BHEL	**ANGLE DRAIN VALVES** LIST OF DOCUMENTS AND DRAWINGS	**413137U5001** Rev.00 **Page** 1 of 1

A. SCOPE OF THE DOCUMENT:

This document lists down the drawings and documents to be followed for executing the order of one set of Angle Drain Valves.

B. LIST OF DOCUMENTS AND DRAWINGS:

S.no.	Item description	Drawing / Document no.	Rev/ Index	Remarks
1	Valve Data Sheet	413137U5200 ✓	00	
2	Technical purchasing specification: Valves	41313795102 ✓	00	
3	Angle Valve Drawing (with pneumatic actuator)	4-13137-95101 ✓	00	
4	Pneumatic angle drain valve actuator and accessories	31811795162 ✓	00	

CIE	S Srivasatava	23/10/13	PED	Navneet Chakrapani	22.10.13
AGREED DEPTT	NAME	DATE & SIGNATURE	DEPTT	NAME	SIGNATURE & DATE

DOC. NO. 413137U5200
REV. NO. 00

BHEL Haridwar
Deptt: PED
ANGLE DRAIN VALVE DATA SHEET

Sl. no.	Valve Tag no.	Valve Description	Nominal Size (Nb)	Connecting Pipe Size (ODxTh) mm	Max. long term Pr. Bar(g)	Max. long term Temp. °C	Max. short term Pr. Bar(g)	Max. short term Temp. °C	Pressure Rating	Type of actuator	Flow Medium	End Conn. Type	Edge preparation as per	Body Material	Seat Area (mm^2)	Rev. Code
1	MAL11AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X14.55 / 73X9.53	286	565	290	589	C3500SPL	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F92	1018	
2	MAL12AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X14.55 / 73X9.53	286	565	290	589	C3500SPL	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F92	1018	
3	MAL19AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X14.55 / 73X9.53	286	565	290	589	C3500SPL	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F92	1018	
4	MAL14AA051	THREE STAGE ANGLE DRAIN VALVE	40/50	48.3X5.08 / 60.3X8.74	60	486	69	516	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	54 / 82 / 132	
5	MAL25AA051	THREE STAGE ANGLE DRAIN VALVE	40/50	48.3X3.68 / 60.3X8.74	5	439	6	520	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
6	MAL20AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X11.07 / 73X9.53	171	539	171	554	C2500	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	1018	
7	MAL22AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X11.07 / 73X9.53	170	505	170	533	C2500	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
8	MAL23AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	PNEUMATIC - SPRING TO CLOSE	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	54 / 82 / 132	
9	MAL24AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	PNEUMATIC - SPRING TO CLOSE	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	54 / 82 / 132	
10	MAL31AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	177/255/ 405	
11	MAL26AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	1018	
12	MAL27AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	1018	
13	MAL41AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X5.54 / 73X9.53	86	410	86	459	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
14	MAL45AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X3.91 / 73X9.53	29	492	29	521	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
15	MAL47AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X3.91 / 73X9.53	16	432	16	432	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	

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ANGLE DRAIN VALVE DATA SHEET

Sl. no.	Valve Tag no.	Valve Description	Nominal Size (Nb)	Connecting Pipe Size (ODxTh) mm	Max. long term Pr. Bar(g)	Max. long term Temp. °C	Max. short term Pr. Bar(g)	Max. short term Temp. °C	Pressure Rating	Type of actuator	Flow Medium	End Conn. Type	Edge preparation as per	Body Material	Seat Area (mm^2)	Rev. Code
16	MAL51AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X3.91 / 73X9.53	6	313	6	333	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A105N	177/255/ 405	
17	MAL54AA051	SINGLE STAGE ANGLE DRAIN VALVE	80/100	88.9X3.96 / 114.3X11.13	2	180	2	223	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A105N	1018	
18	MAL55AA051	SINGLE STAGE ANGLE DRAIN VALVE	80/100	88.9X3.96 / 114.3X11.13	1	125	1	166	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A105N	1018	
19	MAL65AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X5.54 / 73X9.53	60	369	72	431	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
20	MAL81AA051	THREE STAGE ANGLE DRAIN VALVE	25/40	33.4X2.77 / 48.3X7.14	1	540	15	540	C900	PNEUMATIC - SPRING TO OPEN	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	

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1 Scope of Application

This Technical Purchasing Specification covers valves for evacuating of bottled up pressurized steam from steam turbine unit during load throw-off. During normal operation of turbine, this valve shall remain in tightly closed position and down steam side of the valve shall be subjected to condenser vacuum. The valve is to be suitably designed to prevent the ingress of air through valve glands into the system.

The requirements of this specification are valid as far as no other requirements are given in the enquiry.

2 Type-tested Valves

Valves with a valid type-testing certificate according to PED97/23/EC and to the corresponding VdTÜV-Merkblätter, of TRD 110 attachment 1 as well as accordingly to the registration of DIN-DVGW fulfill the requirements of this specification.
For these valves the requirements for manufacturing and testing agreed upon with the TÜVs respectively with the DVGW-federation shall be fulfilled (declaration of commitment).

3 Referenced Documents

- AD2000-W 0
- AD2000-W 7
- AD2000-HP 0
- AD2000-HP 5/3
- TRD 100
- EN 287-1
- DIN EN ISO 15607
- DIN EN ISO 15609-1
- DIN EN ISO 15614-1
- EN 1418
- EN 10028
- EN 10204
- EN 10213
- EN 10222
- EN 10273
- DIN 1690-10
- EN 1559-1
- EN 1559-2
- EN 12266-1/-2
- DIN 17175,
- PED 97/23/EC

In case of differences or contradictions of the referenced documents the higher requirements shall be applied.

4 Technical Data and Design

The criteria, e.g. fluid, pressure, temperature, material of the casing, etc., as well as other technical data are given in the enquiry.

5 Inspection certificate / Declaration of Compliance in Dependence on Fluid, Pressure and Temperature

For all valves an Inspection Certification 3.1 according to EN 10204 must be provided.

6 QA-Requirements regarding the Valve Manufacturer and his Suppliers:

The valve manufacturer as well as his suppliers for the main components like e.g. pressure guiding components, instrumentation and control, shall have an introduced and well-working quality management system, e.g. according to EN ISO 9000 series or equivalent standard. Manufacturers of pressure guiding

components shall have in addition a certificate according to AD2000-W 0 respectively TRD 100.

As far as welding will be performed on the valves, the weld shop shall be certified according to AD2000-HP 0.

7 Manufacturing and Inspection Plan (MIP)

The valve manufacturer shall prepare a Manufacturing and Inspection Plan containing sufficient information on the sequence and extent of the valve inspections as well as the main raw material and shall deliver this to the purchaser for review at the latest 4 weeks after order receipt, but at least 2 weeks before starting manufacturing.

8 Condition for Manufacturing

Manufacturing of the valve mentioned in point 7 shall not be started before the review for the design as well as for the MIP has been given by the purchaser. To prohibit any delay the valve manufacturer shall call for missing reviews and remind the purchaser on time.

By reviewing the MIP the purchaser does not take on any responsibility for processes or manufacturing details of the valve manufacturer or his suppliers, or for the valve itself.

9 Fabrication and Inspection

9.1 Steel Castings

Steel castings, e.g. valve casings, covers, etc., shall be manufactured and inspected according to EN 10213 and EN 1559 part 1 and part 2 and DIN 1690 part 10, and following minimum requirements:

- Analysis (chemical composition) per heat
- Mechanical properties per heat and heat treatment batch, for castings with an individual weight > 1000 kg testing per casting
- Amount of non-destructive testing according to DIN 1690 part 10:

  - weld ends of valves without connection pieces: Quality class A with quality grades S1 + V1
  - transition areas: quality class B with quality grades S2 + V2
  - weld ends of valves with connection pieces: Quality class B with quality grades S2 + V2
  - remaining areas of the casting: quality class D with quality grades S3 + V4; additionally for castings $\geq$ 500 kg or DN $\geq$ 400 mm each casting 100% volume inspection shall be performed.

9.2 Rolled or Forged Material

Rolled or forged material, e.g. connection piece, shall be manufactured and inspected according to the corresponding material standard, e.g. EN 10028, EN 10088, EN 10222, EN 10273, DIN EN 10216-2 and DIN 17440, etc. and following supplements:

- Analysis (chemical composition) per heat
- Mechanical properties per heat and heat treatment batch

9.3 Connecting Elements:

Connecting elements shall be manufactured and tested according to AD2000-W 7. As far as there is a requirement for a test certificate for grade properties, this shall be an inspection certificate 3. 1 according to EN 10204.

9.4 Welding

As far as welding will be performed on the valves (also in case of fabrication welding on castings):

- Welding shall be performed only by welders tested in line with EN 287 or mechanized welds by welding operators tested in line with EN 1418
- Corresponding welding procedure specifications and procedure approval records according to
  - DIN EN ISO 15607
  - DIN EN ISO 15609-1
  - DIN EN ISO 15614-1 shall be available.
- Fabrication welds on castings shall be inspected according to DIN 1690.
- Fabrication welds having a length $\geq$ 150 mm or a depth $\geq$ 40% of the wall thickness or a depth $\geq$

25 mm shall be recorded.

- Design welds shall be inspected according to AD2000-HP 5/3. In case of serial production manufacturer-specific inspection concepts may be applied with written agreement of the purchaser.
- If cast steel parts are subjected to heat treatment in the course of valve manufacture, all parts heated shall subsequently be subjected to a 100% surface crack examination.

9.5 Manufacturing Inspections

Manufacturing inspections shall be performed according to PED 97/23/EC / EN 12266. The PED 97/23/EC a s a n superior legislation shall be observed and applied. These are especially:

a) Pressure test

- Test P10 according to EN 12266 part 1

b) Leak test

- Test P11 + P12, leakage class B according to EN 12266 part 1

c) Functional test

- Test F20 according to EN12266 part 2

d) Verification of dimensions

- Main dimensions
- connecting dimensions

All tolerance ranges which are important for the function shall be recorded. as

- Stem diameter
- Diameters of guides and fits

10 Marking

Valves shall be marked as follows:

- The name and address or other means of identification of the manufacturer and, where appropriate, of his authorized representative established within the Community
- Nominal diameter
- Nominal pressure class
- Casing material
- Flow direction arrow
- Identification-no. (also commission-no.)
- The year of manufacture
- Identification of the pressure equipment according to its nature, such as type, series or batch identification and serial number
- Essential maximum/minimum allowable limits
- CE marking

Valves with a total weight > 1000 kg shall be marked additionally with a permanent information of the weight on the valve or on an safe name- plate.

The provisional KKS-Labels which are fabricated and properly sized are to be made of plastic or similar unbreakable material and attached to the component by wire. The lettering on the labels should include the KKS classification in back, permanent ink.

Marking of the materials for all pressure loaded casing components shall survive during all manufacturing processes according to AD2000-HP 0.

11 Surface Protection

Surface coating of non-stainless steel valves shall be applied as follows

Paint (Coat)	Paint Type	No. of coat	DFT*
Primer Paint	: Epoxy base Zinc rich primer paint	1 Coat	35
Intermediate Paint	: Epoxy TiO2 Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	75

*DFT – Dry Film Thickness (final) in microns

- Shade as per RAL – Grey 9002

12 Documentation

All the documentation for the delivered valve shall remain with the valve manufacturer and shall be stored for at least 10 years. This documentation shall be labelled such as to ensure traceability and allocation to the corresponding valve and shall be marked as belonging to BHEL. The valve manufacturer shall check the documentation with respect to completeness and correctness before shipping the valve. The valve manufacturer shall certify this at the time of the delivery. It is the obligation of the valve manufacturer to hand over a copy of the total documentation to the purchaser on request and free-of-charge.

BHEL expects a documentation of the module/parts including all instructions which are necessary for service, installation and maintenance. Amendments will be requested separately.

In accordance to the Machinery Directive (98/37/EC) and Pressure Equipment Directive (97/23/EC) the following records and logs shall be provided to the purchaser in any case:

- manufactures declaration
- Declaration of conformity
- Material certificates
- Pressure test
- Non-destructive tests

The documentation - also that of the sub suppliers - shall be written in English language and shall contain at least:

- Test certificates of the prematerial (at least inspection certificate 3.1B according to EN 10204)
- Records of all inspections performed by the valve manufacturer or his sub suppliers during manufacturing:
  - Non-destructive inspections of e.g. weld areas or welds
  - Verification of dimensions
  - Pressure and leak tests
  - Functional tests
- Heat treatments performed
- The European Union guidelines and standards which are valid and can be used for the area of application (e.g. PED 97/23/EG, Low-Voltage Guideline 73/23/EWG, etc..) are to be designated in the declaration of conformity according to the remarks and applied quality modules, and shall include all relevant data (see e.g. appendix VII of Guideline 97/23/EG). Risk disclosure and danger analyses in accordance with EN 1050 are to be handed over to BHEL if necessary.

- If materials without European material approval are drawn on for the order (order papers/designs) (e.g. ANSI/ASME materials) appropriate substitute certificates from a designated authority shall be procured and documented accordingly. If the order pertains to a component of a total design group, then all certificates and certification of the component of the highest category of the total design group shall be made available.

13 Final inspection

The purchaser reserves the right to perform final inspections on his ordered parts in the shop of the valve manufacturer, as well as in the shop of his sub suppliers

14 Delivery and Packing

Details regarding delivery are given in the order, however at least following details shall be given together with the delivered parts:

Actualization of standards and instructions

- Purchaser
- Order-no. / project
- Manufacturer commission-no. / works-no.
- Specification
- Number of pieces
- Type / item
- Nominal diameter [DN]
- Maximum allowable pressure [PS]
- Maximum allowable temperature [TS]
- Fluid
- Manufacturer drawing-no.
- Identification-no. of the valve
- Piece weight

  Together with the delivery of the valve the valve manufacturer shall hand over a certificate 2.1

according to EN 10204 in English, which confirms that the delivered valve fulfills the requirements given in the order and in this specification. Furthermore the valve manufacturer shall confirm that only materials as listed in the design bill of material have been used and that the documentation is available in his shop in line with Item 12 above and that he has checked the documentation carefully.
Packing of the valve shall be as follows:

- The valve shall be packed and locked that way, that in general case any damage will be prohibited.
- All openings shall be plugged.
- Detail parts respectively components shall be packed individually, however assignment shall be ensured.
- As far as necessary accessory devices for transportation purposes shall be attached to the valve and/or to the packing, e.g. lifting eyes and lifting signs.
- Bearing areas shall be marked, if necessary.

15 Guarantee

The supplier shall guarantee trouble free operation of the equipment for a period of 2 years after installation and commissioning or a period of 3 years from the date of dispatch of equipment whichever is earlier.

If during erection/commissioning and operation at site, any defect in any component is detected, purchaser's / owner's site representative shall prepare the assessment report and a copy of the same shall be forwarded to the supplier. The supplier shall replace / rectify the concerned items free of charge. The supplier, if he so desires, may deputes his representative to site at his own cost otherwise the report of purchaser's / owner's site representative shall be binding on the supplier.

16 Spares

The offer of valves shall include the requirement of spares to be made available at the time of erection & commissioning. A separate offer of spares to be required for 3 to 5 years of operation shall also be separately enclosed along with main offer.

17 Special tools & tackles

Any special tools & tackles, required for erection, commissioning and maintenance of valves shall be included in main offer per set of valves.

18 Supplementary Requirements

The valve manufacturer shall send following documents in triplicate written in English language to the purchaser's department for records. Documents listed under a) and c) shall be delivered with the order acknowledgement:

a) Part drawing showing the function of the valve and the design bill of material
b) Operating and maintenance instruction
c) Spare part list

19 Deviations

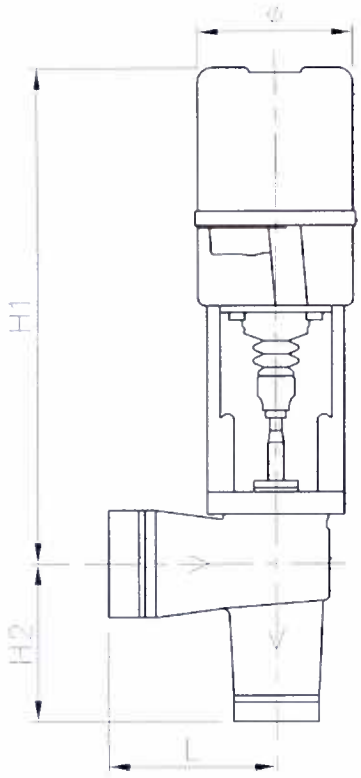
Any deviation from this purchasing specification has to be reported to the purchaser immediately. Any deviation is accepted only if this has been approved or accepted by the purchaser in writing.
In case of any deviation from the specified properties, also if the proof by testing is not required, the purchaser has the right to reject the material.

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm) FORM DG 39(B)

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	~~GMS No./~~ C.B.O.M.– NO.	STATUS OF DRG U
ZONE			ZONE			AGREED DEPT / NAME / SIGN / DATE	

GRADE OF UNTOL.DIM. M/CG. C/M/F –AA0230208 | WELDING A/B/C/D AA0621104 | GAS CUTTING–F3 AA0621101

SCHEMATIC DRAWING



VALVE TAG NO.	L (MM)	H1 (MM)	H2 (MM)	ø (MM)	WEIGHT (KG)
MAL 11,12,19	175	908	175	346	164
MAL 14	175	667	175	270	69
MAL 20	175	698	175	346	125
MAL 22	175	698	175	346	96
MAL 23, 24	175	667	175	270	69
MAL 25	175	667	175	215	63
MAL 26, 27	175	698	175	346	125
MAL 31	175	667	175	270	69
MAL 41	175	667	175	270	69
MAL 45	175	667	175	215	63
MAL 47	175	667	175	215	63
MAL 51	175	667	175	215	63
MAL 54, 55	175	667	275	215	57
MAL 65	175	667	175	270	69
MAL 81	175	667	175	215	63

NOTE:–

THE DIMENSION OF THE VALVE MAY DIFFER FROM THE SCHEMATIC DRAWING.

THE LENGTHS AND HEIGHTS ARE DEFINED AS FOLLOWS:–

1. THE GIVEN LENGTH (L) AND HEIGHT (H2) OF THE VALVE BODY BETWEEN IN– AND OUTLET ARE THE MINIMUM DISTANCES.
2. THE MAXIMUM DISTANCES OF THE CONNECTIONS MAY DIFFER BY APPROX. 50MM.
3. THE GIVEN HEIGHT (H1) OF THE VALVES IS THE MAXIMUM HEIGHT AND INCLUDES THE ACTUATOR AND DISMANTLING HEIGHT.
4. THE ACTUATOR HAS TO BE MOUNTED ACC. TO THE SCHEMATIC DRAWING.
5. THE PIPING CONNECTIONS ARE GIVEN IN VALVE DATA SHEET.

Ref.Drawing No>

Sign & Date

BHARAT HEAVY ELECTRICALS LTD.
RANIPUR, HARDWAR

	NAME	SIGN	DATE
DRN	P.S.SHARMA	–Sd–	12.04.12
CHD	S.K.GUPTA	–Sd–	12.04.12
APPD	S.C.AGARWAL	–Sd–	12.04.12

NO. OF VAR

Inventory No.

DEPT STE		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
CODE 4011		NTS				

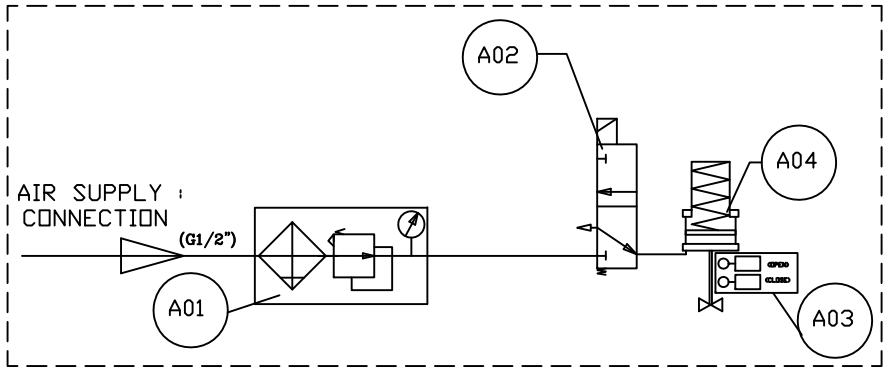
TITLE : ANGLE VALVE WITH PNEUMATIC ACTUATOR

DRAWING NO. 4–13137–95101 (7 22 23 24) REV. 00

SHEET No. 01 | No. OF SHEETS 01

3-18117-95162
चित्रांकन संख्या/DRAWING NO.

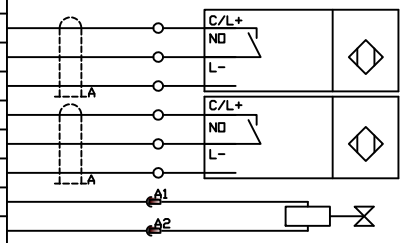
HOOK - UP DIAGRAM



A01 = FILTER REDUCER/REGULATOR
A02 = SOLENOID VALVE
A03 = LIMIT SWITCHES/PROXIMITY SWITCHES
A04 = PNEUMATIC CYLINDER

CONNECTION DIAGRAM OF SOLENOID VALVE AND LIMIT SWITCHES ONTO JUNCTION BOX

MALZZGF051:-X01		
1	O	MALZZCG051C
2	O	
3	O	
4	O	MALZZCG051B
5	O	
6	O	
7	O	MALZZAA051A
8	O	
9	O	
10	O	



Assignment of core conductor colours (DIN IEC 757)

BK: BLACK
BN: BROWN
BU: BLUE
GN: GREEN
GY: GREY
OG: ORANGE
PK: PINK
PU: PURPLE
RD: RED
WH: WHITE
YE: YELLOW

Note:-
1. THE TAGS OF DRAIN VALVE MAL ZZ HAVE BEEN MENTIONED IN DWG 413137U2101.
2. ZZ DENOTES THE SUFFIX AFTER MAL FOR EACH DRAIN VALVE SUCH AS 11,12,14,19 ETC.
3. THE LIMIT SWITCHES AND SOLENOID VALVE OF EACH DRAIN VALVE ARE TO BE CONNECTED TO JUNCTION BOX.
4. THE JUNCTION BOX IS IN VENDOR SCOPE. MAKE ELDON POLYSTER OR EQUIVALENT.
5. THE JUNCTION BOX AND COVER FOR TERMINATION OF EACH DRAIN VALVE ARE TO BE LABELLED AS MALZZGF051.
6. SHIELD SHOULD BE CONNECTED TO BRIDGE SHIELD TERMINALS 9-10.

GENERAL REQUIREMENTS:

VOLTAGE	24 V DC
VOLTAGE TOLERANCE	min. +10/-15%
ENCLOSURE RATING	min. IP65/ NEMA 4
ELECTRICITY CONNECTION	VIA TERMINAL BOX
TEMPERATURE RANGE	+ 5°C TO 70°C

SOLENOID VALVE:

QUANTITY	1 no
RELATIVE DUTY CYCLE	100%
ENERGIZED TIME	CONSTANT RATED
COIL ISOLATION CLASS	F
NOMINAL CURRENT	≤ 1A
PRESSURE	2 to 10 bar
FLOW	860 l/min
EXHAUST PORT	TAPPED M5 EQUIPPED WITH EXHAUST PROTECTION
PUSH BUTTON	ACCESSIBLE FROM OUTSIDE
SWITCHING FUNCTION	3/2 WAY FUNCTION WITH SPRING RETURN
ELECTRICAL CONNECTION	CONNECTOR ROTATABLE X 180° CM8 (Pg 9P) ANY OTHER CONNECTION TO BE SPECIFIED CLEARLY
AIR SUPPLY	INTERNAL CONNECTION FOR ON OFF ACTUATORS
AIR CONNECTION	TO BE SPECIFIED BY VENDOR.
TYPE	ASCO VALVE SC.8.551.A.005 OR EQUIVALENT

FILTER REGULATOR

QUANTITY	1no
CONNECTION TO AIR	G1/2"
MAX INLET PRESSURE(bar)at 23°C&50°C	16 , 10
CONTROLLED PRESSURE (bar)	0.5 to 10
FILTERING CAPACITY	25 um
SEMI AUTOMATIC DRAIN WITH GAUGE	0-12 bar
POLYCARBONATE BOWL WITH PROTECTOR	TO BE PROVIDED
MOUNTING POSITION	VERTICAL,DRAIN AT BOTTOM
MOUNTING TYPE	WITH BRACKETS
MAX FLOW AT 6.3 bar PRESSURE SET PT	300 l/min
TYPE :ASCO 34203088 OR EQUIVALENT	

PROXIMITY LIMIT SWITCHES

QUANTITY	2 noS
TYPE	INDUCTIVE
SWITCHING ELEMENT FUNCTION	PNP CLOSE NORMAL OPEN
CONNECTION	3-POLE
SHIELD:	WIRED IF AVAILABLE
SIZE &DIA	TO BE SPECIFIED BY VENDOR
INSTALLATION	EMBEDDABLE
MATERIAL	BRASS
SENSING DISTANCE	8mm
KIND OF CONNECTION	PRE WIRED, PVC
CABLE LENGTH	2 METER
PROTECTION DEGREE	IP67
TEMPERATURE	25 TO 70°C
TYPE: OMRON E2A-M18KS08-WP-B1-2M	

संदर्भित अभिकल्प संख्या REFERENCE DRG. NO.

हस्ताक्षर और दिनांक/SIGN & DATE

मालगी सूची संख्या INVENTORY NO.

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

PNEUMATIC
ANGLE-DRAIN-VALVE-ACTUATOR

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, रानीपुर, हरिद्वार
BHARAT HEAVY ELECTRICALS LIMITED, RANIPUR, HARDWAR

	नाम/NAME	हस्ताक्षर/SIGN	दिनांक/DATE
बनाया/DRN	SASWATI	SD	15.05.2012
जांचकर्ता CHD	B.S.RANA	CHD_SGN	15.05.2012
स्वीकृतिदाता APPD	KBB	APD_SGN	15.05.2012

वेरिएन्ट संख्या No. of Var.

संशोधन REV.	दिनांक DATE	संशोधनकर्ता ALTERED BY / जांचकर्ता CHD

विभाग DEPTT. STE		माप/SCALE NTS	भार कि.ग्रा. WEIGHT (KG) -	असेम्बली अभिकल्प का संदर्भ REFER TO ASSLY. DRG. -
कूट/CODE 4011				नग क्रमांक ITEM NO. ITEMNO / नगों की संख्या NO. OF ITEMS

शीर्षक/TITLE
ANGLE DRAIN VALVE ACTUATOR AND ACCESSORIES

कार्ड कूट CARD CODE

अभिकल्प संख्या/DRAWING NO.
3-18117-95162

पृष्ठ संख्या/Sheets No.1 पृष्ठों की संख्या/No. of Sheets 1

22 23 24

A3 साइज़/A3 SIZE

ANGLE DRAIN VALVES (WITHOUT ACTUATORS)

LIST OF DOCUMENTS AND DRAWINGS

413137U5002

Rev.00

A. SCOPE OF THE DOCUMENT:

This document lists down the drawings and documents to be followed for executing the order of one set of Angle Drain Valves (Without Actuators).

B. LIST OF DOCUMENTS AND DRAWINGS:

S.no.	Item description	Drawing / Document no.	Rev/ Index	Remarks
1	Valve Data Sheet	413137U5999	00	
2	Technical purchasing specification: Valves	41313795102	00	Var 01

DOC. NO. 413137U5999
REV. NO. 00

BHEL Haridwar
Deptt: PED

ANGLE DRAIN VALVE DATA SHEET (Without Actuators)

Sl. no.	Valve Tag no.	Valve Description	Nominal Size (Nb)	Connecting Pipe Size (ODxTh) mm	Max. long term Pr. Bar(g)	Max. long term Temp. °C	Max. short term Pr. Bar(g)	Max. short term Temp. °C	Pressure Rating	Flow Medium	End Conn. Type	Edge preparation as per	Body Material	Seat Area (mm^2)	Rev. Code
1	MAL11AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X14.55 / 73X9.53	286	565	290	589	C3500SPL	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F92	1018	
2	MAL12AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X14.55 / 73X9.53	286	565	290	589	C3500SPL	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F92	1018	
3	MAL19AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X14.55 / 73X9.53	286	565	290	589	C3500SPL	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F92	1018	
4	MAL14AA051	THREE STAGE ANGLE DRAIN VALVE	40/50	48.3X5.08 / 60.3X8.74	60	486	69	516	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	54 / 82 / 132	
5	MAL25AA051	THREE STAGE ANGLE DRAIN VALVE	40/50	48.3X3.68 / 60.3X8.74	5	439	6	520	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
6	MAL20AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X11.07 / 73X9.53	171	539	171	554	C2500	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	1018	
7	MAL22AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X11.07 / 73X9.53	170	505	170	533	C2500	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
8	MAL23AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	54 / 82 / 132	
9	MAL24AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	54 / 82 / 132	
10	MAL31AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	177/255/ 405	
11	MAL26AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	1018	
12	MAL27AA051	SINGLE STAGE ANGLE DRAIN VALVE	50/65	60.3X6.35 / 73X9.53	54	593	72	617	C1500	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F91	1018	
13	MAL41AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X5.54 / 73X9.53	86	410	86	459	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
14	MAL45AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X3.91 / 73X9.53	29	492	29	521	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	
15	MAL47AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X3.91 / 73X9.53	16	432	16	432	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/ 405	

DOC. NO. 413137U5999
REV. NO. 00

BHEL Haridwar
Deptt: PED

ANGLE DRAIN VALVE DATA SHEET (Without Actuators)

Sl. no.	Valve Tag no.	Valve Description	Nominal Size (Nb)	Connecting Pipe Size (ODxTh) mm	Max. long term Pr. Bar(g)	Max. long term Temp. °C	Max. short term Pr. Bar(g)	Max. short term Temp. °C	Pressure Rating	Flow Medium	End Conn. Type	Edge preparation as per	Body Material	Seat Area (mm^2)	Rev. Code
16	MAL51AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X3.91 / 73X9.53	6	313	6	333	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A105N	177/255/405	
17	MAL65AA051	THREE STAGE ANGLE DRAIN VALVE	50/65	60.3X5.54 / 73X9.53	60	369	72	431	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/405	
18	MAL61AA051	THREE STAGE ANGLE DRAIN VALVE	25/40	33.4X2.77 / 48.3X7.14	1	540	15	540	C900	WET STEAM	BW	FIG. 2a OF ASME 16.25	A182 F22	177/255/405	

Note : 1. These valves are to be supplied without Actuators.

Prepared By NAVNEET
Engr-PED

S K GUPTA
SDGM-PED
20/11/14

MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN		TO BE FILLED BY BHEL	TO BE FILLED BY BHEL
BHEL	VENDOR'S NAME	ITEM	ANGLE DRAIN VALVES	QP NO.	QA/BI/QP/115
				DATED	28/01/2014
		DRG. NO.	AS PER PO		
		SPEC.	AS PER PO		
		REV	01	Page 1 of 5	

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	D	AGENCY M	AGENCY B	AGENCY N	REMARKS
1	2	3	4	5	6	7	8	9		10			11
1	MATERIAL TEST												
1.1	UT ONLY FOR VALVE BODY	QUALITY	MINOR	ULTRASONIC TESTING	100%	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.1	BODY	CHEMICAL	MINOR	CHEMICAL ANALYSIS	PER MELT	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.2		MECHANICAL	MINOR	TENSILE TEST	PER MELT, DIMENSION AND HEATTREATMENT BATCH	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.3			MINOR	YIELD STRENGHT		STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.4			MINOR	ELONGATION		STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.5			MINOR	REDUCTION OF AREA		STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.6			MINOR	HARDNESS TEST	10%	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.7		QUALITY	MINOR	HEAT TREATMENT	PER MELT	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.1.1.8			MINOR	VISUAL AND DIMENSIONAL CHECK	EACH PART	ACCORDING APPROVED DRAWING			√	P	V		
1.1.1.9			MINOR	MPE ONLY ON EXTERNAL SURFACE	100%	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		

		LEGEND:	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY Sanjeev 3/2/14 संजीव कुमार भारद्वाज Sanjeev Kumar Bhardwaj अभियन्ता/Engineer गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar

MANUFACTURER'S NAME AND ADDRESS			STANDARD QUALITY PLAN			TO BE FILLED BY BHEL	TO BE FILLED BY BHEL
BHEL	VENDOR'S NAME	ITEM	ANGLE DRAIN VALVES	QP NO.	QA/BI/QP/115		
				DATED	28/01/2014		
		DRG. NO.	AS PER PO				
		SPEC.	AS PER PO				
		REV	01		Page 2 of 5		

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	D	AGENCY M	AGENCY B	AGENCY N	REMARKS
1	2	3	4	5	6	7	8	9		10			11
1.2.1	SEAT/DISC (INVESTMENT CAST) STELLITE6, VACUUM BRAZING(NO WELDING)	QUALITY	MINOR	CHEMICAL ANALYSIS	PER MELT	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√		P	V		
1.2.2			MINOR	HARDNESS TEST	PER MELT	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√		P	V		
1.3.1	STEM	CHEMICAL	MINOR	CHEMICAL ANALYSIS	PER MELT	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.4.1	BOLTS / NUTS	CHEMICAL	MINOR	CHEMICAL ANALYSIS	PER MELT	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.4.2		MECHANICAL	MINOR	TENSILE TEST	PER MELT, DIMENSION AND HEATTREATMENT BATCH	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.4.3			MINOR	YIELD STRENGHT		STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.4.4			MINOR	ELONGATION		STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		
1.4.5			MINOR	REDUCTION OF AREA		STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC	√	P	V		

		LEGEND:	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. 'M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY Sanjeev 3/2/14 संजीव कुमार भारद्वाज Sanjeev Kumar Bhardwaj अभियन्ता/Engineer गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar

MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN		TO BE FILLED BY BHEL	TO BE FILLED BY BHEL
BHEL	VENDOR'S NAME	ITEM	ANGLE DRAIN VALVES	QP NO.	QA/BI/QP/115
				DATED	28/01/2014
		DRG. NO.	AS PER PO		
		SPEC.	AS PER PO		
		REV	01	Page 3 of 5	

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	D	AGENCY M	AGENCY B	AGENCY N	REMARKS
1	2	3	4	5	6	7	8	9		10			11
1.4.6			MINOR	HARDNESS TEST	PER MELT	STANDARDS AS PER APPROVED DATASHEET/DRAWING	STANDARDS AS PER APPROVED DATASHEET/DRAWING	TC		P	V		
1.4.7		QUALITTY	MINOR	MARKING	EACH PART	ACCORDING APPROVED DRAWING				P	V		
2.	IN PROCESS INSPECTION												
2.1	CHECK ON FINISHED PARTS (INCL. BODY)	DIMENSIONAL	MINOR	MEASUREMENT	100%	ACCORDING APPROVED DRAWING			√	P	V		
2.2	CHECK ON BASIC REQUIREMENT FOR WELDING	CHECKING OF PQR	MINOR	CHECK OF VALIDITY	100%	STANDARD AS PER DOCUMENT NO. 41313795102	STANDARD AS PER DOCUMENT NO. 41313795102	TC	√	p	V		
2.3		CHECKING OF WPS	MINOR	CHECK OF VALIDITY	100%	STANDARD AS PER DOCUMENT NO. 41313795102	STANDARD AS PER DOCUMENT NO. 41313795102	TC	√	p	V		
2.4		SUPERVISION OF WELDING	MINOR	VISUAL	100%	STANDARD AS PER DOCUMENT NO. 41313795102	STANDARD AS PER DOCUMENT NO. 41313795102	TC	√	p	V		
2.5	NDEOFBUTT WELDS	QUALITY	MINOR	X-RAY TESTING	100%	STANDARD AS PER DOCUMENT NO. 41313795102	STANDARD AS PER DOCUMENT NO. 41313795102	TC	√	p	V		
3.	FINAL INSPECTION												
3.1	SHELL TEST (BODY)	HYDROSTATIC	MAJOR	PRESSURETEST	100%	ASME B16.34	ASME B16.34	IBR III RECORD	√	P	W		

		LEGEND:	FOR CUSTOMER USE	
MANUFACTURER/SUBCONTRACTOR		! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY

Sanjeev 3/2/14
संजीव कुमार भारद्वाज
Sanjeev Kumar Bhardwaj
अभियन्ता/Engineer
गुणता आश्वासन/Quality Assurance
बी. एच. ई. एल., हरिद्वार/BHEL Haridwar

MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN		TO BE FILLED BY BHEL	TO BE FILLED BY BHEL
BHEL	VENDOR'S NAME	ITEM	ANGLE DRAIN VALVES	QP NO.	QA/BI/QP/115
				DATED	28/01/2014
		DRG. NO.	AS PER PO		
		SPEC.	AS PER PO		
		REV	01	Page 4 of 5	

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	D	AGENCY M	AGENCY B	AGENCY N	REMARKS
1	2	3	4	5	6	7	8	9	D	10			11
3.2	SEAT TEST (CLOSURE) WITH ACTUATOR OPERATION	HYDROSTATIC	MAJOR	1,1X DESIGN PRESSURE OPERATION	100%	ASME B16.34 PAR, 7.2.5	ASME B16.34 PAR, 7.2.5	IBR III RECORD	√	P	W		
3.3	FUNCTIONAL TEST FOR PNEUMATIV OPERATED VALVES: - VALVE TRAVEL / STROKE - SMOOTH OPENING AND CLOSING	FUNCTION	MAJOR	FUNCTIONAL TESTTS	100%	STANDARDS AS PER APPROVED DATASHEET/DRAWING		TC	√	P	W		
3.4	CHECK ON CONNECTION, LENGTH AND HEIGHT	DIMENSIONAL	MINOR	MEASUREMENT	100%	ACCORDING APPROVED DRAWING				P	V		
3.5	CHECK ON STAMPING / LABELS	VISUAL	MINOR	MARKING OF VALVES	100%	ASMEB16.34	ASMEB16.34	TC		P	V		

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MANUFACTURER/SUBCONTRACTOR				APPROVED BY Sanjeev 3/2/14 संजीव कुमार भारद्वाज Sanjeev Kumar Bhardwaj अभियन्ता/Engineer गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar

MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN			TO BE FILLED BY BHEL	TO BE FILLED BY BHEL
BHEL	VENDOR'S NAME	ITEM	ANGLE DRAIN VALVES	QP NO.	QA/BI/QP/115	
				DATED	28/01/2014	
		DRG. NO.	AS PER PO			
		SPEC.	AS PER PO			
		REV	01	Page 5 of 5		

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY			REMARKS
									M	B	N	
1	2	3	4	5	6	7	8	9	D	10		11
3.6	CHECK ON DOCUMENTATION	VISUAL	MINOR	DOCUMENTATION CHECK	100%	STANDARDS AS PER APPROVED DATASHEET/DRAWING			P	V		
3.7	CHECK ON PAINTING AND PACKING	VISUAL	MINOR	PAINTING /PACKIG CHECK	100%	STANDARDS AS PER APPROVED DATASHEET/DRAWING			P	V		

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MANUFACTURER/SUBCONTRACTOR				APPROVED BY Sanjeev 3/2/14 संजीव कुमार भारद्वाज Sanjeev Kumar Bhardwaj अभियन्ता/Engineer गुणता आश्वासन/Quality Assurance बी. एच. ई. एल., हरिद्वार/BHEL Haridwar