



**Ranhill
SAJ**

SPECIFICATION FOR HIGH DENSITY POLYETHYLENE (HDPE) VALVE

**SPECIFICATION SAJ VL / HDPE/001
(Rev.0.0 / 02.2019)**

QUALITY ASSURANCE DEPARTMENT
RANHILL SAJ SDN. BHD.

Ref. No. : VL / HDPE / 001

Date : 11/2/2019

Total Pages : 11/11

Approved by : 
Head of Quality Assurance

SPECIFICATIONS FOR HDPE VALVE

<u>CONTENTS</u>	<u>Page</u>
Contents	2
General	3
Features required	3
Materials	3
General characteristic	4
Geometric characteristic	5
Mechanical characteristic	6
Physical characteristic	10
Marking	10
Pre-delivery and Evaluation	11
Certification	11

SPECIFICATION FOR HIGH DENSITY POLYETHYLENE (HDPE) VALVE

1.0 General

- 1.1 The specification is applicable to the requirements of a polyethylene piping system and covers the characteristics of valves and shall conform to BS EN 12201-4:2012.
- 1.2 These specifications will provide necessary information on the product requirements for the supply of the valves.

2.0 Features required

- 2.1 The pressure rating for the valve shall be PN16.
- 2.2 The colour of the valve body shall be black.
- 2.3 The spindle of the valve shall be Type B fitted with non-rising stainless steel spindle with 12 mm stem thread lead and close in clockwise direction.

3.0 Materials

3.1 Compound

The compound from which the body of the valve, with spigot end is made, shall be PE 100 only, and shall conform to EN 12201-1:2011. The PE components of the valve shall only be made from virgin material conforming to EN 12201-1:2011.

3.2 Materials for non-polyethylene parts

The materials and the constituent elements used in making the valves (including elastomers, greases and any metal parts as may be used) shall be as resistant to the external and internal environment as the other elements of the piping system and shall have a life expectancy under the following conditions at least equal to that of the HDPE pipes conforming to EN 12201-2:2011 with which they are intended to be used:

- a) During storage;
- b) Under the effect of the water conveyed therein;
- c) With respect to the service environment and operating conditions.

The requirements for the level of material performance for non-polyethylene parts shall be at least as stringent as that of the PE compound for the piping system.

Other materials used in valves in contact with the PE pipe shall not adversely affect the pipe performance or initiate stress cracking.

3.3 Metal Parts

All metal parts susceptible to corrosion shall be adequately protected, providing this is necessary for the durability and function of the system.

When dissimilar metallic materials are used which may be in contact with moisture, steps shall be taken to avoid the possibility of galvanic corrosion.

3.4 Elastomers

Elastomeric seals shall conform to EN 681-1.

3.5 Other materials

Greases or lubricants shall not effect the long-term performance of the PE valve or valve body nor have any adverse effect on the quality of the water.

Other materials conforming to 4.2.1 in BS EN 12201-4:2012 may be used provided that it is proven that the valves conform to the European Standard.

3.6 Assembly

Valves shall be assembled according to manufacturer's procedures and any component used in the assembly shall not prevent conformity of the valve to the European Standard.

4.0 General Characteristics

4.1 Appearance of the valve

When viewed without magnification, the internal and external surfaces of valves shall be smooth, clean and free from scoring, cavities and other surface defects to an extent that would prevent conformity of the valve to the standard BS EN 12201-4:2012.

4.2 Design

4.2.1 General

The design of the valve shall be such that, when assembling the valve onto the pipe or other components, the electrical coils and/or seals are not displaced.

PE valve bodies and their PE spigot end shall have a pressure rating of at least that of the pipe to which they are assembled. PE spigot ends shall have sufficient fusion compatibility (see EN 12201-5) to the pipe to which it is fused to meet the requirements of BS EN 12201-4:2012.

4.2.2 Valve body

The valve body of the valve shall be such that it cannot be dismantled.

4.2.3 Operating device

The operating cap shall be integral with or connected to the stem in such a way disconnection is impossible without special equipment.

The valve shall close by turning the operating device clockwise. For a quarter-turn valve, the position of the obturator shall be clearly indicated on the top side of the operating device.

Stops shall be provided at the fully open and closed positions.

4.2.4 Seals

The seals shall be so mounted as to be resistant to normally occurring mechanical loads. Creep and cold flow effects shall be taken into account. Any mechanism that puts a loading on the seals shall be permanently locked. The pressure in the pipeline shall not be used as the sole means of seal activation.

5.0 Geometric Characteristics

5.1 General

Each valve shall be characterized by its dimensions and associated end connections:

Technical data given by the manufacturer shall include the following informations:

- a) The dimensional characteristics, by working drawings,
- b) The assembling instructions.

5.2 Measurement of Dimensions

The dimensions of the valve shall be measured in accordance with EN ISO 3126 (23 ± 2) °C, after being conditioned for at least 4h. The measurement shall not be made less than 24h after manufacture.

5.3 Dimensions of spigot ends for valves

The dimensions of spigots shall conform to Table 3 of EN 12201-3:2011, Table 3, up to and including d_n 315mm.

5.4 Dimensions of the operating cap

For a quarter-turn valve, the dimension of the operating device shall be designed so it can be operated with a 50mm square and (40 ± 2) mm depth.

6.0 Mechanical characteristics for assembled valves

6.1 General

All tests shall be carried out on valves assembled with pipe(s) conforming to EN 12201-2, where the pipe shall be of the same pressure rating as the valve. Assembly of the valve and pipes shall be in accordance with the technical instructions and the extreme installation conditions of utilization described in EN 12201-5.

The technical description by the manufacturer shall include at least the following information:

- Laying conditions (e.g. valve temperature limits)
- Assembly instructions

6.2 Requirements

Unless otherwise specified by the applicable test method, test pieces shall be conditioned at (23 ± 2) °C before testing in accordance with Table 1.

When tested in accordance with the test methods specified and using the test parameters given in Table 1, the valves shall conform to the requirements given in Table 1.

Table 1: Mechanical characteristics

Characteristics	Requirements	Test parameter		Test method
		Parameters	Value	
Hydrostatic strength (20°C, 100 h)	No failure during test period of any piece	Conditioning time ^a Number of test pieces ^b Type of test Circumferential hoop stress for PE100 Test period Test temperature	Shall conform to EN ISO 1167-1 3 Water-in-water 12.0 Mpa 100 h 20°C	EN ISO 1167-1 and EN ISO 1167-4
Hydrostatic strength (80°C, 165 h)	No failure during test period of any test piece ^c	Conditioning time ^a Number of test pieces ^b Type of test Circumferential hoop stress for PE100 Test period Test temperature	Shall conform to EN ISO 1167-1 3 Water-in-water 5.4 Mpa 165 h 80°C	EN ISO 1167-1 and EN ISO 1167-4

Table 1: Mechanical characteristics (continued)

Characteristics	Requirements	Test parameter		Test method
		Parameters	Value	
Hydrostatic strength (80°C, 1000 h)	No failure during test period of any piece	Conditioning time ^a Number of test pieces ^b Type of test Circumferential hoop stress for PE100 Test period Test temperature	Shall conform to EN ISO 1167-1 3 Water-in-water 5.0 Mpa 1000 h 80°C	EN ISO 1167-1 and EN ISO 1167-4
Leak tightness of seat and packing	No leakage during test period	Test temperature Test fluid Number of test pieces ^b Test pressure Duration of test	23°C Air or nitrogen 1 25 mbar 1 h	Annex A
Leak tightness of seat and packing	No leakage during test period	Test temperature Test fluid Number of test pieces ^b Test pressure Duration of test	23°C Water, air or nitrogen 1 Water: 1.5 PN Air or nitrogen: 1.1 PN 30s	Annex A
Operating torque ^d	Max. operating torque ³⁾ for For $d_n \leq 63\text{mm}$: 5 Nm < M ≤ 35 Nm For $63\text{mm} < d_n \leq 125$: 10 Nm < M ≤ 70Nm For $125\text{mm} < d_n \leq 225\text{mm}$: 10 Nm < M ≤ 150Nm	Test temperature Number of test pieces ^b	0°C and 40°C 1	EN 28233
Stop resistance	No failure at stops	Test temperature Number of test pieces ^b Torque	0°C and 40°C 1 2 times the value of the maximum measured operating torque measured with minimum 150Nm during 15s.	EN 28233
Actuation mechanism resistance	Maximum value: 1.5 times the value of the maximum measured operating torque (see this table)	Test pressure Test temperature Number of test pieces ^b	6 bar 23°C 1	EN 28233
Resistance to bending between supports	No leakage and maximum value for operating torque (see examination of operating torque)	Load applied for: 63mm < $d_n \leq 125\text{mm}$ 125mm < $d_n \leq 225\text{mm}$ Number of test pieces ^b	3kN 6kN 1	EN 12100

Table 1: Mechanical characteristics (continued)

Characteristics	Requirements	Test parameter		Test method
		Parameters	Value	
Leaktightness under tensile load	No leakage and maximum value for operating torque (see examination of operating torque)	Test pressure Test temperature Number of test pieces ^b	25 mbar 23°C Shall conform to ISO 10933	ISO 10933
Leaktightness under and after bending applied to the operating mechanism	No leakage	Number of test pieces ^b	1	EN 1680
Impact loading resistance	No leakage and maximum value for operating torque (see examination of operating torque)	Position of test piece Drop height Mass of striker Type of the striker Test temperature Number of test pieces ^b	Vertical, see Figure 1 2 m 2.5kg d90 in accordance with EN 744:1995 -20°C 1	EN 1705
Multiple test ^f				
1) Resistance to long term internal pressure loading	The test piece shall fulfill the requirements of the following characteristic:	Conditioning time ^a Type of test Number of test pieces ^b Test pressure for PE100 Test period Test temperature	Shall conform to EN ISO 1167-1 Water-in-water 1 1.25 x PN 1000 h 20°C	EN ISO 1167-1 and EN ISO 1167-4
2) Leaktightness of seat and packing	No leakage during test period	Test temperature Test fluid Number of test pieces ^b Test pressure Duration of the test	23°C Air or nitrogen 1 25 mbar 1 h	Annex A
3) Leaktightness of seat and packing	No leakage during test period	Test temperature Test fluid Number of test pieces ^b Test pressure Duration of the test	23°C Water, air or nitrogen 1 Water: 1.5 PN Air or nitrogen: 1.1 PN 30s	Annex A
4) Operating torque ^d	Torque range: For $d_n \leq 63\text{mm}$: $5 \text{ Nm} < M \leq 35 \text{ Nm}$ For $63\text{mm} < d_n \leq 125$: $10 \text{ Nm} < M \leq 70\text{Nm}$ For $125\text{mm} < d_n \leq 225\text{mm}$: $10 \text{ Nm} < M \leq 150\text{Nm}$	Test temperature Number of test pieces ^b	0°C and 40°C 1	EN 28233

Table 1: Mechanical characteristics (continued)

Characteristics	Requirements	Test parameter		Test method
		Parameters	Value	
5) Impact loading	No leakage and maximum value for operating torque (see examination of operating torque)	Position of test piece	Vertical, see Figure 1 ^e	EN 1705
		Drop height	2 m	
		Mass of striker	2.5kg	
		Type of the striker	d90 in accordance with EN 744:1995	
		Test temperature	-20°C	
		Number of test pieces ^b	1	
<p>^a The valves shall not be pressurized within 24h after fusion.</p> <p>^b The numbers of test pieces given indicate the numbers required to establish a value for the characteristic described in the table. The numbers of test pieces required for factory production control and process control should be listed in the manufacturer's quality plan. For guidance see CEN/TS 12201-7[1].</p> <p>^c Only brittle failures shall be taken into account. If a ductile failure occurs before 165 h, the test may be repeated at a lower stress. The stress and the associated minimum test period shall be selected from Table 2 or from a line based on the stress/time points given in Table 2.</p> <p>^d The initiating torque and the running torque shall be within the torque range given in this table.</p> <p>^e The pipe and valve assembly are held on a flat horizontal surface to allow the striker to fall vertically onto the operating cap as shown in Figure 1.</p> <p>^f As soon as possible after the completion of the internal pressure test the other three tests shall be carried out on the valve in the order stated.</p>				

Table 2: Circumferential (hoop) stress at 80°C and associated minimum test period

PE 100	
Stress, mPa	Minimum test period, h
5.4	165
5.3	256
5.2	399
5.1	629
5.0	1000

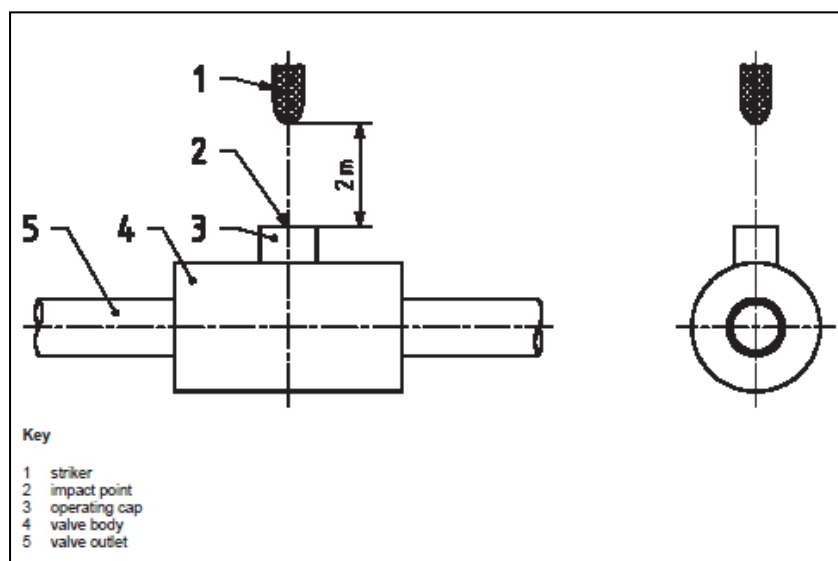


Figure 1: Position of impact loading

7.0 Physical characteristics

7.1 Conditioning

Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing in accordance with Table 3.

7.2 Requirements

When tested in accordance with the test methods specified and using the test parameters given in Table 3, the valves shall conform to the requirements given in Table 3.

Table 3: Physical characteristics

Characteristics	Requirements	Test parameter		Test method
		Parameters	Value	
Oxidation induction time (thermal stability)	≥ 20 min	Test temperature Number of test pieces ^a Test environment Specimen weight	200°C 3 Oxygen (15 ± 2) mg	ISO 11357-6
Melt mass-flow rate (MFR)	After processing maximum deviation of ± 20% of the value measured on the batch used to manufacture the valve	Loading mass Test temperature Time Number of test pieces ^a	5 kg 190°C 10min Shall conform to EN ISO 1133	EN ISO 1133
^a The numbers of test pieces given indicate the numbers required to establish a value for the characteristic described in the table. The numbers of test pieces required for factory production control and process control should be listed in the manufacturer's quality plan. For guidance see CEN/TS 12201-7[1]. ^b Test may be carried out at 210°C or 220°C providing there is clear correlation to the result at 200°C: in case of dispute the reference temperature shall be 200°C.				

8.0 Marking

All HDPE valves shall have the following body markings:-

- The manufacturer name or mark or brand
- The identification of the year manufacture
- The identification of material (HDPE)
- The nominal size (i.e. DN ...).
- The rating of flanges when applicable (PN16).
- Standard reference – BS EN 12201-4:2012
- 'SAJ' letters.
- Class (PE100)

9.0 Pre-Delivery Inspection and Evaluation

- a) It is the responsibility of the tenderer to inform SAJ for inspection purposes during manufacturing and before delivery.
- b) SAJ reserve the right to inspect and witness the testing of product offered.
- c) At any time, when requested, the supplier shall provide SAJ a sample of the product offered for evaluation purposes. All costs shall be borne by the supplier.

10.0 Certification

- a) Manufacturer and/or supplier are required to provide a copy of the certificate and testing report from SIRIM, IKRAM or other recognized certification bodies.
- b) Manufacturer or supplier are required to provide a copy of SPAN's approval certificate of the product to SAJ.
- c) Tests report required should be those tests conducted within a year period.
- d) SAJ have the right to refuse offer or reject supply if the documents required are not enclosed.