LYALL POLYTEC™

GAS APPLICATIONS

POLYETHYLENE BALL VALVES

LYALL-POLYTEC ALLIANCE & COMMITMENT STATEMENT

Alliance

R.W. Lyall & Company, Inc. and **Polytec Co., LTD** have teamed up to provide you with a full line of medium and high density PE Ball Valves. With Polytec's extensive knowledge in the development of polyethylene products, and Lyall's expertise in the gas piping & distribution industry, Lyall can now provide you with a full range of high quality residential and industrial PE Ball Valves sizes 1/2 CTS through 16 IPS.

Company Background

R. W. Lyall & Company, Inc. is a leading manufacturer of quality service line piping systems for the distribution of Natural Gas and Liquid Propane Gas to residential and commercial gas consumers. Founded in 1970, R. W. Lyall & Company has developed and maintained strong brand recognition for its many innovative products including, LYCO® Anodeless Meter Risers, LYCOFIT® Mechanical Fittings and Tapping Tees, LYCO® Meter Set Assemblies, and LYCOFAST® the Industry's first patented pre-assembled, pre-packaged service line kit for extended cost savings to the customer's bottom line.

Established in 1988, **Polytec Co. LTD** has been designing and manufacturing polyethylene ball valves to the highest quality standard since 1993. Because of Polytec's strict adherence to QC processes which are in complete compliance with ISO 9001, Polytec has become a leading manufacturer of high quality, cost effective polyethylene ball valves worldwide.

Our Commitment To You

Lyall has built a strong reputation of supplying quality products and services at the best possible value to the utility industry. We are continuing this tradition with our commitment to Lyall-Polytec products.

Leveraging the technical and operational expertise of Lyall and Polytec, ensures the highest level of quality is consistently achieved. Working collaboratively to refine process controls for both manufacturing and logistics, our customers can rest assured that the Lyall-Polytec offering will meet or exceed the high performance standards they have become accustomed to, on other Lyall products.

Our exclusive agreement to distribute Lyall-Polytec valves in North America includes our proven distribution network, guaranteeing you an extensive product offering of polyethylene ball valves engineered to meet your rigorous requirements.

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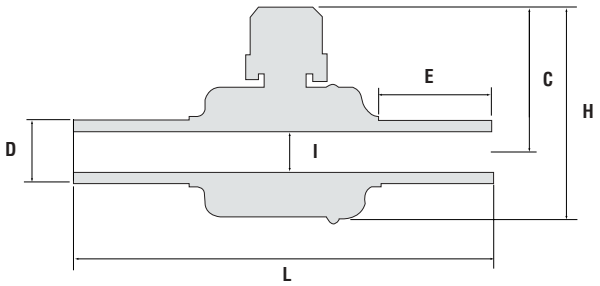
SMALL BODY PE VALVES

AVAILABLE IN BOTH MDPE & HDPE MATERIALS

SMALL BODY PE BALL VALVES IN MDPE

SMALL BODY PE BALL VALVES IN HDPE



CTS VALVE SIZES AND DIMENSIONS (APPROX.)

NOMINAL VALVE SIZE	D	L	H	C	I	Port	CV	E	Weight lbs. kg
1/2 CTS	0.625	11.50	5.12	3.70	1.06	Full	9	3.62	0.97
	15.9mm	292mm	130mm	94mm	27mm			92mm	0.44 kg
1 CTS	1.125	11.50	5.12	3.70	1.06	Full	36	3.62	1.01
	28.6mm	292mm	130mm	94mm	27mm			92mm	0.46 kg
1 1/4 CTS	1.375	11.50	5.12	3.70	1.06	Full	55	3.62	1.0
	34.9mm	292mm	130mm	94mm	27mm			92mm	0.46 kg

All CTS valve sizes are available in a full range of wall thicknesses. Contact your Lyall-Polytec representative for available ISO and other metric sizes.

IPS VALVE SIZES AND DIMENSIONS (APPROX.)

NOMINAL VALVE SIZE	D	L	H	C	I	Port	CV	E	Weight lbs. kg
1/2 IPS	0.840	11.50	5.12	3.70	1.06	Full	20	3.62	0.97
SDR 9.3	21.3mm	292mm	130mm	94mm	27mm			92mm	0.44 kg
3/4 IPS	1.050	11.50	5.12	3.70	1.06	Full	32	3.62	0.99
SDR 11	26.7mm	292mm	130mm	94mm	27mm			92mm	0.45 kg
1 IPS	1.315	11.50	5.12	3.70	1.06	Full	50	3.62	1.01
SDR 11	33.4mm	292mm	130mm	94mm	27mm			92mm	0.46 kg
1 1/4 IPS	1.660	11.50	5.12	3.70	1.06	Std	79	3.62	1.01
SDR 11	42.1mm	292mm	130mm	94mm	27mm			92mm	0.46 kg
1 1/2 IPS	1.900	11.81	5.51	3.78	1.26	Std	104	2.80	1.8
SDR 11	48.3mm	300mm	140mm	96mm	32mm			71mm	0.8 kg
2 IPS	2.375	11.81	5.51	3.78	1.38	Std	118	3.31	1.9
SDR 11	60.3mm	300mm	140mm	96mm	35mm			84mm	0.86 kg

Where applicable, other SDR's are available upon request. Contact your Lyall-Polytec representative for available ISO and other metric sizes.

LARGE BODY PE VALVES

AVAILABLE IN BOTH MDPE & HDPE MATERIALS

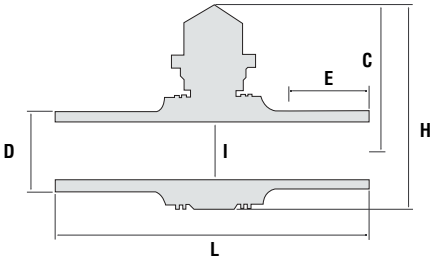
INNOVATIVE DESIGNS

- INTEGRATED PURGE-READY PORTS: Lyall-Polytec large size valves can be furnished with standard pup-ends (NPC Type) or with Purge-Ready ports (PC Type) that can easily be configured for attaching purge port valves.
- PERMANENT ACTUATOR PROTECTION COLLARS (Factory fused)

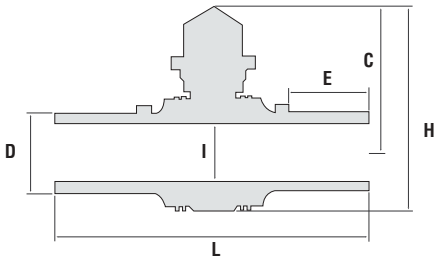
NPC TYPE VALVES

PC TYPE VALVES

VALVE WITH COLLAR OPTION



NO PURGE CONNECTOR (NPC) TYPE VALVE



PURGE READY (PC) TYPE VALVE

IPS VALVE SIZES AND DIMENSIONS (APPROX.)

NOMINAL VALVE SIZE	D	L		H	C	I	Port	CV	E		Weight lbs. kg	
		NPC	PC						NPC	PC	NPC	PC
2 IPS	2.37	19.53	25.98	9.65	7.01	1.77	Full	164	6.69	6.69	4.19	5.29
SDR 11	60.3mm	496mm	660mm	245mm	178mm	45mm			170mm	170mm	1.9 kg	2.4 kg
3 IPS	3.50	21.18	25.98	11.81	8.50	2.52	Full	375	6.69	6.69	8.60	10.36
SDR 11	88.9mm	538 mm	660mm	300mm	216mm	64mm			170mm	170mm	3.90 kg	4.7 kg
4 IPS	4.50	21.18	25.98	11.81	8.50	2.52	Std	407	6.69	6.69	9.70	11.24
SDR 11	114.3mm	538mm	660mm	300mm	216mm	64mm			170mm	170mm	4.4 kg	5.1 kg
4 IPS	4.50	24.02	28.74	14.92	10.39	3.58	Full	591	6.69	6.69	18.52	19.40
SDR 11	114.3mm	610mm	730mm	379mm	264mm	91mm			170mm	170mm	8.4 kg	8.8 kg
6 IPS	6.62	24.02	28.74	14.92	10.39	3.58	Std	854	6.69	6.69	22.27	23.59
SDR 11	168.3mm	610mm	730mm	379mm	264mm	91mm			170mm	170mm	10.1 kg	10.7 kg
6 IPS	6.62	26.18	31.89	18.94	13.03	4.80	Full	1280	6.69	6.69	38.36	40.79
SDR 11	168.3mm	665mm	810mm	481mm	331mm	122mm			170mm	170mm	17.40 kg	18.5kg
8 IPS	8.62	30.12	33.46	24.80	16.57	6.69	Full	2146	6.69	6.02	91.49	94.80
SDR 11	219.1mm	765mm	850mm	630mm	421mm	170mm			170mm	153mm	41.50 kg	43 kg
10 IPS	10.75	30.12	31.89	24.80	16.57	7.95	Full	3074	7.09	5.55	97.22	99.87
SDR 11	273.0mm	765mm	810mm	630mm	421mm	202mm			180mm	141mm	44.10 kg	45.3 kg
12 IPS	12.75	30.12	32.28	24.80	16.57	7.95	Std	3646	7.48	5.55	100.75	103.62
SDR 11	323.8mm	765mm	820mm	630mm	421mm	202mm			190mm	141mm	45.70 kg	47 kg
14 IPS	14.00	35.83	38.58	31.18	19.33	11.38	Full	5736	6.69	5.91	248.02	252.65
SDR 11	355.6mm	910mm	980mm	792mm	491mm	289mm			170mm	150mm	112.50 kg	114.6 kg
16 IPS	16.00	35.83	38.58	31.18	19.33	11.38	Full	6559	6.69	5.91	256.40	261.47
SDR 11	406.4mm	910mm	980mm	792mm	491mm	289mm			170mm	150mm	116.30 kg	118.6 kg

Where applicable, other SDR's are available upon request. Contact your Lyall-Polytec representative for available ISO and other metric sizes.

STEM EXTENSION & PURGE / BYPASS

AVAILABLE IN BOTH MDPE & HDPE MATERIALS

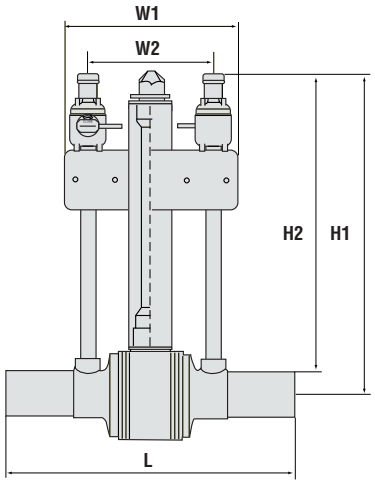
INNOVATIVE OPTIONS PROVIDE ADDITIONAL VALUE AND COST SAVING OPPORTUNITIES

- PERMANENT HEAD EXTENSIONS (Factory fused)
- INTERGRATED PURGE-PORT/VALVES: Ideal for purge and bypass applications

STEM EXTENSION TYPE VALVES

1PS TYPE VALVES

2PS TYPE VALVES



DIMENSIONS OF 2PS VALVE

IPS VALVE SIZES AND DIMENSIONS (APPROX.)

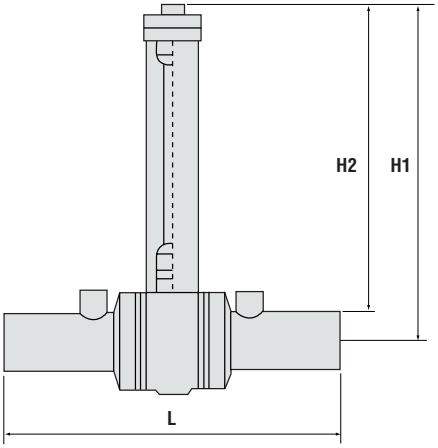
NOMINAL VALVE SIZE	L	H1	H2	W1	W2	Port	CV	Weight lbs. kg		
								NPS	1PS	2PS
2 IPS	25.98	28.74	27.56	14.80	9.84	Full	164	11.68	19.00	21.91
	660mm	730mm	700mm	376mm	250mm			5.3 kg	8.62 kg	9.94 kg
3 IPS	25.98	30.28	28.50	14.80	9.84	Full	375	16.76	21.65	24.56
	660mm	769mm	724mm	376mm	250mm			7.6 kg	9.82 kg	11.14 kg
4 IPS	25.98	30.28	27.95	14.80	9.84	Std	407	17.86	22.71	25.57
	660mm	769mm	710mm	376mm	250mm			8.1 kg	10.3 kg	11.6 kg
4 IPS	28.74	31.85	29.53	17.56	12.60	Full	591	26.01	30.91	33.82
	730mm	809mm	750mm	446mm	320mm			11.8 kg	14.02 kg	15.34 kg
6 IPS	28.74	31.85	28.70	17.56	12.60	Std	854	30.64	35.49	38.47
	730mm	809mm	729mm	446mm	320mm			13.9 kg	16.1 kg	17.45 kg
6 IPS	31.89	33.74	30.51	20.24	15.35	Full	1280	51.37	56.53	59.66
	810mm	857mm	775mm	514mm	390mm			23.3 kg	25.64 kg	27.06 kg
8 IPS	33.46	38.07	33.70	22.76	17.72	Full	2146	105.38	110.54	113.67
	850mm	967mm	856mm	578mm	450mm			47.8 kg	50.14 kg	51.56 kg
10 IPS	31.89	38.07	32.56	22.76	17.72	Full	3074	110.45	77.69	120.50
	810mm	967mm	827mm	578mm	450mm			50.1 kg	35.24 kg	54.66 kg
12 IPS	32.28	38.07	31.85	22.76	17.72	Std	3646	114.20	121.12	124.25
	820mm	967mm	809mm	578mm	450mm			51.8 kg	54.94 kg	56.36 kg
14 IPS	38.58	40.98	33.70	28.90	23.62	Full	5736	259.93	263.03	271.06
	980mm	1041mm	856mm	734mm	600mm			117.9 kg	119.31 kg	122.95 kg
16 IPS	38.58	40.98	32.72	28.90	23.62	Full	6559	268.74	271.85	279.88
	980mm	1041mm	831mm	734mm	600mm			121.9 kg	123.31 kg	126.95 kg

GEAR ACTUATION

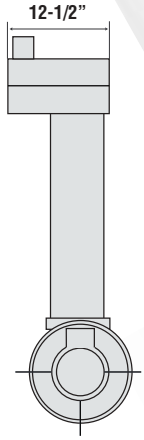
AVAILABLE IN BOTH MDPE & HDPE MATERIALS

2PS GEAR VALVES

NPS GEAR VALVES



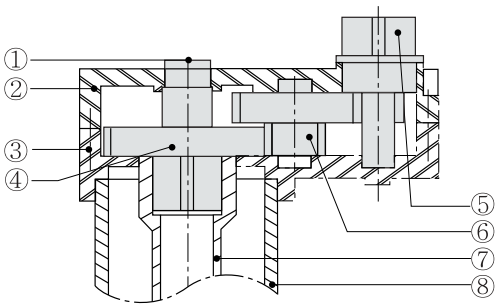
DIMENSIONS OF GEAR VALVE



SIDE VIEW OF GEAR

IPS VALVE SIZES AND DIMENSIONS (APPROX.)

NOMINAL VALVE SIZE	L	H1	H2	Port	CV	Weight lbs. kg		
						NPS	1PS	2PS
6 IPS	30.31	34.72	31.18	Full	1280	62.61	67.77	70.90
	770mm	882mm	792mm			28.4 kg	30.74 kg	32.16 kg
8 IPS	22.83	40.59	36.34	Full	2146	113.98	119.14	122.27
	580mm	1031mm	923mm			51.7 kg	54.04 kg	55.46 kg
10 IPS	31.89	40.59	35.35	Full	3074	119.05	125.97	129.10
	810mm	1031mm	898mm			54 kg	57.14 kg	58.56 kg
12 IPS	38.58	41.97	35.47	Std	3646	265.88	273.90	276.99
	980mm	1066mm	901mm			120.6 kg	124.24 kg	125.64 kg
14 IPS	38.58	41.97	34.68	Full	5736	268.08	276.55	279.63
	980mm	1066mm	881mm			121.6 kg	125.44 kg	126.84 kg
16 IPS	38.58	41.97	33.70	Full	6559	277.34	285.37	288.45
	980mm	1066mm	856mm			125.8 kg	129.44 kg	130.84 kg



STRUCTURE & MATERIAL

No	Component	Material
1	Sub Stem Gear Cap	Acetal
2	Housing Top	PE
3	Housing Bottom	PE
4	Sub Stem Gear	6/6 Nylon+Brass
5	Handle Gear	6/6 Nylon+Brass
6	Middle Gear	6/6 Nylon+Brass
7	Sub Stem	Acetal
8	Protection Tube	PE

GEAR INFORMATION

Item	Description
Gear Ratio	9:1
Operator (Nut)	2" Square

SUMMARY OF VALIDATION TESTING

Each valve is designed in accordance with ASME B16.40, the Code of Federal Regulations, Part 192 and other international standards. Lyall, Polytec, and third party labs conducted testing under these specifications as well as other supplemental tests, as follows:

Shell Test:

Each valve is tested at both 4 and 150 psi to verify the pressure boundary integrity of the valve shell.

All valves passed this test.

Seat Test:

Each valve seat (since the Lyall-Polytec valve is a bi-directional valve, both seats are tested) is tested at 4 and 150 psi to verify the pressure containing ability of the valve closure element and seat seals.

All valves passed this test.

Pressure Boundary Verification:

This test is designed to verify the basic pressure boundary integrity of the valve shell. ASME B16.40 requires this test be performed at 74° F (23°C) and also at 100° F (38°C) for 1,000 hours. See supplemental testing for additional testing completed that exceeds the minimum requirements.

All valves passed this test.

Closure Verification:

This test is designed to verify the structural integrity and pressure retention capability of the valve closure element (ball). The valve is closed and the inlet pressurized for a minimum of 1000 hours at 100° F. The outlet is open to atmosphere.

All valves passed this test.

Temperature Resistance:

This test is designed to verify the valve will perform properly over the temperature range from -20° F to 100° F. The valve is first cooled to -20° F, operated against a differential pressure equal to the design pressure, and subjected to shell and seat leakage tests while at -20° F. The valve temperature is then raised to 100° F and the above process repeated. In addition to operating properly and not leaking, the valve operating torque must not exceed specified limits at both temperature extremes.

All valves passed this test.

Operating Test:

This test is designed to verify the valve will not be damaged or leak after being operated ten times with a differential pressure equal to the design pressure applied across the valve as it is opened. After the ten cycles of operation, each valve is shell and seat tested.

All valves passed this test.

Flow Test:

This test is performed to verify each valve design has at least the specified minimum flow capacity (Cv) in accordance with ASME B16.40.

All valves passed this test.

Note: **Cv** values presented within this document are the typical values of Lyall-Polytec valves and are based on the mathematical equation set forth by ASME B16.40. All Lyall-Polytec valves far exceed the minimum requirement set forth by ASME B16.40. Please contact your Lyall-Polytec representative for more data on the physical testing that was performed.

SUPPLEMENTAL TESTING

In addition to ASME B16.40 Qualification requirements, the following tests were conducted to ensure that the product performance exceeds our customer's requirements.

Sustained Pressure Verification

Testing was conducted at 670 psi Hoop and at temperature of 176° F for a minimum of 1000 hours.

Note: The normal time for this test under these conditions is 170 hours.

All valves passed this test.

Impact Test:

Each valve was subjected to impact testing at temperatures of 0° and 100° F. A 20 pound weight with a special TUP was dropped from a height of 3 feet on the valve actuator, a total of five times. This test was performed at both temperatures. The valve must continue to operate properly and pass the basic valve shell and seat tests after the impacts.

All valves passed this test.

Tensile Test:

Each valve was subjected to a tensile test at loads which would create in the attached pipe either 25% elongation or elongation equal to that caused by the thermal expansion due to 100° F temperature change. The valve must remain operable and not leak during or after this test.

All valves passed this test.

Cycle Test:

Each valve was tested for 1000 cycles. The valves were opened each cycle against a 100 psig differential pressure. At the conclusion, each valve must pass the basic shell and seat tests.

All valves passed this test.

Blowdown Test:

Each valve was subjected to a blowdown test. The intent is to verify the valve will operate properly and the seats will not be damaged during this high-energy release. The valve was installed in a pipeline with a significant reservoir of pressurized air stored upstream. The downstream was open to atmosphere. The upstream reservoir of air was pressurized to 100 psi and the valve opened against this full differential. The reservoir of air blew through the valve. At the conclusion, each valve must pass the basic shell and seat tests.

All valves passed this test.

Please contact your Lyall-Polytec representative for additional technical specifications, and test data.

APPLICATIONS

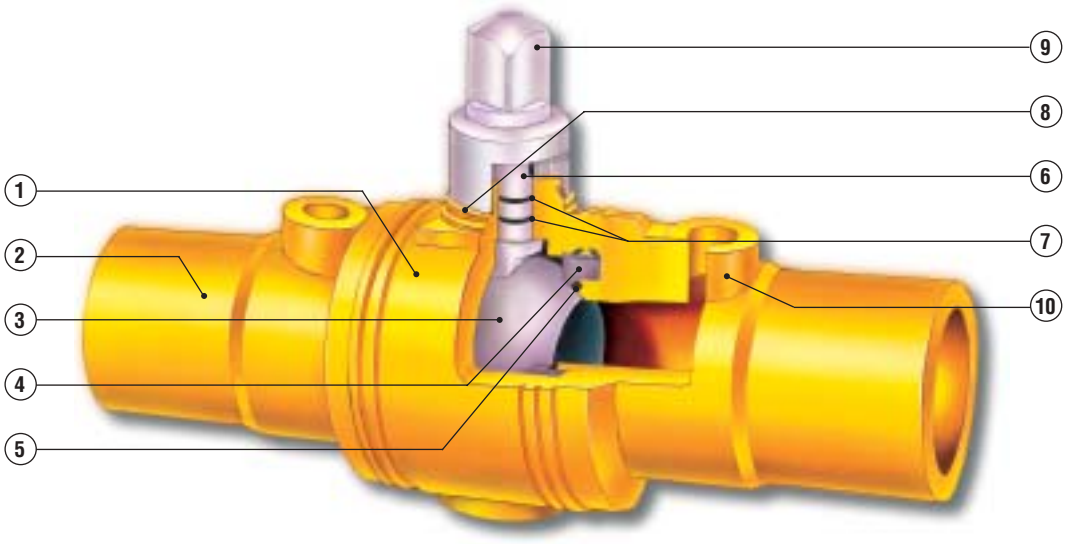
- UTILITIES
- MUNICIPALITIES
- RESIDENTIAL SERVICES
- SERVICE MAINS

WHERE EVER POLYETHYLENE SERVICES ARE INSTALLED

- NATURAL GAS
- PROPANE (LPG)
- WATER
- AGRICULTURE
- IRRIGATION
- SEWER

ISO CERTIFICATION

ISO 9001 Certified manufacturing facility ensures 100% inspection and adherence to rigid quality standards.



MATERIALS OF CONSTRUCTION

No	Component	Material	Operating Feature
1	Body	Polyethylene	PE 2406 (PE 80), PE 3408 (PE 100)
2	End	Polyethylene	PE 2406 (PE 80), PE 3408 (PE 100)
3	Ball	Acetal / Polypropylene*	Excellent Strength & Thermal Resistance
4	Retainer	Polypropylene	Positive Seal under any Condition, Retains Seat under High Differential Pressure
5	Ball Seat	Nitrile (HNBR)	Reliable Sealing from -20° F to 140° F
6	Stem	Acetal	Excellent Durability & Strength
7	Stem Seal	Nitrile (HNBR)	Redundant Sealing with Dual O-rings
8	Weather Seal	Nitrile (HNBR)	Protects from Ground Water and Dirt
9	Operator Nut	Polypropylene	2 inch (50mm) Square or Hexagon
10	Purge Connector	Polyethylene	Integral Easy Purge Connection

Note: *The Lyall-Polytec valve utilizes specially compounded Nitrile (HNBR) seals, unique in the industry. HNBR = Hydrogenated Nitrile Rubber, known for its excellent high temperature performance, high tensile strength, as well as high resistance to fuels, oils, solvents, and ozone.*

** 2 IPS (RP) valves and smaller = Acetal 2 IPS (FP) valves and larger = Polypropylene*

GENERAL INFORMATION

Item	Operating Feature	
Sizes	All standard 1/2 through 1-1/4 CTS and 1/2 through 16 IPS sizes All standard 20mm through 400mm Metric sizes	
Designed/Tested	ASTM D 2513, ASME B16.40, CFR 49, Part 192, CSA B137.4	
Materials	Medium Density PE 2406	High Density PE 3408
Operating Pressure (SDR 11)	PE 2406: 80 psi	PE 3408: 100 psi
Temperature	From -20° F to 140° F (-29° C to 60° C)	From -20° F to 140° F (-29° C to 60° C)
Bore	Standard (Reduced) Port & Full Port	
Pipe Connection	Butt Fusion, Socket Fusion, Electrofusion or LYCOFIT® Mechanical Fittings (up to 2 IPS)	
Operation	90 Degree Operating Standard (360 ° Optional)	
Valve Boxes	Lyall-Polytec Valves are supported by all the leading Valve Box Manufacturers	

LYALL-POLYTEC

POLYETHYLENE BALL VALVES FOR GAS APPLICATIONS

- Meets or exceeds ASTM D 2513, ASME B16.40, **CFR 49**, **PART 192**, and **CSA B137.4**
- ISO 9001 certified manufacturing facility
- Serialized for complete material and process traceability
- Unresticted flow and maximum capacity for optimal performance
- Service rated to maximum allowable pressures
- Operating temperature range of -20° F to 140° F
- Precision manufacturing processes ensure lower operating torque
- Bubble-tight seal throughout entire pressure and temperature range
- Specially compounded nitrile seals (HNBR) exceed industry standards
- Valve body design provides resistance to mechanical and thermal loads making it the strongest part of the PE Piping System
- **10-Year Warranty**

Your Authorized Lyall-Polytec Distributor:

R.W. LYALL & COMPANY, INC.

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RWL Doc# LIT-BVGASDS-1B