



**CORRIGENDUM #4**  
**SUPPLY OF FILTER SEPARATOR**  
**Tender No AGCL/BD/PMC-GHT/FILTER SEPARATOR/2019/29**  
**Date: 18.07.2019**



<b>Sl. No.</b>	<b>Clause No.</b>	<b>Page No.</b>	<b>Description</b>	<b>Amendment/ Addition/ Modification/ Deletion</b>	<b>Details</b>
1	Technical Volume II of II	23 of 109	PROCESS DATA SHEET FOR FILTER SEPARATOR AT KHORAGHAT GGS.	Modification	Process Datasheet modified to Revision D2.
2	Technical Volume II of II	27 of 109	PROCESS DATA SHEET FOR FILTER SEPARATOR AT NAMBOR GGS.	Modification	Process Datasheet modified to Revision D2.



ENERGISING QUALITY

VCS Quality Services Pvt. Ltd. (PMC)  
VCS Project Consultants Pvt Ltd (Engg.)

PROJECT NUMBER : 1009



**PROCESS DATA SHEET FOR FILTER SEPARATOR  
AT KHORAGHAT GGS**

Client Job Number 1009

Total Sheets 4

Document no.	1009	KH	PC	PDS	1003
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# Assam Gas Company Ltd.

**NAMBOR –GOLAGHAT– NUMALIGARH AREA  
GAS PIPELINE PROJECT**



REV	DATE	DESCRIPTION	PREP	CHKD	APPR
D2	18.07.2019	Issued For Bid	VK	CSn	CSn
D1	10.05.2019	Issued For Design	VK	CSn	CSn
C1	14.03.2019	Issued For Client Review	VK	CSn	CSn

VCS Quality Services Pvt Ltd Offices 707 & 708, Tower 1, Assotech Business Cresterra, Sec 135, Expressway, Noida 201301		PROCESS DATA SHEET FOR FILTER SEPARATOR AT KHORAGHAT GGS		PAGE	2 OF 4
OWNER: Assam Gas Company Ltd.		CONTRACT No.: VPC-1009		SHEET	1 OF 3
CLIENT: Assam Gas Company Ltd.			ITEM No.: 1009-KH-FS-1001		
PROJECT: Nambor-Golaghat-Numaligarh Area Gas Pipeline Project			DESCRIPTION: Filter Separator		
AREA: Khoraghat GGS			No. OF OP./STANDBY: 01/-		
GENERAL	Location	Khoraghat		Support method	-
	Type of filter element	By Vendor		Petroleum Class	-
	Switchover : no/manual/auto	Auto		Vessel design code	ASME Section VIII, Div 1
	Switchover by time/diff.pr.	Differential Pressure		Disposable elem.	By Vendor
	Cleaning off-/online	Off-line		Disp.elem.life	By Vendor
	Backwash : no/manual/auto	No		Quick-open.cover	-
	Re-usable elem.life reqd	-		Operating cycle	Continuous
	Magnetic separator	-		Freq.of batches	-
	Complete vendor package	Yes		Batch duration	-
	Heating/cooling envisaged,by	No		Ext.fire	-
Insulation type/thickness	No		Ref.docs.as appl.	-	
Surface treatment, external	By Vendor		P&ID Ref.	1009-KH-PC-PID-1003	
Use columns for duty cases/spaces		<b>Units</b>	Case1		
FLUID DATA	Space (Vessel,coil,jacket etc.)	Vessel			
	Product fluid handled	Natural Gas			
	Composition reference	Note-1			
	Corrosive/Erosive due to	CO2 & Water			
	Flammable/Explosive/Toxic	Yes/Yes/No			
	Source of liquid, drops/mist	Entrained Liquid			
	Presence of solids	Note-8			
	Product : gas/liquid/both...	Both			
	Gas density @ ref. P&T	kg/m <sup>3</sup>	2.03 - 3.15	D2	
	Gas viscosity @ ref.P&T...	cP	0.011 - 0.012		
Liquid density @ ref. P&T	kg/m <sup>3</sup>	625 - 1011			
Liquid viscosity @ ref. P&T	cP	0.22 - 1.002			
Solid density, true/bulk	-	-			
Solids partic.size,settling vel.	-	-			
CAPACITY, FILTRATION	Design inlet gas flow rate	SCMD	70473 - 72139	D2	
	Add to above : liquid loading	-	-		
	Add to gas : solid loading	-	-		
	Gas flow rate range	-	Note-6		
	Filtration : >size w. efficiency	-	Note-7		
Max.allow.outlet liq.entrainm.	-	-			
OPTING: CONDNS	Rated inlet pressure	kg/cm <sup>2</sup> g	1.5 - 2.5		
	Max.pr.drop(fouled) at RF	kg/cm <sup>2</sup>	0.5		
	Inlet pressure/vac.range	kg/cm <sup>2</sup> g	1.5 - 2.5		
	Process temp.range allowed	°C	20 - 40		
DESIGN&CONSTR 'N DATA	Design press./vac.	kg/cm <sup>2</sup> g	19 / FV		
	At Design temperature	°C	-29/65		
	Max.diff.pr.to withstand	kg/cm <sup>2</sup>	Note-4		
	Relief case, valv.set pr @ T	kg/cm <sup>2</sup> g	Fire, 19		
	Test pressure @ temp.	-	-		
MOC & Corr.Allow.-Vessel	-	CS+3mm CA			
Basic MOC - Element/holder	-	SS316L			
Vendor data required by Process				<b>Sketch</b>	
Refer Note-2				Refer sheet 3 of 3	
No.	Nozzle Description	Size/Length	Rating/Pipeclass		
Process Descrip., Spl. Requirements, Int-/Externals, Notes				Refer sheet 2 of 3	
REV	REVISION DESCRIPTION	DATE	PREPD	CHKD	APPD
D2	Issued For Bid	18.07.2019	VK	CSn	CSn
D1	Issued For Design	10.05.2019	VK	CSn	CSn
C1	Issued For Client Review	14.03.2019	VK	CSn	CSn

VCS Quality Services Pvt Ltd Offices 707 & 708, Tower 1, Assotech Business Cresterra, Sec 135, Expressway, Noida 201301	<b>PROCESS DATA SHEET FOR FILTER SEPARATOR AT KHORAGHAT GGS</b>	PAGE	3 OF 4
		SHEET	2 OF 3

OWNER: Assam Gas Company Ltd.	PROJECT: Nambor-Golaghat-Numaligarh Area Gas Pipeline Project
CLIENT: Assam Gas Company Ltd.	AREA: Khoraghat GGS <span style="float: right;">D2</span>
DOCUMENT NO.: 1009-KH-PC-PDS-1003	ITEM No.: 1009-KH-FS-1001
	CONTRACT NO.: VPC-1009
	DESCRIPTION: Filter Separator

**Notes:**

**1 INLET GAS COMPOSITION**

Overall Inlet Composition	Max water Case		Max Condensate Case
	Constituent	Mole fraction (min)	Mole fraction (max)
Methane	0.7940	0.8128	0.8103
Ethane	0.0772	0.0791	0.0788
Propane	0.0468	0.0479	0.0477
i-Butane	0.0081	0.0082	0.0082
n-Butane	0.0153	0.0157	0.0156
i-Pentane	0.0062	0.0064	0.0063
n-Pentane	0.0039	0.0040	0.0040
CO2	0.0038	0.0039	0.0039
Nitrogen	0.0017	0.0018	0.0018
n-Hexane	0.0133	0.0136	0.0233
H2O	0.0067	0.0296	0.0000

**2** Vendor should furnish the following details : D2

- a) Pressure drop across the filter at clean and fouled condition.
- b) Number of filter elements.
- c) Element model number.
- d) Element Life.
- e) Spare elements provided.
- f) Total filter area.
- g) Solid holding capacity.
- h) Cleaning cycle details and operating instructions.
- i) Element Length
- j) All calculations for approval.
- k) Maximum liquid carry over in gas (outlet) if any.
- l) Dimension & weight
- m) Arrangement drawing.
- n) Element removal space requirement.

**3** Maximum water/condensate content shall be 5 to 8 kg/hr. D2

**4** Filter element shall be able to withstand a differential pressure of 1 kg/cm<sup>2</sup> without cracking & failing.

**5** Filter shall be desinged for all operating scenarios. D2

- a) HPHT (High Pressure High Temperature)
- b) HPLT (High Pressure Low Temperature)
- c) LPHT (Low Pressure High Temperature)
- d) LPLT (Low Pressure Low Temperature)

**6** Filter shall be sized to handle minimum flow as (10% of max. flow). Minimum turndown possible shall be confirmed by Vendor.

**7** Efficiency of filter shall be 99.5% for liquid/solid separation size of 3 microns & 100% for size of 5 microns and above.

**8** Maximum liquid droplet size: 3 µm  
Maximum solid particle size: 3 µm

**9** Vendor to advice internal lining requirement for filter to meet performance guarantee.

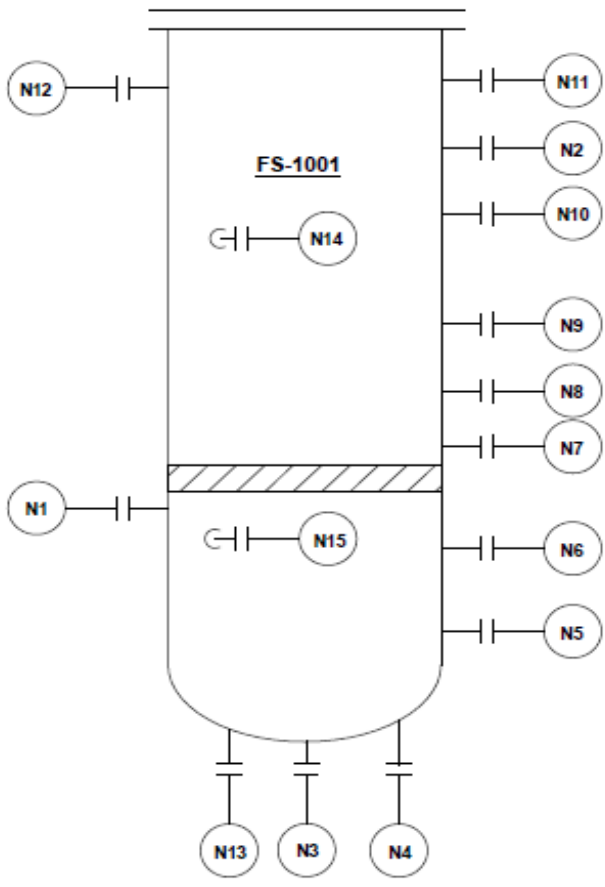
**10** Pressure drop across filter shall be limited to 0.1 kg/cm<sup>2</sup> ( clean condition).

**11** Filter shall be U Stamped

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C1	Issued For Client Review	14.03.2019	VK	CSn	CSn

OWNER: Assam Gas Company Ltd.	PROJECT: Nambor-Golaghat-Mumaligarh Area Gas Pipeline Project	
CLIENT: Assam Gas Company Ltd.	AREA: Khoraghat GGS <span style="border: 1px solid black; padding: 2px;">D2</span>	CONTRACT NO.: VPC-1009
DOCUMENT NO.: 1009-KH-PC-PDS-1003	ITEM No.: 1009-KH-FS-1001	DESCRIPTION: Filter Separator

**Filter Separator Sketch**



No.	Nozzle Description	Size/Length	Rating/Pipeclass
N1	Gas Inlet	8"	150# / 15HC
N2	Gas Outlet	8"	150# / 15HC
N3	Drain	2"	150# / 15HC
N4, N5	Level Instrument Connection	2"	150# / 15HC
N6	Gas return from Lower CD	2"	150# / 15HC
N7	Drain for filter element	2"	150# / 15HC
N8	Gas return upper CD	2"	150# / 15HC
N9, N10	Level Gauge Connection	2"	150# / 15HC
N11	Pressure Safety Valve	2"	150# / 15HC
N12	Pressure Indicator Connection	2"	150# / 15HC
N13	Utility Connection	2"	150# / 15HC
N14, N15	Pressure Differential Transmitter	2"	150# / 15HC

CD: Continuous Drainer

REV	REVISION DESCRIPTION	DATE	PREPD	CHKD	APPD
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ENERGISING QUALITY

VCS Quality Services Pvt. Ltd. (PMC)  
VCS Project Consultants Pvt Ltd (Engg.)

PROJECT NUMBER : 1009



**PROCESS DATA SHEET FOR FILTER SEPARATOR  
AT NAMBOR GGS**

Client Job Number 1009

Total Sheets 4

Document no.	1009	NA	PC	PDS	1004
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# Assam Gas Company Ltd.

**NAMBOR –GOLAGHAT– NUMALIGARH AREA  
GAS PIPELINE PROJECT**



REV	DATE	DESCRIPTION	PREP	CHKD	APPR
D2	18.07.2019	Issued For Bid	VK	CSn	CSn
D1	10.05.2019	Issued For Design	VK	CSn	CSn
C1	14.03.2019	Issued For Client Review	VK	CSn	CSn

OWNER: Assam Gas Company Ltd.	CONTRACT No.: VPC-1009	DOCUMENT NO.: 1009-NA-PC-PDS-1004
CLIENT: Assam Gas Company Ltd.	ITEM No.: 1009-NA-FS-1001	
PROJECT: <del>Nambor-Golaghat</del> Numaligarh Area Gas Pipeline Project	DESCRIPTION: Filter Separator	
AREA: Nambor GGS	No. OF OP./STANDBY: 01/-	

<b>GENERAL</b>	Location	Nambor	Support method	-
	Type of filter element	By Vendor	Petroleum Class	-
	Switchover : no/manual/auto	Auto	Vessel design code	ASME Section VIII, Div 1
	Switchover by time/diff.pr.	Differential Pressure	Disposable elem.	By Vendor
	Cleaning off-/online	Off-line	Disp.elem.life	By Vendor
	Backwash : no/manual/auto	No	Quick-open.cover	-
	Re-usable elem.life reqd	-	Operating cycle	Continuous
	Magnetic separator	-	Freq.of batches	-
	Complete vendor package	Yes	Batch duration	-
	Heating/cooling envisaged,by	No	Ext.fire	-
Insulation type/thickness	No	Ref.docs.as appl.	-	
Surface treatment, external	By Vendor	P&ID Ref.	1009-NA-PC-PID-1004	

Use columns for duty cases/spaces		<b>Units</b>	Case1		
<b>FLUID DATA</b>	Space (Vessel,coil,jacket etc.)		Vessel		
	Product fluid handled		Natural Gas		
	Composition reference		Note-1		
	Corrosive/Erosive due to		CO2 & Water		
	Flammable/Explosive/Toxic		Yes/Yes/No		
	Source of liquid, drops/mist		Entrained Liquid		
	Presence of solids		Note-8		
	Product : gas/liquid/both...		Both		
	Gas density @ ref. P&T	kg/m <sup>3</sup>	2.03 - 3.15		
	Gas viscosity @ ref.P&T...	cP	0.011 - 0.012		
Liquid density @ ref. P&T	kg/m <sup>3</sup>	625 - 1011			
Liquid viscosity @ ref. P&T	cP	0.22 - 1.002			
Solid density, true/bulk	-	-			
Solids partic.size,settling vel.	-	-			
<b>CAPACITY, FILTRATION</b>	Design inlet gas flow rate	SCMD	60405 - 61833		
	Add to above : liquid loading	-	-		
	Add to gas : solid loading	-	-		
	Gas flow rate range	-	Note-6		
	Filtration : ≥size w. efficiency	-	Note-7		
<b>OPTING. CONDN'S</b>	Rated inlet pressure	kg/cm <sup>2</sup> g	1.5 - 2.5		
	Max.pr.drop(fouled) at RF	kg/cm <sup>2</sup>	0.5		
	Inlet pressure/vac.range	kg/cm <sup>2</sup> g	1.5 - 2.5		
	Process temp.range allowed	°C	20 - 40		
<b>DESIGN&amp;CONSTR 'N DATA</b>	Design press./vac.	kg/cm <sup>2</sup> g	19 / FV		
	At Design temperature	°C	-29/65		
	Max.diff.pr.to withstand	kg/cm <sup>2</sup>	Note-4		
	Relief case, valv.set pr @ T	kg/cm <sup>2</sup> g	Fire, 19		
	Test pressure @ temp.	-	-		
	MOC & Corr.Allow.-Vessel	-	CS+3mm CA		
Basic MOC - Element/holder	-	SS316L			

Vendor data required by Process				<b>Sketch</b>			
Refer Note-2				Refer sheet 3 of 3			
No.	Nozzle Description	Size/Length	Rating/Pipeclass				
		Refer sheet 3 of 3					

Process Descrip., Spl. Requirements, Int-/Externals, Notes
Refer sheet 2 of 3

REV	REVISION DESCRIPTION	DATE	PREPD	CHKD	APPD
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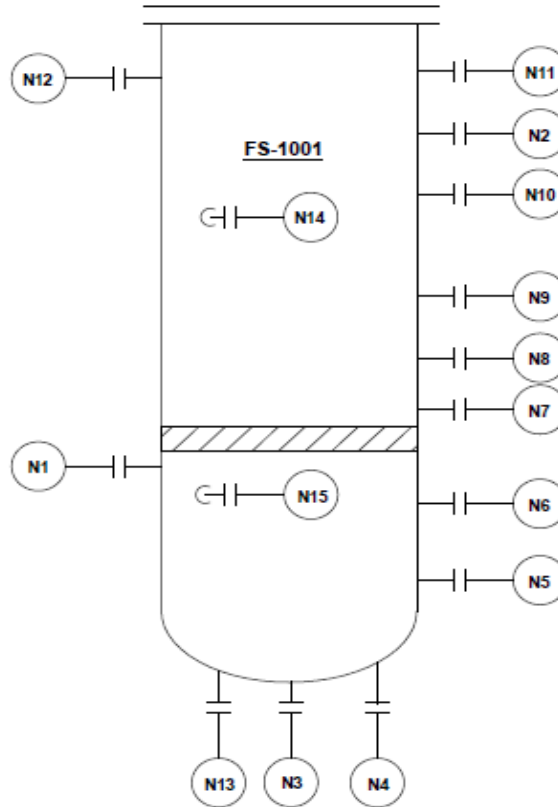
VCS Quality Services Pvt Ltd Offices 707 & 708, Tower 1, Assotech Business Cresterra, Sec 135, Expressway, Noida 201301		<b>PROCESS DATA SHEET FOR</b> <b>FILTER SEPARATOR</b> AT NAMBOR GGS		PAGE	3 OF 4
				SHEET	2 OF 3
OWNER: Assam Gas Company Ltd.		PROJECT: Nambor-Golaghat-Numaligarh Area Gas Pipeline Project			
CLIENT: Assam Gas Company Ltd.		AREA: Nambor GGS		CONTRACT NO.: VPC-1009	
DOCUMENT NO.: 1009-NA-PC-PDS-1004		ITEM No.: 1009-NA-FS-1001		DESCRIPTION: Filter Separator	
<b>Notes:</b>					
<b>1 INLET GAS COMPOSITION</b>					
<b>Overall Inlet Composition</b>		<b>Max water Case</b>		<b>Max Condensate Case</b>	
Constituent	Mole fraction (min)	Mole fraction (max)	Mole fraction		
Methane	0.7940	0.8128	0.8103		
Ethane	0.0772	0.0791	0.0788		
Propane	0.0468	0.0479	0.0477		
i-Butane	0.0081	0.0082	0.0082		
n-Butane	0.0153	0.0157	0.0156		
i-Pentane	0.0062	0.0064	0.0063		
n-Pentane	0.0039	0.0040	0.0040		
CO2	0.0038	0.0039	0.0039		
Nitrogen	0.0017	0.0018	0.0018		
n-Hexane	0.0133	0.0136	0.0233		
H2O	0.0067	0.0296	0.0000		
<b>2</b> Vendor should furnish the following details : <span style="float: right;">D2</span>					
a) Pressure drop across the filter at clean and fouled condition.					
b) Number of filter elements.					
c) Element model number.					
d) Element Life.					
e) Spare elements provided.					
f) Total filter area.					
g) Solid holding capacity.					
h) Cleaning cycle details and operating instructions.					
i) Element Length					
j) All calculations for approval.					
k) Maximum liquid carry over in gas (outlet) if any.					
l) Dimension & weight					
m) Arrangement drawing.					
n) Element removal space requirement.					
<b>3</b> Maximum water/condensate content shall be 5 to 8 kg/hr. <span style="float: right;">D2</span>					
<b>4</b> Filter element shall be able to withstand a differential pressure of 1 kg/cm <sup>2</sup> without cracking & failing.					
<b>5</b> Filter shall be desinged for all operating scenarios.					
a) HPHT (High Pressure High Temperature)					
b) HPLT (High Pressure Low Temperature)					
c) LPHT (Low Pressure High Temperature)					
d) LPLT (Low Pressure Low Temperature)					
<b>6</b> Filter shall be sized to handle minimum flow as (10% of max. flow). Minimum turndown possible shall be confirmed by Vendor.					
<b>7</b> Efficiency of filter shall be 99.5% for liquid/solid separation size of 3 microns & 100% for size of 5 microns and above.					
<b>8</b> Maximum liquid droplet size: 3 µm Maximum solid particle size: 3 µm					
<b>9</b> Vendor to advice internal lining requirement for filter to meet performance guarantee.					
<b>10</b> Pressure drop across filter shall be limited to 0.1 kg/cm <sup>2</sup> ( clean condition).					
<b>11</b> Filter shall be U Stamped					
<b>REV</b>	<b>REVISION DESCRIPTION</b>	<b>DATE</b>	<b>PREPD</b>	<b>CHKD</b>	<b>APPD</b>
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VCS Quality Services Pvt Ltd Offices 707 & 708, Tower 1, Assotech Business Cresterra, Sec 135, Expressway, Noida 201301	PROCESS DATA SHEET FOR <b>FILTER SEPARATOR</b> AT NAMBOR GGS	PAGE	4 OF 4
		SHEET	3 OF 3

OWNER: Assam Gas Company Ltd.	PROJECT: Nambor-Golaghat-Numaligarh Area Gas Pipeline Project
CLIENT: Assam Gas Company Ltd.	AREA: Nambor GGS
DOCUMENT NO.: 1009-NA-PC-PDS-1004	ITEM No.: 1009-NA-FS-1001
CONTRACT NO.: VPC-1009	
DESCRIPTION: Filter Separator	

**Filter Separator Sketch**



No.	Nozzle Description	Size/Length	Rating/Pipeclass
N1	Gas Inlet	8"	150# / 15HC
N2	Gas Outlet	8"	150# / 15HC
N3	Drain	2"	150# / 15HC
N4, N5	Level Instrument Connection	2"	150# / 15HC
N6	Gas return from Lower CD	2"	150# / 15HC
N7	Drain for filter element	2"	150# / 15HC
N8	Gas return upper CD	2"	150# / 15HC
N9, N10	Level Gauge Connection	2"	150# / 15HC
N11	Pressure Safety Valve	2"	150# / 15HC
N12	Pressure Indicator Connection	2"	150# / 15HC
N13	Utility Connection	2"	150# / 15HC
N14, N15	Pressure Differential Transmitter	2"	150# / 15HC

CD: Continuos Drainer

REV	REVISION DESCRIPTION	DATE	PREPD	CHKD	APPD
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