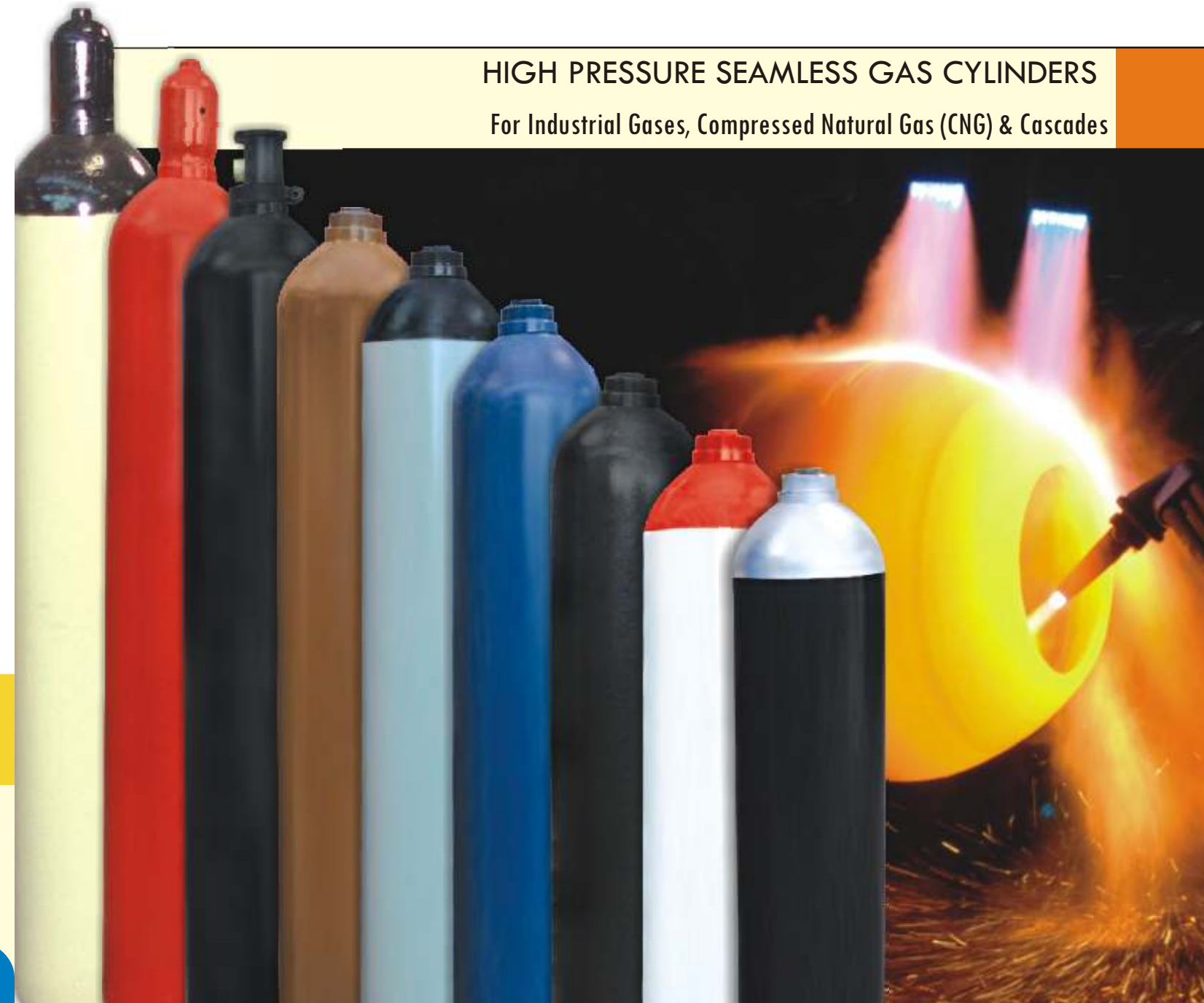




**MARUTTI** Koatsu Cylinders Ltd.

HIGH PRESSURE SEAMLESS GAS CYLINDERS  
For Industrial Gases, Compressed Natural Gas (CNG) & Cascades



**MARUTTI** Koatsu Cylinders Ltd.

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# COMPANY



**MARUTI KOATSU CYLINDERS LIMITED** pioneered the development of large capacity high pressure gas cylinders in the country. Starting commercial production on November 6, 1986 at its plant in Halol (near Vadodara) in Gujarat, Maruti is committed to production of high quality cylinders to meet the most rigorous service conditions of the gas industry (industrial gases, CNG and cascades).

Due to our emphasis on stringent quality control and use of modern equipment, we have perfected the art of manufacturing cylinders for various demanding applications.

We give top priority to customer satisfaction by providing quality products, which meet stringent national and international standards and prompt after sales service. Our products are supplied both in the domestic as well as international markets.

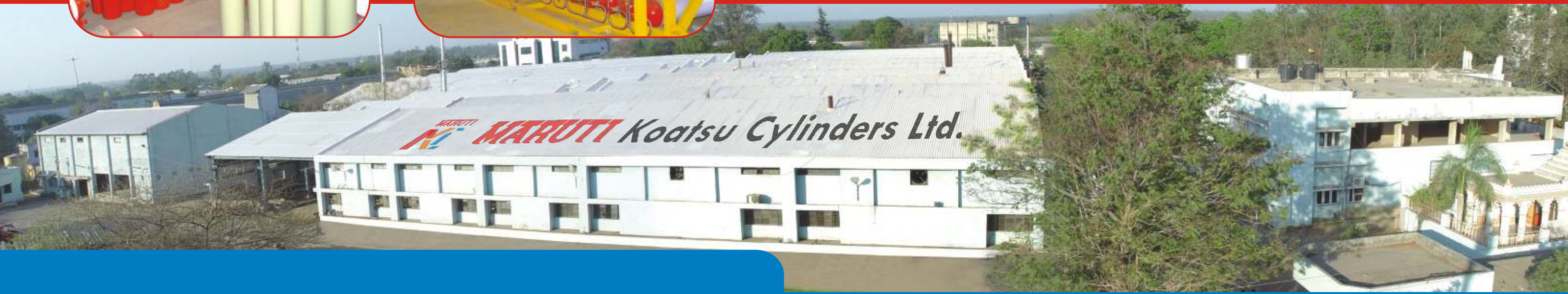
Our cylinders are used for storage of compressed gases at pressures ranging from 150 Bar to 400 Bar with outside diameters ranging from 108 mm to 356 mm. The applications include industrial, medical and high purity gases, fire extinguishers and beverage dispensing cylinders.

With the introduction of natural gas as automotive fuel, we also manufacture CNG cylinders both for ON-BOARD use (W.P. 200bar) and cascades (no. of cylinders manifolded & basketed together) required for dispensing stations (W.P.250 bar and above).



# QUALITY

Our cylinders conform to national standards IS 7285 ( Part I):2004, IS 7285 ( Part II ) :2004 and IS 15490:2004 and international standards ISO 9809-1, ISO 9809-2, ISO 11439:2000 (CNG-1), NZS 5454, BS 5045 (part I), DOT 3AA, EN1964 etc. Each batch of cylinders is certified by third party inspection agency like BIS, BV, TUV, SGS etc.



# MATERIALS



## CHEMICAL COMPOSITION

Material		C-Manganese Steel	C-Manganese	Chromium Molybdenum Steel
Ref. No.		(1)	(2)	(3)
Chemical Composition	C	0.45 (max)	0.38 (max)	0.25~0.38
	Si	0.10~0.35	0.10~0.35	0.1~0.4
	Mn	1.20~1.70	1.35~1.70	0.4~0.90
	P	0.02 (max)	0.02 (max)	0.02 (max)
	S	0.02 (max)	-	0.02 (max)
	S+P	0.03 (max)	-	0.03 (max)
	Ni	0.02 (max)	-	0.02 (max)
	Cr	0.02 (max)	-	0.80~1.20
	Mo	-	-	0.15~0.35

## MECHANICAL PROPERTIES

Material		C-Manganese Steel	C-Manganese	Chromium Molybdenum Steel
Ref. No.		(1)	(2)	(3)
Heat Treatment		Normalizing	Oil Quenching and Tempering	Oil Quenching and Tempering
Mechanical Properties	Tensile Strength (Kgf/mm <sup>2</sup> )	70 (Min)	76 (Min)	94 (Min)
	Yield Point (Kgf/mm <sup>2</sup> )	48 (Min)	56 (Min)	80 (Min)
	Elongation (GL 50mm)(%)	18 (Min)	15 (Min)	15 (Min)
	Remark	IS:7285 (Part-I)	IS:7285 (Part-II)	IS:7285 (Part-II) IS:15490:2004

## TOLERANCES

Description	Tolerances	
Water Capacity	Less than 20 liters	+10%, -0 (max 1 liter)
	More than 20 liters	+5%, -0 or ±2.5% (NGV Cylinder)
Outside Diameter	+1%	
Minimum Wall Thickness	+30%, -0	
Length	± 1%	
Tare Weight	± 10%	



## MANUFACTURING STANDARDS

### Export :

High Pressure Seamless Gas Cylinders are manufactured in accordance with following international standards.

1. ISO:9809-1 and ISO:11439:2000(CNG-I) of International Standards Organisation (ISO)
2. NZS 5454 (New Zealand Standard)
3. BS 5045 Part 1 (British Standard)
4. DOT 3 AA (Department of Transport)
5. DIN (Deutsche Industrie Normen)

The manufactured cylinders are certified by Illrd party inspection agency like BV, TUV, SGS etc. as required by the buyer. We can also supply to other international standard as required by the buyer.

### Domestic:

High Pressure Seamless Gas Cylinders are manufactured in accordance with IS 7285(Part-I): 2004, IS 7285 (Part-2):2004 and IS 15490:2004 under inspection of Bureau of Indian Standards (BIS) which ensures implementation of these standards and also conformance to Gas Cylinder Rules, 2004 of Government of India.



## TESTS AND INSPECTIONS

Maruti gas cylinders undergo regular tests and inspections, as well as rigid quality control under the company's own quality control system designed to ensure qualitative control system and to ensure qualitative excellence.

The tests and inspections listed below are conducted for all materials, from mother tubes to finished gas cylinders.



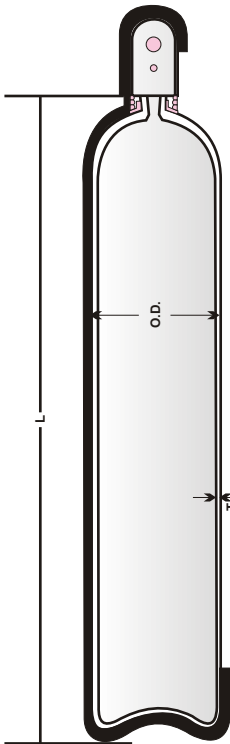
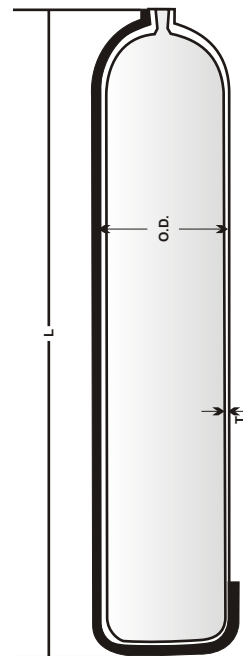
Tests and inspections		Remarks
Inspection of Mother Tube	Check Analysis	Periodic
	Outside, inside surface inspection	Each pipe
In-Process Inspection and Tests	Dimensional Measurement	Each cut piece
	Bottom and Surface Inspection	Inside shot blasting after bottom forming
	Ultrasonic Flaw detection	Each Cylinder blank
	Hardness Test	For Cr-Mo Cylinder
	Thread Inspection	All Cr-Mo Cylinder
	Hydrostatic Test	Each Cylinder
	Pressure Cycling Test & Hydraulic Bursting Test	Water Jacket system
	Weighing and Volume Measuring	Batch Test for CNG on-board storage cylinders
	Leakage Test	Capacity determination
	Flattening Test / Bend Test	Pneumatic
Final Inspection	Mechanical Tests (tensile and impact)	Batch Test
	Inspection of Marking, threading & painting	Batch Test
	Final Inspection	Company's quality control department. Illrd Party Inspecting Agency



# SEAMLESS STEEL CYLINDERS

Manufactured as per National / International Standard Automotive CNG Cylinder

Max Working Pressure at 15°C	Test Pressure	Water Capacity (Ltr)	Outside Diameter (O.D) mm	Minimum Wall Thickness (T) (mm)	Length (Approx) (L) (mm)	Weight (Approx) Without Valve & cap (Kg)		
204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	20	232	5.3	660	24.3		
		21	232	5.3	685	25.3		
		22	232	5.3	710	26.3		
		25	232	5.3	785	29.2		
		28	232	5.3	880	32.0		
		30	232	5.3	920	34.0		
		35	232	5.3	1050	38.8		
		40	232	5.3	1180	43.6		
		45	232	5.3	1310	48.4		
		50	232	5.3	1445	53.2		
204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	55	232	5.3	1590	57.9		
		60	232	5.3	1725	62.7		
		30	267	6.0	760	38.4		
		35	267	6.0	860	43.5		
		40	267	6.0	960	48.5		
		45	267	6.0	1060	53.6		
		50	267	6.0	1165	58.6		
		55	267	6.0	1265	63.7		
		60	267	6.0	1365	68.7		
		65	267	6.0	1465	73.8		
204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	70	267	6.0	1565	78.8		
		75	267	6.0	1665	83.9		
		80	267	6.0	1765	88.9		
		40	325	7.3	705	46.3		
		45	325	7.3	770	50.6		
		50	325	7.3	840	54.9		
		55	325	7.3	905	59.1		
		60	325	7.3	970	63.4		
		65	325	7.3	1040	67.7		
		204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	70	325	7.3	1105	71.9
75	325			7.3	1170	76.2		
80	325			7.3	1240	80.5		
85	325			7.3	1305	84.8		
90	325			7.3	1370	89.0		
95	325			7.3	1440	93.3		
100	325			7.3	1505	97.6		
110	325			7.3	1640	106.1		
204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>			50	356	7.5	730	54.7
				55	356	7.5	790	58.7
		57	356	7.5	810	60.3		
		60	356	7.5	845	62.7		
		65	356	7.5	900	66.6		
		70	356	7.5	955	70.6		
		75	356	7.5	1010	74.6		
		204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	77	356	7.5	1030	76.2
				80	356	7.5	1065	78.6
				85	356	7.5	1120	82.6
90	356			7.5	1175	86.6		
95	356			7.5	1230	90.5		
100	356			7.5	1290	94.5		
204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	110	356	7.5	1400	102.5		
		120	356	7.5	1510	110.5		



		60	406	8.6	710	70.0
		70	406	8.6	795	78.0
		80	406	8.6	880	86.0
		90	406	8.6	965	94.0
204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	97	406	8.6	1025	100.0
		100	406	8.6	1050	102.0
		101	406	8.6	1060	103.0
		110	406	8.6	1135	110.0
		112	406	8.6	1150	111.0
		120	406	8.6	1220	118.0
		130	406	8.6	1305	126.0
		140	406	8.6	1390	134.0

Manufactured as per National / International Std. (Industrial Gas Cylinders)

Max Working Pressure at 15°C	Test Pressure	Water Capacity (Ltr)	Outside Diameter (O.D) mm	Minimum Wall Thickness (T) (mm)	Length (Approx) (L) (mm)	Weight (Approx) Without Valve & cap (Kg)		
		1.8	108	4.0	315	4.5		
		3.0	108	4.0	475	6.5		
		5.0	108	4.0	740	10.0		
		4.8	139.8	4.2	450	9.0		
		6.8	139.8	4.2	595	10.5		
150 Kgf/cm <sup>2</sup>	250 Kgf/cm <sup>2</sup>	9.0	139.8	4.2	765	13.2		
		10.2	139.8	4.2	855	15.5		
		14.0	139.8	4.2	1140	20.0		
		27.0	232	5.4	845	35.0		
		34.0	232	5.4	1030	42.0		
150 Kgf/cm <sup>2</sup>	250 Kgf/cm <sup>2</sup>	40.2	232	5.4	1200	48.0		
		43.3	232	5.4	1280	50.0		
		46.7	232	5.4	1370	52.0		
		54.0	232	5.4	1570	60.0		
		68.0	267	6.3	1515	76.5		
		80.0	267	6.3	1755	87.5		
		21	232	5.3	675	31.0		
		22	232	5.3	700	32.5		
		25	232	5.3	780	35.0		
		30	232	5.3	920	40.0		
		40	232	5.3	1195	50.0		
		45	232	5.3	1330	55.0		
		204 Kgf/cm <sup>2</sup>	340 Kgf/cm <sup>2</sup>	50	232	5.3	1465	60.0
				35	267	6.0	825	40.0
				40	267	6.0	920	44.0
45	267			6.0	1020	49.0		
50	267			6.0	1120	53.0		
		60	267	6.0	1320	62.0		
		80	267	6.0	1720	80.0		
		50	232	7.0	1515	75.0		
		260 Kgf/cm <sup>2</sup>	435 Kgf/cm <sup>2</sup>	60	232	7.0	1790	87.0
				75	267	7.5	1700	99.0
80	267			7.5	1800	105.0		
400 Kgf/cm <sup>2</sup>	667 Kgf/cm <sup>2</sup>	40	232	10.0	1310	92.0		
		45	232	10.0	1455	101.0		

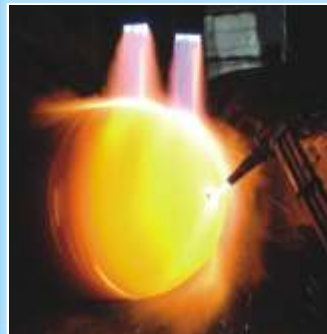
The Wall Thickness Shall Vary as per standard.  
Length & Weight are approximate & liable to change as per standard.

# MANUFACTURING PROCESS

Quality receives topmost attention at Maruti Koatsu Cylinders starting with the inspection of incoming raw materials to the final inspection of the finished product.



CUT PIPES



DOMING



NECKING



BOTTOM PRESSING



HEAT TREATMENT



NECK THREADING ON CNC M/C

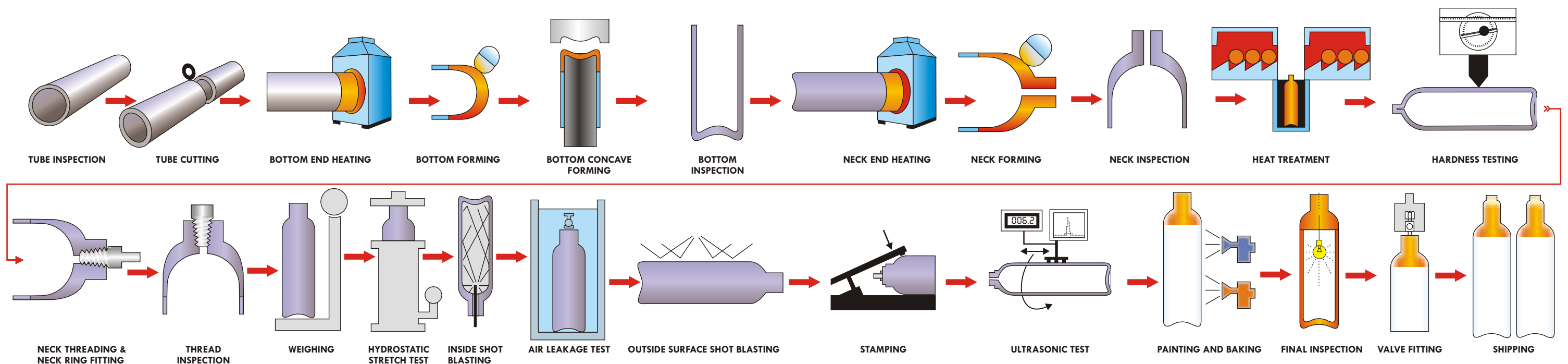


STAMPING



PAINTING BOOTH

NO COMPROMISE ON QUALITY & SAFETY





## CYLINDER ACCESSORIES & CASCADES

### CYLINDER VALVE INLET CONNECTIONS

Type		Major diameter in (mm.)	Taper	Number of threads per inch	Thread form	Length threads in in (mm.)	Specification
India & U.K.	0.715"	20.142	1:8 on dia	14	Whitworth, normal to cone surface	22.2	IS:3224-2002 (BS:431)
	1"	27.788	1:8 on dia	14		25.4	IS:3224-2002 (BS:431)
	1.25"	34.925	1:8 on dia	11		31.75	IS:3224-2002 (BS:431)
U.S.A.	1/2"-14NGT	21.222	1:16 on dia	14	NGT (60°), normal to cone axis	17.2	ANSI-B-57.1
	3/4"-14NGT	26.568	1:16 on dia	14		24	ANSI-B-57.1
	1"-11½NGT	33.226	1:16 on dia	11½		21.2	ANSI-B-57.1
Germany	19.8 mm.	19.2	3:25 on dia	14	Whitworth normal to cone surface	17	DIN 477
	28.8mm.	27.8	3:25 on dia	14		22	DIN 477
	31.3 mm.	30.3	3:25 on dia	14		22	DIN 477
Japan	small	20.000	3:26 on dia	14	Whitworth(55°) Round thread normal to cone surface,	20	JIS-B-8246
	Standard	28.00	3:26 on dia	14		28	JIS-B-8246
	Acetylene	39.000	3:26 on dia	12		26	JIS-B-8246

### NECK RING

Type	Diameter D mm.	Diameter D inches	Number of threads per inch	Length of thread L mm.	Material
Riveted	80	3.150	11	20	M.S./S.G. Iron

On request stamped neck rings with customers' name can be provided.



### IDENTIFICATION COLOURS FOR CYLINDERS

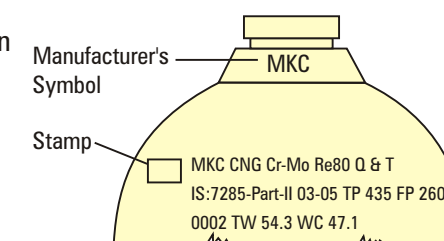
In India identification colours are as follows.

NAME OF GAS	Oxygen	Hydrogen	Argon	Nitrogen	Carbon Dioxide	Helium	Medical Oxygen	Nitrous Oxide	CNG
COLOUR	Black	Signal Red	Peacock Blue	French Grey & Black	Black & Silver	Middle Brown	Black & White	French Blue	White and Signal red

### MARKING

As per manufacturing standard permanent markings are stamped clearly on thicker portion of cylinders shoulder as shown in the following example.

MKC	Manufacturer's Symbol
CNG	Chemical symbol of gas
Cr-Mo.	Symbol of material
Re 80	Yield strength (80 kgf/mm <sup>2</sup> )
Q&T	Symbol of heat treatment
IS:7285-Part-II	Standard to which cylinders are manufactured
03-05	Month & year of testing
T.P.	Test pressure (kgf/cm <sup>2</sup> )
F.P.	Filling pressure (kgf/cm <sup>2</sup> ) at 15°C
0002	Serial no. of cylinder
TW	Tare weight of cyl. (kg.)
WC	Water Capacity (lit)



Conversion Unit	
1 mm.	= 0.03937 in
1 kg.	= 2.20642 lb
1 lit.	= 61.0238 in <sup>3</sup>
1 m <sup>3</sup>	= 35.3147 ft <sup>3</sup>
1 kg/cm <sup>0</sup>	= 14.223 psi
1 kg/cm <sup>2</sup>	= 0.98066 bar
1 kgf/cm <sup>2</sup>	= 98.0665 kPa
1 bar	= 100 kPa