

Cylinder Bore Tubes For Shock Absorber & Gas Springs.

Introduction

Steel tubes are used as cylinder in shock absorbers and gas springs in automotive industries and in various other applications.

Important requirements of tubes used in such applications are

- Close tolerance in I.D
- Extremely good finish in ID
- Controlled ID ovality & concentricity
- Ability to withstand the required pressure.
- Ability to withstand slight forming as required by the design of the shock absorber.
- ID free from any deep line marks.

Wall thickness of these tubes are generally in the range of 1.0 mm to 1.3 mm with varying OD (Outer Diameter).

DOM (Drawn Over Mandrel) Electric Resistance Welded tubes are preferred due to its ability to produce such thin wall tubes with consistent quality and also economically.



Process Development at TI

After series of experimentation and process qualification studies, TI has successfully developed DOM process for producing cylinder bore tubes used in shock absorber and gas spring application.

Draw tool design, lubrication process and DOM process design were developed to get consistent dimensional tolerance and ID finish over large batches of production.

Several size ranges are produced for various designs of shock absorbers.

Typical sizes with dimensional tolerances, chemical composition, ID surface finish, and mechanical properties that are achieved are tabulated in Table-1

Process Control

Certification of TI quality systems in conformance to QS 9000 standards enables TI to exercise stringent process control at every step of the manufacturing process.

Statistical Process Control is followed during drawing process for all key product characteristics to ensure that the close tolerances are achieved consistently with preventive steps taken at every critical process step.

Proper tooling management with carefully controlled lubrication process enabled in getting superior ID finish consistently with narrow dimensional spread.

Tubes are subjected to 100% eddy current testing at final stage. Proper care is taken in packaging to make sure that the tube reaches to customer without any dents and damages.

Table-1 – Typical sizes of cylinder bore tubes that are produced with properties.

Sl. No	Tube size (OD X ID) mm	Tolerance on O.D (mm)	Tolerance on I.D (mm)	ID ovality (mm) max.,	ID Finish (max.,)	Material	Tensile Strength (kg/mm ²)	Yield strength (kg/mm ²)	Elongation (%)
1	15 X 13	-0/+0.16	-0/+0.05	0.03	0.5Ra	DIN St 42	46-59	-	8 min.,
2	18 X 16	+/-0.10	-0/+0.05	0.03	3.2 RZ	SAE 1010	40 min.,	-	5 min.,
3	18.5 X 16.00	-0/+0.16	-0/+0.05	0.03	0.5Ra	DIN St 42	46-59	-	8 min.,
4	22 X 19	-0/+0.16	-0/+0.05	0.03	0.5Ra	DIN St 42	46-59	-	8 min.,
5	22 X 20	+/-0.1	-0/+0.05	0.03	0.5Ra	SAE 1010	48 min.,	36 min.,	-
6	24 X 22	+/-0.1	-0/+0.06	0.03	0.5Ra	SAE 1010	38 min.,	25 min.,	-
7	27 X 25	+/-0.1	-0/+0.06	0.03	3.2RZ	SAE 1010	38 min.,	25 min.,	-
8	28 X 24	+/-0.1	-0/+0.05	0.03	0.5Ra	SAE 1020	50 min.,	45 min.,	-
9	32.60 X 30.20	+/-0.10	-0/+0.06	0.03	3.2 RZ	SAE 1010	35 min.,	-	5 min.,
10	32.40 X 30.00	+/-0.10	-0/+0.052	0.03	3.2 RZ	SAE 1010	48 min.,	36 min.,	5 min.,

Note: • SAE 1010 , SAE 1020, DIN ST 37.2, DIN St 52.3 , JIS STKM 11,12 ,13 and any other equivalent customer specific materials can be supplied .

• These are some typical sizes. Other sizes of customer specific requirements can also be offered.

Why TII

- Customer focus
- Short Lead Time/ small batch flexibility
- Wide Range of Products
- World class quality

1 million dollar sales to Malaysian Automobile ancillary manufacturers

Other Applications

- Front Fork (2 wheeler)
- Drive Shaft
- Steering column
- Hydraulic cylinder
- Side Impact tube



INDIA

TII Precision Steel Tubes- Global Standards, Engineered Solutions



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