

SSID Tubing for Hydraulic Cylinder – Mirror tube

Introduction

ERW- DOM (Electric Resistance Welded-Drawn Over Mandrel) tubes become preferred choice for various applications which include automotive, farm machinery, truck and home appliances. The ERW- DOM tubes are preferred due to its higher strength with precise dimensional tolerances.

Definition

ASTM- A513- Standard addresses Type-6 as one of the types of the tube. Type-6 is classified as SSID (Special Smooth Inside Diameter) tubes normally used for cylinder applications. The standard specifies certain micro finish on ID to facilitate usage of these category tubes as cylinder with or without additional processes in the DOM tubes. Requirement of additional processes like honing, ball burnishing etc., is decided based on the ability and the consistency of the DOM tubes to meet ID finish and close dimensional tolerances on ID for the intended application.

Process Development at TI

TI-India has developed a special process to produce extremely smooth ID finish tubes with very close tolerance on I.D. These tubes are used in hydraulic cylinder application. This development work resulted in **Mirror Tube** whose I.D finish and the I.D tolerance are similar to that obtained in a conventional honing process thus avoiding or minimizing the costly honing process normally followed for such application.

Application

Thick walled tubes are used for hydraulic cylinder application. These cylinders are used in variety of equipments like earth movers, agricultural equipment, and lifting application. The application requires a smooth finish and close tolerance on ID for the piston to freely move inside the cylinder tube for a number of repeated strokes under severe operating conditions.

Product Characteristics

TI uses high strength material for SSID tubes for Hydraulic Cylinder Applications. The chemistry is controlled to narrower band than that specified in standard specification to get consistent mechanical properties. The tooling and process are so designed that in “as drawn” condition the ID tolerance conforms to H9 tolerance with ID finish less than 0.5 Ra.



Such closer tolerance and superior finish on ID enable the customer to use the tube directly without additional or reduced operating cost to improve surface finish.

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 to ensure that the tolerances are achieved consistently with preventive steps taken at every critical process step.

Table- 1- Size ranges and Dimensional tolerance with I.D Finish of SSID- Mirror tubes.

Size (O.D X ID) mm	O.D Tolerance (mm)	I.D Tolerance (mm)	I.D Ovality (mm max.,)	Eccentricity (mm max.,)	I.D Finish (Ra max.,)
40 X 30	+/- 0.20	-0/+0.052	0.03	0.2	0.5
50 X 40	+/- 0.20	-0/+0.062	0.03	0.2	0.5
60 X 50	+/- 0.20	-0/+0.062	0.03	0.2	0.5
70 X 60	+/- 0.20	-0/+0.074	0.04	0.2	0.5
80 X 70	+/- 0.20	-0/+0.074	0.04	0.2	0.5

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

Chemical Composition

%C	%Mn	%Si	%S	%P	%Al
0.22 max.,	1.60 max.,	0.55 max.,	0.025 max.,	0.025 max.,	0.02 min.,

Other standard grades

- SAE 1020
- SAE 1026

Mechanical Properties

UTS (N/mm2)	% Elongation
640 min.,	8 min.,

**Go For Mirror tube
Reduce Honing Cost**

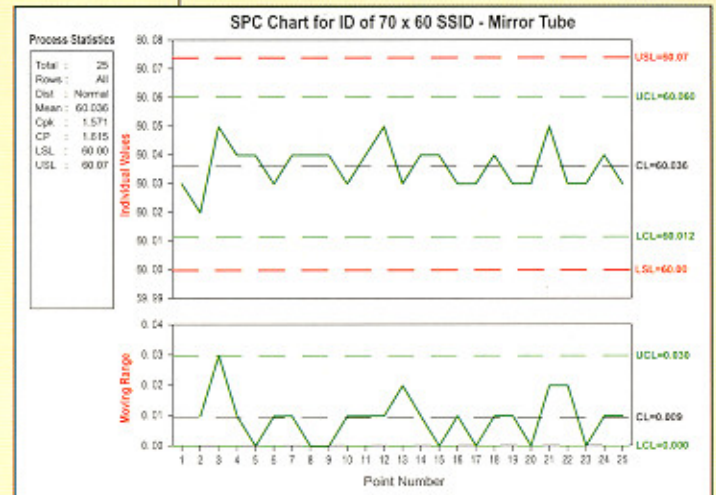
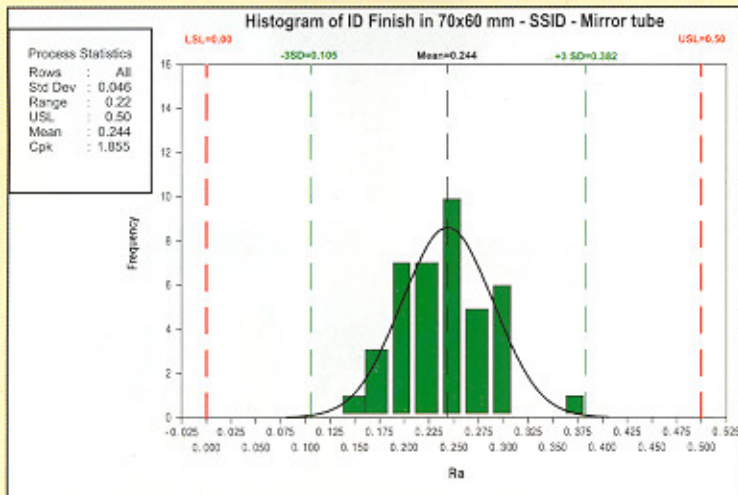
Customer Satisfaction

Process design by CFT (Cross Functional Team), Control of Process at each stage of the manufacturing step and total commitment to Continuous Improvement philosophy are the key factors considered for each application.

DOM tubes are supplied to all major automobile manufacturers in India and to other overseas customers conforming to various international standards.

Close interaction with the customer right at the process design stage helped in better understanding of the product thus developing value engineered tubes to full satisfaction of the customer.

With such a background TPI should be your choice for a reliable supplier.



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
- Shock absorber
- Side Impact tube



TII Precision Steel Tubes- Global Standards, Engineered Solutions



TUBE INVESTMENTS OF INDIA
 UNIT: TUBE PRODUCTS OF INDIA- EXPORTS DIVISION
 AVADI- CHENNAI- INDIA- 600054
 TEL: 91-44-6383099/323/212/244/338/339
 FAX: 91-44-6383110/6383211
 E MAIL: sales@tubeproductsofindia.com
 Web Site: www.tubeproductsofindia.com

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