







## Separator Spec Sheet

Separator size is 1200 x 3600 mm , design pressure 80 bar @ 250 degree c, 33000 NM3/d, 3000 bbl/d. Separator fitted with:

- ESMER multiphase meter, Specifications:
- ESMER GL2
- System: 2" SCH80s 600# RF
- Body and flange material: SS316
- Impuls tubing and fittings: AISI 316L (1.4404)
- Skidframe: AISI 316L (1.4404)
- Cone beta ratio: 0,7
- Design pressure: 60 Barg
- Design temperature: 220 °C
- Separator is fitted with auto sampler.
- Separator is fitted with GWF level transmitter.
- Separator is fitted with Vortex flow meter.
- Fitted with water cut meter.

		<b>Process Data Sheet</b> <b>Two Phase Separator</b>							
1 Equipment No.: <b>V-101</b>		Number required: <b>1</b>							
OPERATING/MECHANICAL DATA									
3 Description								Units	
4 Contents		Crude Oil Feed							
5 Working temperature, min./normal/max.		90 - 170						°C	
6 Working pressure - min./normal/max.		11 - 22						barg	
7 - normal/min.vac. conditions								mbar a	
8 Design temperature, upper/lower		210 -20						°C	
9 Design pressure, internal/external		42 FV						bar g	
10 Test pressure, hydrostatic/pneumatic		55 hydrotest						bar g	
11 Liquid - quantity (Note 1)		50 - 310						m3/d	
12 - density at 15°C								kg/m3	
13 - density at working temperature		810 - 966						kg/m3	
14 Vapour - quantity (Note 1)		1000 - 10000						Sm3/d	
15 - molecular weight		21 - 29							
16 - density at working temperature		8.9 - 17.85						kg/m3	
17 Heating/cooling medium		NA							
18 - max. quantity required		NA						kg/s	
19									
20 Diameter of shell ID		850						mm	
21 Length between tangent lines		1200						mm	
22									
23									
24 Type of heads (Note 2)		Semi-elliptical							
25 Wall thickness - shell/head (Note 4 & 5)		20 20						mm	
26 Corrosion allowance/lining/cladding		3						mm	
27 Insulation type / thickness		PP / 50						mm	
28									
29									
30 Total volume (including vessel heads) :		0.84		m³		Relief valve(s) - Type/size :		Conventional 1D2	
31 Normal liquid volume :		0.30		m³		- Set pressure :		42 barg	
32 Volume range required for level control :		0.33		m³		- Number required :		1	
33 Peak wind speed (3 sec gust) :		45		m/s		Earthquake Zone :		Not Applicable	
INFORMATION TO BE SUBMITTED WITH THE TENDER									
34									
35									
36									
37									
38									
39									
40									
41									
REMARKS ON REVISIONS									
43 Note 1: No overdesign is considered.									
44 Note 2: Given head type is indicative. The most economically head type to be selected by Vendor.									
45 Note 3: No slug size is considered and no foaming is considered.									
46 Note 4: Vessel weld joint efficiency considered as 1. Fo scour service vessel fully radiography is required.									
47 Note 5: Vendor to confirm the wall thickness as per design code.									
Made by: 		Date: 02-05-2019		EQUIPMENT : <b>V-101</b> NAME : <b>Two Phase Separator</b> CLIENT :  Plant :		Rev.		01 02	
Chk'd by: 		Date: 02-05-2019				Date: 22-04-2019 02-05-2019			
Appr'd by: 		Date: 02-05-2019				Project No. <b>VEC4020</b>			
Eng. by : 						Doc. No. <b>VEC4020-PDS-11001</b>			
Principal : 						Sheet 1		Continued on Sheet 2	

# Process Data Sheet Two Phase Separator

1	Equipment No.: V-101		Number required: 1	
2	OPERATING/MECHANICAL DATA			
3	Description			Units
4	Contents	Crude Oil Feed		
5	Working temperature, min./normal/max.	90 - 170		°C
6	Working pressure - min./normal/max.	11 - 22		barg
7	- normal/min.vac. conditions			mbar a
8	Design temperature, upper/lower	210 -20		°C
9	Design pressure, internal/external	42 FV		bar g
10	Test pressure, hydrostatic/pneumatic	55 hydrotest		bar g
11	Liquid - quantity (Note 1)	50 - 310		m3/d
12	- density at 15°C			kg/m3
13	- density at working temperature	810 - 966		kg/m3
14	Vapour - quantity (Note 1)	1000 - 10000		Sm3/d
15	- molecular weight	21 - 29		
16	- density at working temperature	8.9 - 17.85		kg/m3
17	Heating/cooling medium	NA		
18	- max. quantity required	NA		kg/s
19				
20	Diameter of shell ID	850		mm
21	Length between tangent lines	1200		mm
22				
23				
24	Type of heads (Note 2)	Semi-elliptical		
25	Wall thickness - shell/head (Note 4 & 5)	20 20		mm
26	Corrosion allowance/lining/cladding	3		mm
27	Insulation Type / Thickness	PP / 50		mm
28				
29				
30	Total volume (including vessel heads) :	0.84 m <sup>3</sup>	Relief valve(s) - Type/size :	Conventional 1D2
31	Normal liquid volume :	0.30 m <sup>3</sup>	- Set pressure :	42 barg
32	Volume range required for level control :	0.33 m <sup>3</sup>	- Number required :	1
33	Peak wind speed (3 sec gust) :	45 m/s	Earthquake Zone :	Not Applicable
34	INFORMATION TO BE SUBMITTED WITH THE TENDER			
35				
36				
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42	REMARKS ON REVISIONS			
43	Note 1: No overdesign is considered.			
44	Note 2: Given head type is indicative. The most economically head type to be selected by Vendor.			
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47	Note 5: Vendor to confirm the wall thickness as per design code.			
	Made by: AB	Date: 02-05-2019	EQUIPMENT : V-101	
	Chk'd by: VW	Date: 02-05-2019	NAME : Two Phase Separator	
	Appr'd by: SB	Date: 02-05-2019	CLIENT : [REDACTED]	
			Plant :	
	Eng. by : [REDACTED]		Rev.	01 02
			Date	22-04-2019 02-05-2019
			Project No.	VEC4020
			Doc. No.	[REDACTED]
			Sheet 1	Continued on Sheet 2

Process Data Sheet  
Two Phase Separator

MATERIAL SPECIFICATION

Part	ASTM No.	Part	ASTM No.
Shell	SA516 Gr. 60 equivalent	Downcomers	by vendor
Cladding/lining of shell	by vendor	Baffles	by vendor
Heads	SA516 Gr. 60 equivalent	Internal pipe fittings	by vendor
Cladding/lining of heads	by vendor	Stud bolts, external	by vendor
Reinforcing rings	by vendor	Nuts, external	by vendor
Skirt, base plate, etc.	by vendor	Bolts, internal	by vendor
Saddles	by vendor	Nuts, internal	by vendor
Jacket	by vendor	Gaskets, external	by vendor
Shell flanges	by vendor	Gaskets, internal	by vendor
Nozzles (line pipe/plate)	by vendor		
Liner of nozzles and manholes	by vendor		
Flanges (ANS)	by vendor		
Flanges (Non-ANS)	by vendor		
Welding fittings	by vendor		
Stiffening rings	by vendor		
Insulation support rings	by vendor		
Cleats for platforms. etc.	by vendor		
Internal parts	SS316L		

FABRICATION AND INSPECTION REQUIREMENTS

Construction in accordance with:	
Inspection	By vendor
Inspection authority	By vendor
Stress relieving	By vendor
Special heat treatment	By vendor
Radiography	Full
Other non-destructive testing	By vendor
Chemical analysis	By vendor
Manufacturer's certificate - chemical analysis	By vendor
- mechanical data	By vendor

WEIGHTS

Erection weight (shipping weight) :	approx. 1000	kg	Weight of internals :	By Vendor	kg
Total weight, operating :	By Vendor	kg	Weight of insulation :	NA	kg
Total weight, full of water :	By Vendor	kg	Weight of fireproofing :		kg

REFERENCE DRAWINGS/LIST

40	Arrangement - construction - outline	:	
41	Standard vessel	:	
42	Additional drawings	:	
43	Welding electrodes, rods, etc.:		refer international Std.
44	General remarks for vessels	:	Anchor bolt ring and base plate :
45	Flanged pipe nozzles	:	Lifting lug :
46	Thermowell nozzles	:	Name plate : By vendor
47	Carbon steel flanges	:	Support ring for insulation :
48	Vortex breaker	:	Inspection hole/hand hole/
49	Skirt/saddles/brackets	:	manhole/davits, etc. :

Note: This sheet is to be confirmed and/or completed by the Vendor.

The manufacturer is responsible for ensuring that the equipment is designed and constructed in accordance with the specifications and codes referred to on the data sheet/requisition and/or drawings. Furthermore, the manufacturer is responsible for ensuring that the design, including thicknesses of pressure parts, is satisfactory for the design conditions indicated on the data sheet / requisition and/or drawings. Calculations and thicknesses of material supplied to the manufacturer are for information and tendering purposes only. The manufacturer shall make his own calculations for which he is fully responsible. The manufacturer shall ensure that the equipment supplied conforms to all applicable codes and national statutory regulations, and he shall obtain all necessary approvals from statutory authorities.

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	Sheet 2 Continued on Sheet 3

Process Data Sheet  
Two Phase Separator

NOZZLE DATA (Note 3)

Mark	Number	Service	Nom. dia. and flange rating	Remarks
N1	1	Feed Inlet	DN 80 (600#)	Horizontal half-open pipe
N2	1	Vapour outlet	DN 50 (600#)	On nozzle A1
N3	1	Liquid outlet	DN 80 (600#)	Provide vortex breaker
N4	1	Drain	DN 50 (600#)	Note 1
N5	1	Vent	DN 50 (600#)	Note 1
N6	1	Utility connection for flush	DN 50 (600#)	Note 1
N7	1	Utility connection for drain	DN 80 (600#)	Note 1
N8	1	PSV	DN 50 (600#)	Note 1
N9	1	Spare	DN 80 (600#)	Note 1

INSTRUMENT CONNECTIONS

K1	1	Pressure Gauge	DN 50 (600#)	Note 1
K2A/B	2	Level gauge	DN 50 (600#)	Note 1
K3	1	Level Transmitter / Controller	DN 80 (600#)	Note 1 & 2
K4	1	Temperature Gauge	DN 50 (600#)	Note 1

MANHOLES ETC.

A1	1	Flange connection	DN 400	Note 1

Note 1: Nozzle size to be confirmed by Vendor.

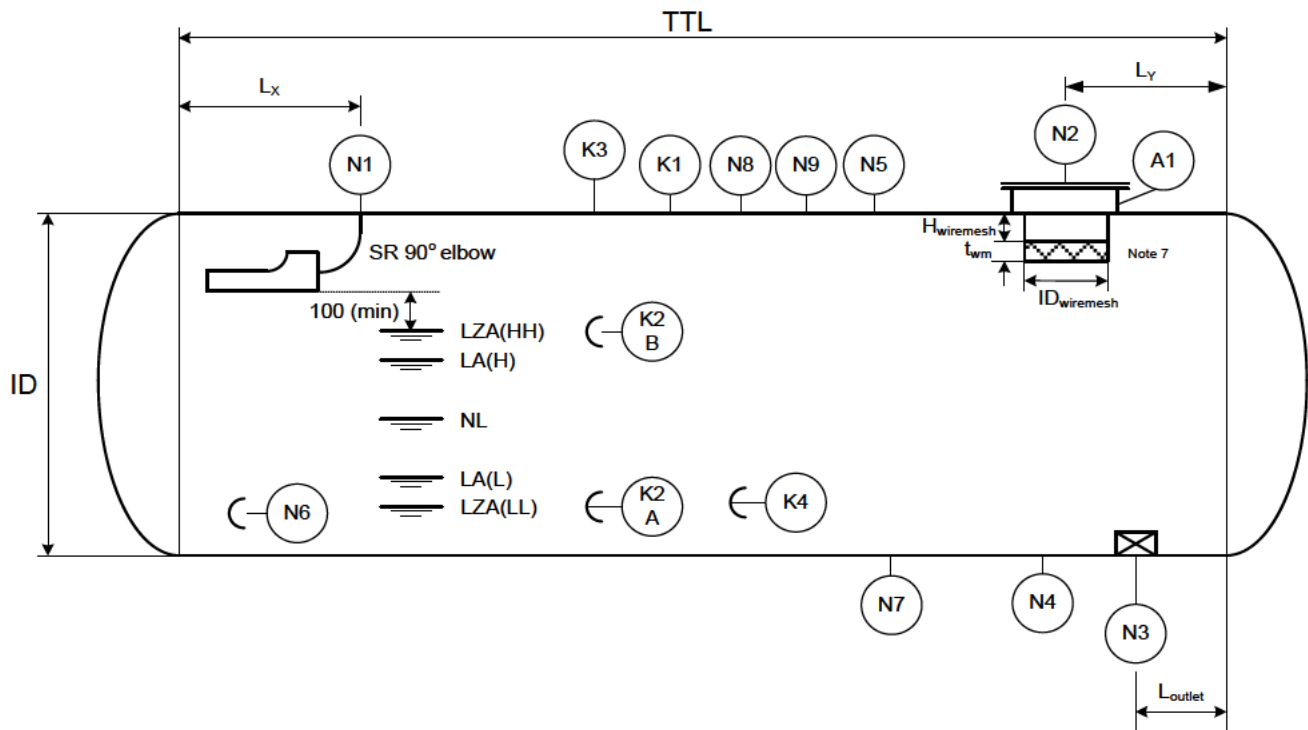
Note 2: Level transmitter is Guided Wave Radar type, hence vendor to provide stilling well.

Note 3: Vendor to consider insulation thickness for deriving the nozzle projection.

Eng. by :

Doc. No.

Process Data Sheet  
Two Phase Separator



Main Dimensions

TTL	=	1200	mm
ID	=	850	mm
t <sub>wm</sub>	=	100	mm
L <sub>outlet</sub>	=	250	mm
L <sub>x</sub>	=	410	mm (5)
L <sub>y</sub>	=	300	mm (6)

Level setting relative to bottom of vessel

LZA(HH)	=	550	mm
LA(H)	=	450	mm
LA(L)	=	180	mm
LZA(LL)	=	50	mm

Wiremesh dimensions

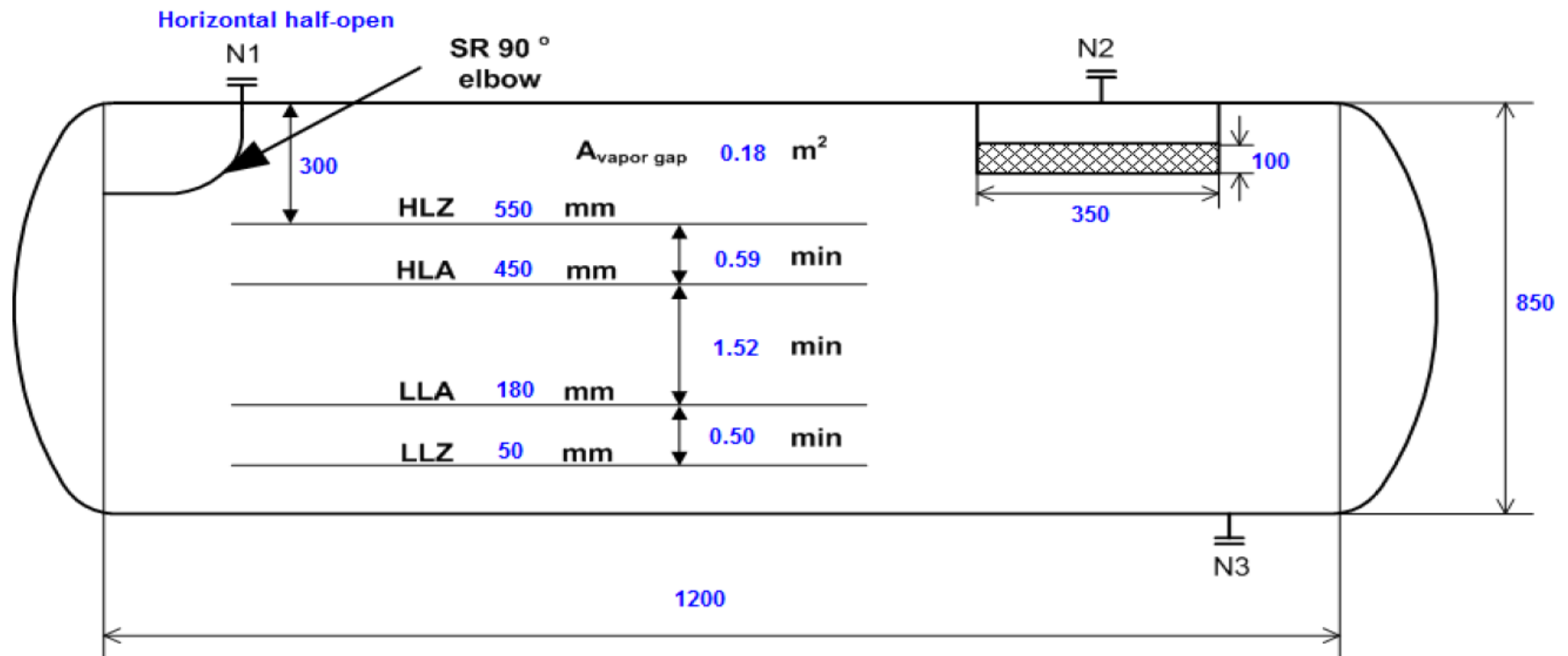
H <sub>wm</sub>	=	100	mm
t <sub>wm</sub>	=	100	mm
ID <sub>wiremesh</sub>	=	350	mm

General Remark

- (1) Vessel shall be designed in accordance to ASME section VIII Div. 1.
- (2) Product outlet nozzle N3 shall be equipped with a type A vortex breaker.
- (3) The LZA(HH) and LZA(LL) are level settings only for indicative purpose. The actual operating level will be from LA(H) & LA(L). NLL shall be 350 mm.
- (4) As feed inlet a horizontal half open pipe is installed. The distance between the bottom of the half open pipe and the LZA(HH) level shall be minimum 100 mm. The half open pipe outlet area shall be minimum four times the area of the feed inlet nozzle
- (5) Given distance is an estimation. The inlet device shall end at the vertical plane of the vessel T.L.
- (6) Given distance is an estimation. Distance shall be mechanical minimum from the vessel T.L.
- (7) Hand hole 16" is provided for installing and removing the wiremesh demister.
- (8) All internals shall be properly supported in the vessel.



# SUMMARY SHEET FOR TWO PHASE SEPARATOR



INPUT DATA		
Stream data		
Vapor oversize factor	1.00	-
Liquid viscosity	2.00	cP
Liquid oversize factor	1.00	-
Vessel		
Slug size	0.00	m <sup>3</sup>
Foaming allowance	No	
Head type	Semi-elliptical	
G/L separation internal	Horizontal wiremesh	
Residence time HLA-HLZ	0.50	min
Residence time LLA-HLA	1.50	min
Residence time LLZ-LLA	0.50	min

OUTPUT DATA		
Vessel		
Vessel ID	850	mm
Vessel TL-TL	1200	mm
DESIGN CHECK		
Vessel		
Gas load factor	0.105	m/s
Axial gas velocity	0.091	m/s
Axial liquid velocity	0.0123	m/s
Liquid level		
HLZ level	550	mm
HLA level	450	mm
LLA level	180	mm
LLZ level	50	mm
Separation efficiency		
Inlet device G/L efficiency	80	%
Demister thickness	100	mm
Demister area	0.10	m <sup>2</sup>
Demister ID	350	mm
Demister gas load factor	0.011	m/s
Cut off vapor droplet (note 1)	212	micron
D <sub>min</sub> Liquid Degassing	320	mm
D <sub>min</sub> Defoaming	650	mm
Pressure drop		
Vapor pressure drop (including in- and outlet nozzles)	1825	Pa
Nozzles		
N1 Feed nozzle	3"	
N2 Vapor outlet nozzle	2"	
N3 Liquid outlet nozzle	3"	

Note 1: Degassing of the vapor in the liquid phase is based on an assumed normal liquid level in the vessel of 320 mm

Note 2: HLZ & LLZ level are only for indicative purpose.