Base Load Power Hub (BLPH)

EQUIPMENT DATA SHEETS - HYDROGEN VENT (Q-43004)

Document Number 1724000887-MAC-DS-00006

Document Class: 2

Rev.	Date	Description	Prepared	Reviewed	Approved
04	06/12/2024	Accepted for Construction (AFC)	SB	RV	ADL
03	20/10/2024	Accepted for Construction (AFC)	SB	RV	UL
02	04/09/2024	Issue for Review (IFR)	SB	RV	UL
01	25/07/2024	Issue for Review (IFR)	SB	RV	UL
00	07/06/2024	Issue for Review (IFR)	ADL	GP	UL

THERMO ENGINEERING
AN ENCORE COMBUSTION COMPANY

Revision / Change Log

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Rev.	Description
00	Issue for Review (IFR)
01	Issue for Review (IFR)
02	Issue for Review (IFR)
03	Acceptance for Constrcution (AFC)
04	Accepted for Construction (AFC)

HOLDS LIST

No.	Description
1	
2	
3	
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TECHNICAL SPECIFICATION FOR
12 " – SVT - STANDARD VENT TIP
ITEM : Q-43004

Equipment description

The Vent tip type SVT (Standard Vent Tip) is a tip capable to vent into atmosphere the specified gas flow.

The tip will be supplied complete with the following items:

- Vent shell realised from stainless steel plate.
- Protection windshield realised from stainless steel perforated plate to avoid the flame came down (in case of combustion), for wind effect, on the external part of the tip shell down wind direction.
  This undesirable effect is the responsible of short tip life of tips located in exposed wind sites.
- 150# W.N.R.F. flange for riser connection.
- Set of stainless-steel supports for the windshield.
- Lifting hooks for tip assembling realised in stainless steel material.
- 2 nos. MIOL-C (red steady burning) will be installed at approx. 1.5 meter from the top of the vent.
- Electrical ladder type cable tray (100 mm width) with supports will be provided for AWL.
- Bird screen will be provided in top of vent tip.

The tip will be delivered completely assembled with all components and ready to be installed.

The tip will be provided with a bird screen at the top.

Please see attached table (Attachment 1_Maintenance) and please refers to Operation Maintenance Manual Doc. No.: 1724000887-MAC-MAN-00017_01

DESIGN DATA				
- Release case		CASE HOT BLOWDOWN		
- Max. gas flow	(kg/h)	13485		
- Gas temperature	(°C)	120		
- Average gas molecular weight	(kg/kmol)	2		
- Cp/Cv ratio		1.4		
FLARE PHYSICAL DATA				
- Exit gas velocity at max. flow	(m/s)	678.47		
- Mach number		.44		
- Flare tip pres.drop at max.flow	(mmH2O)	1704.8		
CONSTRUCTION DATA				

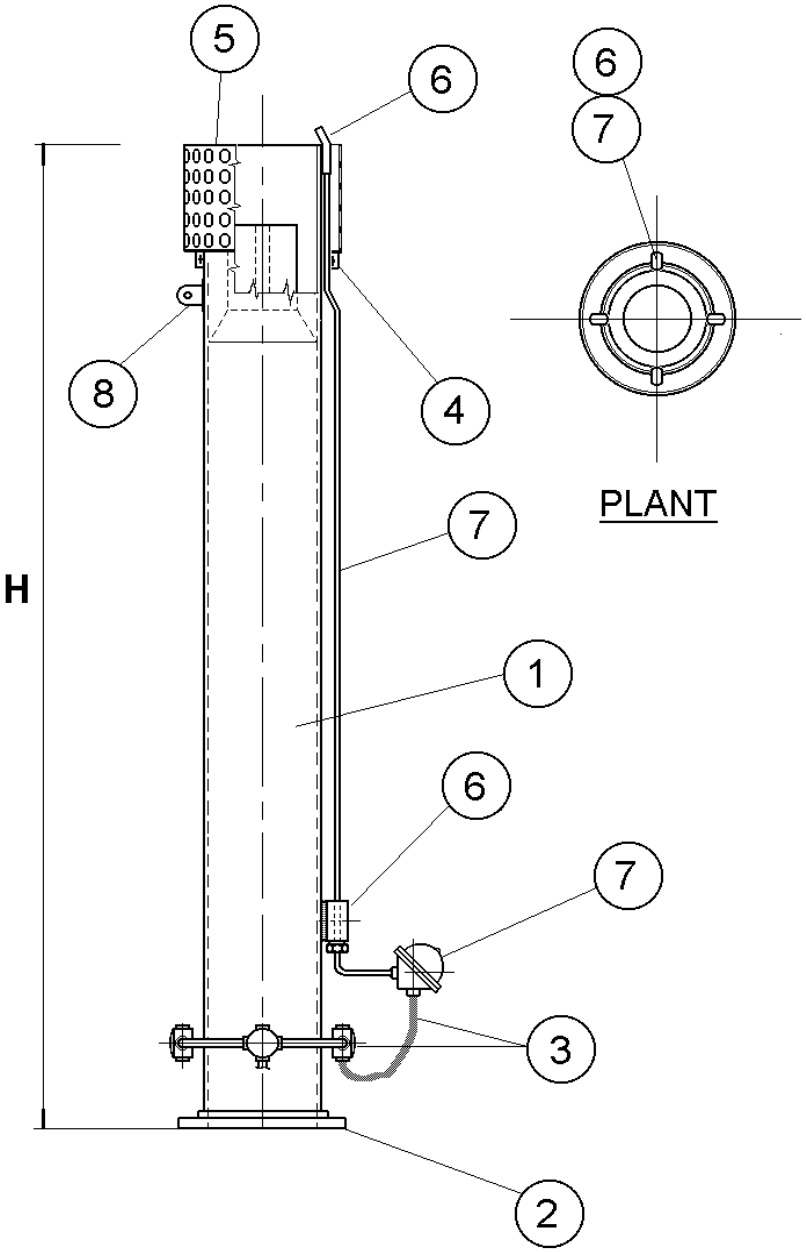
Pos.	Description	No.	Diameter "	Conn. rating	Material	Notes
1	Vent shell	1	12	-	AISI - 316	
2	Connection flange	1	12	150# WNRF	AISI – 316L	
3	Conduit for thermocoup.	0	-	-	-	
4	Windshield support/s	3	-	-	AISI-316	
5	Windshield	1	-	-	AISI-316	
6	Thermocouples guide	0	-	-	-	
7	Thermocouples	0	-	-	-	-
8	Lifting hooks	2	-	-	AISI-316	-
9						
10						
11						
12						
13						
14						

REQUIRED UTILITIES		
- Purge gas or min. gas flow	(Nm^3/h)	3.41

DIMENSIONS AND WEIGHTS		
- Tip net weight	(kg)	450
- Dimension for transport	(cm)	505 H X 120 L X 60 W
- Gross weight for transport	(kg)	500
- Flare tip height	(m)	H = 5

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VENT TIP GENERAL SCHEME



TECHNICAL SPECIFICATION FOR
12 " – SVS - SPIRAL VENTURI SEAL
ITEM : Q-43004

Equipment description

The Seal type SVS (Spiral Venturi Seal) is a system capable to avoid the air inlet into the flare riser using the minimum possible purge gas quantity as indicated on this specification.

The indicated flow is the minimum quantity necessary to maintain the oxygen concentration below the seal **less than 6%.** Into the seal are located strategically four sagomated plates that produce a vorticosity at the exit gas.

The vorticosity flow produce an excellent air/gas mixture immediately at the top of the tip. It is intuitive that the phenomena increases with the increasing of the exit gas velocity and consequently the combustion efficiency does not change at any flow.

The main components are:

- Internal reduction cone. The size reduction is calculated in function of the available gas pressure.
- Internal shell to keep the required restriction and to obtain the venturi effect.
- Shaped plates to produce the necessary vorticosity to exit gas. It is important note that the above plates do not create any size restriction.

The specified quantity does not consider the purge gas volume change due to ambient temperature variations.

The seal is self-draining type, and no external drain line is required. Normally the seal is directly installed into the flare tip. No internal seal parts are in movement and no block is possible.

No maintenance is required during the normal operations.

Please see attached table (Attachment 1_Maintenance) and please refers to Operation Maintenance Manual Doc. No.: 1724000887-MAC-MAN-00017_01

DESIGN DATA				
Release case		CASE HOT BLOWDOWN		
Max. gas flow	(kg/h)	13485		
Gas temperature	(°C)	120		

Average gas molecular weight	(kg/kmol)	2		
Cp/Cv ratio		1.4		

FLARE PHYSICAL DATA				
Seal pressure drop at max. flow	(mmH2O)	271.94		

CONSTRUCTION DATA

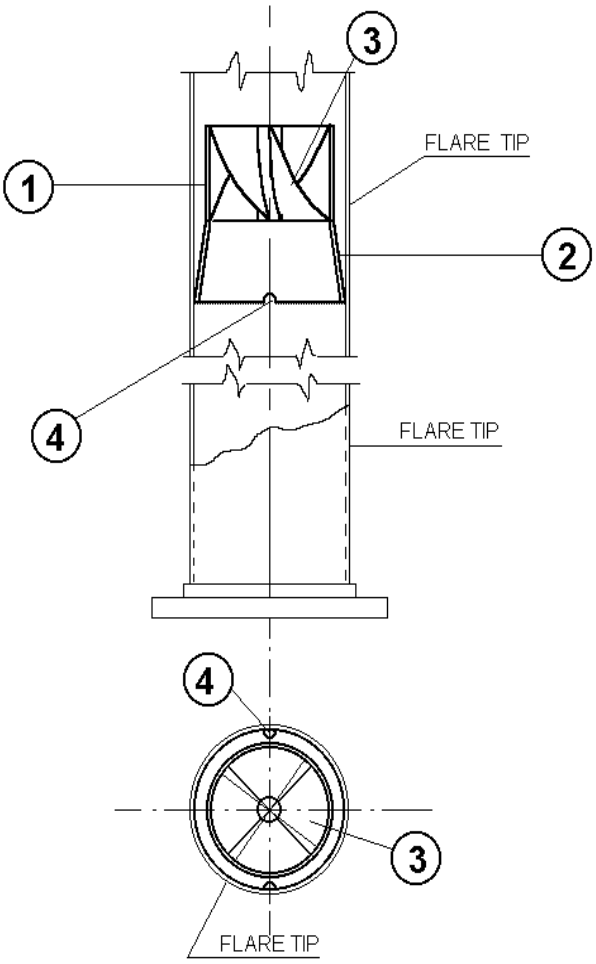
Pos	Description	No.	Diameter "	Conn. rating	Material	Notes
1	Seal diameter	1	12	-	AISI-316	
2	Reduction cone	1	-	-	AISI-316	
3	Internal sectors	4	-	-	AISI-316	
4	Drain	2	-	-		Internal
5						
6						
7						
8						

REQUIRED UTILITIES				
- Purge gas or min. gas flow	(Nm^3/h)	3.41(2)		

DIMENSIONS AND WEIGHTS				
- Seal net weight	(kg)	40		

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EQUIPMENT SCHEME



GENERAL NOTES	
1	The seal is assembled into the flare tip.
2	The indicated purge quantity is of inert or combustible gas in order of preference.
3	
4	
5	
6	

TECHNICAL SPECIFICATION FOR
16.5 m SELF-SUPPORTING TYPE ELEVATED VENT
ITEM: Q-43004

DESIGN DATA				
Release case		CASE HOT BLOWDOWN		
Max. gas flow	(kg/h)	13485		
Gas temperature	(°C)	120		
Average gas molecular weight	(kg/kmol)	2		
Cp/Cv ratio		1.4		
VENT PHYSICAL DATA				
Vent total pres. drop at max. flow	(mmH2O)	3000	TO BE ADDED TO DELTA P OF WS	

CONSTRUCTION DATA

Description	No.	Diameter "	Conn. rating	Material	Notes
Vent riser	1	12	150# WN. RF.	SA350 GR. LF2	For flanged connections
- upper stack	1	20	-	SA516 GR.60 or equiv.	
- bottom stack (WATER SEAL)	1	42		SA516 GR.60 or equiv.	-
Gas inlet connection	1				See attached Nozzle List table on sheet 13 of 14
Nozzle for instrument					See attached Nozzle List table on sheet 13 of 14

REQUIRED UTILITIES				
- Purge gas or min. gas flow	(Nm^3/h)	3.41		

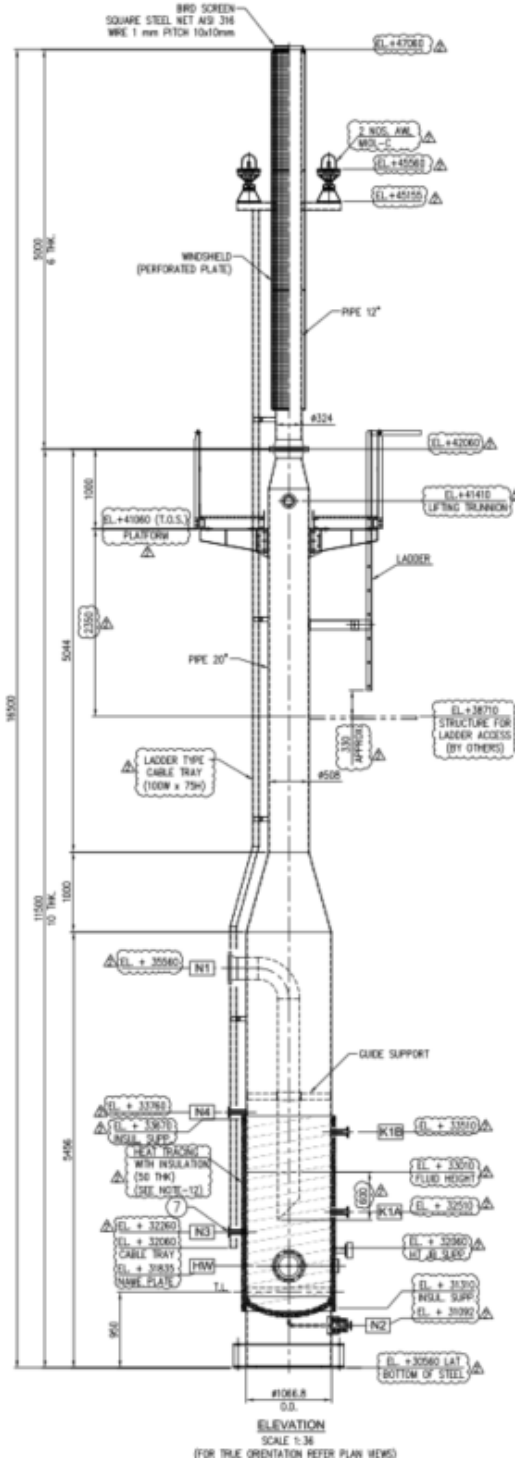
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DIMENSIONS AND WEIGHTS				
- Total vent height (including 5m tip)	(m)	16.5		
- Vent total weight	(kg)	4500		
- Delivered number of trunks (excluding tip)		1		
- Trunks max. length	(m)	11.5		

Please see attached table (Attachment 1_Maintenance) and please refers to Operation Maintenance Manual Doc. No.: 1724000887-MAC-MAN-00017_01

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VENT RISER GENERAL ARRANGEMENT



TECHNICAL SPECIFICATION
FOR
VERTICAL LIQUID SEAL

Equipment description

The Vertical Liquid Seal (V-WS) is an equipment capable to avoid the flame return into the gas header in case of no purge gas presence in the flare system.

- The seal will be located directly under the flare stack and will be itself part of the riser. The vessel will be calculated for the design internal pressure and temperature and verified as part of riser at the mechanical stability.
- The seal base will be complete with baseplate and anchor boxes for connection with foundation by means of foundation bolts (foundation and foundation anchor bolts are not in our scope of supply).
- The top of the seal (gas exit connection) will be constituted of a reduction cone to connect to the stack.
- The seal will be delivered completely assembled and ready for field installation.
- the liquid consumption is based on the assumption of the refilling of water and glycol every 6 months.
-The liquid seal drum, instrument connection, drain line to be electrically traced for avoiding ice formation (set temp.+5°C).
- ETE shall supply loose Thermostat to be installed by customer.
- ETE shall provide and installed self-regulating heating cable. (for details - see attached datasheet)
- All supports (clips) for 50 THK insulation are provided and installed by ETE.

Please see attached table (Attachment 1_Maintenance) and please refers to Operation Maintenance Manual Doc. No.: 1724000887-MAC-MAN-00017_01

DESIGN DATA		
- Max. gas flow	(kg/h)	13485
- Operating temperature	(°C)	120
- Design temperature	(°C)	80
- Operating pressure	(mmH2O)	ATM
- Design pressure	(barg)	3.5
- Average gas molecular weight	(kg/kmol)	2
- Water seal pressure drop at max. flow	(mmH2O)	1109.352
- Shell corrosion allowance	(mm)	3
- Head and cone corrosion allowance	(mm)	3
- Liquid type for seal	(vol/vol)	Water/Glycol (50%)
- Liquid consumption	(l/h)	0.12 l/h

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- External insulation		Yes
- Design code		ASME VIII Div 1 and 2014/68/EU (PED CE)
- Test by		ETE (Per Code)
-Hydrotest pressure	(barg)	5.5
- MDMT	(°C)	-29
-Fluid Group		1
-Volume	Liter	4700
-Filling liquid Volume	Liter	1700
-Category		IV
-Module		G
- Noise Requirements		<85 dBA @1mt distance
- Painting Project Spec.		123A90-DDL-MAT-SP-60006
- ATEX Area		ATEX (2014/34/EU)
-Area Classification		ZONE 2 IIC T1

CONSTRUCTION DATA (See scheme at next page)

Description	No.	Material	Notes
Seal shell	1	A-516 Gr.60 or equiv.	
Upper reduction cone	1	A-516 Gr.60 or equiv.	
2 : 1 elliptical head	1	A-516 Gr.60 or equiv.	
Seal skirt	1	S275 J0 or equiv.	
Internal gas header	1	A-333 Gr.6 or equiv.	

DIMENSIONS AND WEIGHTS

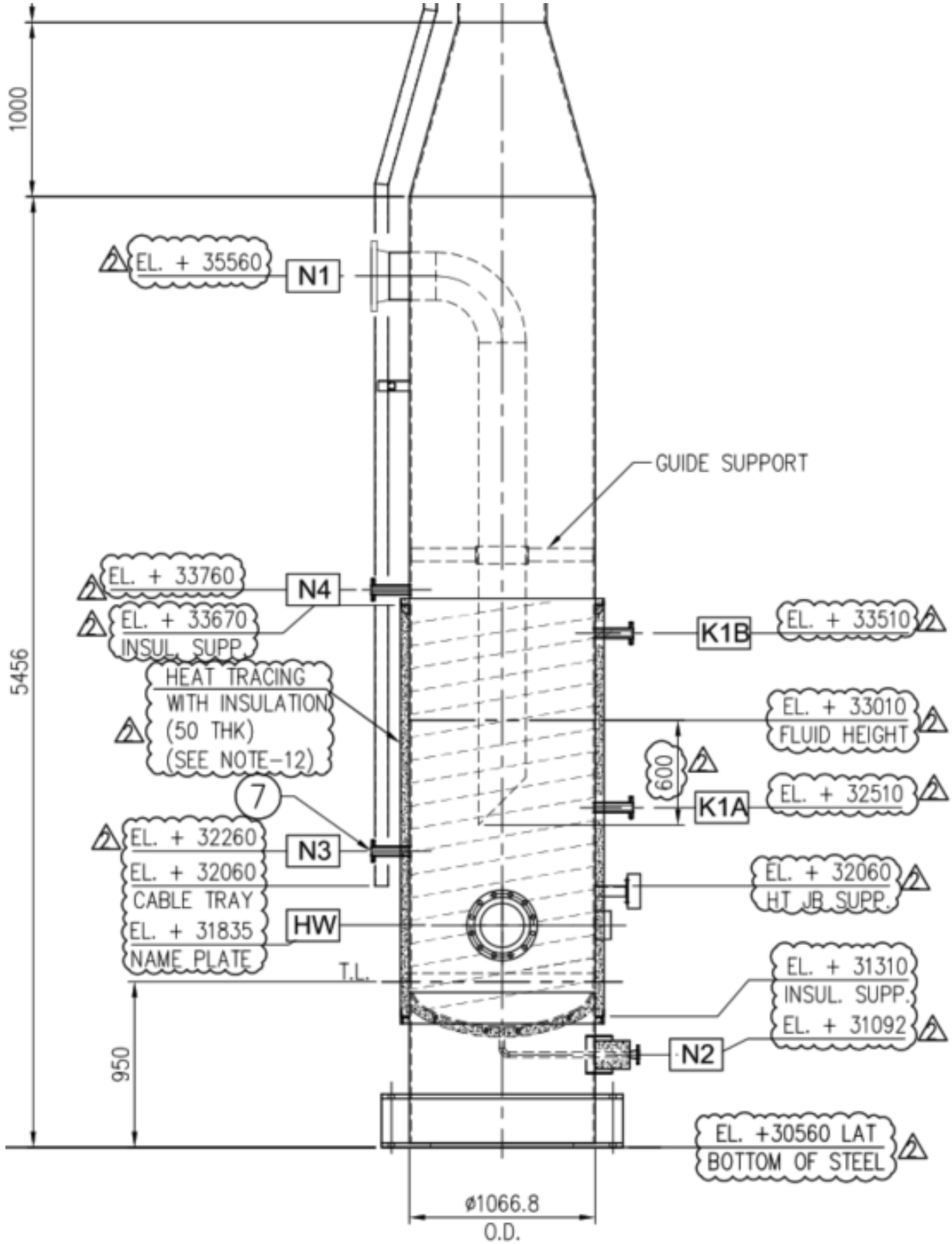
D = shell diameter	(mm)	1066.8
H = seal height	(mm)	4506
H1 = cone height	(mm)	1000
H2 = skirt height	(mm)	950
H4 = total seal height	(mm)	6456
T = shell Thickness	(mm)	10

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Total seal weight	(kg)	2400

ITEM	DIAM. (inch)	TYPE	CLASS	FACING 2)	THICKNESS (sch/mm)	ELEVAT. 5)	DISTANCES from C.L.	DIA.REINF.	THK. REINF.	SERVICE
N1	**10"**	**WN**	**150**	**RF**	SCH.40	EL.+35560	750 mm	Dia.473	8 THK	**Vent Inlet from V-43001 (with dip pipe)**
N2	**1"**	WN	**150**	**RF**	SCH.XS	EL.+31092	800 mm	-	-	**Drain**
N3	**1"**	**LWN**	**150**	**RF**	12.7 mm	EL.+32260	750 mm	-	-	**Swan Neck Connection**
N4	**1"**	**LWN**	**150**	**RF**	12.7 mm	EL.+33760	750 mm	-	-	**Filling Line**
K1A	**1"**	**LWN**	150	**RF**	12.7 mm	EL.+32510	750 mm	-	-	**Level Transm.**
HW	8"	WN	150	RF	SCH.40	EL.+31835	750 mm	Dia.320	8 THK	**HAND HOLE**
K1B	1"	LWN	150	RF	12.7 mm	EL.+33510	750 mm			Level Transm.

- All flanges shall be ASME B16.5



ELEVATION
SCALE 1:36

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