INTERNATIONAL STANDARD

ISO 17558

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Steel wire ropes — Socketing procedures — Molten metal and resin socketing

Câbles en acier — Procédés de manchonnage — Manchonnage à l'aide de métal fondu et de résine

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 17558 was prepared by Technical Committee ISO/TC 105, *Steel wire ropes*.

This first edition of ISO 17558 cancels and replaces ISO 7595:1984 and ISO/TR 7596:1982, of which it constitutes a technical revision.

Introduction

This International Standard was developed in response to a worldwide demand for a specification combining the procedures for the socketing of steel wire ropes by molten metal and resin. With an increasing use of resin as a socketing medium, opportunity was taken to review and update the requirements formerly given by ISO/TR 7596.

Each socket design should be used only with the appropriate method or methods of socketing which have been proven as being satisfactory by prototype testing.

Sockets, if properly attached to the wire rope, should sustain the full breaking force of the rope. This is important because accidental release of a load due to failure of a rope termination could create a hazard.

Steel wire ropes — Socketing procedures — Molten metal and resin socketing

1 Scope

This International Standard specifies procedures for the molten metal and resin socketing of steel wire ropes. It also specifies a type testing method for assessing the performance of a socketing system.

The procedures described in this International Standard are for use with sockets having a strength exceeding that of the minimum breaking force of the rope to be socketed and made from a material that remains unchanged when the socketing media is hot metal.

Operating temperature limits for ropes socketed with lead-based alloys, zinc and zine-based alloys and resin are given for information in Annex E.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 75-2:2004, *Plastics — Determination of temperature of deflection under load — Part 2: Plastics and ebonite*

ISO 604, *Plastics — Determination of compressive properties*

ISO 3838, *Crude petroleum and liquid or solid petroleum products — Determination of density or relative density — Capillary-stoppered pyknometer and graduated bicapillary pyknometer methods*

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 17893, *Steel wire ropes — Definitions, designation and classification*

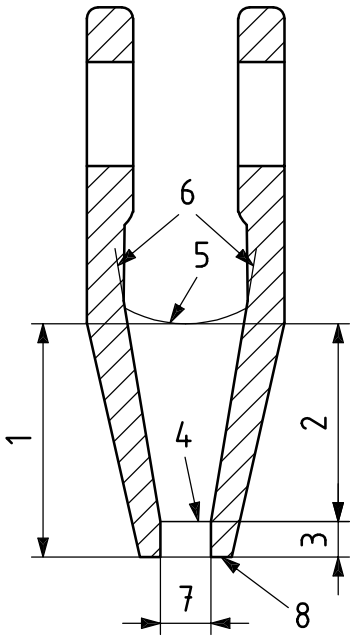
EN 59, *Glass reinforced plastics — Measurement of hardness by means of a Barcol impressor*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17893 and the following apply.

3.1
socket
wire rope termination incorporating a socket basket

See Figure 1.



Key

1 overall basket length [tapered portion plus parallel portion(s), if applicable, plus radius at rope entry]
2 tapered portion of socket basket
3 parallel portion of socket basket and any radius at rope entry
4 small end of tapered portion of socket basket
5 large end of tapered portion of socket basket
6 included angle of tapered portion of socket basket
7 bore (smallest internal diameter at rope entry)
8 base of socket

NOTE The base of the socket is often called the “mouth” or “nose”.

Figure 1 — Nomenclature of typical parts of socket basket

3.1.1
socketing
procedure whereby a socket is attached to a wire rope by means of molten metal or resin

3.1.2
socketing system
method of attachment comprising instructions and materials for the socketing of wire ropes with molten metal or resin

3.1.3
socketing medium
molten metal or resin used for socketing

3.2
socket basket
tapered portion of a socket within which the wire rope brush is secured

3.3
serving
seizing
method or material that secures a wire rope to prevent it from unlaying

3.3.1
permanent serving
serving applied prior to socketing and remaining in place at least until the socketing operation has been completed

3.3.2
temporary serving
serving applied and subsequently removed at various stages of the socketing operation

3.4
gelling
change in condition of a resin from a liquid to a semi-solid, jelly-like composition

3.5
hooking
procedure whereby the end of a wire-forming part of a brush is bent to form a hook

3.6
socketer
person trained in socketing having the requisite knowledge and experience to ensure that the required operations and procedures are correctly carried out

3.7
qualified person
person who, by possession of a recognized degree in an applicable field or certificate of professional standing, or who, by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work

3.8
socketing system designer
person or organization that designs and is responsible for type testing of the socketing system

4 Preparation for socketing

4.1 Serving

4.1.1 Serving of wire rope

The wire rope shall be served taking into account the type of rope, the length of the socket basket, the length of the brush to be formed, any additional brush length for the hooking or protrusion of wires and the depth of any serving that may be included within the socket.

Additional servings or additional length of serving may be required for spiral rope.

Two types of serving shall be used as follows.

Temporary servings shall be used to hold the strands and wires in position during the cutting operation.

A permanent serving shall be used to hold the strands and wires in position during the socketing operation. The permanent serving shall be in position before cutting the rope. The position of the permanent serving shall permit the correct positioning of the brush in relation to the socket.

NOTE The permanent serving is attached to that part of the rope which remains partly within the bore or immediately adjacent to the base of the socket when the socketing has been completed.

4.1.2 Serving material

Serving shall be of wire or strand or, alternatively, a mechanical device, e.g. clamps.

When serving wire or strand is used for permanent serving it shall be tinned or galvanized soft wire or strand for galvanized rope, and bright, tinned or galvanized soft wire or strand for bright rope.

Copper and brass wires shall not be used for servings.

Materials used for permanent serving shall preserve the rope lay and shall not cause deleterious electrolytic reaction in service.

The serving material shall be capable of withstanding the temperature involved in the socketing procedure.

4.2 Cutting of rope

The wire rope shall be cut by abrasive wheel, percussive or shearing methods, paying particular attention not to disturb the position of the wires below the permanent serving.

Cutting methods that fuse the wire rope end shall not be used.

4.3 Preparation of the socket

Dirt, grease, scale or residues shall be removed from the inside of the socket basket.

NOTE This does not preclude the use of a releasing agent when socketing with resin.

4.4 Inserting rope into socket

One of two procedures shall be used to insert the rope into the socket.

In the first method, the rope shall be inserted into the socket prior to the preparation of the brush. In the second method, after the brush has been prepared in accordance with 4.6, it shall be closed and compacted to enable it to be inserted into the bore of the socket without damaging the rope.

4.5 Preparation of the brush

The temporary serving at the point of cut shall be removed and the strands fanned outwards to allow opening of the wires.

The rope including any steel core shall be unlaid into its constituent wires to form an open brush. See Figure 2.

Wires should not be bent to an excessive angle at the permanent serving, since this can cause premature failure. The opening angle of the brush should not exceed 45° from the vertical, see Figure 2. Special care should be taken with locked-coil rope due to the sensitivity of the lock coil wire section.

When socketing fibre core ropes or ropes with non-metallic components, the core or those non-metallic components shall be removed from the brush.

When socketing fibre core ropes using molten metal, the exposed end of the fibre core should be protected from the heat created by the molten metal so that the fibre core material does not ignite, melt or otherwise burn, smoke or smoulder; alternatively, with preformed round-strand ropes, a longer piece of the fibre core may be removed and replaced by a suitable wire rope. In this case, the permanent serving should be removed, the rope unlaid over a longer distance, the fibre core cut and the rope inserted, the rope strands closed again and the permanent serving re-applied at its original position. The replacement core should then be completely unlaid to form an open brush.

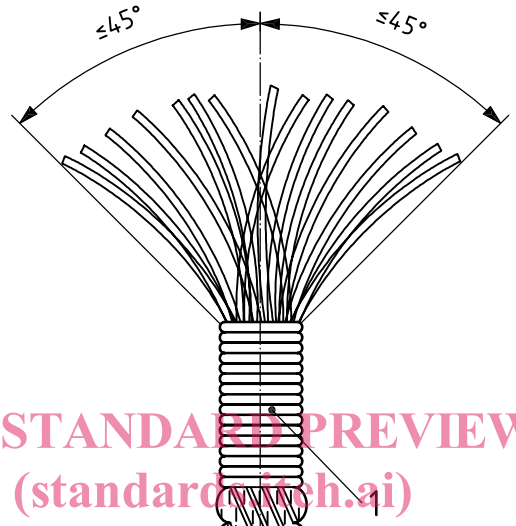
The following diameters, d_R, for the replacement core are recommended:

— ropes with 6 strands, $d_R = 0{,}35d_m$ to $0{,}40d_m$;

— ropes with 8 strands, $d_R = 0{,}47d_m$ to $0{,}52d_m$;

where d_m is the measured diameter of the rope.

After dealing with the core, the individual wires from the strands shall be unlaid (but not straightened) completely down to the permanent serving and a brush formed.



Key

1 permanent serving

Figure 2 — Brush opening angle

4.6 Cleaning and degreasing of brush

The brush shall be thoroughly cleaned and degreased.

The brush shall be dry and free from any visible residue.

Care shall be taken that the degreasing is confined to the brush.

The degreasing agent shall be worked well into the root of the brush.

The brush shall be held downwards to prevent the degreasing agent from being trapped in the root of the brush.

The time between cleaning and pouring should be as short as possible to minimize oxidation of the brush.

It is essential that when using solvents the solvent manufacturer's instructions are followed.

Some national regulations or specific methods of socketing require bright wires to be pre-treated when socketed with molten metal. In certain conditions, this might also be required to improve adhesion between the wires and the socketing metal when socketing with lead-based alloys. In these cases, the procedures given in Annex A are recommended.