49.5

5. Physical Properties 1

Density	Coefficient of expansion (10^{-6}/℃)				Modulus of elasticity (GPa)				Thermal Conductivity (W/M · k)		
Kg/dm³	20~800℃	~900℃	~1000℃	~1100℃	800℃	900℃	1000℃	1100℃	800℃	1000℃	1100℃
8.03	17.3	17.8	18.6	19.1	115	112	108	102	23.5	27.8	29.5

Project No23057 (NH25-35MIC)

6. Larson Miller Curve (Stress Rupture Strength) ⚠1

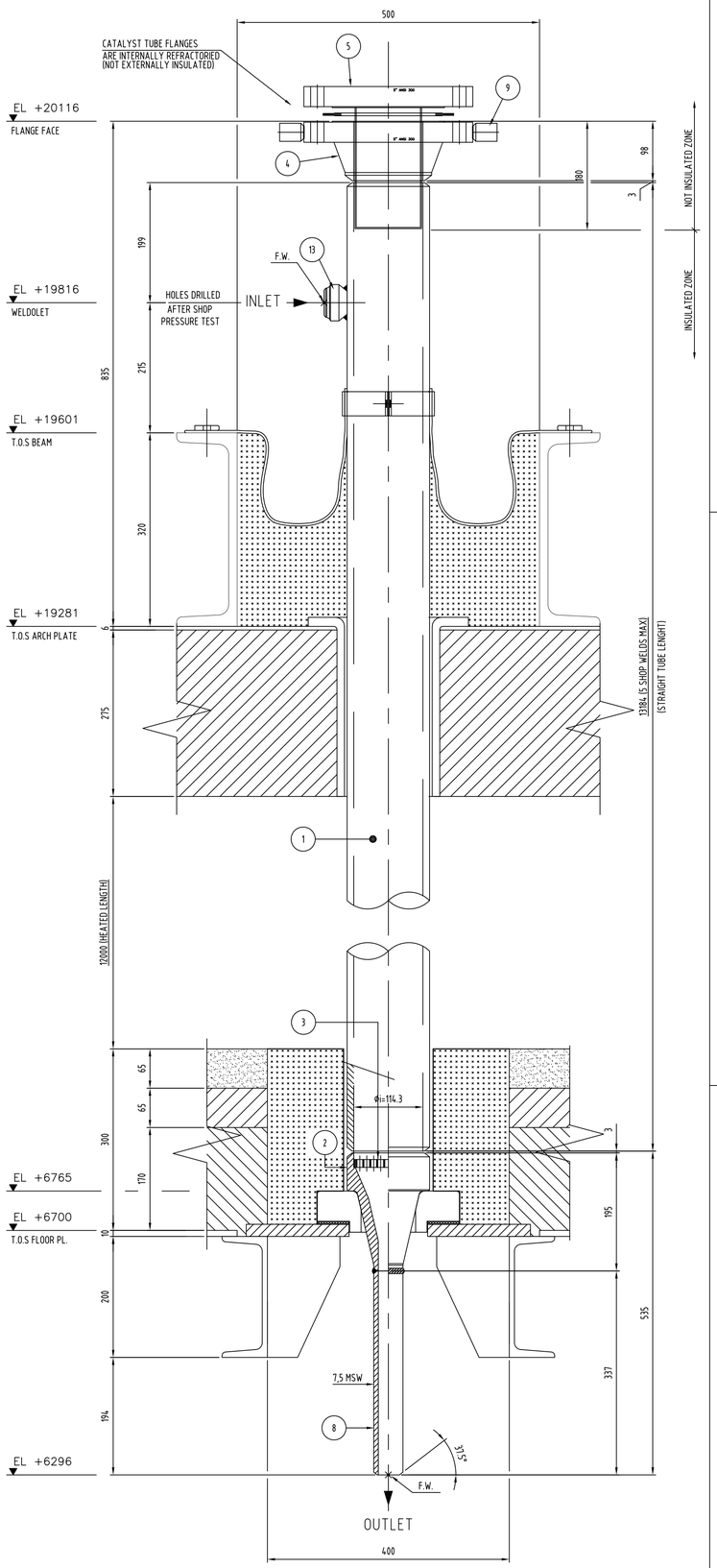


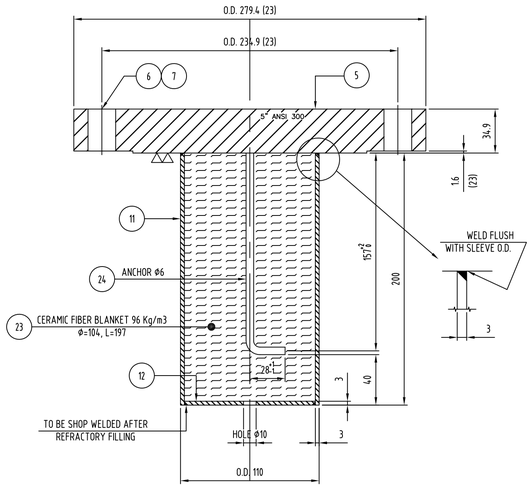
7. Stress Rupture Strength Table ⚠1

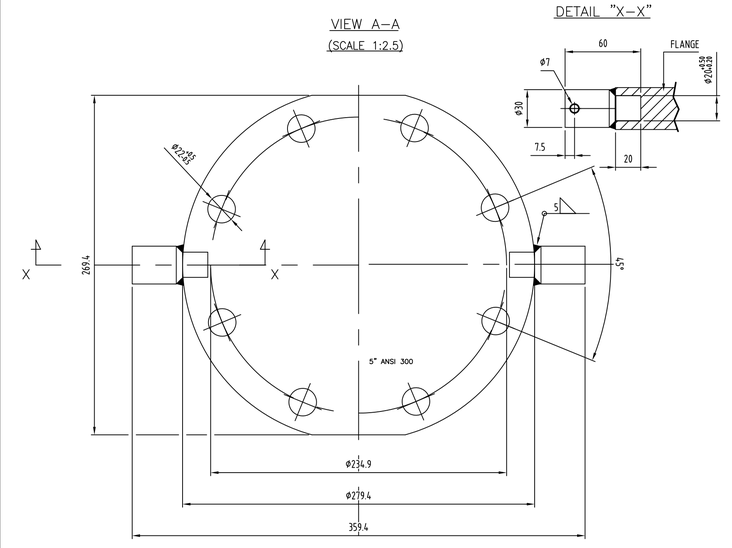
Temperature (℃)	1000hours Rupture Stress		10000hours Rupture Stress		100000hours Rupture Stress	
	Average (MPa)	Minimum (MPa)	Average (MPa)	Minimum (MPa)	Average (MPa)	Minimum (MPa)
850	62.5	61.2	50.6	49.3	40.1	38.8
900	48.8	47.6	38.1	36.8	28.9	27.6
950	37.0	35.8	27.6	26.4	19.9	18.6
1000	27.1	25.8	19.2	17.9	13.0	11.7
1050	19.0	17.7	12.7	11.4	8.3	7.0
1100	12.8	11.5	8.2	6.9	5.2	4.1
1125	10.3	9.1	6.4	5.3	4.2	3.2

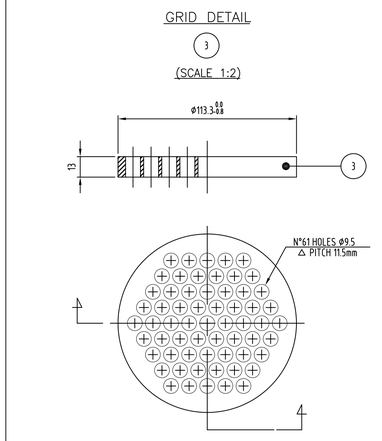
NOTE: Calculate allowable stress for static casting as 90% of Larson Miller Curve shown

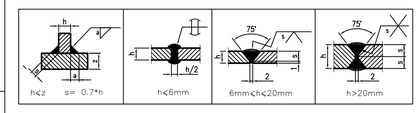
Edited: Lu Congcong 陆丛丛
Checked: Rinkal Dogra
Approved: Wang Zhenhua 王振华











GENERAL NOTES

1– ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2– VENDOR EXTENT OF SUPPLY SHALL BE AS SPECIF. IN PERTAINING MATERIAL REQUISITION.
3– ALL REQUIREMENTS AS SPECIFIED IN PERTAINING REQUISITIONS AND SPECIFIC. HAVE TO BE MET BY VENDOR.
4– IN CASE OF CONTRADICTION BETWEEN BILL OF MATERIAL AND DRAWINGS THE DRAWING SHALL GOVERN AND SHANFARI SHALL DIRECTLY BE INFORMED.
5– THE INDICATED GRID SHALL BE WELDED INTO CAT. TUBE BEFORE WELDING THE REDUCER TUBE.
6– ALL WELD PREPARATIONS ACCORDING WITH MANUFACTURER STANDARD UNLESS OTHERWISE NOTED AND APPROVED BY SHANFARI.
7– THE INSIDE SURFACE OF CAST TUBES AND FITTINGS SHALL BE 3.2 MICROMET. (Ra.) OR BETTER
8– WPS,PQR AND WELDER QUALIFICATION SHALL BE IN ACCORDANCE WITH ASME IX LAST EDITION.
9– MECHANICAL DIMENSIONAL DESIGN IS A FULL SUPPLIER'S RESPONSABILITY AND SHALL BE DEVELOPED BY TAKING INTO ACCOUNT THE CHARACTERISTICS OF SUPPLIED MATERIAL.
10– TOLERANCE: WORKING & PREFABBRICATION TOLERANCE AS PER DOC. "MATERIAL SPECIFICATION FOR REFORMER TUBES AND FITTINGS" No. "R–10–MSS–PR–001".
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16– CAST TUBE HYDROSTATIC PROOF TEST AND FINAL HYDROSTATIC TEST AS PER GTP–VD–10–20–QC–ITP–SH283 ITP.
17– WATER USED FOR HYDROTEST SHALL HAVE LESS THAN 25 ppm CHLORIDES.
18– INLET WELDOLET DIMENSION SEE DETAIL DWG.
19– THE WELDOLET ONLY WILL BE DRILLED AFTER HYDRAULIC TEST TO STRESS THE WELDING.
20– FLANGE DIMENSIONS AND THICKNESS, BOLTS/NUTS NUMBER, SIZE AND LENGTH, DATA OF TOP FLANGE GASKETS TO BE AS PER DWG. BASED ON FLANGE FITTING WITH TUBE I.D. AND O.D.
21– CATALYST TUBE ASSEMBLIES TO BE SUPPLIED COMPLETLY SHOP FABRICATED AND TESTED.
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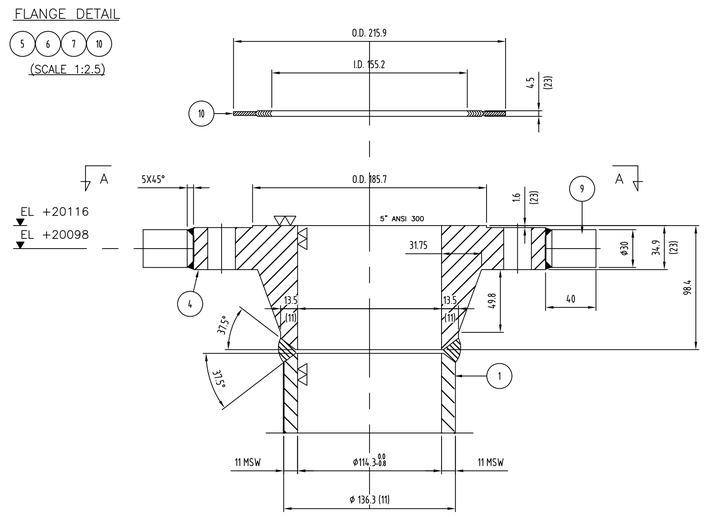
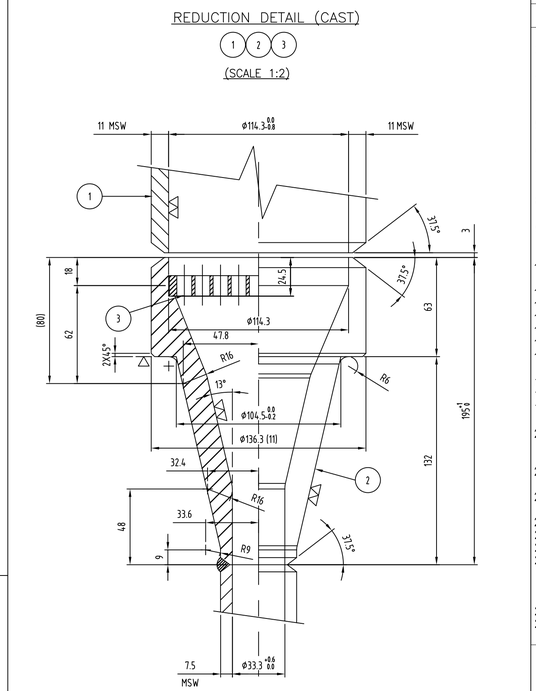
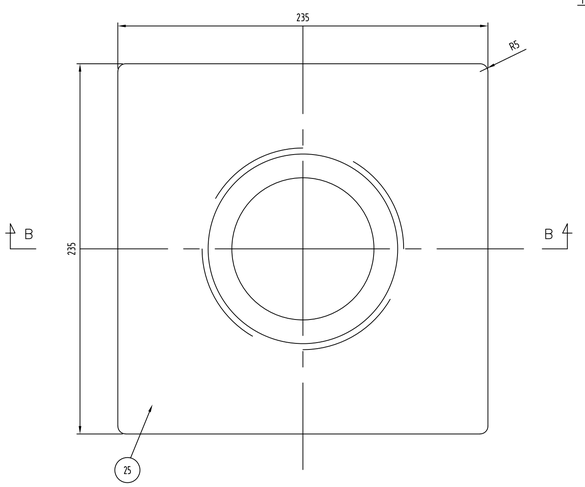
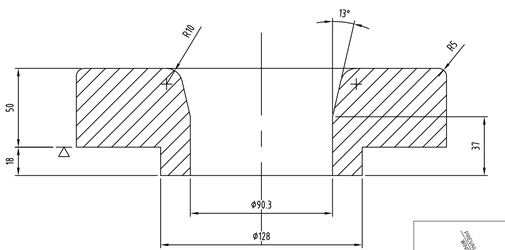
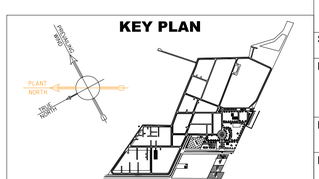
27– M.S.W MINIMUM SOUND WALL
28– T.B.C. TO BE CONFIRMED.











E. FORMILL

Rev.	Date	Status	Description	Issued by	Chkd by	Appd by	Client
D3	09-Aug-2023	AFC	APPROVED FOR CONSTRUCTION	A.C.	S.CH.	E.F.	A.AGH
D2	16-Jun-2023	AFC	APPROVED FOR CONSTRUCTION	A.C.	S.CH.	E.F.	A.AGH
D1	08-Sept-2022	IFC	ISSUED FOR COMMENT	A.C.	S.CH.	E.F.	A.AGH
D0	05-Aug-2022	IFC	ISSUED FOR COMMENT	A.C.	S.CH.	E.F.	A.AGH

Client's MC: Shargan Consultant Engineers
Client: N.P.C.
Vendor: Shanfari / پارگاسان PARGASHAN
Contractor: استیژ / شرکت طرح و ساخت پتنا (سهامی خاص)

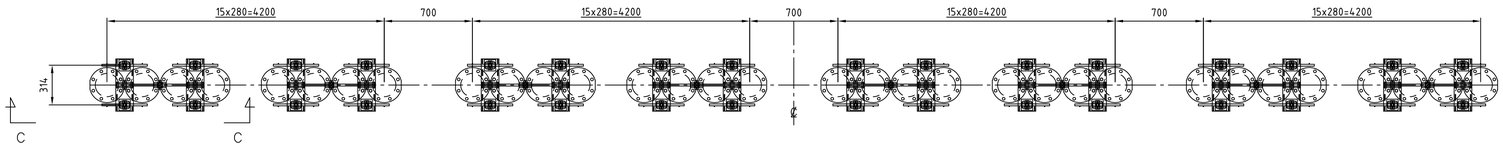
Project name:
Eslam Abad Gharb (NPC)
Gas To Methanol and PVM Complex

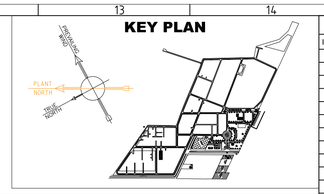
Sub Project Name: 660_KTA_METHANOL

Document Title :
DETAIL DRAWING FOR CATALYST TUBE
FOR STEAM REFORMER PACKAGE (10-H-2001)

Document Class :	Document Type :	Scale	Size	Sheet
A	DWG	1:5	A1	1_OF_2

Document Number: GTP-VD-10-20-TD-DWG-SH318 — Rev. D3



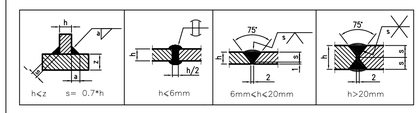


BILL OF MATERIALS

ITEM	Q.TY	DESCRIPTION AND DIMENSION (mm)	ASTM MAT.	VENDOR SPEC.
1	640	CENTRICAST TUBE ID ø114.3 Thk. 11mm MSW L=13184	25Cr 35Ni Nb MICRDALLOY	–
2	640	STATIC CAST REDUCER TO FIT TUBE I.D.	25Cr 35Ni Nb MICRDALLOY	–
3	640	GRID PLATE (STATIC CAST)	25Cr 35Ni Nb MICRDALLOY	–
4	640	SPECIAL FLG 5"– 300# ANSI RF MACHINED TO FIT TO POS.1	ASTM A 182 F304H	–
5	640	BLIND FLANGE 5"– 300# ANSI RF	ASTM A 182 F304H	–
6	5120	STUD BOLT ø 3/4" THREADED L=125	ASTM A 193 Gr.B8 Cl.2	–
7	10240	HEX.NUT ø 3/4"	ASTM A 194 Gr.8	–
8	640	PIPE O.D. ø48.3 7.5 MSW L=337	ASTM B-407 UNS N08811	–
9	1280	STEEL ROD ø30 L=60	S.S. 304	–
10	640	5" 300# SPIRAL WOUND GASKET Sp. 4.5mm WITH INNER/OUTER RING AISI 316	AISI 316 + GRAPHITE	–
11	640	PLATE THK.3mm	18/8 S.S.	–
12	640	PLATE OD 104mm THK.3mm	18/8 S.S.	–
13	640	WELDOLET ID ø114.3 Thk 10(11) MSW x 1 1/4" SCH.40 (b)(21)(22)	ASTM A182 F304H	–
14	160	PLATE 260 x 15 x 700	S275 JR	–
15	640	PLATE 180 x 15 x 360	S275 JR	–
16	640	PLATE 140 x 10 x 140	S275 JR	–
17	640	PLATE 90 x 10 x 90	S275 JR	–
18	320	UPN 140 L=414	S275 JR	–
19	1280	PLATE 80 x 10 x 90	S275 JR	–
20	640	PLATE 60 x 15 x 80	S275 JR	–
21	640	L=675	S275 JR	–
22	960	L=70	S275 JR	–
23	640	REFRACTORY	CERAMIC FIBRE BLANKET	–
24	640	ANCHOR ROD ø6 L=182	18/8 S.S.	–
25	640	TUBE SUPPORT CASTING	A 297 GR HK	–
26	1280	HEX.NUT M16	8.8	–
27	640	WASHERS FOR M16	S275 JR	–
28	1280	COTTER PIN ø5	S275 JR	–
29	1280	PLATE 50 x 8 x 100	S275 JR	–

GENERAL NOTES FOR MATERIAL

REV.
a) 100% PMI IS REQUESTED ON ALLOY STEEL AND STAINLESS STEEL FOR EACH COMPONENT (MIN. ONE TEST/HEAT).
b) WELDOLETS SHALL BE SUPPLIED FORGED BLIND TO BE DRILLED AFTER HYDROTEST.



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SECTION "C–C"

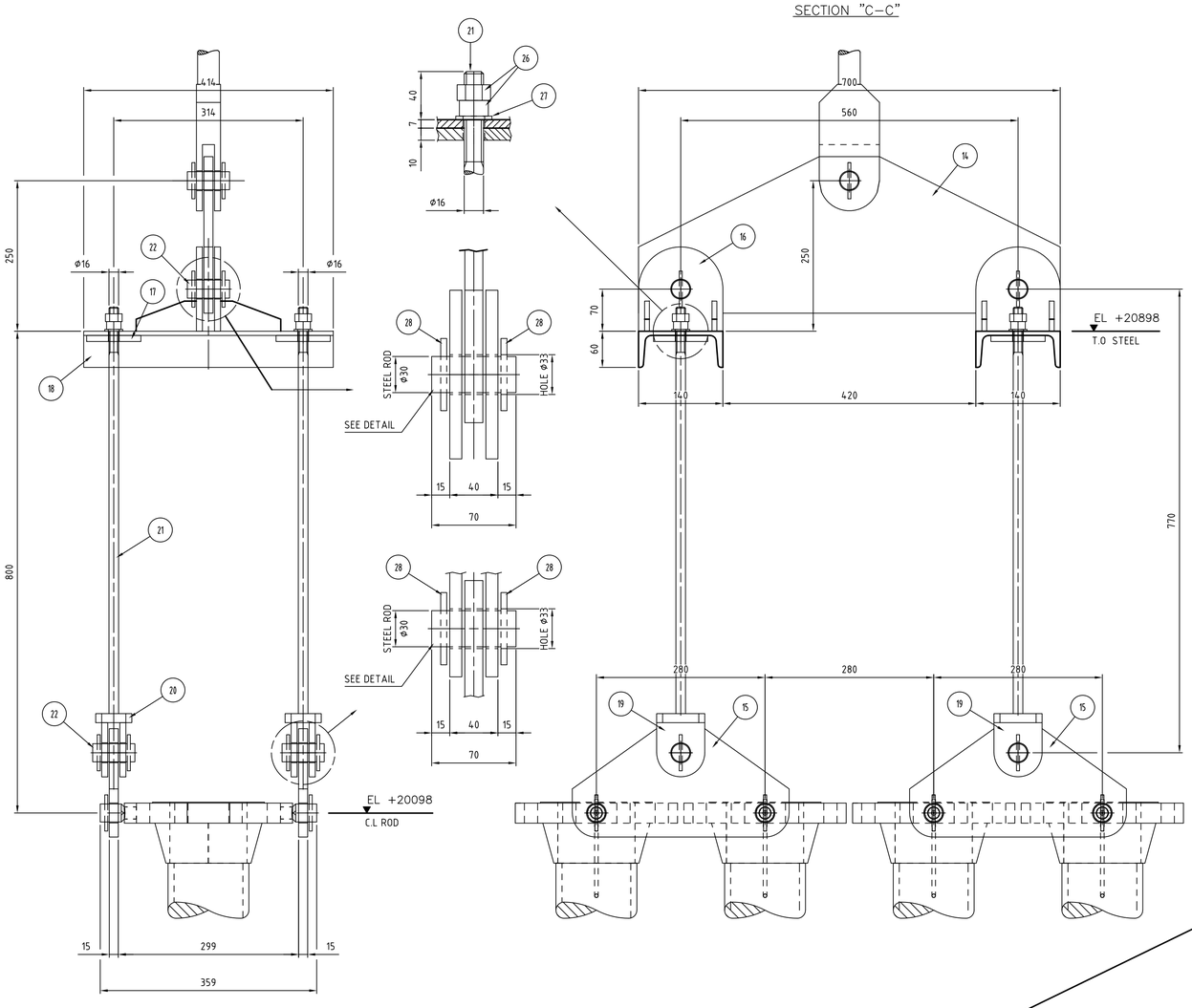

PLATE DETAIL
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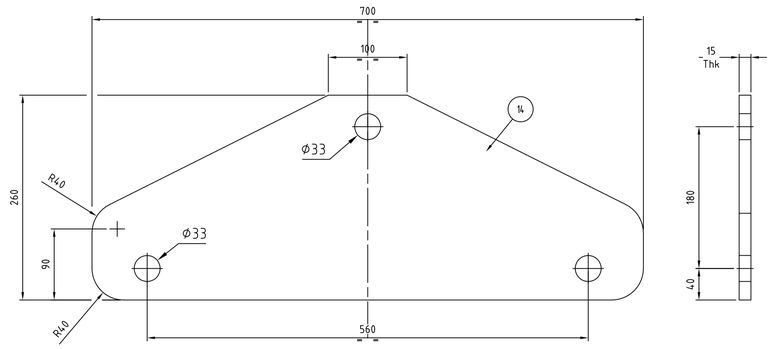

PLATE DETAIL
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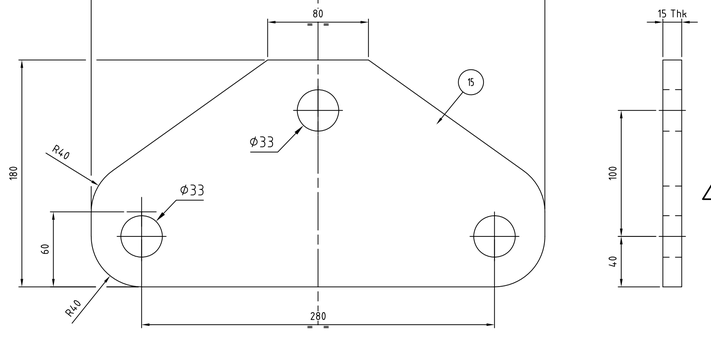

SUPPORT DETAIL
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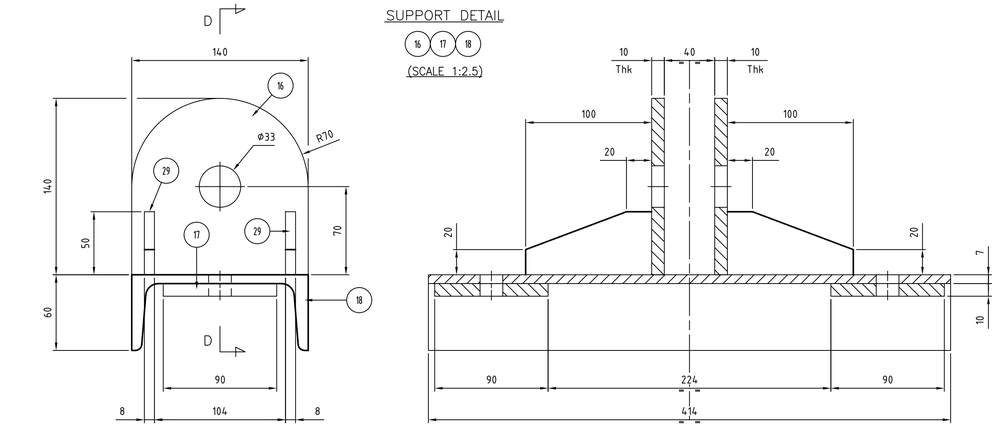

SUPPORT DETAIL
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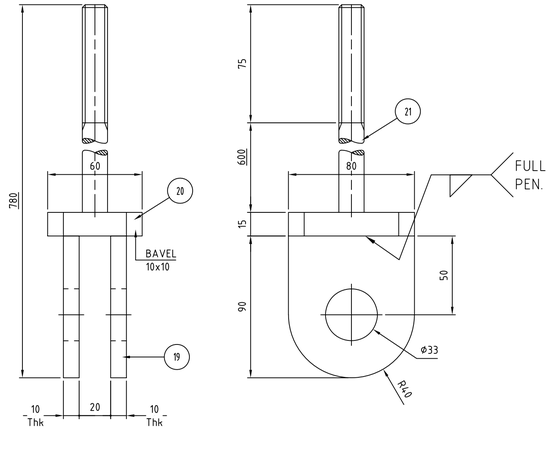

STEEL ROD DETAIL
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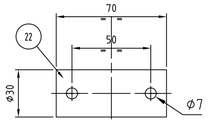

E. FORMILLI

DESIGN DATA

PART		FLANGES POS. 4/5	CAST TUBE	OUTLET ZONE POS. 8
FLUID		MIXED FEED+STEAM	MIXED FEED+STEAM	REFORMED GAS
FLUID PHASE		GAS	GAS	GAS
FLUID GROUP/EQUIPM. CATEGORY		–	–	–
MODULE		–	–	–
DESIGN PRESSURE	Bar(g)	24.0	24.0	23.0
DESIGN TEMPERATURE	°C	300	980	900
CORROSION ALLOWANCE	mm	0	0	0
HYDRO–TEST PRESS. (SHOP) (20)	Bar(g)	AS PER APPROVED ITP		
PNEUMATIC TEST PRESS. (SHOP)	Bar(g)	AS PER APPROVED ITP		
EMPTY WEIGHT	kg	520.3		
OPERATION WEIGHT	kg	–		
WEIGHT FULL OF WATER	kg	–		
VOLUME	m^3	–		
POST WELD HEAT TREATMENT		N.A.		
RADIOG. SHOP WELD PERC.	%	AS PER APPROVED ITP		
RADIOG. FIELD WELD PERC.	%	100		
DYE PENETRANT	%	AS PER APPROVED ITP		
PMI	%	AS PER APPROVED ITP		
ULTRASONIC EXAMINATION	%	AS PER APPROVED ITP		
MAGNETIC EXAMINATION	%	AS PER APPROVED ITP		
DESIGN AS PER		API 530–7TH; ASME B31.3 2018		
CONSTRUCTION AS PER				
INSPECTION BY				

Rev.	Date	Status	Description	Issued by	Chkd by	Appd by	Client
D3	09-Aug-2023	AFC	APPROVED FOR CONSTRUCTION	A.C.	S.CH	E.F.	A.AGH
D2	16-Jun-2023	AFC	APPROVED FOR CONSTRUCTION	A.C.	S.CH	E.F.	A.AGH
D1	08-Sept-2022	IFC	ISSUED FOR COMMENT	A.C.	S.CH	E.F.	A.AGH
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Client's MC: Shargan Consultant Engineers
Client: N.P.C.
Vendor: Shanfari, پرگاسیران PARGASIRAN
Contractor: اسپنز, شرکت طرح و ساخت پتا (هلدینگ صنایع نفت، گاز، پتروشیمی و نیرو)

Project name:
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