



Socketing procedures for wire ropes — Resin socketing

0 Introduction

Sockets are the most efficient of wire rope terminations and if properly made will sustain the full breaking load of the rope. Traditionally the socketing material has been molten white metal or zinc. More recently, however, suitable synthetic resins have been developed.

The first laboratory tests on resin socketing were carried out about twenty years ago in both Europe and America. They showed that man-made resins could satisfactorily hold the rope under both static and dynamic loads.

There has been considerable development since then, and in some areas, notably the testing of wire ropes, the use of resin socketing has become widespread.

The two resins systems currently in general use are based respectively on polyester resins and epoxide resins. In general, the polyester is slightly more brittle than the epoxide, but is less temperature sensitive in the curing stage. In addition, the polyesters cure much more quickly than the epoxides.

In neither system, however, is it necessary to pre-heat the socket prior to pouring and the temperature of the resin during pouring and curing is much lower than the normal casting temperatures for metal. There is therefore less possibility of the heat affecting either the lubricant or wires in the rope. This is especially an advantage when socketing higher tensile ropes.

Field experience has developed, or is developing, in a number of countries, notably in the United Kingdom and the Netherlands with polyesters, and in the USA with epoxides. A system study of polyester resin socketing has been carried out by government laboratories and commercial companies in the United Kingdom.

Whilst the laboratory tests and investigations have shown the current resin systems to be satisfactory, practical experience is somewhat limited; in view of this, ISO Technical Committee 111 has recommended the publishing of this document in the form of a Technical Report rather than an International Standard at this stage in order to draw the attention of the experts to this type of socketing and gather more experience. It is envisaged that with the more widespread usage of resin socketing, it will be possible to elaborate, in due course, an International Standard on the basis of this Technical Report.

NOTE — Sockets and molten metal socketing will form the subject of future International Standards.

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1 Scope and field of application

This Technical Report provides guidance on recommended practices for the resin socketing of wire ropes produced in accordance with ISO 2408. The recommendations are also generally applicable to the socketing of other wire ropes.

When socketing ropes which have wire tensile grades greater than 1 960 MPa (N/mm²), special precautions may be necessary and the rope supplier should be consulted.

Rope terminations made by socketing in accordance with this Technical Report may be used for determining the breaking load of wire ropes in accordance with ISO 3108.

2 References

ISO 2408, *Steel wire ropes for general purposes — Characteristics.*

ISO 3108, *Steel wire ropes for general purposes — Determination of actual breaking load.*

ISO 3189/1, *Sockets for wire ropes — Part 1 : General conditions of acceptance.*¹⁾

3 General

ISO 3189/1 specifies the dimensions of the sockets for general purpose ropes. The sockets and socketed assemblies shall pass the prototype tests indicated in the same International Standard.

Sockets for use with spiral strands and locked coil ropes, and for carrying out breaking load tests on ropes may have special dimensional requirements.

4 Preparation of the rope end

A sufficient length of the rope should be externally cleaned on both sides of the designated point of cut by wiping with a clean dry cloth. This cleaning should be confined to the length of rope to be threaded through the socket.

4.1 Seizing of the rope

Two types of seizing are recognized.

- a) Temporary seizing is used when cutting non-preformed ropes, multistrand ropes, spiral strands, etc. A temporary seizing may be applied to the rope on each side of the cut.

These seizings should be such as to hold the strands and wires reasonably well in position during the cutting operation.

- b) Permanent seizing is used to hold the wires and strands during the socketing operation. A permanent seizing is applied to that part of the rope which is partly within or adjacent to the mouth of the socket or immediately outside the socket when the operation is completed.

The permanent seizing should

- 1) ensure that the wires and strands are undisturbed during socketing operations;
- 2) permit the passage of the seized rope through the mouth of the socket.

4.2 Seizing material

The seizing material should be tinned or galvanized soft wire or strand for galvanized rope, and bright or galvanized soft wire or strand for bright rope.

Alternative materials may be used but care should be taken that they do not cause deleterious electrolytic action in service.