

INSTRUMENTATION DEPARTMENT	SCOPE OF INSPECTION AND TESTS	32654-14-PS-001 SIT INST	
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PROJECT: Construction of additional Ammonia Barge

ITEM : Shutdown valve and accessories

EQPT NO.

The following inspection and test shall be conducted and records to be submitted


Sl.No	Description	Inspection. Required	Witness Reqd	Remarks
<b>INSTRUMENT VALVES (CONTROL AND ON-OFF)</b>				
1.0	Visual inspection for valve assembly	\$	\$	
2.0	Dimensional inspection for valves and accessories	\$	\$	
3.0	Material test certificate for valve(and accessories if applicable)	\$	*	
4.0	Hydraulic test 100% (Shell test, seat leakage test etc)	\$	\$	
5.0	Certificate for electrical code (SOV, positioner, Limit switches, cable glands, inbuilt junction boxes, intrinsic safe certificate for any barriers in case of Namur sensors etc)	\$	*	
6.0	Weather proof certificate (SOV, positioner, Limit switch Cable glands, junction boxes if any etc)	\$	*	
7.0	Functional test (SOV, positioner, limit switches, partial stroking, Position transmitter, other contacts if any etc)	\$	\$	
8.0	Bought out item test certificates- (Solenoid valve, positioner, air filter regulator etc) from OEM	\$	*	
9.0	IBR Test certificate for steam service	\$	*	
<b>AIR FILTER REGULATORS</b>				
1.0	Visual inspection	\$	\$	
2.0	Performance test accuracy	\$	\$	
<b>INSTRUMENT TUBES/ PIPES/ FITTINGS</b>				
1.0	Visual inspection	\$	\$	
2.0	Dimensional inspection (Note 1)	\$	\$	
3.0	Material test certificate	\$	*	
4.0	Hydraulic/ pneumatic test report (Note 2)	\$	*	

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INSTRUMENTATION DEPARTMENT		SCOPE OF INSPECTION AND TESTS		32654-14-PS-001 SIT INST	
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SI.No	Description	Inspection Required	Witness Reqd	Remarks	
<p>Note -1 ID of ferrule by GO/NOGO gauge, pipe thread by plug and ring gauge, interchangeability of ferrule nut.</p> <p>Note-2 Also ferrule tightening test to be carried out.</p> <p>\$ - Manufacturer shall conduct their standard inspection as part of their 'quality assurance' program and shall furnish inspection reports for review. If required, witness inspection will be conducted by purchaser's representative.</p> <p>*Report review</p> <p><u>General notes</u></p> <p>Witnessed inspections at the factory for each instrument shall be as follows:</p> <ol style="list-style-type: none"> <li>Inspection method for all instruments shall be in accordance with client/consultant approved QAP.</li> <li>Verify that the instruments comply with the approved specification(s) and datasheet(s).</li> <li>Visual inspection shall include checking of labels and nameplates, painting, connection sizes, general workmanship etc as applicable.</li> <li>Pressure test shall be carried out by Manufacturer according to the design pressure indicated on the specification data sheets and codes requirements.</li> <li>Pressure test certificates shall be made available by the Vendor at the time of equipment inspection and delivery.</li> </ol>					
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INSTRUMENTATION DEPARTMENT		VENDOR DATA REQUIREMENTS		32654-14-PS-001 VDR INST				
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PROJECT:		Construction of additional Ammonia Barge						
CLIENT:		FACT						
ITEM:		Control valves (Shut down valve)						
STATUS		ENQUIRY/-COMMITMENT						
PO NUMBER								
SL NO.	GRP. CODE	DESCRIPTION	OFFER	AFTER COMMITMENT			FINAL	
			QTY	QTY	Lead Time In Weeks			QTY
					Reqd	Prop	Agrd	
1	B	Manufactures catalogues with detailed technical specification, material etc for valve and all accessories		1P+1S	4			3P+1S
2	B	List of deviations	1S					
3	B	Recommended spare parts list (BOM)		1P+1S	4			3P+1S
4	B	Quality plan for valve and accessories (Bought out items)		1P+1S	6			3P+1S
5	B	Production program		1P+1S	6			3P+1S
6	B	Control valve specification data sheet		1P+1S	6			3P+1S
7	B	Bought out item specification data sheet, OEM catalog, drawings etc		1P+1S	8			3P+1S
8	A, B	Instrument air consumption details		1P+1S	8			3P+1S
9	A,C	Dimensional outline drawings of valve and accessories		1P+1S	8			3P+1S
10	A,B, C	Schematic wiring and termination drawings		1P+1S	8			3P+1S
11	A, B	Air piping hookup drawings		1P+1S	8			3P+1S
12	A, B	Electrical hookup drawings (For solenoid valve, electro hydraulic actuator etc)		1P+1S	8			3P+1S
13	A, B	Details of Power requirement (For electro hydraulic actuators)		1P+1S	8			3P+1S
14	B,C	Performance/ calibration test, Hydraulic, seat leakage test, functional test certificates, NDE/ NDT reports		1P+1S	2BDM			3P+1S
15	B,C	Material test report		1P+1S	2BDM			3P+1S
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16	C	Detailed spare parts list for future requirement	1P+1S	8		3P+1S
17	C	Installation, operation, commissioning and maintenance manual	1P+1S	(1)		3P+1S
18	C	Third party certificate CCOE, IBR, SIL, Fire safe design for valve etc	1P+1S			3P+1S
19	B,C	Control valve capacity (Cv) calculation, noise calculation actuator sizing calculations, Inlet/ outlet velocity etc	1P+1S	8		3P+1S
20	B	Inspection and test procedure	1P+1S	8		3P+1S
24	G	All documents and drawings in CD	4S	(1)		2S

**Group code:**  
A- For review and detailed engineering,  
B- For review,  
C- For information and record document type:  
R- Reproducible,  
P- Print,  
M- Microfilm  
S- Soft (CD/DVD)

**Notes:**  
@ Vendor shall fill in proposed lead-time if different from the required lead-time.  
@@ Each set of final documents shall be submitted in a folder. Two such folders shall be packed and dispatched with the equipment  
(1)-dispatched along with instrument/ system  
BDM- Before dispatch of material

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- 1.0 The Following requirements apply for the shutdown valves (SDV) indicated in data sheet no. 32654-14-DA-00001.
- 2.0 Vendor shall fill the "Vendor confirmation column" against each of the requirements and submit for review of PMC/ OWNER before finalizing the order for SDV. Further, vendor shall strike out clauses which are not complied or not applicable wherever possible against each of the requirements mentioned below.
- 3.0 All similar items (ie valves, actuators and sub components) shall be from same OEM to reduce the inventory spares.
- 4.0 The vendor shall confirm submission of QAP for the assembly as well as for components from OEM for review and approval of PMC. Sample inspection and test requirements are specified in 32654-14-PS-001 SIT INST.
- 5.0 Vendor shall submit all documents and drawings as mentioned in document 32654-14-PS-001 VDR INST.
- 6.0 Vendor shall supply spares as per document 32654-14-PS-001 SPR INST.
- 7.0 These shutdown valves are intended for operation in both directions during loading and unloading situation. The process data is given below for different operating modes. Vendor shall check and confirm the suitability of the valve in all the cases.

	Parameter	Units	Case 1 Loading (Forward flow)	Case 2 Unloading (Reverse flow)	Case 3 Depressurization (Forward Flow)	Case 4 Transportation (No Flow)
<u>Liquid Service Valves</u>	Upstream Pressure	kg/cm <sup>2</sup> (G)	2.0	6	6	1
	Sizing Pressure Drop	kg/cm <sup>2</sup>	0.2	0.2	-	-
	Temperature	°C	(-)33 to 40	(-)33 to 40	(-)33 to 40	(-)33 to 40
	Shutoff Pressure	kg/cm <sup>2</sup> (G)	9.52	22.97	6 (Valve under Closed state)	22.84 (Valve under Closed state)
<u>Vapor Service Valves</u>	Upstream Pressure	kg/cm <sup>2</sup> (G)	1.0	6	1 to 6	1
	Sizing Pressure Drop	kg/cm <sup>2</sup>	0.2	0.2	0.2	-
	Temperature	°C	(-)33 to 40	(-)33 to 40	40	(-)33 to 40
	Shutoff Pressure	kg/cm <sup>2</sup> (G)	9.52	22.97	6	22.84 (Valve under Closed state)

8.0 All the Valves shall be suitable for bidirectional service since the flow is reversed in different operating modes.

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<b>TECHNICAL PROCUREMENT SPECIFICATION</b>	<b>SPECIAL REQUIREMENT FOR SHUTDOWN VALVES</b>	32654-14-PS-001 SPL (INST)	
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- 9.0 SDVs shall be supplied in completely factory assembled and tubed condition with all accessories.
- 10.0 The open and close limit switches of the valve shall be terminated in a housing attached permanently with the valve actuator. The housing shall be suitable for the hazardous area indicated. The housing shall have cable entry (2no) one with cable gland and other one plugged. The MOC of cable gland shall be SS304.
- 11.0 The valve shall have local indication for quickly identifying the open and close position of the valve.
- 12.0 The actuator shall have sufficient extension from the body of the valve to accommodate cold insulation (80mm thick) on pipe as well as valve body.
- 13.0 Valve actuator (Piston/ cylinder) orientation shall be parallel to the pipe line.
- 14.0 Actuator shall be selected at full differential pressure and with 30% factor of safety. Actuator selection/ torque calculation to be furnished.
- 15.0 Stroke time of valves shall not exceed 30Sec. If this criterion is not met alone by venting through the solenoid valve, an additional quick exhaust valve shall be installed in the pneumatic circuit without any additional implications to owner.
- 16.0 Name plate shall be provided on all components and on valve indicating the tag number, permanently attached. Tag numbers are given below:  
Liquid service valves: Total 8 nos

Valve Tag numbers	Solenoid Valve Tag numbers
XPV-301A	USY-301A
XPV-301B	USY-301B
XPV-302A	USY-302A
XPV-302B	USY-302B
XPV-303A	USY-303A
XPV-303B	USY-303B
XPV-304A	USY-304A
XPV-304B	USY-304B

Vapour service valves: Total 4 nos

Valve Tag numbers	Solenoid Valve Tag numbers
XPV-301C	USY-301C
XPV-302C	USY-302C
XPV-303C	USY-303C
XPV-304C	USY-304C

- 17.0 Additional specifications are mentioned below:

SL NO	DESCRIPTION	Vendor confirmation
1.	Tubing : SS316 6mm OD 1mm thick wall	
2.	Fittings : MOC SS316	
3.	Painting/ Colour : Red	
A.	Accessories with actuator	

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**TECHNICAL  
PROCUREMENT  
SPECIFICATION**

**SPECIAL REQUIREMENT FOR  
SHUTDOWN VALVES**

32654-14-PS-001 SPL  
(INST)

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SL NO	DESCRIPTION	Vendor confirmation
1.	Mounting bracket	
2.	Hand wheel for manual override (LEVER)	
3.	Air Filter regulator -2" pressure gauge with 0-10kg/cm2, 1/4" NPTF air supply connection, Manual drain, SS body, 5 micrometer sintered bronze filter, Mounting on actuator bracket	
4.	Solenoid valve : 3 Way universal type with freewheeling diode across coil.	
5.	Limit switches: Separate open and close micro switch required (2 no for each valve), SPDT gold plated contact, 24V 2A contact rating,	

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TECHNICAL PROCUREMENT SPECIFICATION		EQUIPMENT / ITEMS TO BE SUPPLIED		32654-14-PS-001 IS	
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TPS NO. 32654-14-PS-001					
Sl. No.	Eqpt. No. / Tag No.	Description	Qty.	Remarks	
<b>A</b>	-	<b>Liquid ammonia service valves-80 NB as per data sheet (32654-14-DA-0001,326554-14-DA-00002,32654-14-PS-001 SPL INST)</b>			
1	XPV-301A	Shutdown Valve with accessories	1 Set		
2	XPV-301B	Shutdown Valve with accessories	1 Set		
3	XPV-302A	Shutdown Valve with accessories	1 Set		
4	XPV-302B	Shutdown Valve with accessories	1 Set		
5	XPV-303A	Shutdown Valve with accessories	1 Set		
6	XPV-303B	Shutdown Valve with accessories	1 Set		
7	XPV-304A	Shutdown Valve with accessories	1 Set		
8	XPV-304B	Shutdown Valve with accessories	1 Set		
<b>B</b>	-	<b>Vapour ammonia service valves-80 NB as per data sheet (32654-14-DA-0001,326554-14-DA-00002,32654-14-PS-001 SPL INST)</b>			
	XPV-301C	Shutdown Valve with accessories	1 Set		
	XPV-302C	Shutdown Valve with accessories	1 Set		
	XPV-303C	Shutdown Valve with accessories	1 Set		
	XPV-304C	Shutdown Valve with accessories	1 Set		
<b>C</b>	-	<b>Spares</b>			
1	-	Spares for Liquid ammonia service valves As per 32654-14-PS-001 SPR-INST	1 Lot		
2	-	Spares for Vapour ammonia service valves As per 32654-14-PS-001 SPR-INST	1 Lot		
3					
2					
1					
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DATA SHEET		CONTROL VALVE (SHUTDOWN VALVE)						32654-14-DA-00001	
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Units	Flow: liq. (1) kg/hr (2) m <sup>3</sup> /hr, Gas- Nm <sup>3</sup> /hr	Steam-kg/hr	Pressure - kg/cm <sup>2</sup> g		Density-kg/m <sup>3</sup>				
General	Tag number								
	Line size & schedule/ material		80NB&Sch 40/A333Gr1		80NB&Sch 40/A333Gr1				
	Quantity (nos.)		8		4				
	Service		Liquid Ammonia		Vapor Ammonia				
	P&ID ref drawing		32654-11-PD-001		32654-11-PD-001				
	Fluid & state		Anhydrous ammonia	Liquid	Anhydrous ammonia	Vapour			
	Area classification		IEC Zone 1 Gr IIA T1		IEC Zone 1 Gr IIA T1		IEC Zone Gr T		
Process data	Flow	Min	Max	Design	33761 (nor) /40513/		198.65 (Nor)/238.38/		
	Inlet pre.	Min	Max	Design	/ * /		/ * /		
	Outlet	Min	Max	Design	/ * /		/ * /		
	Temp. °C	Min	Max	Design	-33 / /		/ 40 /		
	ΔP sizing	Δ P shut off		0.2	*		0.2		
	Density	Cmp.factor	Mol.wt		683 / /17.03		472 / /17.03		
	Flash %	Op.visc.c P		-	0.291		-		
	° of superheat	% solids		-	-		-		
	Vap.pr. kg/cm <sup>2</sup> a	Crit. Press							
	Cv.	nor.	max. valve		MTS/ MTS /MTS		MTS/ MTS /MTS		
	Noise level to be < 90 dBA				Required		Required		
	Velocity	Inlet	Outlet		MTS		MTS		
	Body	Type of valve		Ball		Ball			
Body size		Port size		80 NB	Full bore		80 NB	Full bore	
Guiding		No. of ports		Top	1		Top	1	
End connection ANSI		300# Small Groove		300# Small Groove					
Body material		A352Gr LCB		A352Gr LCB					
Bonnet type		Mfr Std		Mfr Std					
Packing material		Teflon		Teflon					
Trim form		Trim type		On off	-		On off	-	
Trim material - plug & seat		A351Gr CF8M, RPTFE		A351Gr CF8M, RPTFE					
Tight shut off class		FCI 70.2 Class...VI		FCI 70.2 Class...VI		FCI 70.2 Class...			
Flow tending to									
%opening @min/nor/max flow		- / - /-		- / - /-		/ / /			
Actuator		Type		Piston With Rack &Pinion		Piston With Rack &Pinion			
	Close at	Open at		MTS	MTS		MTS	MTS	
	Fail position		Close		Close				
	Handwheel & location		Yes	Mfr Std		Yes	Std		
Positioner	Air supply pressure		3.5 Kg/Cm2 (Min)		3.5 Kg/Cm2 (Min)				
	Input	Output		-	-		-	-	
	Bypass	Gauges		-	-		-	-	
	Partial stroke test feature		-		-		-		
I/P	Input	Output		-	-		-	-	
	Solenoid valve	Limit switch		Yes	Open&Close		Yes	Open&Close	
Options	Airset,gauge,fil	Air lock relay		Yes	-		Yes	-	
	Tracing	Jacketting		-	-		-	-	
	Quick exhaust valve		-		-		-		
	IBR	Calibration		-	Required		-	Required	
Certifica	Material test	Hydro test		Required	Required		Required	Required	
	Fire safe design	W/p, E/P		No	Required		No	Required	
	Valve	Actuator		MTS	MTS		MTS	MTS	
Model	Positioner	I/P tranaducer		-	NA		-	NA	
	Quick exhaust	Sol. Valve		-	MTS		-	MTS	
MTS- Mfr to specify									
* Refer 32654-14-PS-001 SPL INST for tag nmbers and additional requirements									
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2						CLIENT	FACT		
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General	Coil voltage	<input type="checkbox"/> 110 V AC	<input type="checkbox"/> 230 V AC	<input type="checkbox"/> 110V DC	<input checked="" type="checkbox"/> 24VDC	1
	Tolerance in voltage	<input type="checkbox"/> +/-15%	<input checked="" type="checkbox"/> +/-10%			2
	Tolerance in Frequency	<input type="checkbox"/> +/-3 %				3
	Max. ambient temperature range	<input checked="" type="checkbox"/> 15-60 °C				4
	Temp. class of coil insulation	<input type="checkbox"/> A (105°C)	<input type="checkbox"/> B (130°C)	<input checked="" type="checkbox"/> F(155°C)	<input type="checkbox"/> H (180°C)	5
		<input type="checkbox"/> E (120°C)				6
	Coil construction	<input checked="" type="checkbox"/> Epoxy encapsulated	<input type="checkbox"/> Non-moulded type			7
	Area classification	<input type="checkbox"/> Non Hazardous				8
		<input checked="" type="checkbox"/> Hazardous as per IEC Zone 1 Gr IIA T1				9
	Weather Protection	<input checked="" type="checkbox"/> Weather proof IP 65				10
	Explosion protection	<input type="checkbox"/> Intrinsic safe Exi	<input checked="" type="checkbox"/> Flameproof Exd			11
	Duty	<input checked="" type="checkbox"/> Continuous	<input type="checkbox"/> Intermittent			12
	Duty Cycle	<input type="checkbox"/> MFR to specify (If intermittent)				13
	Connection- Cable / Air	<input checked="" type="checkbox"/> 1/2" NPTF	/	<input checked="" type="checkbox"/> 1/4" NPTF		14
	Cable gland/ plug material	<input type="checkbox"/> Cd-Ni plated brass	<input checked="" type="checkbox"/> SS316			15
	Local reset	<input checked="" type="checkbox"/> Required	<input type="checkbox"/> Not required			16
	Reference standard	<input checked="" type="checkbox"/> IS8935				17
Process data	Tag no.		*			18
	Service		Air			19
	Fluid & state		Air & Gas			20
	Flow maximum					21
	Press. min / nor / max kg/cm <sup>2</sup>	/	/	/	/	22
	Differential press. min/max kg/cm <sup>2</sup>	/	/	/	/	23
	Temp. nor / max Deg C	/	/	/	/	24
	Fluid density Kg/m3 / sp gravity	/	/	/	/	25
	Viscosity cP					26
	Allowable pressure drop					27
	Valve Cv / orifice size		MTS			28
Material	Body	<input checked="" type="checkbox"/> 316 SS	<input type="checkbox"/> Brass	<input type="checkbox"/> 316 SS	<input type="checkbox"/> Brass	29
	Seat	<input checked="" type="checkbox"/> 316 SS	<input type="checkbox"/>	<input type="checkbox"/> 316 SS	<input type="checkbox"/>	30
	Disc	<input checked="" type="checkbox"/> Teflon	<input type="checkbox"/> Buna N	<input type="checkbox"/> Teflon	<input type="checkbox"/> Buna N	31
	Seal	<input checked="" type="checkbox"/> Teflon	<input type="checkbox"/> Buna N	<input type="checkbox"/> Teflon	<input type="checkbox"/> Buna N	32
	Core tube					33
	Core and plug nut					34
	Core spring					35
Others	Port type	<input type="checkbox"/> 2 way	<input checked="" type="checkbox"/> 3 way	<input type="checkbox"/> 2 way	<input type="checkbox"/> 3 way	36
	No. of coil	<input checked="" type="checkbox"/> Single	<input type="checkbox"/> Double	<input type="checkbox"/> Single	<input type="checkbox"/> Double	37
	Valve action					38
	Response time					39
	Pneumatic / process ports					40
	Electrical					41
	Marking	As per IS8935		As per IS8935		42
	Accessories					43
Make / model no.		MTS			44	
Quantity		12 nos			45	
Certifica	Weather protection	<input checked="" type="checkbox"/> Required	<input type="checkbox"/> Required			46
	Explosion protection	<input checked="" type="checkbox"/> Required (FM/ CMRI)	<input type="checkbox"/> Required (FM/ CMRI)			47
	Test certificate	<input checked="" type="checkbox"/> Required (IS8935)	<input type="checkbox"/> Required (IS8935)			48

Notes: \*Refer 32654-14PS-001 SPL for Tag numbers  
 1 The vent port shall be bug proofed.  
 2 Flying leads are not acceptable for the connections.

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2					CLIENT	FACT
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Sl. No.	Description	Quantity	Unit price	Total price
a.	Solenoid valve	2 Nos		
b.	Air filter regulator with pressure gauge	2 Nos		
c.	Limit switch (On and Off)	2 Set		
d.	Piston O ring, Packing etc (For each size/ type)	2 Set of each type		
e.	Quick exhaust valve (If applicable)	2 Nos		

**Notes:**

1. The above indicated spares are loose items to be handed over to client along with the supply of valves.
2. ~~Next rounded figure to be considered wherever % is specified (Example: For total 11 nos. instruments with 10% spares basis, 2 Nos. spares shall be provided)~~
3. ~~Wherever complete instrument/set is considered as spare, spare quantity shall never exceed ordered/ purchased quantity (for example, if ordered quantity is 1 and mandatory spare philosophy is 20% or min 2, in such cases mandatory spares quantity shall be 1 and not 2)~~

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<b>REV.</b>	<b>DATE</b>	<b>DESCRIPTION</b>	<b>PREPARED</b>	<b>CHECKED</b>	<b>APPROVED</b>

**FACT ENGINEERING AND DESIGN ORGANISATION**



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