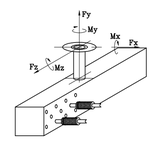
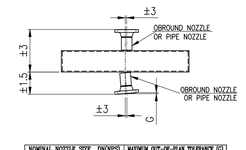
THE MAXIMUM ALLOWABLE MOMENTS AND FORCES PER EACH NOZZLE (IF LOADS ARE DIVIDED EQUALLY FOR NOZZLES ACCORDING TO 3xAPI 661(7.1.10.1)						
SIZE	Fx(N)	Fy(N)	Fz(N)	Mx(N.m)	My(N.m)	Mz(N.m)
4"	10020	8010	10020	2430	3660	2430
2"	3060	3990	3060	450	720	450



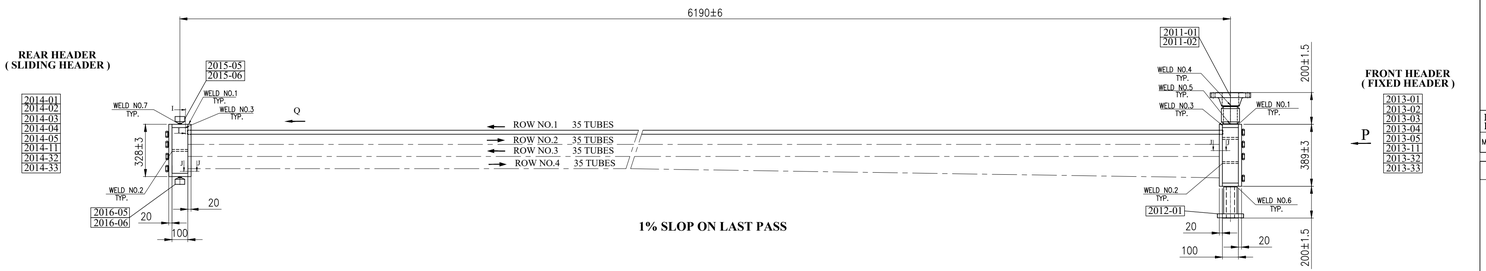
LATERAL DISPLACEMENT OF HEADERS (DIRECTION Z) INSIDE BUNDLE FRAME IN RELATION WITH EXPANSION FORCES ON NOZZLES (mm) (ACCORDING TO API661 7-1-1-2)	
MAXIMUM DISPLACEMENT OF FRONT AND REAR HEADER(Z DIRECTION)	INLET/OUTLET : ±9

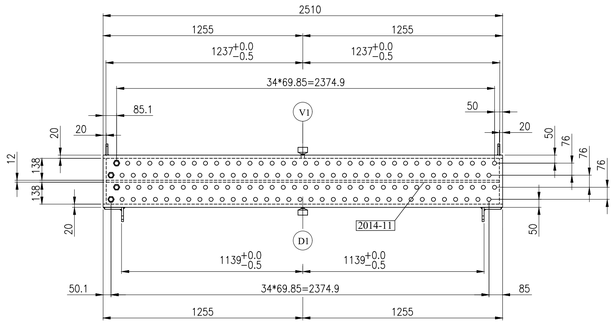
NOZZLE ALIGNMENT TOLERANCES



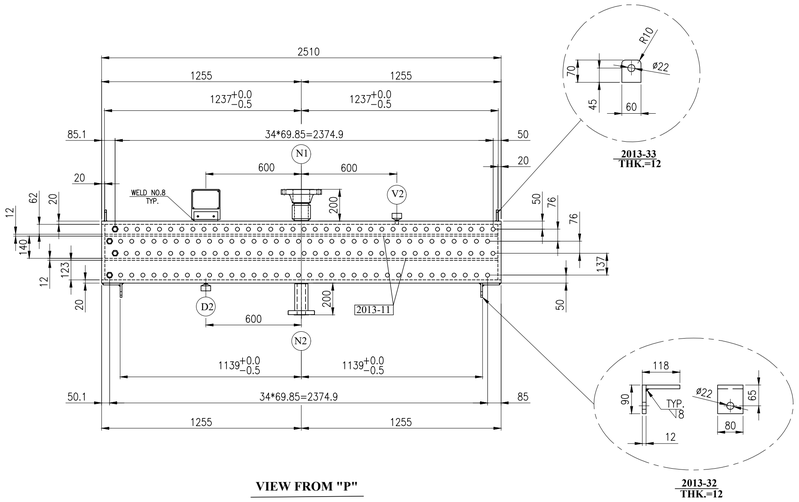
NOMINAL NOZZLE SIZE DN(NPS)	MAXIMUM OUT-OF-PLAN TOLERANCE (C)
50 TO 100 (2 TO 4)	1.6 mm (1/16 inch)
150 TO 300 (6 TO 12)	2.4 mm (3/32 inch)

PART NO.	DESCRIPTION	DIMENSIONS DIA.(mm)	LENGTH (mm)	WIDTH (mm)	THK.(mm)	MATERIAL	QTY.	UNT WEIGHT (Kg)	TOTAL WEIGHT (Kg)	STD DWG	REV.
2000-00	***A TUBE BUNDLE INCLUDING :***	-	-	-	-	-	2	***2919.9***	***5840***	-	
2010-00	***EXTRUDED FINNED TUBE INCLUDING :***	-	-	-	-	-	-	***2010.7***	-	-	
2010-01	BASE TUBE 1" (SEAMLESS -MIN. WALL-BWG16)	25.4	6096	-	1.65	SA-334 Gr.6	140	6.5	913.2	-	
2010-04	ALUMINUM TUBE	35.75	5212.08	-	4.9	AL-1060	140	7.8	1097.5	-	
2011-00	***INLET NOZZLE INCLUDING :***	-	-	-	-	-		***11.0***	-	-	
2011-01	PIPE NOZZLE 4" , SCH 160 (SEAMLESS)		107	-	13.49	SA-333 Gr.6	1	3.9	3.9	-	
2011-02	FLANGE 4" (ANSI B16.5 300#,WN,RF)	254	86	-	-	SA-350 LF2 CL.1	1	7.1	7.1	-	
2012-00	***OUTLET NOZZLE INCLUDING :***	-	-	-	-	-	-	***3.5***		-	
2012-01	NOZZLE 2" (ANSI B16.5.300#LWN,RF)	165	196	-	15.85	SA-350 LF2 CL.1	1	3.5	3.5	-	
2013-00	***FRONT HEADER INCLUDING :***	-	-	-	-	-	-	***446.8***	-	-	
2013-01	TUBE SHEET	-	2510	389	20	SA-516 Gr.70N	1	153.3	153.3	-	
2013-02	PLUG SHEET	-	2510	389	20		1	153.3	153.3	-	
2013-03	TOP PLATE	-	2510	100	20		1	39.4	39.4	-	
2013-04	BOTTOM PLATE	-	2510	100	20		1	39.4	39.4	-	
2013-05	END PLATE	-	349	100	20		2	5.5	11.0	-	
2013-11	PARTITION	-	2470	100	12		2	23.2	46.5	-	
2013-32	SLIDING PAD	-	106/90	80	12		2	1.6	3.1	-	
2013-33	FIXING	-	70	60	12		2	0.4	0.8	-	
2014-00	***REAR HEADER INCLUDING :***	-	-	-	-	-	-	***373.6***	-	-	
2014-01	TUBE SHEET	-	2510	328	20	SA-516 Gr.70N	1	129.3	129.3	-	
2014-02	PLUG SHEET	-	2510	328	20		1	129.3	129.3	-	
2014-03	TOP PLATE	-	2510	100	20		1	39.4	39.4	-	
2014-04	BOTTOM PLATE	-	2510	100	20		1	39.4	39.4	-	
2014-05	END PLATE	-	288	100	20		2	4.5	9.0	-	
2014-11	PARTITION	-	2470	100	12		1	23.3	23.3	-	
2014-32	SLIDING PAD	-	106/90	80	12		2	1.6	3.1	-	
2014-33	FIXING	-	70	60	12		2	0.4	0.8	-	
2015-00	***VENT INCLUDING :***	-	-	-	-	-	-	***6.0***	-	-	
2015-05	COUPLING 1",6000#	-	-	-	-	SA-350 LF2 CL.1	2	1.7	3.4	2122	
2015-06	PLUG FOR COUPLING 1",6000#	-	-	-	-	SA-350 LF2 CL.1	2	1.3	2.6	2242	
2016-00	***DRAIN INCLUDING :***	-	-	-	-	-	-	***6.0***	-	-	
2016-05	COUPLING 1",6000#	-	-	-	-	SA-350 LF2 CL.1	2	1.7	3.4	2122	
2016-06	PLUG FOR COUPLING 1",6000#	-	-	-	-	SA-350 LF2 CL.1	2	1.3	2.6	2242	
2020-00	***MISCELLANEOUS PARTS INCLUDING :***	-	-	-	-	-	-	***62.3***	-	-	
2020-01	PLUG (1 1/8" 12 UNF CL.2A)	-	-	-	-	SA-350 LF2 CL.1	280	0.22	61.6	2201	
2020-02	PLUG GASKET	29/35.5	-	-	1.5	SOFT IRON	280	-	-	2280	
2020-02	STAND FOR BRACKET	-	150	60	5	C.S	1	0.35	0.7	-	





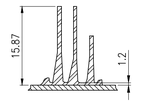
VIEW FROM "Q"
REAR HEADER



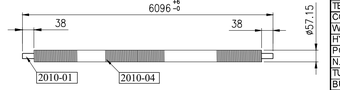
VIEW FROM "P"
FRONT HEADER

FIN TUBE DETAIL

EXTRUDED DETAIL



EXTRUDED DETAIL



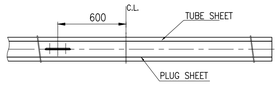
EXTRUDED FIN TUBE 1" SEAMLESS FPI=11 Fin dia.=Ø57.15

NOZZELS TABLE

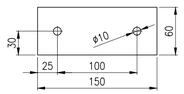
MARK NO.	SERVICE	SIZE	NOZZLE MATERIAL	FLANGE MATERIAL	RATING	TYPE	FACING	SCH. THK.	FLANGE FACE FINISHING	QTY. PER BUNDLE	QTY. PER ITEM
N1	INLET NOZZLE	4"	SA-333 Gr.6	SA-350 LF2 CL.1	300#	WN	RF	160	125-250 µ-in	1	2
N2	OUTLET NOZZLE	2"	SA-350 LF2 CL.1		300#	LWN	RF	15.85	125-250 µ-in	1	2
V1,V2	VENT	1"	SA-350 LF2 CL.1		6000	COUPLING	-	-	-	2	4
D1,D2	DRAIN	1"	SA-350 LF2 CL.1		6000	COUPLING	-	-	-	2	4

APPLICABLE CODES AND STANDARDS
ASME VIII-DIV.1 2019, API 661

SERVICE	PROPANE
MAXIMUM DESIGN TEMPERATURE (°C)	120
MINIMUM DESIGN AMBIENT TEMPERATURE (°C)	5
DESIGN PRESSURE (barg)	22+F.V.
TEST PRESSURE (barg)	
CORROSION ALLOWANCE	3
WELD JOINT EFFICIENCY	0.6 FOR PARTITION / 0.85 FOR OTHER PARTS
HYDROTEST	YES
POST WELD HEAT TREATMENT	YES
N.D.T. EXAMINATION OF WELDED JOINTS	SEE NDT CHECK LIST
TUBE TO TUBE SHEET JOINT	STRENGTH WELD + EXPANDED
BUNDLE CAPACITY (m 3)	0.480
BUNDLE WEIGHT WITH FRAME (EMPTY) (Kg)	2920
BUNDLE WEIGHT WITH FRAME (FULL OF WATER) (Kg)	3400



NAME PLATE POSITION



THK.= 5 mm
2020-05

NOTES :

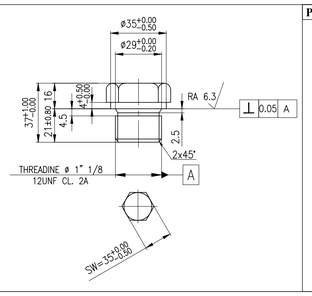
1- ALL DIMENSIONS ARE IN MILIMETERS .
2- ALL NOZZLE FACINGS SHALL BE PROTECTED BY COVER AND 4 BOLTS.
3- FLANGE CONTACT FACES SHALL BE COATED WITH GREASE.
4- ALL FLANGE BOLTS SHALL STRADDLE MAIN AXISES .
5- ALL ENGINEERING AND MANUFACTURING CHARACTERISTICS NOT MENTIONED ON THIS DRAWING ARE INDICATED ON THE FOLLOWING APPLICABLE DOCUMENTS :
- A -CALCULATION BOOK
- B -WELDING PROCEDURE SPECIFICATION (W.P.S.)
- C -NON DESTRUCTIVE TEST CHECK LIST (N.D.T.)
- D -PAINTING & GALVANIZING SPECIFICATION SHEETS

6- HEADER PLUG THREADS SHALL BE COVERED BY ANTISEIZE GREASE PROPER FOR 200°C TEMPERATURE.

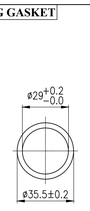
REFERENCE DOCUMENTS		
TITLE	VENDOR DOCUMENT NO.	CLIENT DOCUMENT NO.
GENERAL ARRANGEMENT	1158-A01-1000-00	EI027-DMF-VD-ME-DWG-003
BUNDLE FRAME	1158-A01-2400-00	EI027-DMF-VD-ME-DWG-007
AIR COOLER DATA SHEET	1158-A01-0010-00	EI027-DMF-VD-ME-DSH-002
MECHANICAL CALCULATION	1158-A01-0020-00	EI027-DMF-VD-ME-CAL-006
WELDING PROCEDURE SPECIFICATION (W.P.S.)	1158-A01-0060-00	EI027-DMF-VD-QC-WPS-021
NON DESTRUCTIVE TEST CHECK LIST (N.D.T.)	1158-A01-0070-00	EI027-DMF-VD-QC-PRO-022

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED BY	FINAL APPROVED BY
2						
1						
0	06/02/2024	ISSUED FOR APPROVAL	F.SZ	S.S	J.B.L	A.GHZ

PLUG (1 1/8" 12 UNF CL.2A)

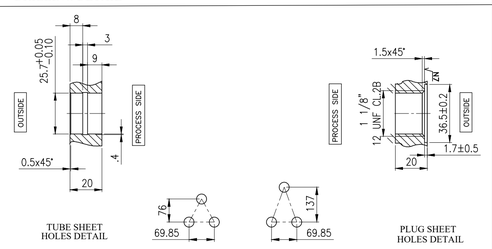


PLUG GASKET



THK.=1.5

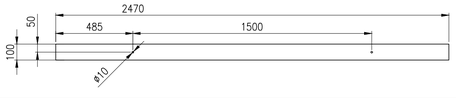
DRILLING DETAIL



TUBE SHEET HOLES DETAIL

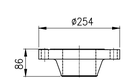
PLUG SHEET HOLES DETAIL

PARTITION THK. =12 2013-11 & 2014-11

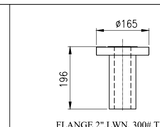


NOZZLE DETAIL

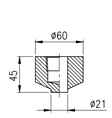
PIPE 4" SCH.160,THK.=13.49
W=3.9 Kg,SCALE=2:1



FLANGE 4" , SCH.160,WN 300#,
W=7.1 Kg,SCALE=2:1



FLANGE 2",LWN, 300#,THK.=15.85
W=3.5 Kg,SCALE=2:1

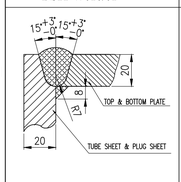


COUPLING 1" 11 1/2 NPT, 6000 #
STD. NO. 2122

PLUG Ø1" 11 1/2NPT
STD 2242

TABLE OF WELDS
WPS NO. 1158-000-0060-00

WELD NO. 1
DS11-W010/01



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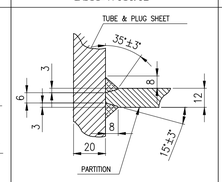
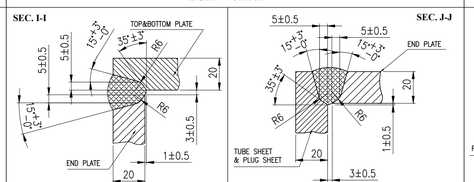
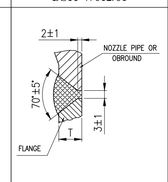
DS11-W010/02



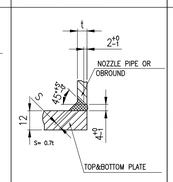
WELD NO. 3
DS11-W011/01



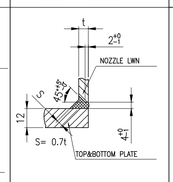
WELD NO. 4
DS11-W012/01



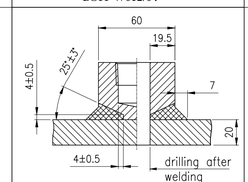
WELD NO. 5
DS11-W012/02



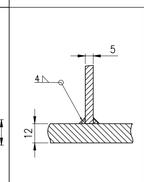
WELD NO. 6
DS11-W012/03



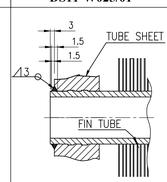
WELD NO. 7
DS11-W012/04



WELD NO. 8
DS11-W014/01



WELD NO. 9
DS11-W025/01



CLIENT:

CONTRACTOR:

PROJECT :
AIR COOLER FOR
Toase-ehe Park Sanati Gohar Ofogh Petrochemical Co.

TUBE BUNDLE DRAWING
1158-A01-2000-00

DWG. NO.	EI027-DMF-VD-ME-DWG-005
SCALE : N.T.S.	SIZE : A1 REV. : 0

Damafin
thermal technology
Factory : Km 14 special Karaj road