Technical catalogue

ASTORE

Manual valves in PVC-U

aliaxis

General characteristics
PVC-U

Developed in 1930 in Germany, PVC-U (rigid polyvinyl chloride - unplasticized) is obtained through the polymerization of a vinyl chloride monomer. The presence of chlorine in the PVC-U molecule results in a high performance resin, in terms of thermal stability and chemical and mechanical resistance, up to temperatures of 60° C.

The different formulations obtained by adding suitable additives and stabilizers render the PVC-U the most versatile of all plastic materials, allowing it to be adapted to many applications involving fluids under pressure.

PVC-U represents one of the more economic solutions in the field of thermoplastic and metal materials for resolving problems in the transport of corrosive chemical fluids, and in the distribution and treatment of water in general.

The mains reasons for this preference are the unique characteristics of the resin, which include:

- **Good chemical resistance:** PVC-U resins have excellent chemical resistance to most acids and alkalis, paraffin/aliphatic hydrocarbons and saline solutions. It is not recommended for the transport of polar organic compounds, including some types of chlorinated and aromatic solvents. PVC-U resins are also fully compatible with the transport of foodstuffs, demineralised water, potable water and unconditioned water, as provided for by current national and international standards.

- **Good thermal stability:** PVC-U resins have good thermal stability in the temperature range between 20°C and 50°C and are typically used in industrial and water supply applications, guaranteeing excellent mechanical strength, sufficient rigidity for the purpose, reduced thermal expansion coefficients and high factors of safety in service. PVC-U compounds are also resistant to combustion with a flash point of 399°C. The flame, in fact, only persists if the oxygen concentration is twice that of atmospheric or in the presence of a flame from an external source.
Flash point: 399° C. Oxygen index: 45%. UL 94 class: V0.
Thanks to the reduced coefficient of thermal conductivity
(λ = 0,15 W/m °C according to ASTM C177) the use of PVC-U resin for transporting hot fluids reduces heat loss and virtually eliminates condensation problems.

- **Good mechanical strength:** PVC-U resins are characterised by their low permeability to oxygen and reduced water absorption (0.1% at 23°C according to ASTM D 570). The thermal stability of the material leads to good impact resistance and the capacity to support service pressures of 4 - 6 - 10 - 16 bar at 20°C.

- **Resistance to ageing:** PVC-U resins have a high circumferential breaking strength (Minimum Required Strength MRS ≥ 25.0 MPa at 20°C) and allow long installation lifetimes without showing any signs of significant physical-mechanical deterioration.

Density	
Test method	ISO 1183 - ASTM D792
Unit of measurement	g/cm^3
Value	1,38
Modulus of elasticity	
Test method	ISO 527
Unit of measurement	$MPa = N/mm^2$
Value	3200
IZOD notched impact strength at 23°C	
Test method	ASTM D256
Unit of measurement	J/m
Value	50
Ultimate elongation	
Test method	ISO 527
Unit of measurement	%
Value	50
Shore hardness	
Test method	ISO 868
Unit of measurement	Shore D
Value	80
Tensile strength	
Test method	ISO 527
Unit of measurement	$MPa = N/mm^2$
Value	50
VICAT softening point (B/50)	
Test method	ISO 306
Unit of measurement	°C
Value	76
Heat distortion temperature HDT (0.46 N/mm^2)	
Test method	ASTM D648
Unit of measurement	°C
Value	86
Thermal conductivity at 23°C	
Test method	DIN 52612-1 - ASTM C177
Unit of measurement	W/(m °C)
Value	0,16
Coefficient of linear thermal expansion	
Test method	DIN 53752 - ASTM D696
Unit of measurement	m/(m °C)
Value	8 x 10-5
Limiting Oxygen Index	
Test method	ISO 4859-1 - ASTM D2863
Unit of measurement	%
Value	45

Reference standards

PVC-U

Production of the ASTORE valves is carried out according to the highest quality standards and in full compliance with the environmental restrictions set by the applicable laws in force and in accordance with ISO 14001.
All products are made in accordance with the quality guarantee system in compliance with ISO 9001.

- **BS 4346-1**
  Joints and fittings for use with solvent weld PVC pressure pipes
- **EN 10226-1/2**
  Pipe threads where pressure tight joints are made on the threads.
  Part 2: Taper external threads and taper internal threads - Dimensions, tolerances and designation
- **EN ISO 1452**
  PVC-U pipes and fittings for water supply systems
- **EN ISO 15493**
  Plastic piping systems (Pipes, Fittings and Valves) in ABS, PVC-U, PVC-C for industrial applications
- **EN 12201-3**
  Piping systems, plastic, for water distribution, drainage and pressure sewerage - Polyethylene (PE) - Part 3: Fittings
- **EN 12201-5**
  Piping systems, plastic, for water distribution, drainage and pressure sewerage - Polyethylene (PE) - Part 4: Valves
- **ISO 7**
  Fittings with pressure-tight threaded joints
- **ISO 228-1**
  Fittings with threaded connections
- **ISO 727**
  PVC-U pipes and fittings. Dimensions and tolerances - metric series
- **ISO 4427-3**
  Piping systems, plastic, for water distribution, drainage and pressure sewerage - Polyethylene (PE) - Part 3: Fittings
- **ISO 17885**
  Plastic Piping Systems - Mechanical Fittings for Pressure Piping Systems - Specifications

Approvals and quality marks

- **ACS France (Attestation de conformité Sanitaire)**
  Suitability of PVC-U and PVC-C for drinking water

- **WRAS (Water regulations advisory scheme - UK)**
  Suitability of PVC-U for transporting potable water

- **OQC by NSF**
  ASTORE products are OQC certified, Certificate of Controlled Origin by NSF.
  NSF with the brand OQC (Origin and Quality controlled) also declare the suitability of the products for transporting potable water.
  For the detailed list of certified products please refer to OQC on the www.nsf.org site

Solvent welding Instructions

Solvent welding, or cement jointing, is the longitudinal joining system for connecting rigid PVC-U pipes and fittings.

The "cementing" is carried out using adhesives/cements obtained by dissolving PVC-U polymer in a solvent mixture. This solvent liquefies the walls of the pipe and/or fitting, allowing the constituent material to chemically combine and be subsequently welded. Chemical welding allows permanent joints be achieved possessing chemical and mechanical strength characteristics identical to those of the pipes and fittings joined. The adhesives/solvent cements must be selected according to the type of thermoplastic resin to weld, in that the nature of the solvents vary, as does the weld material contained in them. It must be remembered, therefore, that all the solvent cements designed for joining thermoplastic pipes and fittings must be used to join pipes, fittings and valves of the same material.

Before starting any solvent welding operations, the efficiency and condition of the equipment used and the pieces to be assembled must be verified, in particular the uniformity, fluidity and expiry date of the solvent cement.

1) Cut the pipe perpendicular to its axis to obtain a clean square section, preferably using a wheeled pipe cutter designed specifically for thermoplastic pipes (fig. 1).

2) Chamfer the outer edges of the pipe in order to ensure that it enters the socket of the fitting at an angle of 15°. The chamfering operation must be carried out at all costs, otherwise the lack of chamfer can lead to the solvent being scraped off the surface of the fitting, thus compromising the effectiveness of the joint.
The chamfering must be carried out using the appropriate chamfering tool (fig. 2).

3) Measure the depth of the socket of the fitting to the internal shoulder and mark the corresponding distance on the end of the pipe (fig. 3 and 4).
For more details, refer to the "Socket depth, cement and chamfer length" table.

4) Using an clean paper towel or applicator soaked in Cleaner-Primer, remove any traces of dirt or grease from the outer surface of the pipe for the entire cementing length. Repeat the same operation on the internal surface of the socket of the fitting: leaving the surfaces softened (fig. 5).

Leave the surfaces to dry for a few minutes before applying the solvent cement. Remember that, in addition to cleaning the joint surfaces, the Cleaner-Primer also performs the important role of softening and preparing the surface to receive the solvent, an operation that enables a perfect joint to be obtained.

5) Apply the solvent cement in a uniform manner longitudinally over both parts to be assembled (outer surface of the pipe and internal coupling surface of the fitting) using an applicator or suitably sized coarse brush.

For more detailed information, refer to the "Brush-applicator characteristics and dimensions" table.

Fig. 1

Fig. 2

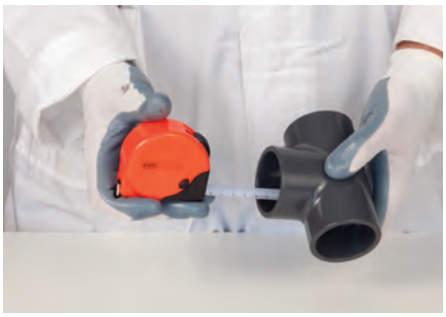


Fig. 3

Fig. 4

Fig. 5

It is advisable to use an applicator/brush of dimension not less than half the diameter of the pipe. The solvent cement must be applied along the entire length of the joining surface of both the pipe and the fitting:

- for the entire joint length of the pipe previously marked on the outer surface (fig. 6)
- for the entire depth of the socket as far as the internal shoulder (fig.7)

6) Fully insert the pipe into the fitting immediately and without any rotation. Only after this operation will it be possible to slightly rotate both ends (max. 1/4 of a turn between pipe and fitting). This rotation movement will render the layer of applied solvent cement more uniform (fig. 8)

7) The pipe must be inserted in the fitting as soon and as quick as possible (after no more than 20-25 seconds is recommended). Depending on the external diameter of the pipe and, as a result, possible handling difficulties, the insertion of the pipe into the fitting must be carried out:

- manually by one person for external diameters < 90 mm.
- manually by two people for external diameters from d 90 to d < 160 mm.
- using mechanical pipe-pullers for external diameters > 160 mm.

8) Immediately after fully inserting the pipe in the fitting, apply pressure to the joined parts for a few seconds. Then use crepe paper or a clean cloth to remove any excess solvent cement from the outer surfaces, and from internal surfaces where possible (fig. 9).

9) Solvent cement drying: the joined parts must be left to stand in order to allow the solvent cement to set naturally without generating any unnecessary stress. The setting time depends on the amount of stress that the joint will be placed under.

In particular, the following minimum setting times must be respected according to the ambient temperature:

- before handling the joint:

- from 5 to 10 minutes for ambient T. > 10°C
- from 15 to 20 minutes for ambient T. < 10°C

- for repair joints on pipes of any size or pressure not subject to hydraulic testing:

- 1 hour for each atm of applied pressure

- for joints in pipes and fittings of any diameter subject to pressure testing up to PN 16:

- minimum 24 hours

The solvent cement setting times indicated are valid at ambient temperature (approx. 25°C.). For particular climatic conditions (humidity, temperature, etc...), we recommend you contact our technical services department and/or the solvent cement manufacturer for more information (fig. 10 and 11).

Fig. 6

Fig. 7


Fig.8

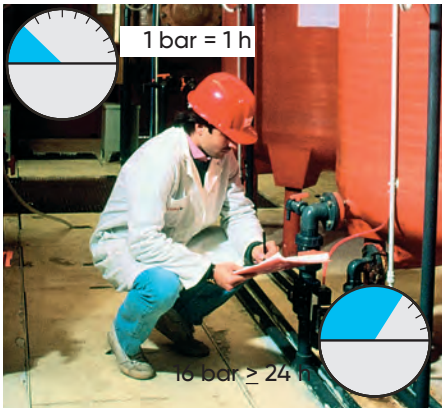


Fig.11

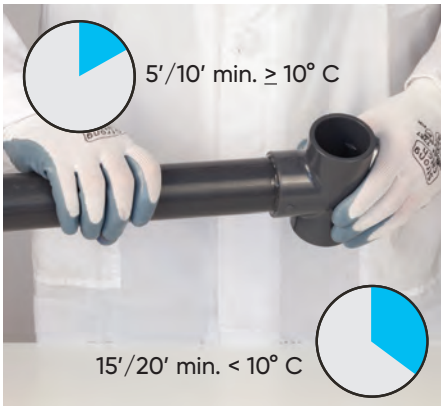
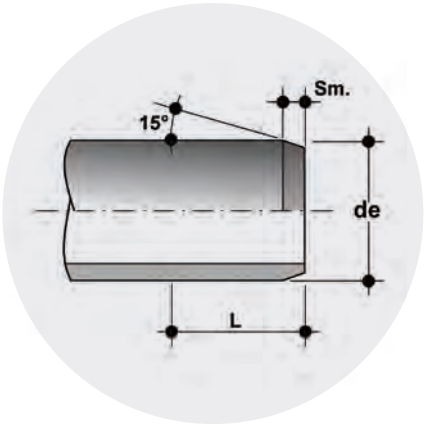


Fig.10


Fig.9



Socket depth, cement and chamfer length

External diameter		Cementing length L (mm)		Chamfer Sm (mm)
Metric series de (mm)	BS series (inches)	Metric series	BS series	
16	3/8"	14	14.5	
20	1/2"	16	16.5	1.5
25	3/4"	18,5	19.5	3
32	1"	22	22.5	3
40	1" 1/4	26	27	3
50	1" 1/2	31	30	3
63	2"	37,5	36	5
75	2" 1/2	43,5	43.5	5
90	3"	51	50.5	5
110	4"	61	63	5
125	-	68,5	-	5
140	5"	76	76	5
160	6"	86	90	5
180	-	96	-	5÷6
200	-	106	-	5÷6
225	8"	118,5	115.5	5÷6
250	-	131	-	5÷6
280	10"	146	142.5	5÷6
315	12"	163,5	168	5÷6

Characteristics and dimensions of brushes-applicators

External diameter		Type and dimensions of Brush or Applicator
de (mm)	(inch)	
16 - 25	3/8" - 3/4"	Round (8 - 10 mm)
32 - 63	1" - 2"	Round (20 - 25 mm)
75 - 160	2" 1/2 - 6"	Rectangular / round (45 - 50 mm)
>160	>6"	Rectangular / cylindrical (45 - 50 mm)
>160 - 315	>6" - 12"	Rectangular / cylindrical (60 - 65 mm)

Warnings

• In the case where the external diameter of the pipe and the internal diameter of the fitting are at opposite extremes of their tolerance values, the dry pipe cannot be inserted in the dry socket of the fitting. Insertion will only be possible after having applied the Cleaner and Solvent Cement to both parts to be joined.

• The solvent cement is manufactured from the same PVC resin used for the production of the pipes, fittings and valves. Unless otherwise specified, the solvent cement used on the surfaces to join must also be usable with the following tolerances:

- maximum interference 0.2 mm,

- maximum clearance 0.6 mm.

• When using the Cleaner and Solvent Cement, the following precautions should be adopted:

- use gloves and safety glasses to protect hands and eyes.

- use the Cleaner and Solvent Cement in a working environment with sufficient ventilation to avoid the formation of pockets of air containing concentrations of evaporated solvent, which can irritate the respiratory tract and eyes,

- due to the volatile nature of the solvents in the cleaner and cement, the containers must be closed immediately after use,

- Solvents in the gaseous phase tend to form flammable mixtures. Therefore, remove any ignition sources such as welding operations, accumulation of electrostatic charges, etc. from the work area, and do not smoke. In all cases, it is advisable to adhere strictly to the solvent cement manufacturer's instructions written on the packaging,

- In order to prevent a deterioration in the performance of the cleaner and solvent cement, the joining operations should be carried out within an ambient temperature range of between + 5 and + 40° C.

• The amount of solvent cement used on the joints depends on a number of factors (environmental conditions, pipe size, cement viscosity, operator experience, etc.) which are often difficult to quantify. In this respect, Table "Rigid PVC-U pipes and fittings. Theoretical solvent cement consumption" reports the approximate quantities of cement normally used for joining various diameter pipes and fittings.

• After having completed all the joints and prior to putting the lines into service, make sure that the insides of the pipes and fittings are completely free of any solvent traces/ vapours. This will prevent contamination of the fluids conveyed.

• Table "Most common defects" reports the most common types of defect found if the correct solvent welding procedure is not followed.

Rigid PVC-U pipes and fittings theoretical solvent cement consumption

Pipe/Fitting diameter		Number of joints per kg of solvent cement
d (mm)	d (inches)	
16	3/8"	550
20	1/2"	500
25	3/4"	450
32	1"	400
40	1" 1/4	300
50	1" 1/2	200
63	2"	140
75	2" 1/2	90
90	3"	60
110	4"	40
125	-	30
140	5"	25
160	6"	15
180	-	12
200	-	10
225	8"	6
250	-	4
280	10"	2
315	12"	2

Most common defects

Solvent cement too fluid (incorrect diluent addition)	
Immediate effect	Cementing failure
Consequence	Joint separation or leaks from between the pipe and fitting
Excess solvent cement	
Immediate effect	Internal and external runs beyond the joint zone
Consequence	Weakening of the outer surface of the joint area and formation of bubbles with micro-cracks/sources of fracture in the base material
Excessively dense solvent cement due to evaporated solvent	
Immediate effect	Cementing failure
Consequence	Joint separation or leaks from between the pipe and fitting. Possible surface cracks triggering cracks in the base material
Insufficient and/or incorrect distribution of solvent cement	
Immediate effect	Cementing failure or local weakness
Consequence	Joint separation or leaks from between the pipe and fitting
Incorrect pipe insertion (incomplete, excessive, misaligned)	
Immediate effect	Imperfect joint
Consequence	Transmission of mechanical stresses from the pipe to the fitting and/or leaks from the joint
Impurities and/or humidity on the surfaces of the parts to join	
Immediate effect	Imperfect joint
Consequence	Joint separation or leaks (fluid seepage) from between the pipe and fitting

Installation instructions for threaded joints

To guarantee the hydraulic seal of the joint on fittings and valves with a threaded female end, we recommend you perform the following operations:

1. Start winding some PTFE sealing tape on the outside of the threaded male end, taking care not to obstruct the through-hole on the pipe, fitting or valve (fig. 1);

2. Complete the first winding layer by winding the tape clockwise until you reach the root of the thread. Remember to keep the tape taut throughout the entire process (fig. 2);

3. Press on the tips of the thread to make sure the tape adheres fully to the support clip;

4. Increase the thickness of the PTFE layer by continuing to apply the taut tape and winding it clockwise until you achieve the optimal level (fig. 3);

5. Connect the previously sealed male end to the female end and proceed manually by screwing the two elements;

6. Make sure the layer of PTFE is not removed during screwing, as this would compromise the hydraulic seal of the joint;

7. Complete screwing the two ends exploiting the entire length of the thread with the aid of a strap wrench or similar tool;

8. Avoid tightening the elements too much, as this could damage the threads or cause stress to the elements themselves.

Fig. 1

Fig.2

Fig.3

Recommendations

For correct installation, we recommend you only use sealing tape in non-sintered PTFE. Under all circumstances avoid using materials such as hemp, lint or paints usually implemented for the hydraulic seal on metal threads.

Warnings

Avoid using threaded joints in the following cases:

- highly critical applications, such as for conveying chemically aggressive or toxic fluids,
- in the presence of medium or high pressures. In this case, we recommend the use of solvent welding joints, hot welding joints or flanged joints,
- systems subject to mechanical and/or thermal stresses such as water hammers, strong variations in temperature, bends, misalignments and cross tensions which could cause the threaded joint to break prematurely,
- coupling of elements with excessive distance from one another.

322

Astore 322 is a true union ball valve for irrigation and water supply systems, with free ball support and radial disassembly, which ensure a quick and easy installation and a convenient maintenance.

TRUE UNION BALL VALVE FOR IRRIGATION AND WATER SUPPLY SYSTEMS

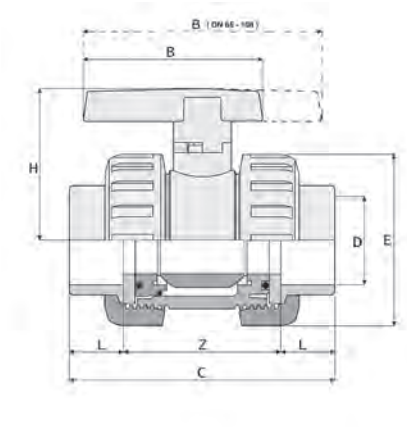
- Versions available: ISO metric (1V322) and BS standard (3V322) plain solvent weld socket, BSP female threaded socket (1V321).

Technical specifications	
Construction	True union grey PVC ball valve, with free ball support and radial disassembly
Size range	DN 10 ÷ 100
Nominal pressure	DN 10÷50: PN16 with water at 20°C DN 65÷80: PN10 with water at 20°C DN 100: PN6 with water at 20°C
Temperature range	0 °C ÷ 60 °C
Coupling standards	**Solvent welding:** ISO 727, EN ISO 1452-4 (model 1V322); BS4346-1 (model 3V322)
	Thread: UNI ISO 228-1, ISO 7-1, UNI EN ISO 1452-4 (model 1V321)
	PVC-U
Seal material	EPDM (O-ring) PE (ball seats)
Control options	Manual control

DN 10 ÷ 50

DN 65 ÷ 100

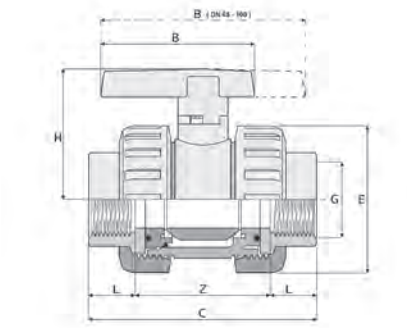
DIMENSIONS



1V322

True union grey PVC ball valve, ISO metric plain solvent weld socket, with free ball support and radial disassembly.
EPDM seals.
PE ball seats.

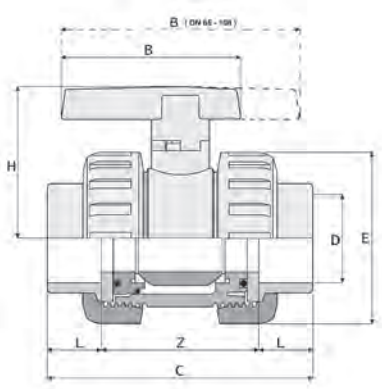
D	PN	DN	L	Z	C	E	H	B	g	Code
16	16	10	14	47	75	50	50	57	125	1V32216000H
20	16	15	16	48	80	50	50	57	130	1V32220000H
25	16	20	19	57	95	55	55	66	205	1V32225000H
32	16	25	22	64	108	63	63	75	300	1V32232000H
40	16	32	26	72	124	76	76	90	450	1V32240000H
50	16	40	31	84	146	88	88	103	710	1V32250000H
63	16	50	38	96	172	102	102	121	1150	1V32263000H
75	10	65	44	142	230	138	138	225	3400	1V32275000LW
90	10	80	51	142	244	138	138	225	3500	1V32290000LW
110	6	100	61	162	284	171	171	280	5900	1V32211000LW



1V321

True union grey PVC ball valve, BSP female threaded socket, with free ball support and radial disassembly.
EPDM seals.
PE ball seats.

G	PN	DN	L	Z	C	E	H	B	g	Code
3/8"	16	10	13	49	75	50	50	57	130	1V32116000H
1/2"	16	15	17	46	80	50	50	57	135	1V32120000H
3/4"	16	20	19	57	95	59	55	66	215	1V32125000H
1"	16	25	22	64	108	68	63	75	310	1V32132000H
1"1/4	16	32	24	76	124	80	76	90	460	1V32140000H
1"1/2	16	40	24	98	146	96	88	103	730	1V32150000H
2"	16	50	29	114	172	116	102	121	1200	1V32163000H
2"1/2	10	65	33	164	230	168	138	225	3400	1V32175000LW
3"	10	80	36	172	244	168	138	225	3550	1V32190000LW
4"	10	100	42	200	284	210	171	280	5900	1V32111000LW



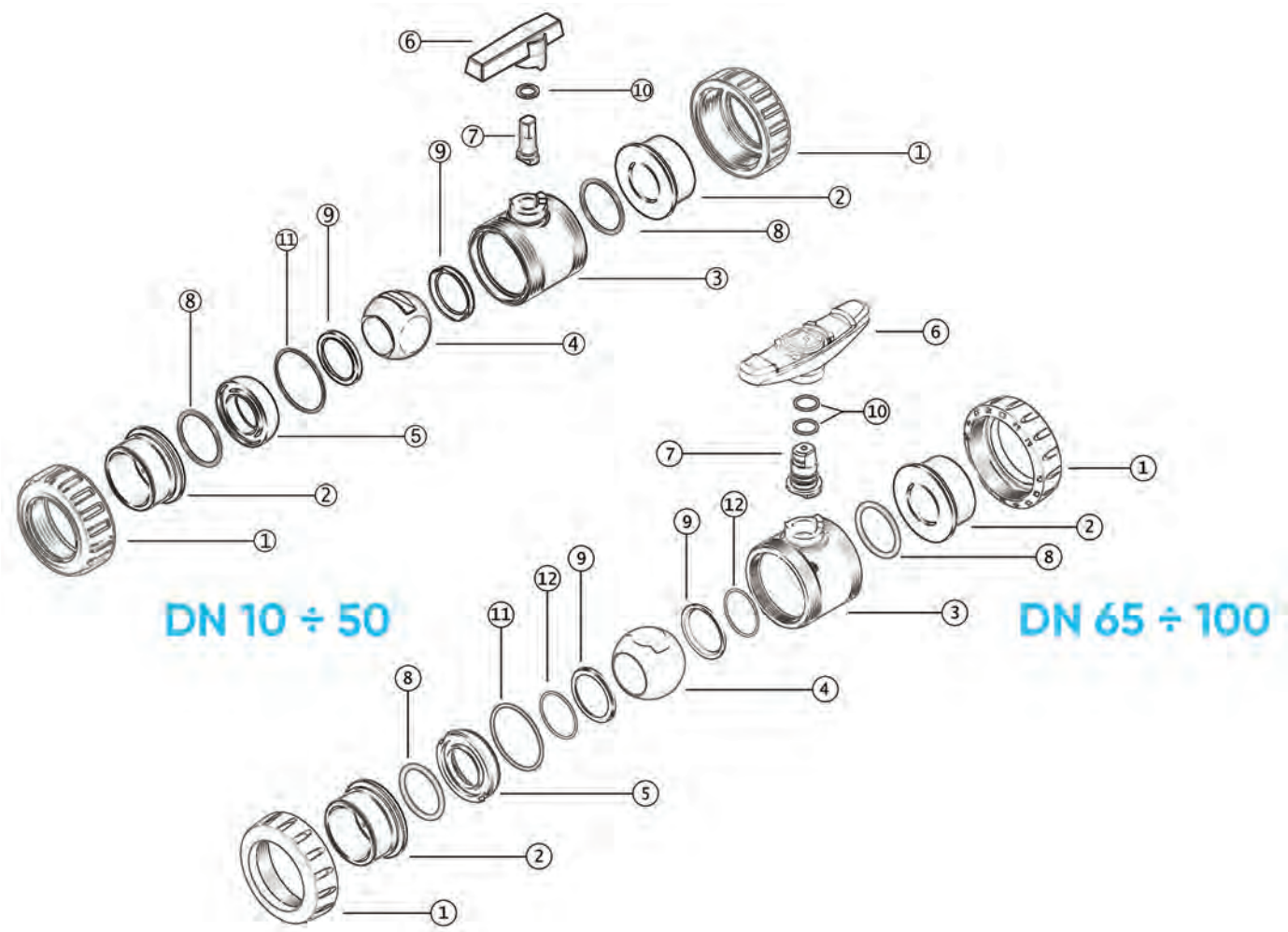
3V322

True union grey PVC ball valve, BS Standard plain solvent weld socket, with free ball support and radial disassembly.
EPDM seals.
PE ball seats.

G	PN	DN	L	Z	C	E	H	B	g	Code
3/8"	16	10	15	45	75	50	50	57	125	3V32216000H
1/2"	16	15	17	46	80	50	50	57	130	3V32220000H
3/4"	16	20	19	57	95	59	55	66	205	3V32225000H
1"	16	25	22	64	108	68	63	75	300	3V32232000H
1"1/4	16	32	26	72	124	80	76	90	450	3V32240000H
1"1/2	16	40	31	84	146	96	88	103	710	3V32250000H
2"	16	50	38	96	172	116	102	121	1150	3V32263000H
2"1/2	10	65	44	142	230	168	138	225	3400	1V32275000LW
3"	10	80	51	142	244	168	138	225	3500	3V32290000LW
4"	10	100	61	162	284	210	171	280	5900	3V32211000LW

COMPONENTS

EXPLODED VIEW



1	Nut (PVC-U - 2)	**5**	Support (PVC-U - 1)	**9**	Ball seat (PE - 2)
2	Union end (PVC-U - 2)	**6**	Handle (PVC-U - 1)	**10***	Stem O-ring (EPDM - 1)
3	Body (PVC-U - 1)	**7**	Stem (PVC-U - 1)	**11**	Radial O-ring (EPDM - 1)
4	Ball (PVC-U - 1)	**8**	Socket O-ring (EPDM - 2)	**12****	Ball seat O-ring (EPDM - 2)

*2 pcs for DN 65÷100
**Only for DN 65÷100
Inside brackets are indicated the material and the quantity supplied for each component.

ОФИЦИАЛЬНЫЙ ПРЕДСТАВИТЕЛЬ FIP В УКРАИНЕ
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