


Form No:	 PE&SD	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52034</b>
		<b>PURCHASE SPECIFICATION</b>	Rev. No. 02
		<b>VALVE WITH ELECTRICAL ACTUATOR &amp; INTEGRAL STARTER</b>	Page 1 of 12

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### 1.0 GENERAL:

The actuators are intended for operation of valves used in power stations, fertilizer plants, petro-chemical plants & refineries. These will generally be located outdoor where it will be exposed to atmosphere laden with fine coal dust, ammonia vapour, hydro carbon vapour. The actuators proposed shall be suitable for operation under aforesaid atmospheric condition. Copper and copper alloys shall not be used.

### 2.0 SCOPE:

This specification covers the design, manufacture, testing and delivery of electric actuators for open/close & regulating duty. The actuator assembly shall be complete with drive motors, gears, hand wheel, signalling and switching units associated control and terminal boxes, internal wiring, earthing terminal and other accessories as required.


### 3.0 STANDARDS:

The actuator shall comply with the requirements of latest issue of relevant IEC/Indian standard IS 325. In case of any conflict between this specification and the above standards, this standard shall prevail. The mounting dimensions shall be as per DIN 3210.

Valve design shall be as per the specifications indicated in table below (Types of valves-as applicable & as per requirement mentioned in Variant Table)

Sl. No.	VALVE TYPE	MATERIAL	ANSI Pr.CLASS	BHEL CORP. STD.
3.1	GATE VALVE	CARBON STEEL	150	AA7521418
3.2	GATE VALVE	CARBON STEEL	300	AA7521428
3.3	GATE VALVE	CARBON STEEL	600	AA7521448
3.4	GATE VALVE	CARBON STEEL	1500	AA7521508
3.5	GATE VALVE	CARBON STEEL	2500	AA7521528
3.6	GATE VALVE	1-1/4CR-1/2MO	600	AA7521451
3.7	GATE VALVE	1-1/4CR-1/2MO	1500	AA7521511
3.8	GATE VALVE	2-1/4CR-1MO	300	AA7521434
3.9	GATE VALVE	2-1/4CR-1MO	600	AA7521454
3.10	GATE VALVE	2-1/4CR-1MO	1500	AA7521514
3.11	GATE VALVE	2-1/4CR-1MO	2500	AA7521534
3.12	GATE VALVE+GL.SEALING	CARBON STEEL	150	AA7526408
3.13	GATE VALVE+GL.SEALING	CARBON STEEL	300	AA7526428
3.14	GLOBE VALVE	CARBON STEEL	150	AA7501408
3.15	GLOBE VALVE	CARBON STEEL	300	AA7501428
3.16	GLOBE VALVE	CARBON STEEL	600	AA7501448
3.17	GLOBE VALVE	1-1/4CR-1/2MO	600	AA7501451
3.18	GLOBE VALVE	1-1/4CR-1/2MO	1500	AA7501511
3.19	GLOBE VALVE	1-1/4CR-1/2MO	2500	AA7501531
3.20	GLOBE VALVE	2-1/4CR-1MO	600	AA7501454
3.21	GLOBE VALVE	2-1/4CR-1MO	1500	AA7501514
3.22	GLOBE VALVE	2-1/4CR-1MO	2500	AA7501534
3.23	GLOBE VALVE+GL.SEALING	CARBON STEEL	150	AA7506408

Refer Doc	<b>LAYOUTS &amp; PIPING ENGINEERING</b>	<b>PREPARED</b>	<b>CHECKED</b>	<b>APPROVED</b>	<b>DATE</b>
	<b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	RAGHAVENDRA SVN	G SRIKANTH	VVSS SUNDAR	04.10.14

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3.24	GLOBE VALVE+GL.SEALING	CARBON STEEL	300	AA7506428
3.25	GLOBE VALVE WITH REG. DISC	CARBON STEEL	800	HY7511943
3.26	GATE VALVE	STAINLESS STEEL	150	AA7521418
3.27	GLOBE VALVE	STAINLESS STEEL	150	AA7501418
3.28	GLOBE VALVE	CARBON STEEL	1500	AA7501508
3.29	GATE VALVE	CARBON STEEL	150	AA7521408
3.30	GLOBE VALVE WITH REG. DISC	2-1/4CR-1MO	1500	HY7511514
3.31	GLOBE VALVE WITH REG. DISC	CARBON STEEL	150	AA7511408
3.32	GLOBE VALVE WITH REG. DISC	CARBON STEEL	300	AA7511428

Sl. No.	VALVE TYPE	MATERIAL	Pr.CLASS	PLANT SPEC.
3.33	GATE VALVE (SIZE >24")	CARBON STEEL	ANSI 300	PY52049
3.34	REG.GLOBE VALVE 6" FL	CARBON STEEL	ANSI 600	PY52121
3.35	GATE VALVE	CAST IRON	PN 1.6	PY52127
3.36	GATE VALVE	CAST IRON	PN1.0/1.6	PY52067

#### 4.0 AMBIENT CONDITION:

The actuators shall be suitable for operation in an ambient temperature of 50°C, -15°C min.and max. relative humidity of 100% unless otherwise specified.

#### 5.0 POWER SUPPLY

5.1 The actuator motor shall be of squirrel cage Induction type and suitable for operation on power supply of 415V, 3 Phase 50Hz AC unless otherwise specified. Only one feeder of 415V, 3 Ph, 50 Hz AC will be provided. Any other power supplies required for control circuit operation shall be derived from 415V, 3 Ph, 50 Hz AC only.

5.2 For isolating service the actuator shall be rated for minimum of fifteen minutes continuous operation or three successive open close operations of the valve whichever is longer.

5.3 For regulating service, the actuator shall be suitably time rated for the duty cycle with not less than 150 starts per hour.

5.4 The motor shall operate without any practical difficulty for any of the following conditions:


- a) Voltage variation :  $\pm 10\%$
- b) Frequency variation :  $\pm 5\%$
- c) Combined variation :  $\pm 10\%$

#### 6.0 PERFORMANCE:

6.1 Motor shall be suitable for direct on line starting.

6.2 Starting current shall not exceed six times full load current.

6.3 Motors shall meet the requirements of current, torque, axial thrust, acceleration & stall time as imposed by driven equipment. Thermal torque rating of each drive unit shall have

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adequate margin and at least equal to theoretical brake torque required to drive the equipment under full load, including all losses in speed reducers and power transmission.

6.4 The motors shall be capable of withstanding the torque and voltage stresses resulting from an out of phase condition between motor residual voltage and incoming source voltage equal to 150% of rated voltage during transfer of supply.

6.5 The motor temperature rise shall be limited to class 'B' values.

6.6 The motor shall be capable of running at 75% of rated voltage for a period of 5 minutes. The motor shall also be capable of starting and accelerating to full speed along with the driven equipment without exceeding the acceptable winding temperature even when the supply voltage drops down to 80% of its rated value.

6.7 Margin of 20% shall be provided in motor rating over and above the continuous maximum demand of the driven equipment.

#### **7.0 CONSTRUCTION**

7.1 Motors shall be totally enclosed to minimum protection class of IP67 as per IEC 345. The enclosure shall be suitable to protect the motor from leakage steam, water, gas or oil from valve joints and glands.

7.2 Cooling fans where ever provided shall be suitable for both directions of rotation.

7.3 Actuator Make: Only reputed & proven designs are acceptable. Unless noted otherwise it shall be of ROTORK / AUMA / LIMITORQUE/ ANTRIEB make.

#### **8.0 INSULATION:**

Motors shall have class 'F' non-hygroscopic insulation.

#### **9.0 LUBRICATION:**

The actuators shall be provided with double shielded, Grease prelubricated regressive, antifriction bearings having a minimum life rating of 1,00,000 hours.


#### **10.0 TORQUE SWITCHES :**

10.1 Each actuator shall be provided with atleast one open and one close torque switches. All torque switches shall be with 2 NO + 2 NC contacts.

10.2 The torque switches shall have an accuracy  $\pm 3\%$  of set value. The exact value shall be furnished in the offer.

10.3 The torque switches shall be provided with calibrated knobs for setting desired torque. Separate knobs shall be provided for close and open torque switches.

10.4 The torque switches shall be provided with mechanical latching device to prevent operations when unsealing a jammed valve in closed position. Similarly close torque switch

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shall not act while unsealing from jammed open position. The latching device shall unlatch as soon as the valve leaves the end position. If such provision is not possible, the torque switches shall be bypassed by end position limit switches which opens on valve leaving end position. These limit switches additional to the number of limit switches specified elsewhere.

#### **11.0 LIMIT SWITCHES:**

11.1 One open and one close limit switches shall be provided. The type of limit switches shall be gear driven cam type or proximity type as given in the data sheet.

11.2 Two intermediate position limit switches each independently adjustable for entire travel shall be provided. All limit switches shall be with 2NO + 2NC contacts and shall be of rotary coil type.

11.3 Actuator running in open and actuator running in close direction contacts shall be provided. The same shall be with 2 NO + 2 NC contacts.

#### **12.0 CONTACTS:**

12.1 The contacts of limit and torque switches shall be snap acting, self cleaning type. The contacts shall be Capable of making and breaking inductive current of 5A at 240V AC/0.25 A at 220V DC.

12.2 The actuator motor shall be provided with winding temperature protection by thermostat embedded in the hot spot of the motor windings directly sensing the winding temperature and giving tripping command to trip motor for overload.

#### **13.0 ENCLOSURE:**

13.1 The torque and limit switches shall preferably be housed in a separate enclosure with protection class IP67 of IEC 144.

#### **14.0 HAND WHEEL :**


14.1 The actuator shall be provided with a hand-wheel for manual operation. The size of hand wheel shall be sufficiently big for easy operation. A lever shall be provided to engage the hand wheel but shall disengage automatically on energising the motor.

14.2 The hand wheel shall be so arranged that when looking from hand wheel the valve is closed by rotating the hand wheel in clock wise direction.

14.3 The hand wheel shall have plain polished rim.

#### **15.0 SPACE HEATER:**

Space Heater shall be provided for actuators rated above 5 kw or if the ambient temperature is below 5 Deg C.

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Where applicable, space heater shall be provided in limit switch and starter compartments to prevent condensation. The Power supply requirements of space heater shall be derived within the actuator compartment from 415V AC 3 phase supply.

#### 16.0 LOCAL POSITION INDICATOR

16.1 Each actuator shall be provided with a mechanical position indicator to indicate valve position with sufficient accuracy.

16.2 The local position indicator should be factory calibrated so that it reads accurately the valve/ damper position when the actuator is mounted at purchaser's works or at site. It shall preferably be adjustable.

#### 17.0 REMOTE POSITION TRANSMITTERS

Each actuator shall be provided with 4-20mA, 2wire 24V DC potentiometric type electronic position transmitter or with proximity type position transmitter or LVDT type position transmitter as indicated in the data sheet.

#### 18.0 INTEGRAL STARTER:

18.1 Integral Starter shall be provided in a water tight enclosure with protection class 67 as per IEC 144.

18.2 The integral starter shall consist of the following equipment.

- a) Mechanically and electrically interlocked reversing contactors.
- b) Thermal overload relay.
- c) Step down control transformer.
- d) Interposing relays.
- e) Monitoring relay.
- f) Fuses on primary and secondary side of control transformer.


18.3 The control transformer shall be provided with earther screen between primary and secondary winding.

18.4 One line of secondary of control transformer shall be earthed through a disconnecting link.

18.5 The control transformer shall be sized to feed an external load of at least 15 VA in addition to internal load.

#### 19.0 LOCAL CONTROLS:

19.1 Local open-stop push buttons shall be provided on the actuator. The stop push button shall stay put on depressing and require a key to reset. In addition to the push buttons, a two position key operated selector switch shall be provided for local remote operation mode selection. Contacts with 2 NO + 2 NC shall be provided for actuator in remote mode and actuator in local mode.

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## 20.0 WIRING:

20.1 The internal wiring shall be of minimum 1.5 sq.mm stranded PVC insulated copper conductor.

20.2 The wiring shall be identified by means of numbered ferrules on both ends of all wires.

## 21.0 Terminal & Terminal Boxes :

### 21.1 Motor Terminal Box :

21.1.1 The terminals, terminal boards, terminal boxes, winding details and associated equipment shall be suitable for connection to supply system having short circuit capacity 40 KA for 1 sec.

21.1.2 The terminals shall be stud type insulated from the frame. The insulation shall not be porcelain. The minimum size of studs shall be 6mm brass or 4 mm stainless steel or phosphor bronze.

21.1.3 The terminal boxes shall be totally enclosed to protection class IP 67 of IEC 144.

21.1.4 Terminal box shall be capable of being turned through 360° in steps of 90° to facilitate cable entry from any direction.

21.1.5 Terminal box shall have sufficient space to connect one no. of 3Cx2.5 sq.mm copper conductor, PVC insulated armoured cable.

### 21.2.0 Actuator Terminal Box :

21.2.1 All terminals of limit and torque switches, space heater, position transmitters shall be brought to a common terminal box. The enclosure shall be to protection class IP 67 of IEC 144.

21.2.2 The terminal shall be screw type with sufficient insulation between two adjacent terminals.

21.2.3 There shall be at least five terminals spare to terminate spare cores of cable.


21.2.4 The actuator terminal box shall be suitable for receiving the following cables.

- one no. 19C X 2.5 sq.mm control cable.
- one no. 10C X 2.5 sq.mm control cable.
- one no. DAS cable of OD 8.0 mm (approx.)

## 22.0 Cable Glands:

22.1 The motor terminal box and actuator terminal box shall be provided with double compression nickel plated brass cable glands to suit cable type and size specified in data sheet.

## 23.0 Name Plate:

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23.1 Name plate with inscription shall be provided for push buttons and selector switch.

23.2 Motor shall be provided with name plate as per IEC/IS standard.

23.3 Wiring diagram of actuator shall be fixed inside the actuator terminal box cover plate.

23.4 A name plate on the actuator shall be provided with the following minimum data.

- (a) Tag No (purchaser's Tag no of associated valve/damper)
- (b) Torque rating
- (c) Full travel time

#### **24.0 EARTHING TERMINAL :**

Two earthing terminals with earth symbol shall be provided on either side of motor and also an actuator terminal box. The earth terminal shall be 4 mm brass stud.

#### **25.0 PAINTING :**

The motor external parts shall be furnished and painted to produce a neat and durable surface which would prevent rusting and corrosion. The equipment shall be thoroughly degreased. All rust, sharp edges and scale removed and treated with one coat of primer and finished with two coats of grey enamel paint. Motor fans (if any) shall also be painted to withstand corrosion.

#### **26.0 TESTS :**

26.1 **Type Tests** : 5 copies of type test certificates shall be furnished for perusal. The type test should have been carried out as per IEC/IS 325 specification. But the following minimum check should have been carried out.


- a) Working check for all accessories.
- b) Pressurisation : the actual gear box shall be fitted with oil and pressurised at 1 bar for a period of not less than 15 minutes. No seepage or leakage shall be allowed.
- c) IR (Insulation Resistance) test.
- d) Torque characteristics : The manufacturer shall supply a set of curves showing maximum operating duration of actuator for various torque values corresponding to motor temperature rise.
- e) Supply variation
- f) Torque switch setting
- g) Consecutive starts of 60 starts
- h) Overheating test.
- i) Degree of protection test.
- j) Humidity cycling
- k) Endurance test.

#### **26.2 Routine Test :**

The following routine tests shall be carried out on each actuator.

- a) IR test and Impulse test.



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- b) Wiring continuity test.
- c) Operational test for proper functioning of the valve along with actuator.
- d) Motor locked rotor test and check current at stand still.
- e) Load actuator to maximum rated torque and measure load current.
- f) Over voltage test.

#### 27.0 SPARES:

A list of recommended spares with unit price shall be furnished for three years of trouble free operation.

#### 28.0 DOCUMENTS :

28.1 Any deviation in the offered product from any clause / sub clause above must be clearly mentioned by the bidder in the offer.

28.2 Three copies of complete technical literature, wiring diagram and dimensional drawings shall be furnished along with the offer.

28.3 Three copies of technical datasheet of the actuator shall be furnished along with the offer.

28.4 Ten copies each of the following documents/drawings shall be furnished within 2 months after placement of order:


- a) Final control circuit and wiring diagram showing external wiring.
- b) Final overall assembly drawing of valve + actuator assembly
- c) O & M Manuals.

28.5 Six copies of all 'type and routine test certification' shall be despatched separately.

#### DATA SHEET :

SLNO	PARAMETERS	
1	Tag No.	
2	Service	
3	Project	
4	Power supply	Motor –415V, 3 phase AC, 50 Hz Space Heater (Where Applicable) –Power supply internally fed
5	Electronic position transmitter (EPT	4-20mA, 2 wire 24V DC potentiometric type.
6	Integral starter	YES/ <del>NO</del>
7	Local push buttons	YES/ <del>NO</del>
8	Local / Remote selector switch	YES/ <del>NO</del>
9	Enclosure	Weather proof IP67
10	Power cable size	a) 4 core x 2.5 mm sq. Copper conductor PVC insulated upto 3.7 KW motor. b) 4 core x 6.0 mm sq. Aluminium conductor PVC



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		insulated and steel armoured for 3.8 to 5.0 KW motor. c) 3 core x 16 sq. mm Aluminium conductor PVC insulated and steel armoured.
11	Control cable size	2 nos. multi core 2.55 sq.mm copper conductor PVC insulated & armoured Cable.
12	Painting	Epoxy based shade 631 of IS-5
13	Fault withstand capacity of motor terminal box	45 KA for 0.2 Seconds

### 29.0 PERFORMANCE GUARANTEE:

Actuators shall be guaranteed for satisfactory performance under the specified conditions for a period of 24 Months.

### 30.0 PACKING :

Actuators shall be seaworthy for transport by rail, road or sea as applicable.

31.0 Where ever the integral bypass valve is provided the bypass valve also shall be fitted with

electric actuator with similar technical features as of main actuator.

32.0 Extension spindle general arrangements Drg No. (vendor shall enclose the drgs. wherever applicable)

**NOTE :-** Wherever valves are required with extension spindle arrangement vendor shall supply the extension spindle arrangement with floor pedestal (pedestal shall have 4 x dia 18 holes on pcd 260 to fix the pedestal on floor) and with 2 universal joints and one expansion piece to accommodate the piping expansion/ movement for both main valve and bypass valve (where ever applicable).


### 31.0 INSPECTION AND TESTING:

Bidder to furnish Quality Plan to BHEL/Customer/Consultant for approval after award of contract. Quality plan will be reviewed during detailed Engineering stage with respect to Inspection, standard Engineering practices & Specification Requirements and various tests and stages of inspection. Bidder to abide by the same.

QAP guidelines and format is attached.

Inspection agency:

BHEL/Third Party appointed by BHEL/Customer/Consultant. The various review/witness/observation stages by Individual agencies (or) Group of Agencies as above will be in line with approved quality plan

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#### ANNEXURE-A – DATA SHEET


Information To Be Furnished By Vendor Along With Offer

(Vendor to fill-up this data sheet and furnish along with offer. REVISIONS carried out if any, at any time later must be submitted to BHEL PE&SD Hyd.)

Sl. No	PARAMETERS	VENDOR's RESPONSE	REMARKS
1.	Valve tag No(s).		
2.	Quantity		
3.	Description(Type/Matl./End Details)		
4.	Valve size/ANSI Pressure Class		
5.	Actuator(Motor)rating (kW)		
6.	Make of actuator & Model No.		
7.	Type of motor (Sq.cage/Induction)		
8.	Supply voltage / Frequency.	415V +/-5% /50Hz +/-5%	
9.	Suitable for short time duty.	15 min	
10.	Suitable for minimum no. of starts.	150	
11.	Enclosure protection class for complete actuator unit	IP 67	
12.	Hazardous Area Classification	Safe Area	
13.	Motor insulation		
14.	Design ambient Temp.	80%	
15.	Minimum starting voltage	75%	
16.	Min. voltage during running for 5 min.		
17.	Motor full load current		
18.	Motor starting current.		
19.	Type of bearings (Sealed for life-Type) min. Life	100,000hrs	
20.	Torque (Nm)		
21.	Output speed (rpm)		
22.	End of travel limit switch		
23.	Intermediate adjustable position limit switches		
24.	Built-in local position indicator	One	
25.	Built-in electronic positioner with power supply unit		
26.	In built electric positioner unit with position transmitter for remote indication-for regulating type of valves.	4 -20 mA isolated output	
27.	Integral stator (Clause 18)		
28.	Local push button for local/remote/stop facility		
29.	Local remote selectors switch		
30.	Torque limit switches-1 one for each direction		
31.	Contact ratings	5 Amps at 240V AC 0.5	

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		Amps at 110V DC	
32.	Space heater in terminal box		
33.	Hand wheel (with declutching lever)	1 No.	
34.	Name plate SS316 material (Clause 7.1.2)		
35.	Paint-epoxy based (shade 631 Grey-IS-5		
36.	Cable glands (explosion proof design, if applicable)		
37.	Dimensional G.A drawing	Drg. No.	
38.	Control wiring drawing	Drg. No.	
39.	Action of loss of signal	Stay put	
40.	Motion inhibit feature between actuator movements		
41.	Protection system provided (against single phasing, incorrect phase rotation, thermostat)		
42.	Type of service-Isolating/Regulating		
43.	Valve & Actuator assembly GA drawing (enclosed)		

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**VARIANT TABLE:**

Var No	Size	End conn	Item Description	Applicable Valve Spec	Material Code
01	32"	BW	MO GTV CS (WCB) 32" CL 300 BW	PY52049	PY9752034012
02	12"	BW	MO GTV AS (WC9) 12" CL 1500 BW	AA7521514	PY9752034020
03	--	--	ACTUATOR FOR 14" GTV CS GO VALVE	--	PY9752034039
04	6"	FLRF	MO REG.GLV CS (WCB) 6" CL 600 FLRF	PY52121	PY9752034047
05	16"	FLFF	MO GTV CAST IRON 16" CL PN1.6 FF	PY52127	PY9752034055
06	10"	FLFF	MO GTV CAST IRON 10" CL PN1.6 FF	PY52127	PY9752034063
07	12"	FLFF	MO GTV CAST IRON 12" CL PN1.6 FF	PY52127	PY9752034071
08	14"	FLFF	MO GTV CAST IRON 14" CL PN1.6 FF	PY52127	PY9752034080
09	4"	FLFF	MO GTV CAST IRON 4"CL PN1.6 FF	PY52127	PY9752034098
10	8"	FLFF	MO GTV CAST IRON 8" CL PN1.6 FF	PY52067	PY9752034101
11	6"	FLFF	MO GTV CAST IRON 6" CL PN1.6 FF	PY52067	PY9752034110

**RECORD OF REVISIONS:**

Rev No	Date	Revision Detail	Prepared	Reviewed	Approved
00	04.10.14	FIRST ISSUE	SVN R	GS	VVSS S
01	22.09.22	Inspection and testing notes are added	SVN R	GS	VVSS S
02	16.10.23	Sl. 3.36 Added.	A MOQEET	VUK	GS

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Form No:	 PE&SD	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52067</b>
		<b>TECHNICAL SPECIFICATION</b>	Rev. No. 02
		<b>SLUICE VALVE, CAST IRON, IS14846 PN1.0/PN 1.6</b>	Page 1 of 4

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## 1.0 GENERAL

### 1.1 SCOPE

This standard specifies the requirements of **Cast Iron Non Rising Stem Type Wedge Gate Sluice Valves of Rating PN1.0/1.6 as per IS-14846.**

1.2 The Gate Valves supplied according to this specification shall conform to the requirements of latest version of the Standard IS-14846 and comply with the additional requirements indicated in this specification.

### 1.3 APPLICATION

The valves procured according to this standard are intended to be used for water supply, sewage treatment plant, Fire Water Application.

## 2.0 DESIGNATION

A hand operated Sluice valve of nominal pipe bore 150 NB, conforming to IS 14846 standard, cast iron material, with pressure rating of PN 1.0 and with flat face (FF) flanged end connections conforming to PN10 rating of IS 1536, IS 1538, IS 9523 & IS 8329 shall be designated as




***SLUICE VLV HO CI 150NB PN1.0 IS PN10 FF***


A hand operated Sluice valve of nominal pipe bore 150 NB, conforming to IS 14846 standard, cast iron material, with pressure rating of PN 1.6 and with flat face (FF) flanged end connections conforming to 150 class rating of ANSI B16.5 shall be designated as

***SLUICE VLV HO CI 150NB PN1.6 IS 150# FF***

A hand operated Sluice valve of nominal pipe bore 150 NB, conforming to IS 14846 standard, cast iron material, with pressure rating of PN 1.6 and with flat face (FF) flanged end connections conforming to 150 class rating of ANSI B16.5 along with LIMIT SWITCH shall be designated as:

***SLUICE VLV HO CI 150NB PN1.6 IS 150# FF with LS***


Refer Doc	<b>LAYOUTS &amp; PIPING ENGINEERING</b>  <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	PREPARED	CHECKED	APPROVED	DATE
		 IMRAN AHMAD	 DS BARAIK	 SRIKANTH G	02.05.16

Form No:	 PE&SD	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52067</b>
		<b>TECHNICAL SPECIFICATION</b>	Rev. No. 02
		<b>SLUICE GATE VALVE, CAST IRON, PN1.0/1.6 IS14846</b>	Page 2 of 4

### 3.0 GENERAL TECHNICAL REQUIREMENTS:

CL	REQUIREMENTS	COMPLIANCE
3.1	Size	As indicated in material description
3.2	Nominal Pressure Rating (PN)	PN 1.0/1.6 as per IS 14846, as indicated in material description.
3.3	Material of construction	Shall be as per Preferred material as per table 1 of IS 14846 with below deviations:
i)	Body, bonnet, dome, stool cover, wedge/disc, stuffing box, gland, Yoke, thrust plate and cap	Grey cast iron - IS-210 Gr FG 260
ii)	Hand wheel	Grey cast iron - IS-210 Gr FG 260
iii)	Stem	Stainless steel to AISI-410 13% Cr.St.
iv)	Gear housing	Grey cast iron - IS-210 Gr FG 260
3.4	Construction	As per IS-14846 & <b>Outside Screw Non Rising Spindle type</b>
3.5	Mode of Operation  Hand Operated (HO) Gear Operated (GO) Motor Operated (MO)	As indicated in material description
3.6	End Connections: a) Flanged Connection  b) Flange Facing	As indicated in material description Either one of 150# - As per ASME B16.5 PN10/16 - As per IS-1536, IS-1538, IS-8329 or IS-9523 The Flange Facing shall be Flat Face (FF)
3.7	Dimensions & Tolerances	As per Preferred Dimensions-PD (short body) indicated in table 2 of IS 14846
3.8	Testing	As per IS-14846 & approved QAP
3.9	Surface Preparation, Coating, Painting  (Unless otherwise indicated in Project specific Painting Schedule attached along with the Enquiry)	Surface Preparation as per IS-14846 Primer - Zinc Rich Epoxy Finish - Aliphatic Polyurethane Shade - RAL3000 (P.O.RED) Total DFT - 125 Microns (Minimum)
3.10	Marking, Packing & Storage	As per IS-14846
3.11	Limit Switch: Qty – 2 No's (Each for open & close end position)  Protection class: IP67  Contact: 1 No DPDT or  2 Nos SPDT minimum	Shall be provided if required as per material description  Refer Project specific requirements if any supplied along with enquiry

Note: Asbestos material shall not be used

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		<b>SLUICE GATE VALVE, CAST IRON, PN1.0/1.6 IS14846</b>	Page 3 of 4

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#### 4.0 ORDERING INFORMATION AS PER ANNEXURE-D OF IS-14846:

4.1	Nominal pressure of valve required	<b>PN 1.0/1.6 As indicated in material description</b>
4.2	Size of valve required	<b>As indicated in material description</b>
4.3	Whether Hand wheel or Cap is required	<b>Hand wheel</b>
4.4	Whether Hand wheels are required with special finish	<b>No</b>
4.5	Whether water is specially corrosive	<b>For Fire Water Application</b>
4.6	Whether valves are for use in pipeline or in unsupported or in terminal positions	<b>In Pipe line duly supported</b>
4.7	Tests required	<b>Both Open and Closed ends</b>
4.8	Whether additional tests other than those are required	<b>No</b>
4.9	Whether contrary to the specification, counter clockwise rotation for closing is required	<b>No</b>
4.10	Nature of operation — Vertical, horizontal or inclined	<b>Shall be suitable for all types of Installation - Vertical / Horizontal</b>
4.11	Flanges / Flange dimensions specific, if any	<b>As indicated in material description</b> <b>Refer point 3.6 indicated above</b>
4.12	Whether tail pieces or adaptors are required to suit special types or for proprietary or other joints	<b>No</b>
4.13	Type of power operation required, if any	<b>As indicated in material description</b>
4.14	Type of gear required <b>(construction as per IS 14846)</b>	<b>a) Gear operator required for sizes 250 NB &amp; Above (default)</b> <b>b) For sizes less than 250 NB gear operator to be provided as per material description</b>
4.15	Thrust bearings, if required on stem collar	<b>Yes</b>
4.16	By pass arrangement	<b>Required for 250 NB &amp; ABOVE as per IS 14846</b>

#### 5.0 ACCESSORIES OR OPTIONAL FEATURES FOR SLUICE VALVES (AS PER ANNEXURE-A OF IS-14846) AND OTHER SPECIAL REQUIREMENTS:

- 5.1 Locking arrangement for Hand wheel: **To be provided**
- 5.2 Valve gate position indicator: **To be provided**
- 5.3 Anti-friction devices / Thrust bearing for stem collars: **To be provided**
- 5.4 By-pass arrangement valve: **To be provided for 250 NB & above**
- 5.5 Drain plug: **To be provided**



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		<b>TECHNICAL SPECIFICATION</b>	Rev. No. 02
		<b>SLUICE GATE VALVE, CAST IRON, PN1.0/1.6 IS14846</b>	Page 4 of 4

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5.6 Gear operation: **To be provided for 250 NB & above (default)**  
 (To be provided for sizes below 250 NB if specified in the material description)

5.7 Gate valve shall be provided with back seating bush to facilitate gland renewal during full open condition of valve

5.8 Gate valve shall be **Outside Screw Non Rising Spindle type**.

5.9 **Limit Switch with IP 67 protection and 1 No DPDT or 2 No SPDT contact :**

Refer Cl 3.11 of this specification. 2 No's Limit switches (Each for open & close end position), shall be provided if required as per material description.

Project specific requirements if any shall be provided along with Enquiry and during drawing approval stage

#### 6.0 DOCUMENTATION:

##### 6.1 Along with the offer:

One copy of each of the following documents shall be submitted along with the offer:

- G.A. drawings/ leaflets/ catalogues for the item with binding dimensions, material specification details, weight etc.
- Signed and stamped copy of this specification accepting the scope of supply as indicated in the specification.

##### 6.2 After PO Placement:

Four copies each of the following documents shall be submitted for approval.

G.A. Drawings for the offered item with binding dimensions, material specification details, tests to be conducted, weight etc.






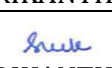
Schedule for document submissions:


S.no	Description	Schedule
1	Submission of GA drawing by vendor	7 days from the date of P.O.
2	Approval GA drawing by BHEL	14 days from drawing submission *

\* The GA drawing submitted by vendor shall be strictly in compliance to all applicable standards and specification. The approval of GA drawing in no way absolves the supplier from meeting this specification requirement

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#### RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
00	15.09.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO
01	28.07.2017	GENERAL REVISION	 G.KALYAN	 SRIKANTH G
02	16.10.2023	Added PN1.6 Rating	 M.A.MOQEET	 SRIKANTH G

Form No:	 <b>PE&amp;SD</b>	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>		<b>PY52216</b>	
		<b>TECHNICAL SPECIFICATION</b>		Rev. No. 01	
		<b>SWING CHECK VALVE, SINGLE DOOR PATTERN, CAST IRON, IS5312-PART 1</b>		Page 1 of 4	

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**SWING CHECK VALVE, CAST IRON, IS 5312-PART 1**  
**SINGLE DOOR PATTERN**

**1.0 GENERAL**

**1.1 SCOPE**

This specification specifies the requirements of flanged reflux valves of single door, swing check type from 50 to 600 mm sizes confirming to all the requirements of latest edition of Indian standard IS: 5312-part 1

**1.2** This standard shall be supplemented by and shall meet the requirements of BHEL specification for Technical delivery conditions of valves - "AA0851403"

**1.3 APPLICATION**

For water supply and sewage treatment plants.




**2.0 DESIGNATION**


A single door swing check valve of nominal pipe bore 150 NB, conforming to IS-5312 part 1 standard, of cast iron material, pressure rating of PN 1.0 and with flat face(FF) flanged end connections conforming to PN10 rating of IS 1536, IS 1538, IS 9523 & IS 8329 shall be designated as

*NRV CI 150NB PN1.0 IS5312-1 FL PN10 FF*

A single door swing check valve of nominal pipe bore 150 NB, conforming to IS-5312 part 1 standard, of cast iron material, pressure rating of PN 1.0 and with flat face(FF) flanged end connections conforming to 150 class rating of ANSI B16.5 shall be designated as

*NRV CI 150NB PN1.0 IS5312-1 FL 150# FF*

Refer Doc		<b>LAYOUTS &amp; PIPING ENGINEERING</b>  <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	PREPARED	CHECKED	APPROVED	DATE
			 IMRAN AHMAD	 G.KALYAN	 SRIKANTH G	07.08.17

Form No:	 <b>PE&amp;SD</b>	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY52216</b>	
		<b>TECHNICAL SPECIFICATION</b>		Rev. No. 01
		<b>SWING CHECK VALVE, SINGLE DOOR PATTERN, CAST IRON, IS5312-PART 1</b>		Page 2 of 4

### 3.0 TECHNICAL REQUIREMENTS

CL	REQUIREMENTS	COMPLIANCE
3.1	Size	As indicated in material description
3.2	Nominal pressure (PN)	PN 1.0/PN 1.6 as per IS 5312 part 1 (As indicated in the material description)
3.3	Material of construction	Preferred material as per table 1 of IS 5312 part 1
3.4	Construction	IS 5312 part 1
3.5	End Connections: a) Flanged Connection  b) Facing (FF)	As indicated in the material description one of PN10 - As per IS 1536, IS 1538, IS 8329 & IS 9523 or  PN16 - As per IS 1536, IS 1538, IS 8329 & IS 9523 or  150# - As per ASME B 16.5  The facing of cast iron flanged ends shall be flat face (FF)
3.6	Dimensions	As indicated in table 2 of IS 5312 part 1 (Alternate lengths shall not be considered and not applicable)
3.7	Testing	As per IS 5312 part 1
3.8	Surface Preparation, Coating, Painting & Marking	As per IS 5312 part 1 & AA0851403

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		<b>TECHNICAL SPECIFICATION</b>		Rev. No. 01
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#### 4.0 ORDERING INFORMATION AS PER IS 5312 Part 1:

4.1	Size of valve	As indicated in material description
4.2	Maximum cold non-shock working pressure	PN 1.0 (1.0 MPa)/ PN 1.6 (1.6 MPa) (As indicated in the material description)
4.3	Material of body, door and cover	Preferred material as per table 1 of IS5312 part 1
4.4	Operating position of valve horizontal, vertical or inclined	Shall be suitable for all positions horizontal, vertical or inclined
4.5	Whether by-pass arrangement required or not	Not required
4.6	Flow velocity or volumetric flow rate	The maximum acceptable flow velocity and volumetric flow rate shall be indicated by vendor
4.7	Whether the water is corrosive and if so, details to be given	The application is for RAW SEWAGE.
4.8	Flange details if other than mentioned in this IS 5312 standard	As indicated in the material description Refer point 3.5 indicated above

#### 5.0 DOCUMENTATION:

##### 5.1 Along with the offer:

One copy of each of the following documents shall be submitted along with the offer:

- G.A. drawings/ leaflets/ catalogues for the item with binding dimensions, material specification details, weight etc.
- Signed and stamped copy of this specification accepting the scope of supply as indicated in the specification.

##### 5.2 After PO Placement:

Four copies each of the following documents shall be submitted for approval.

G.A. Drawings for the offered item with binding dimensions, material specification details, tests to be conducted, weight etc.

Schedule for document submissions:

S.no	Description	Schedule
1	Submission of GA drawing by vendor	7 days from the date of P.O.
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

\* The GA drawing submitted by vendor shall be strictly in compliance to all applicable standards and specification. The approval of GA drawing in no way absolves the supplier from meeting this specification requirement

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		<b>TECHNICAL SPECIFICATION</b>		Rev. No. 01
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**RECORD OF REVISIONS:**

Rev No	Date	Revision Detail	Revised by	Approved by
00	07.08.17	FIRST ISSUE	 G.KALYAN	 SRIKANTH G
01	25.09.20	Added PN 1.6 requirements	 G.KALYAN	 SRIKANTH G

ANNEXURE-2 to Doc. No. PY-SZ-4-M146-8316-01					
<b>PAINTING SCHEDULE FOR FIRE PROTECTION SYSTEM</b>					
<b>1. Paint requirement For Over-ground (GI Pipe) pipes normally empty but periodically charged with water .</b>					
SL No	Name of the item	Type	Number of coat	DFT of each layer in micron	Remark
1	Primer	Etch Primer: micaceous iron oxide (MIO)	2	6	
2	Final Paint	Synthetic Enamel paint (Long Oil Alkyd) to IS2932.	3	25	shade : RAL3000 PO RED
		Total DFT in micron		87	
Note: Surface preparation shall be done either by manually or by any other approved method.					
<b>2. Paints for external surfaces protection of piping / fittings/ Structural steel, etc. (Carbon steel /Mild Steel ) to be installed indoor and outdoor.</b>					
SL No	Name of the item	Type	Number of coat	DFT of each layer in micron	Remark
1	Primer	Red Oxide Zinc Phosphate primer to IS 12744 (Alkyd base)	1	30	
2	Final Paint	Synthetic Enamel paint (Long Oil Alkyd) to IS2932.	3	25	Shade : RAL3000 PO RED shade for structural steel: Dark Admiralty Grey colour shade 632
		Total DFT in micron		105	
<b>3. Paints for external surfaces protection of Deluge valve and other Hydrant components etc. to be installed indoor and outdoor.</b>					
SL No	Name of the item	Type	Number of coat	DFT of each layer in micron	Remark
1	Primer	Zinc filled epoxy Primer	1	35	
2	Final Paint	Aliphatic Polyurethane	3	30	shade : shade : RAL3000 PO RED
		Total DFT in micron		125	
<b>Note:</b>					
1 Paint shall be as per IS 2932.					
2 Surface preparation shall be done by means of Degreasing and Mech. Cleaning with wire brushing/hand tool (SP6 as applicable).					