

BUREAU OF INDIAN STANDARDS
(Southern Regional Office)

Our Ref: 60/CM 1

6 Dec 2013

Subject: Preparation & Review of Product Manuals for Product Certification

This has reference to CMD-I's circular CMD-1/31 dated 11 Nov 2013 on the above subject.

In this connection, the draft Product Manual in respect of IS 3601 allotted to SRO has been prepared. The same is attached herewith for hosting on the BIS Intranet for inviting suggestions and comments for a period of 15 days.

The comments may be sent to SRO/ HBO.

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**MANUAL FOR CERTIFICATION OF STEEL TUBES FOR
MECHANICAL AND GENERAL ENGINEERING PURPOSES**

For BIS use only

**DOC No.CMD-III/3601 MANUAL
DATE OF ISSUE:- 29.11.2013**

**MANUAL FOR CERTIFICATION OF STEEL
TUBES FOR MECHANICAL AND GENERAL
ENGINEERING PURPOSES**

IS 3601:2006

FIRST ISSUE



**BUREAU OF INDIAN STANDARDS
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NEW DELHI – 110 002**

Prepared by HBO

MANUAL FOR CERTIFICATION OF STEEL TUBES FOR MECHANICAL AND GENERAL ENGINEERING PURPOSES

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MANUAL FOR CERTIFICATION OF STEEL TUBES

[IS 3601]

FIRST ISSUE

FORWARD

The present manual attempts in highlighting requirements of various products relating to steel tubes thereof for providing handy and significant information related to relevant products. It elaborate principle manufacturing processes and desired controls, involved inspection and testing as need be practiced by BIS licencees and further monitoring thereof expected to be exercised by BIS Inspecting Officials (IO) during planned visits to those units and monitoring of BIS Certification Marks (CM) activities. Different tests as contained in relevant standards and referred standards thereof need be carried out at the licencees laboratory by the visiting officer with knowledge and background possessed by the individual. Since such IOs. come from different educational and technical background and may not be experienced or even having basic knowledge in the relevant field or product category, such documentation of scrotal manual aims in providing basic inputs and all essential aspects with the expectation of bringing uniformity of vision and enabling adoption of rational practices by concerned BIS officials during their visits for inspections to such sector as well as follow of actions.

THIS DOCUMENT IS INTENDED FOR INTERNAL USE BY BIS INSPECTING OFFICERS WHO SHOULD HOWEVER DO NOT TREAT SUCH DOCUMENT AS REPLACEMENT FOR REFERRED STANDARDS OR THAT OF RELEVANT SCHEME FOR TESTING AND INSPECTION (STI). STANDARDS AND OTHER DOCUMENTS (STI ETC.) REFERRED ARE AS APPLICABLE AT THE TIME OF PREPARATION OF MANUAL HOWEVER, LATEST STANDARDS/OTHER DOCUMENTS AS IMPLEMENTED SHALL BE REFERRED

**MANUAL FOR CERTIFICATION OF STEEL TUBES FOR
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Indian Standard

**STEEL TUBE'S FOR MECHANICAL AND GENERAL
ENGINEERING PURPOSES – SPECIFICATION
(Second Revision)**

IS 3601:2006

Pg No. 1-17

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**AMENDMENT NO.1 SEPTEMBER 2012
TO .
IS 3601 : 2006 STEEL TUBES FOR MECHANICAL AND
GENERAL ENGINEERING PURPOSES -
SPECIFICATION**

(Second Revision)

*(Page 3, clause 17.1, line 2) -Substitute 'high frequency induction
welded' for 'high frequency induction butt-welded' . –*

*(Page 8, Table 6, table heading) - Substitute 'HFIW or ERW Types' for
'HFW Types Only'.*

(MTD 19)

Reprography Unit, BIS, New Delhi, India

MANUAL FOR CERTIFICATION OF STEEL TUBES FOR MECHANICAL AND GENERAL ENGINEERING PURPOSES

SECTION – I

1.0 PRODUCTS AND SIGNIFICANT PROCESSES:

1.1 This document covers the carbon steels welded and seamless tubes given in Table 1 as well as sizes also recommended and does not cover steel tubes for pressure purposes and for structural purposes. Any other special requirements may be agreed to between purchaser and the manufacturer.

1.2 WELDING

a) In this process covers the requirements for hot finished welded steel tubes, electric resistance welded or high frequency induction butt-welded steel tubes and oxyacetylene welded tubes in as welded, welded and annealed/normalized condition.

b) In the other process covers hot finished seamless steel tubes sizes upto including 406.4mm outside diameter.

c) In this process covers cold drawn electric resistance welded steel tubes and high frequency induction butt welded steel tubes

2.0 Latest Indian Standard Number as IS 3601:2006 and Product Title as “Steel Tubes for Mechanical and General Engineering Purposes- Specification (Second Revision)” and Amendment No.1.

TABLE 1 TYPES AND GRADES OF STEEL TUBES

Section	Type	Grade
2.	Welded tubes (WT): Hot finished welded (HFW), electric resistance welded (ERW), High frequency induction butt welded (HFIW) and Oxy- acetylene welded tubes (OAW)	160, 210 240 & 310
3	Hot finished seamless (HFS)	160, 210, 240 & 310
4	Cold drawn seamless (CDS)	160, 210, 240, 310, 370, 430 & 540
5	Cold drawn electric resistance welded (CEW)	160, 210, 240,310 370 & 430

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SECTION –II

RAW MATERIAL & COMPONENTS

- 1.1** Steel shall not contain either Sulphur or Phosphorous more than 0.040 percent in the ladle analysis when carried out as per IS 228.
- 1.2** Steel Sheets or Strips of any suitable grade as per IS 10748 may be used.
- 1.3** The check analysis should be on the purchase order where Sulphur and Phosphorous should not more than 0.005 percent.
- 1.4** Supply of steel tubes for mechanical and general engineering purposes shall be confirmed to IS 1387.

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SECTION –III

1. IN PROCESS QUALITY CONTROL

It is mentioned in Scheme of Testing and Inspection DOC:STI/3601/3 dated September 2006 related to IS 3601:2006 control from raw material to finished product with frequency and level of control as per STI.

2. INFRASTRUCTURE FOR PRODUCTION

Firm should have complete infrastructure for manufacturing of steel tubes for Mechanical & General engineering purposes like fabrication like welding machine for seamless welding, electric resistance welding and high frequency induction butt-welding.

Tubes shall be made by cold drawing electric resistance welding.

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SECTION-IV

1. CERTIFICATION CRITERIAS

Identification of critical requirements like tensile testing, flatter test, Bend test (strip), drift extension test, workmanship, dimensioning and crushing test as per the requirements laid down.

Scheme of Testing and Inspection as per DOC:STI/3601/3 dated September 2006 provided to the manufacturer obtained licence.

Marking fee rate as Rs. 8.70 per unit: marking fee Rs.34,000/- for large scale unit and Rs.29,000/- for small scale unit for an operating year one year. An acceptance to be given on getting licence.

Grouping guidelines for particular one group may be dimensional or physical and chemical properties if designated.

Guide lines for writing scope of licence for certain limit of use of that product if mentioned.

Guidelines for inclusion of new varieties i.e., to add one or more varieties other than the existing one in the licence if required by the licensee.

Sample size for drawl of sample(s) also mentioned if required.

Manner of sealing of sample(s).

Remnants of sample(s) either returnable or non returnable to be mentioned during drawl of sample(s) according to its use and condition after testing.

Procedure to be followed for destroying/deshaping/recycling the product that does not meet the quality parameters during regular production.

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SECTION-V

1. INSPECTION AND TESTING

- 1.0** Packing material requirement (to be available in the factory at all times) for verification as well as packing/dispatching of sample(s).
- 2.0** During inspection least of necessary test equipments/facilities with requirement and frequency of calibration of the above equipments are to be kept with the firm for their verification.
- 3.0** Status of test facilities in BIS laboratories or Out side laboratory with testing charges and approximate time required for testing at the above labs are easily available/accessible at website.
- 4.0** Whether grant of licence will be based on factory testing/independent testing or combined including raw material testing to be done during inspection.
- 5.0** Details of tests to be carried out in the factory in case of applicant samples/verification samples, surveillance/market samples as well as raw material sample(s) if required.

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SECTION-VI

DOC:STI/3601/3
September 2006

SCHEME OF TESTING AND INSPECTION FOR CERTIFICATION OF STEEL TUBES FOR MECHANICAL AND GENERAL ENGG. PURPOSES ACCORDING TO IS 3601:2006

1. **LABORATORY** - A laboratory shall be maintained which shall be suitably equipped and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 All testing apparatus shall be periodically checked and calibrated records of such checks/calibration shall be maintained.

2. **TEST RECORDS** - All records of tests and inspection shall be kept in suitable forms approved by the Bureau.

2.1 Copies of any records and other connected papers that may be required by the Bureau shall be made available at any time on request.

3. **QUALITY CONTROL** - It is recommended that, as far as possible, Statistical Quality Control (SQC.) methods may be used for controlling the quality of the product during production as envisaged in this Scheme [See IS 397(Part 1):2003, IS 397(Part 2):2003 and IS 397 (Part-3)2003].

3.1 In addition, effort should be made to gradually to introduce Quality Management system in accordance with IS/ISO 9001: 2000.

4.0 **STANDARD MARK** - The Standard Mark, as given in Column(1) of the First Schedule the First Schedule of the licence, shall be applied at a suitable place on the outside of each tube provided always that the tubes so marked conform to all the requirements of the specification, Pipes below 50mm NB shall be marked by using transfix labels and pipes above 50mm NB by either Llsingtransfix labels or by stenciling.

4.1 The symbol 'GEN' to be stamped/embossed on each tube for Mechanical and General Engineering Purposes at a regular interval on the pipe. :1

41 **MARKING** - In addition the following information shall be included in the label attached to each bundle or stenciled on the tube.

- (a) The type and grade of the tubes;
- (b) Name of the manufacturer or trade mark, if any;
- (c) Size;

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- (d) Length of the tube;
- (e) Type of surface coating if any;
- (f) Identification mark in code or otherwise to enable the date and lot of manufacture to be traced back to factory records; and
- (g) 'Made in India', if required
- (h) Licence No. (CM/L.....)

5.0 **LEVELS OF CONTROL** - The tests, as indicated in Table I attached and at the levels of control specified therein, shall be carried out on the whole production of the factory which is covered by this scheme and appropriate records and charts maintained in accordance with paragraph 2.0 above. All the production which conforms to the Indian Standards and covered by the licence shall be marked with certification mark of the Bureau.

5.1 The dimensions of the steel tubes of particular type and grade shall be checked as per relevant clause and table given in IS 3601:2006 with suitable gauges.

5.2 On the basis of tests and analysis results, decision will be taken regarding conformity or otherwise of the lot as a whole with the requirements of the specification as given in Table 1 (Sec-III. 1).

5.3 In respect of all other clauses of the specification the factory shall maintain appropriate control and checks to ensure that their product conforms to the various requirements of this specification.

6.0 **REJECTIONS** - A separate record shall be maintained giving information relating to the rejection of the production not conforming to the requirements of the specification and the method of its disposal. Such material shall in no circumstances be stored together with those conforming to the specification.

7.0 **SAMPLES** - The licensee shall supply, free of charge, the samples required in accordance with the Bureau of Indian Standards (Certification) Regulations, 1988, as subsequently amended, from the factory or godowns. The Bureau shall pay for the samples taken by it from the open market.

8.0 **REPLACEMENT** - Whenever a complaint is received soon after the goods with Standard marks have been purchased and used, and if there is adequate evidence that the goods have not been misused, defective goods are replaced free of cost by the licensee in case the complaint is proved to be genuine and the warranty period (where applicable) has not expired. The final authority to judge the conformity of the product to the Indian Standard shall be with the Bureau. The firm shall have own complaint investigation system as per IS 15400.

8.1 In the event of any damages caused by the goods bearing the standard Marks, or claim being filed by the consumers against BIS Standard mark and not "conforming to" the relevant Indian Standard, entire liability arising out of such non conforming product shall be of licensee and BIS shall not in any way be responsible in such cases.

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9.0 **STOP MARKING** - The marking of the product shall be stopped under intimation to the Bureau if, at any time, there is some difficulty in maintaining the conformity of their product to the specification, or the testing equipment goes out of order. The marking may be resumed as soon as the defects are removed under intimation to Bureau.

9.1 The marking of the product shall be stopped immediately if directed to do so by Bureau for any reason. The marking may then be resumed only after permission by the Bureau. The information regarding resumption of marking shall also be sent to the Bureau.

10.0 **PRODUCTION DATA** -The licensee shall send to BIS as per the enclosed proforma- I to be authenticated by a Chartered Accountant ~ statement of quantity produced, marked and exported by him and the trade value thereof at the end of each operative year of the licence.

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IS 3601:2006
STEEL TUBES FOR GENERAL AND MECHANICAL ENGG. PURPOSES
TABLE 1 LEVELS OF CONTROL

TEST DETAILS				LEVELS OF CONTROL			
S.r. No.	Requirement	Test Methods		No. of Samples	Lot Size	Frequency	Remarks
		Clause	Reference				
1	Chemical Composition	4	IS 3601 Relevant parts of IS 228	One		Each consignment	i) If the material is supplied with ISI mark or accompanied by a test certificate giving result of ladle analysis , no testing is required to be done
2.	Workmanship	6	IS 3601	One			
3.	Straightness	8	-do-	Each tube	-do-	-do-	
4	Surface Protection	11	IS 3601 & IS 2633	-do-	-do-	Production surface of one size type and grade in one shift	This is an optional requirement
5	Tensile test	13.1	IS 3601 & IS 1608	One		-do-	In case the sample fails in any one or more of the test specified two further samples shall be drawn and tested for that requirement. If both the repeat samples pass the tubes shall be accepted. In case of failure of either of the sample tubes represented by these test pieces shall not be marked.
6	Flattening test	13.2	IS 3601 & IS 2328	One		One hour's productions of one size type and grade	
7	Bend test (strip)	13.3	IS 3601	-do-		One hour's productions of one size type and grade	
8	Bend test (whole tube)	13.4	-do- IS 2329	-do-		-do-	
9	Crushing test	13.5	IS 3601	One		-do-	

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DOC:STI/3601/3
September 2006

IS 3601:2006

STEEL TUBES FOR GENERAL AND MECHANICAL ENGG. PURPOSES

TABLE 1 LEVELS OF CONTROL

TEST DETAILS				LEVELS OF CONTROL			
S.r. No.	Requirement	Test Methods		No. of Samples	Lot Size	Frequency	Remarks
		Clause	Reference				
10	Drift expansion test	13.6	IS 3601 & IS 2335	One		-do-	-do-
11	Length	9	IS 3601	One		-do-	In case failure all the tubes shall be checked and only those tubes found conforming shall be Marked
12	Dimensions	10	IS 3601	One		-do-	

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SECTION VII

**CMD/PF 311
March 1985**

ACCEPTANCE OF RATE OF MARKING FEE

This is with reference to your letter No. _____ dated _____

We hereby agree to pay to Bureau of Indian Standards after grant of licence to use ISI Standard Mark on Steel Tubes for Mechanical and General Engineering Purposes – Specification according to IS 3601:2006 marking fee at the following rate and in the manner stipulated as under:

- i) Rate of Marking Fee: The marking fee is payable as follows:**

**Rs. 8-70 per unit with a Minimum Marking
Fee of Rs. 34,000-00 for Large Scale Units;
Rs. 29,000-00 for Small Scale Units for an
Operative period of One Year**

(Unit = One Tonne)

- ii) Minimum marking fee for one operative year payable in advance which will be carried over to next renewal. Actual marking fee for the first nine months of the operative period calculated on the unit rate on the production marked or the minimum marking fee whichever is higher shall be payable at the time of the first renewal of the licence. For subsequent renewals, the actual marking fee for 12 months period consisting of last three months of previous operative year and the first nine months of the current operative year of the minimum fee whichever is higher, shall payable.**

Signature:

Name:

Place:

Designation:

Date:

Seal:

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SECTION VIII

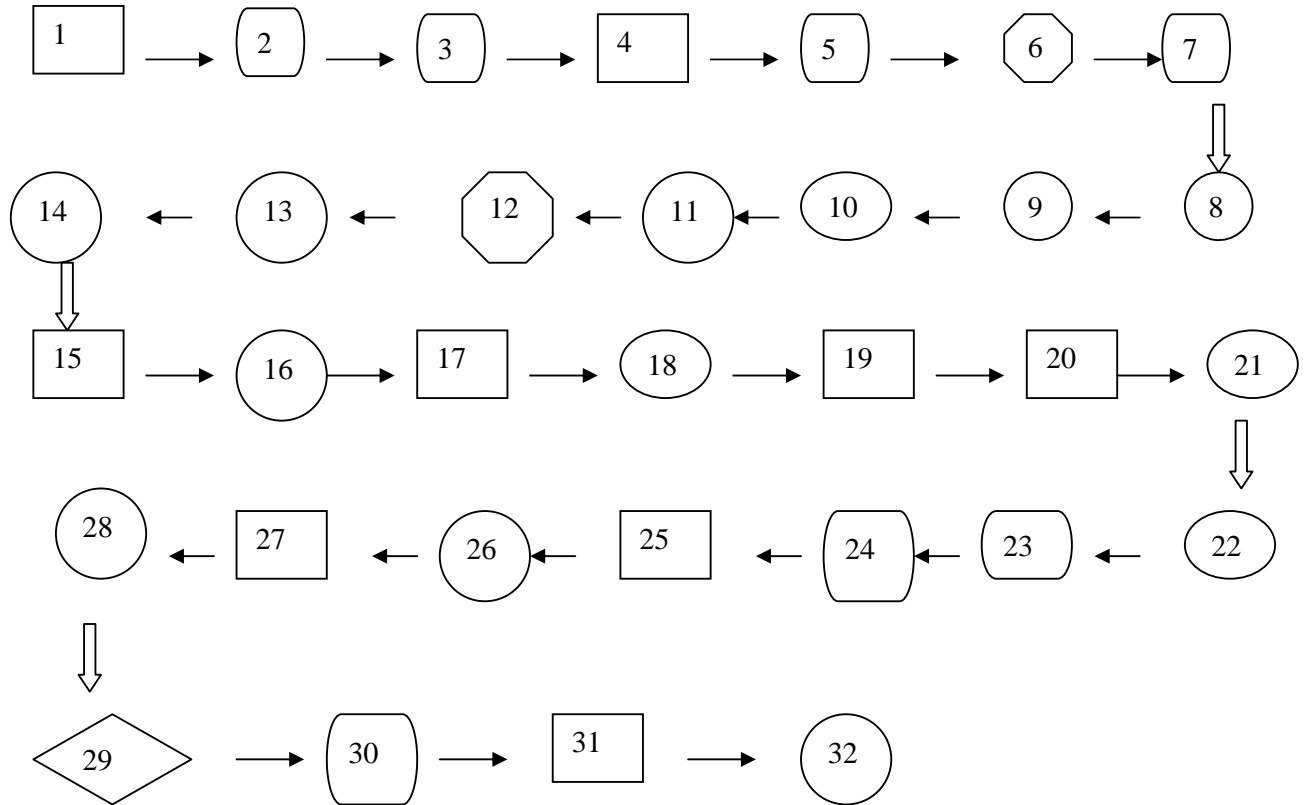
LIST OF BIS & OSL LABORATORIES

Pg No. 32-34

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ANNEX-A

**MANUFACTURING AND TESTING FLOW DIAGRAM OF
STEEL TUBES**



The description of the flow chart is as given below:-

1. Raw material identification and checks (Chem. & thickness)
2. Decoiler
3. Slitting
4. Ultrasonic testing
5. End shear
6. Butt weld
7. Strip accumulator
8. Strip edge preparation
9. Preforming
10. Forming

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11. Automatic welding
12. Removal of internal/external weld bead/fin
13. Induction annealing of weld seam
14. Water cooling
15. Metallographic examination stacking prior to dispatch
16. Sizing
17. Eddy current testing
18. Identification cutting to length
19. Dimensional checks
20. Weld seam test
21. Pipe end beveling/facing
22. Hydrostatic testing
23. Pickling and fluxing
24. Drying
25. Hot dip Zinc coating
26. Steam Blowing
27. Passivation
28. Visual inspection
29. Threading
30. Final inspection
31. Marking and stamping
32. Final acceptance, bundling, stacking prior to dispatch

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ANNEX-B (I)

THE GAZETTE OF INDIA

EXTRA ORDINARY

PART II – Section 3 Sub-Section (i)

PUBLISHED BY AUTHORITY

No. 211] NEW DELHI, TUESDAY, JULY 18, 1978/ASADHA 27, 1900

MINISTRY OF INDUSTRY

(Department Of Heavy Industry)

ORDER

New Delhi, The 18th July, 1978

G.S.R. 374(E) – In exercise of the power conferred by Section 3 of the Essential Commodities Act, 1955 (10 of 1955), the Central Government hereby makes the following Order, namely:-

1. Short title and commencement:

- (i) This Order may be called the Mild Steel Tubes (excluding Seamless tubes and tubes according to API specifications) (Quality Control) Order 1978.
- (ii) It shall come into force on 1st August, 1978.

2. Definition: In this order, unless the context otherwise requires-

- (a) 'Mild Steel Tubes' mean seam welded including electric resistance welded, screw and socketed and plain and mild steel tubes;
- (b) "Specified Standards' mean the following Indian Standard Specifications as amended/revised form time to time.

S. No.	IS No.	Title
1.	1239 (Part I) 1973	Mild Steel Tubes and Tubulars
2.	1161-1978	Steel tubes for structural purposes (Second revision)
3.	4270-1967	Steel tubes used for water wells (upto 200 mm dia.).

3. No person shall by himself or by any person on his behalf manufacture or store for sale, sell or distribute any mild steel tubes having wall thickness less than the wall thickness stipulated for light class in the specified standards covered by this Order and that it would be with ISI Certification mark and provided that the thickness of Zinc coating on the galvanized tubes shall be in accordance with IS 4736-1968 provided further that nothing in this Order shall apply in relation to export of mild steel tubes which do not conform to the specified standard but conform to any specification required by the foreign buyer.

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4. The residual quantities of sub-standard quality left with manufacturers/traders can be disposed of by cutting pipes and tubes into length not in excess of 1.5 metre before being sold in the market.

5. This Order cancels the Order on this subject dated 21.6.77 and all Corrigenda thereof.

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ANNEX-B(II)

THE GAZETTE OF INDIA

EXTRAORDINARY

PART II- SECTION 3 SUB-SECTION (i)

PUBLISHED BY AUTHORITY

NO. 209] NEW DELHI, THURSDAY, JUNE 1, 1983/JYAISTHA 11, 1905

MINISTRY OF INDUSTRY

(Department Of Heavy Industry)

ORDER

New Delhi The 1st June, 1983

G.S.R. 462 (E)- In exercise of the powers conferred by section 3 of the Essential Commodities Act, 1955 (10 of 1955), the Central Government hereby makes the following amendments in the Mild Steel Tubes (Excluding Seamless tubes and tubes according to API specifications (Quality Control) Order, 1976 (hereinafter referred to as the said Order). In the said order for paragraph 4, the following paragraph shall be substituted, namely:-

“4. The residual quantities of sub-standards qualities left with manufacturers, traders shall be punched with holes of minimum 5 mm diameter to be clear and through, by any process, with an interval of maximum 1.5 metres between such punched holes, before being sold in the markets.”

“Note- Principal Rules/Order published vide Notification NO. G.S.R. 374 (E) dated 18th July 1978, Gazette of India Extraordinary Part II- Section-3, Sub-section (i) page 633-634.”

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ANNEX-C

CLASSIFICATION OF IMPERFECTIONS IN WELDS

(Ref. IS 10793-83/ISO 6520-1982)

Designation	Explanations
Group No. 1 CRACKS	
Cracks	A discontinuity produced by a local rupture which may arise from the effect of cooling or stresses.
Micro-fissure (microcrack)	When a crack has microscopic dimensions it is known as a micro-fissure or micro-crack
Longitudinal Crack	A crack substantially parallel to the axis of the weld. Such cracks may also be situated at the weld junction.
Transverse crack	A crack substantially transverse to the axis of the weld.
Radiating cracks	Cracks radiating from a common point. Small radiating cracks are known as "star cracks".
Crater crack	A crack in the end crater of a weld, which may be longitudinal, transverse or star cracking.
Group of disconnected cracks	A group of disconnected cracks
Branching cracks	A group of connected cracks originating from a common crack and distinguishable from disconnected cracks and from radiating cracks.
Note: All above stated cracks may be situated, in the weld metal, in the heat-affected zone or in the parent metal	

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Group No. 2 CAVITIES	
Gas cavity	A cavity formed by entrapped gas.
Gas pore	A gas cavity of essentially spherical form:
Uniformly distributed Porosity	A number of gas pores distributed in a substantially uniform manner through out the weld metal; not to be confused with linear porosity.
Localized (clustered) porosity	Group of gas cavities.
Linear porosity	A line of gas pores situated parallel to the axis of the weld.
Elongated cavity	A large non-spherical cavity with its major dimension approximately parallel to the axis of the weld.
Worm-hole	A tubular cavity in weld metal caused by release of gas. The shape and position of worm-holes is determined by the mode of solidification and the sources of the gas. Generally they are grouped in clusters and distributed in a herringbone formation.
Surface pore	A small gas pore which breaks the surface of a weld.
Shrinkage cavity	A cavity due to shrinkage during solidification.
Interdendritic shrinkage	An elongated shrinkage cavity formed between dendrites during cooling which may contain entrapped gas. Such a defect is generally to be found perpendicular to the weld face.
Micro-shrinkage	Shrinkage only visible under the microscope.
Interdendritic microshrinkage	Interdendritic shrinkage only visible under the microscope.
Crater pipe	The depression at the end of a weld run and not eliminated before or during subsequent weld passes.

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Group No.3 SOLID INCLUSIONS	
Solid inclusion	Solid foreign substances entrapped in the weld metal.
Slag inclusion	Slag entrapped in the weld metal
Flux inclusion	Flux entrapped in the weld metal.
Oxide inclusion	Metallic oxide trapped in the weld metal during solidification.
Puckering	In certain cases, especially in aluminum alloys, gross oxide film enfoldment can occur due to a combination of unsatisfactory protection from atmospheric contamination and turbulence in the weld pool.
Metallic inclusion	A particle of foreign metal trapped in the weld metal. It may be of tungsten, copper or other metals.
Note: Slag/Flux inclusion may be Linear, isolated or others.	
Group no. 4 LACK OF FUSION AND PENETRATION	
Lack of fusion (incomplete fusion)	Lack of union, between weld metal and parent metal or weld metal and weld metal.
Lack of penetration (Incomplete penetration)	Lack of fusion between parent metal and parent metal due to failure of weld metal to extend into the root of the joint.

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**Group No. 5
IMPERFECT SHAPE**

Imperfect shape	Imperfect shape of the external surfaces of the weld or defective joint Geometry.
Undercut	A groove at the toe (s) (or at the root) of a weld run due to welding. Undercut may be continuous or intermittent.
Shrinkage groove	A shallow groove in the root caused by contraction in the weld metal along each side of the penetration bead.
Excess weld metal	An excess of weld metal at the face(s) of the butt weld.
Excessive convexity	An excess of weld metal at the face of a fillet weld.
Excessive penetration	Excess weld metal protruding through the root of a weld made from one side or through weld metal previously deposited from either side of a multi-run joint. It may be localized also.
Incorrect weld profile	Too small an angle between the plane of the parent metal surface and a plane tangential to the weld bead surface at the toe.
Overlap	Excess of weld metal at the toe of a weld covering the parent metal surface but not fused to it.
Misalignment	Misalignment between two welded pieces. This could be “linear” or “angular”.
Sagging	Weld metal collapse due to gravity.
Burn through	A collapse of the weld pool resulting in a hole in the weld or at the side of the weld.
Incompletely filled groove	A longitudinal continuous or intermittent channel in the surface of a weld due to insufficient deposition of weld metal
Irregular width/ surface	Excessive variation in width or surface.

**Group No. 6
MISCELLANEOUS IMPERFECTION**

Such defects includes stray flash or arc strike, Spatter, Tungsten spatter, Torn surface, Grinding mark, Chipping mark, Under flushing.

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ANNEX-D

List of Referred Standards

IS No.	Title
IS 228	Methods of chemical analysis of pig iron, cast iron and plain carbon and low alloy steel (revised) (issued in parts)
IS 1387:1993	General requirements for the supply of metallurgical materials (second revision)
IS 1608:2005	Metallic materials – Tensile testing at ambient temperature (third revision)
IS 2328:2005	Metallic materials – Tube – Flattening test (second revision)
IS 2329:2005	Metallic materials – Tube (in full section) – Bend test (second revision)
IS 2335:2005	Metallic materials-Tube-Drift expanding test (second revision)
IS 2633:2005	Methods of testing uniformity of coating of zinc coated articles (second revision)
IS 4711:1974	Methods of sampling of steel pipes, tubes and fittings (first revision)
IS 10748:2004	Hot rolled steel strip for welded tubes and pipes – Specification (second revision)

MANUAL FOR CERTIFICATION OF STEEL TUBES FOR MECHANICAL AND GENERAL ENGINEERING PURPOSES

ANNEX-E

SPECIAL GUIDELINES

Available guidelines of CMD on above and relevant aspect of grant of licence, operation of Certifications Marks licence and marking of products are appended.

Subject	Reference as below
Processing of applications of galvanizing units procuring BIS certified black tubes for galvanizing and other finishing operation (CMD-III/16:1161 dt. 08.01.2001)	ANNEX-E (I)
Implementation of revised IS 3601:2006 (CMD-III/16: 3601 dt. 03.07.2006)	ANNEX-E (II)

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ANNEX-E (I)

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ANNEX-E (II)

(CMD-III/16: 3601 dt. 03.07.2006)

Implementation of revised IS 3601:2006.