

结构设计及加工制造的特点 Structure features of cryogenic ball valve

低温球阀用于低温工况，特别是用于液化天然气等一些危险介质工况，祺隆公司对于低温球阀的设计、制造、试验积累了丰富的经验。

Cryogenic ball valve is used for low temperature working condition, especially for some hazard media, such as liquidized natural gas. Our company has been experienced in the design, manufacturing, inspection and test of cryogenic ball valve.

材料的用途 Choose for material

一般的钢材在低温下会出现低温脆性，因此根据低温球阀的最低工作温度选择适合的阀体材料是设计与制造的一个关键。阀体材料的最低工作温度见下表。低温材料需要根据标准要求进行低温冲击试验，以确保材料低温下的适用性。填料、垫片、螺栓、螺母也需要采用适合低温工况的材料。

Common steels are brittle in the cryogenic condition. So, the key point for the design and production of cryogenic ball is to select proper body material according to the minimum working temperature of the ball valve. To ensure the material suitability under the low temperature condition, the material adopted shall be impact tested according to the standard requirement. The packing, gasket, bolt and nut shall also adopt the materials suitable for low temperature condition.

阀体材料的最低工作温度
Minimum working temperature for body material

锻件		锻件	
材料	最低使用温度	材料	最低使用温度
ASTM A350 LF2	-46℃	ASTM A350 LF2 LCB	-46℃
		ASTM A350 LF2 LCC	-46℃
ASTM A350 LF2	-59℃	ASTM A350 LF2 LC1	-59℃
ASTM A350 LF2	-73℃	ASTM A350 LF2 LC2	-73℃
ASTM A350 LF2	-101℃	ASTM A350 LF2 LC3	-101℃
ASTM A182 LF2	-254℃	ASTM A182 LF2 cf8	-254℃
ASTM A182 LF2	-254℃	ASTM A182 LF2 CF8M	-254℃
ASTM A182 LF2	-254℃	ASTM A182 LF2 CF3	-254℃
ASTM A182 LF2	-254℃	ASTM A182 LF2 CF3M	-254℃



低温试验区
Low temperature impact tested

结构设计及加工制造的特点 Design and manufacturing features

根据标准要求，温度低于-50℃的球阀，一般采用长颈结构设计，一提高填料处的温度，确保阀杆填料的可靠密封，颈部长度一般按标准要求设计，用户有特殊要求，也可按合同要求。

用于低温介质的阀门，当阀门处在关闭位置时，滞留在阀门中腔的低温液体介质在温度升高时因气化而使体积急剧膨胀，导致阀门中腔压力异常升高，严重的会造成阀门破裂等事故。祺隆球阀具有中腔自动泄压功能，当中腔异常升压时，中腔介质能够依靠其自身的作用力推动阀门而自动泄压，从而确保阀门的安全。

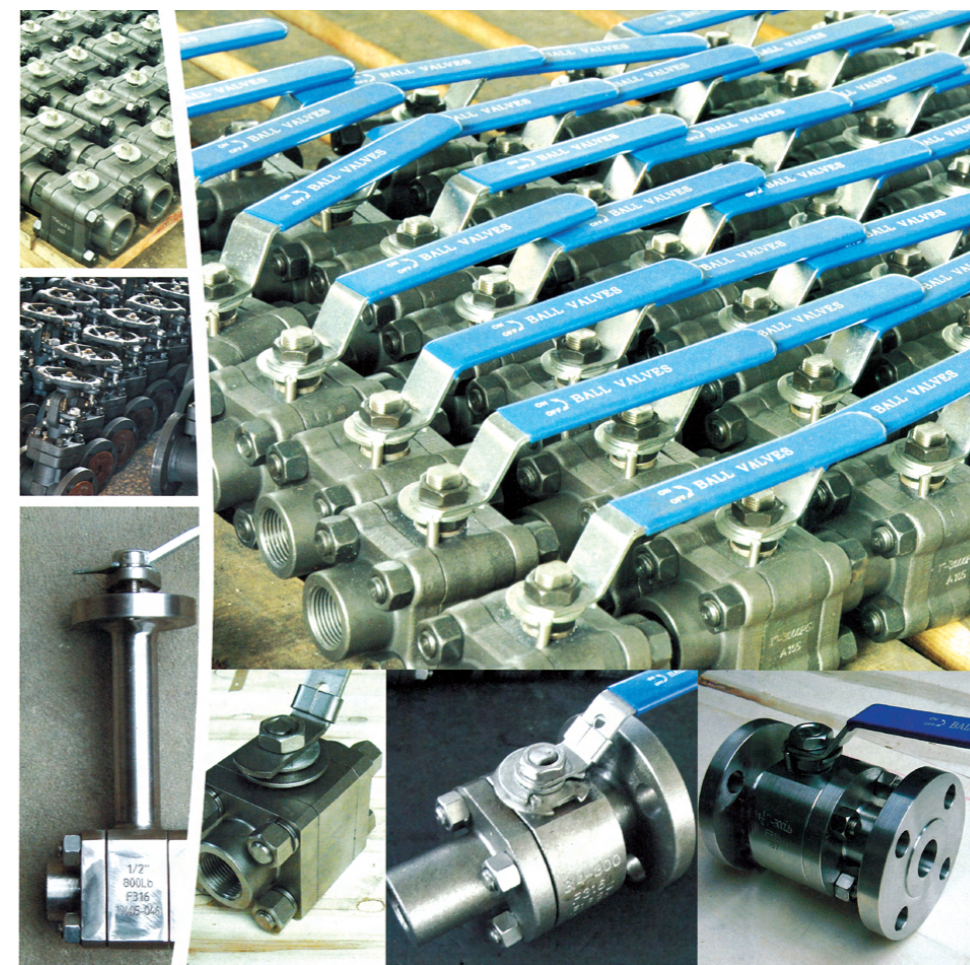
根据合同要求，可以进行低温试验，以检验阀门在低温下的操作扭矩、密封性能等指标。

阀门的零部件经过低温处理，以确保零部件在低温下形状和尺寸的稳定性。

Being required by the standard, the long neck design is usually adopted for the ball valve below -50℃. The long neck design can keep the heat at the packing position and ensure the reliable sealing performance of the valve packing. The length of the neck complies to the standard, but, can be also changed as per the customer's request in the contract.

For cryogenic ball valve, if the valve is at closed position, the cryogenic liquid stayed in the cavity of the valve will be gasified and expanded when the temperature gets rising. This will cause the unusual high pressure in the cavity, and maybe break the valve. To avoid such dangerous accident, our ball valve has self-relief function for the cavity pressure. When the pressure in the cavity unusually rises, the medium in the cavity will push the seat to relieve the pressure by its own force. Such design will endure the safety of the valve.

The ball valve can be cryogenically tested if it is specified in the contract. The operating torque, sealing performance and other data can be obtained and checked by the test. The spare parts of the valve shall be cryogenically treated to ensure their dimensional stability under the cryogenic condition.



用途 Application

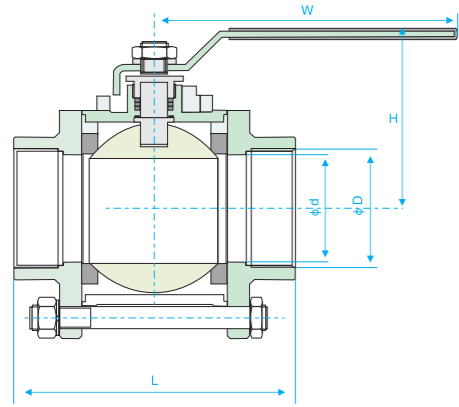
内螺纹球阀适用于中低压管路，用于截断或接通管路中的介质，其驱动方式一般为手动，也可采用气动或电动。根据结构设计的不同，可分为三片式，两片式及一片式。

Female threaded ball valves are suitable for use on pipelines of medium or low pressure to turn off or switch on pipeline medium. Operation manners are in general of manual, and pneumatic or electric actuators are available. Based on design structures, the valves get divided into three pieces, two pieces, and one piece types.

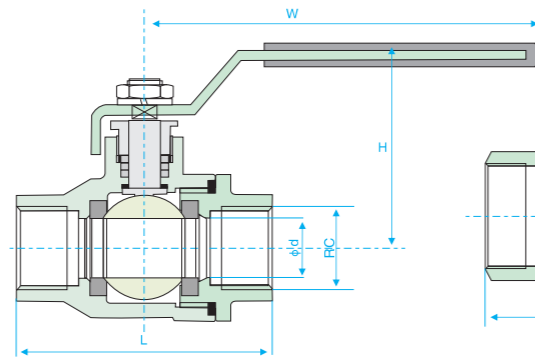
型号、材料及主要参数 Material and Main Valve Data

型号Type	QS11F-WP8	QS11F-WR8	QL11F-WP8	QL11F-WR8	QZ11F-WP8	QZ11F-WR8	
结构特点Structure Feature	三片式，全通径通道，可以方便的在线更换阀门内件。 Three pieces body, full bore, easy to replace the trims		两片式，全通径通道，结构较简单。 Two pieces body, full bore, simple structure		一片式，缩径通道，结构简单。 One piece body, reduced bore, simple structure		
连接形式Connection	内螺纹连接（一般采用圆锥管螺纹，根据用户要求，也可采用NPT螺纹） Female thread ends (usually is NPT)						
公称压力Pressure Rating	800WOG或1000WOG						
主要零件材料 Main parts material	阀体、阀盖 Body, Bonnet	CF8	CF8M	CF8	CF8M	CF8	CF8M
	球体、阀杆 Ball, Stem	0Cr18Ni9 (304)	0Cr17Ni12Mo2 (316)	0Cr18Ni9 (304)	0Cr17Ni12Mo2 (316)	0Cr18Ni9 (304)	0Cr17Ni12Mo2 (316)
	密封面 sealing surface	增强聚四氟乙烯 PTFE					
适用工况 Applicable condition	适用介质 Applicable medium	硝酸类腐蚀性介质 Nitric acid corrosive medium	醋酸类腐蚀性介质 Acetic acid corrosive medium	硝酸类腐蚀性介质 Nitric acid corrosive medium	醋酸类腐蚀性介质 Acetic acid corrosive medium	硝酸类腐蚀性介质 Nitric acid corrosive medium	醋酸类腐蚀性介质 Acetic acid corrosive medium
	适用温度 Applicable temperature	≤180℃					

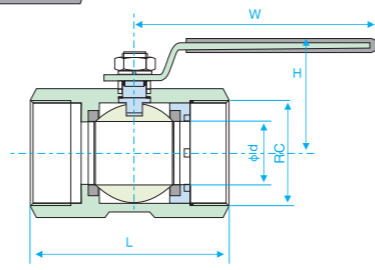
主要尺寸及重量 Main sizes and weights



QS11F内螺纹连接三片式球阀
QS11F female threaded three pieces ball valve



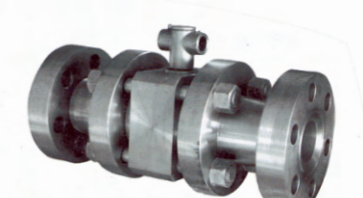
QL11F内螺纹连接二片式球阀
QL11F female threaded two pieces ball valve



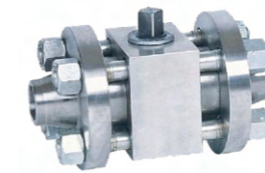
QZ11F内螺纹连接一片式球阀
QZ11F female threaded one piece ball valve



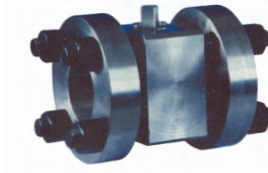
内螺纹连接承插焊连接高压锻造球阀
Female thread & SW ends high pressure forged ball valve



法兰连接高压锻造球阀
flanged ends high pressure forged ball valve



对焊连接高压锻造球阀
BW ends high pressure forged ball valve



对夹连接高压锻造球阀
Wafer type high pressure forged ball valve

用途 Application

高压锻造球阀适用于Class600~Class1500、PN16~PN320的管路上，用于截断或接通管路中的介质。高压锻造球阀的驱动方式一般为手动，也可采用蜗轮蜗杆传动、气动及电动。连接形式有承插焊连接、内螺纹连接、法兰连接、对夹连接及对焊连接。

High pressure forged ball valves are suitable for use on pipe lines of Class600 ~ Class1500 , PN160 ~ PN320 , being used for cutting off or switching on pipelines medium, of wich operation manners are of manual in general, and worm gear and pneumatic or electric actuators are available, connections are of socket welding and female threaded ends .

型号、材料及主要参数 Material and Main Valve Data

连接形式	公称压力 Pressure Rating	常规产品型号 Type				
承插焊连接 SW	Class600	Q6C1N-A6	Q6C1N-A6P8	Q6C1N-A6P3	Q6C1N-A6R8	Q6C1N-A6R3
	Class800	Q6C1N-A8	Q6C1N-A8P8	Q6C1N-A8P3	Q6C1N-A8R8	Q6C1N-A8R3
	Class900	Q6C1N-A9	Q6C1N-A9P8	Q6C1N-A9P3	Q6C1N-A9R8	Q6C1N-A9R3
	Class1500	Q6C1N-A15	Q6C1N-A15P8	Q6C1N-A15P3	Q6C1N-A15R8	Q6C1N-A15R3
内螺纹连接 Female thread	Class600	Q11N-A6	Q11N-A6P8	Q11N-A6P3	Q11N-A6R8	Q11N-A6R3
	Class800	Q11N-A8	Q11N-A8P8	Q11N-A8P3	Q11N-A8R8	Q11N-A8R3
	Class900	Q11N-A9	Q11N-A9P8	Q11N-A9P3	Q11N-A9R8	Q11N-A9R3
主要零件材料 Main parts material	阀体、阀盖 Body, Bonnet	A105	304	304L	316	316L
	球体、阀杆 Ball, Stem	2Cr13	304	304L	316	316L
	密封面 sealing surface	尼龙、增强聚四氟乙烯、对位聚苯、PEEK NYLO、RPTFE、PPL、PEEK				
适用工况 Applicable condition	适用介质 Applicable medium	水、蒸汽、油品、煤气、液化气、天然气等 Water, Steam Oils, Coal gas, Liquefied gas, gas	硝酸类腐蚀性介质 Nitric acid corrosion medium	强氧化性介质 Strong oxidizing medium	醋酸类腐蚀性介质 Acetic acid corrosive medium	尿素类腐蚀性介质 Urea corrosive medium
	适用温度 Applicable temperature	≤80℃ (尼龙)、≤180℃ (增强聚四氟乙烯)、≤300℃ (对位聚苯)、≤250℃ (PEEK) ≤80℃ (尼龙)、≤180℃ (RPTFE)、≤300℃ (PPL)、≤250℃ (PEEK)				

型号Type	Q41N-160	Q41N-320	Q71N-160	Q71N-320	Q61N-160	Q61N-320
连接形式Connection	法兰连接	法兰连接	对夹连接	对夹连接	对焊连接	对焊连接
公称压力Pressure Rating	PN160	PN320	PN160	PN320	PN160	PN320
主要零件材料 Main parts material	阀体: 碳钢; 阀座、球体、阀杆: 2Cr13; 密封圈: 尼龙; 螺栓: 35CrMo body:wcb; seat, ball, stem: 2cr13 oring:nylo packing:35crmo					
适用工况 Applicable condition	适用介质 Applicable medium	水、油品、氮、氢、氨等介质 Water, Coal gas, nitrogen, hydrogen, ammonia				
	适用温度 Applicable temperature	≤180℃				

结构形式 Sstructures	公称尺寸 Dimensions			尺寸Dimensions (mm)				重量 Weight (Kg)
	DN	NPS	RC	L	d	W	H	
三片式 Three pieces	10	3/8	3/8	60	10	95	57	0.4
	15	1/2	1/2	75	14	110	68	0.5
	20	3/4	3/4	80	19	110	70	0.7
	25	1	1	90	25	140	80	1.2
	32	1 1/4	1 1/4	110	32	140	85	1.9
	40	1 1/2	1 1/2	120	38	180	100	2.7
	50	2	2	144	50	180	110	3.9
	65	2 1/2	2 1/2	186	64	200	130	7.1
	80	3	3	206	76	250	150	11.5
两片式 Two pieces	10	3/8	3/8	55	10	95	57	0.3
	15	1/2	1/2	65	14	110	68	0.4
	20	3/4	3/4	78	19	110	70	0.6
	25	1	1	88	25	140	80	1.0
	32	1 1/4	1 1/4	105	32	140	85	1.6
	40	1 1/2	1 1/2	112	38	180	100	2.3
	50	2	2	125	50	180	110	3.3
	65	2 1/2	2 1/2	165	64	200	130	6.0
	80	3	3	184	76	250	150	9.8
一片式 One piece	10	3/8	3/8	39	6	70	35	0.2
	15	1/2	1/2	57	9	95	44	0.3
	20	3/4	3/4	59	12	95	47	0.4
	25	1	1	71	16	110	55	0.6
	32	1 1/4	1 1/4	80	20	110	60	1.1
	40	1 1/2	1 1/2	83	25	140	75	1.5
	50	2	2	100	32	140	80	2.8