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Steel wire ropes — Pulling eyes for rope installation — Types and minimum requirements

Câbles en acier — Anneaux de tirage — Types et exigences minimales

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Introduction

This International Standard was developed in response to a worldwide demand for a standard identifying the different types of Pulling Eyes that are used to facilitate the installing and re-reeving of ropes on a machine.

Such Pulling Eyes, sometimes referred to as becketts, are often used when another rope is required to pull the new rope into place.

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Steel wire ropes — Pulling Eyes for Rope Installation — Types and minimum requirements

1 Scope

This International Standard identifies the different types of pulling eyes that are prepared at, or attached to, a steel wire rope end for connection to another rope when installing a new rope or re-reeving an existing rope on a machine.

This International Standard also specifies the minimum requirements for pulling eyes, including their geometry, strength, maximum line pull to which the pulling eye should be subjected and information for use to be provided by the manufacturer.

The pulling eyes covered by this International Standard are not intended to be subject to a load when the machine performs a service operation.

This International Standard applies to those pulling eyes that are prepared at, or attached to, ends of steel wire ropes conforming to ISO 2408 and ISO 10425.

This International Standard does not apply to steel wire ropes with fibre cores.

This International Standard does not cover those separate end connection accessories that slide over the end of a rope and comprise an eye and tubular type braided rope, often referred to as a 'wire rope stocking' or 'cable sock'.

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 2408 Steel wire ropes for general purposes – Minimum requirements

ISO 7500-1:2004 Metallic materials – Verification of static uniaxial testing machines – Pt.1 Tension/compression testing machines

ISO 10425 Steel wire ropes for the petroleum and natural gas industries – Minimum requirements and terms of acceptance.

ISO 17893 Steel wire ropes – Vocabulary, designation and classification

3 Terms and definitions

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

3.1

Pulling eye

end preparation or end attachment in the form of a loop or eye to facilitate installation or re-reeving of a steel wire rope on a machine

3.2

flexible type pulling eye

pulling eye made from components of rope e.g. individual strands or core.

NOTE In order to provide for an easier passage of the rope through the reeving arrangement, the outer strands of the rope may be reduced by removing some of the wires to form a short-length tapered section that is held together by casting a metal cone over the taper, pressing ferrules; or by applying a serving over the taper.

NOTE Pulling eyes made from the centre strand of the core will have limited load capacity.

3.3

rigid type pulling eye

pulling eye made by welding a component such as a pad eye, modified eyebolt or chain link to the end of a stranded rope

3.4

semi-rigid type pulling eye

pulling eye comprising looped short length of smaller diameter wire rope secured in two opposing gussets between outer strands of the larger parent rope by a swaged ferrule.

3.5

single use pulling eye

pulling eye located on the drum end of the rope for the purposes of installation and then subsequent removal of the rope following a single service life.

3.6

multiple use pulling eye

pulling eye fitted to rope intended to experience multiple service life .e.g. installation and/or multiple re-reeving or end for ending the rope.

4 Requirements

4.1 General

The manufacturer shall, for each type of pulling eye that he intends to produce, prepare detailed manufacturing instructions. These instructions shall, at least, as applicable to the type of pulling eye, include the following aspects:

- the rope types and diameters for which the pulling eye type is suitable;
- method for preparing the rope end;
- matching the pad-eye; modified eyebolt or chain link to the rope;
- method for welding component to the rope;
- method for forming the eye or loop;
- method for preparing the tapered section;
- inspection criteria.

The manufacturing instructions shall be supported with a written declaration that the system has passed the type testing requirements of 4.3.

Pulling eyes shall be made in accordance with the manufacturer's instructions.

In the case of the welded components attached to the rope end, the welding shall be performed by a qualified person.

Qualification procedure shall be performed as defined in clause 4.6

Re-qualification is not required provided that a minimum of 3 component welds are made during any 12 month period.

4.2 Geometry

4.2.1 Flexible type pulling eye made from the centre strand of the core

The dimensions of the eye or loop shall be such that it shall be possible for its shape to change sufficiently enough to pass the completed pulling eye through an aperture of equivalent size to the diameter of the rope that is to be installed.

The internal length of the eye or loop, as manufactured, shall be at least three times the diameter of the rope.

An illustration of such a completed pulling eye is given in Figure 1.



Figure 1 Completed flexible pulling eye made from the centre strand of the core

4.2.2 Flexible type pulling eye made from the steel core itself

The internal length of the eye or loop, as manufactured, shall be at least five times the diameter of the rope.

An illustration of such a completed pulling eye is given in Figure 2.

NOTE It is not usually possible for a pulling eye made from the steel core itself to be passed through an aperture of equivalent size to the diameter of the rope.



Figure 2 Completed flexible pulling eye made from the steel core itself

4.2.3 Flexible type pulling eye made from the steel core and secured with pressed ferrules

The internal length of the eye or loop, as manufactured, shall be at least five times the diameter of the rope.