BS EN ISO 6218:2015

BSI Standards Publication

Inland navigation vessels — Manually- and power-operated coupling devices for pushing units and coupled vessels — Safety requirements and main dimensions

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN ISO 6218:2015. It supersedes BS EN ISO 6218:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SME/32, Ships and marine technology - Steering committee.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2015

ISBN 978 0 580 85006 6

ICS 47.060; 47.020.50

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2015.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 6218

October 2015

ICS 47.060

Supersedes EN ISO 6218:2005

English Version

Inland navigation vessels - Manually- and power-operated coupling devices for pushing units and coupled vessels - Safety requirements and main dimensions (ISO 6218:2015)

Bateaux de navigation intérieure - Treuils d'accouplement manoeuvrés à la main ou motorisés pour les convois poussés et les formations à couple - Exigences de sécurité et dimensions principales (ISO 6218:2015)

Fahrzeuge der Binnenschifffahrt - Handbetätigte und kraftbetriebene Spannvorrichtungen für Drahtseilverbindungen von Schub- und Koppelverbänden - Sicherheitsanforderungen und Hauptmaße (ISO 6218:2015)

This European Standard was approved by CEN on 3 July 2015.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword

This document (EN ISO 6218:2015) has been prepared by Technical Committee ISO/TC 8 "Ships and marine technology" in collaboration with Technical Committee CEN/TC 15 “Inland navigation vessels” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2016, and conflicting national standards shall be withdrawn at the latest by April 2016.

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

This document supersedes EN ISO 6218:2005.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 6218:2015 has been approved by CEN as EN ISO 6218:2015 without any modification.

Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 7, *Inland navigation vessels*.

This third edition cancels and replaces the second edition (ISO 6218:2005), which has been technically revised with the following changes:

— addition of power-driven coupling devices, with requirements and figures respectively;

— addition of "Parts" with drawing;

— new regulation of Types;

— addition of requirements for a tensioning device;

— foundation as accessory part;

— Figure 1 and Figure 2 added (components of coupling device), Figure 4 corrected (brake);

— requirements on Material added;

— assembly instruction added;

— operating instructions added;

— designation updated;

— Annex A updated.

INTERNATIONAL STANDARD ISO 6218:2015(E)

Inland navigation vessels — Manually- and power-operated coupling devices for pushing units and coupled vessels — Safety requirements and main dimensions

1 Scope

This International Standard specifies dimensions and safety requirements for manually operated and power-driven coupling devices used for assembling inland navigation vessels as a push tow or vessels coupled alongside by means of wire rope connections. The coupling device secures the stable positioning of the coupled vessels.

Requirements for the safety to protect operators from accidents during the creation, operation, and separation of the wire rope connections of push tows and vessels coupled alongside are contained in this International Standard.

It also gives rules for designation and testing.

2 Normative references

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

ISO 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 3730, *Shipbuilding and marine structures — Mooring winches*

ISO 4014, *Hexagon head bolts — Product grades A and B*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
manually operated coupling device
straining device in which a wire rope is strained by turning a hand wheel

3.2
minimum breaking load
load at which the wire rope will break

3.3
power-driven coupling device
straining device in which a wire rope is strained by a power-driven equipment

3.4
tensioning device
ratchet spanner
tool used to increase the tension of the taut wire rope

3.5
straining load
tensile force applied to the wire rope when a specific tangential force is applied to the hand wheel or when a specific force by a power operated mechanism is applied to the gear

4 Safety requirements

4.1 General

4.1.1 Components

Manually operated coupling devices consist of hand wheel, gear, rope drum with rope fastening, footbrake, arresting device, and winch plate, see Figure 1.

Manually operated coupling devices may have the following additional components:

— tensioning device;

— change gear.

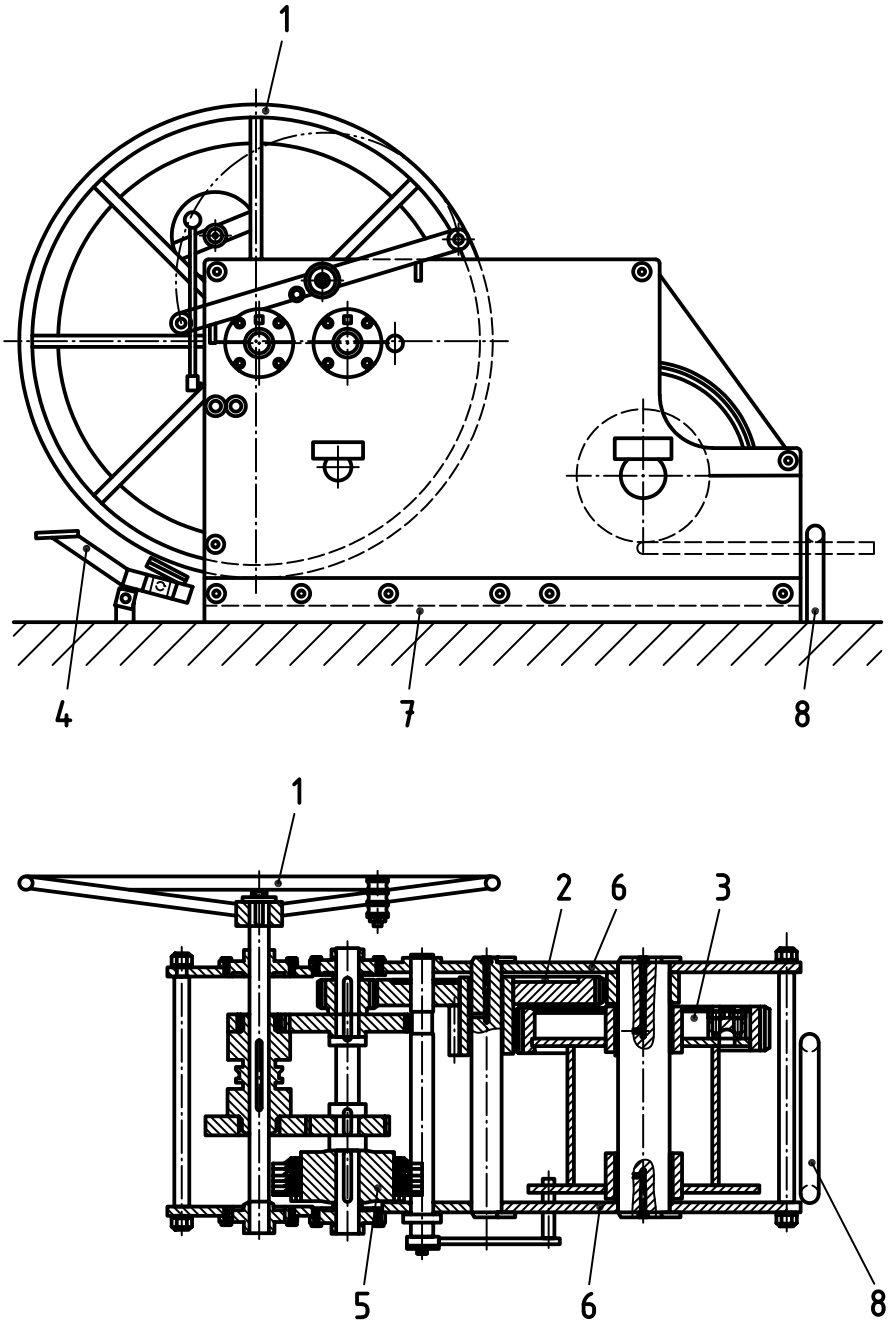
Accessory parts for coupling devices are the following:

— foundation;

— guide track for wire rope.

Power operated coupling devices consist of power unit (e.g. electric motor, hydraulic power pack) with controls and gearing, rope drum with rope fastening, arresting device, and winch plate, see Figure 2.

Electrical drives and control equipment shall meet the requirements in ISO 3730.



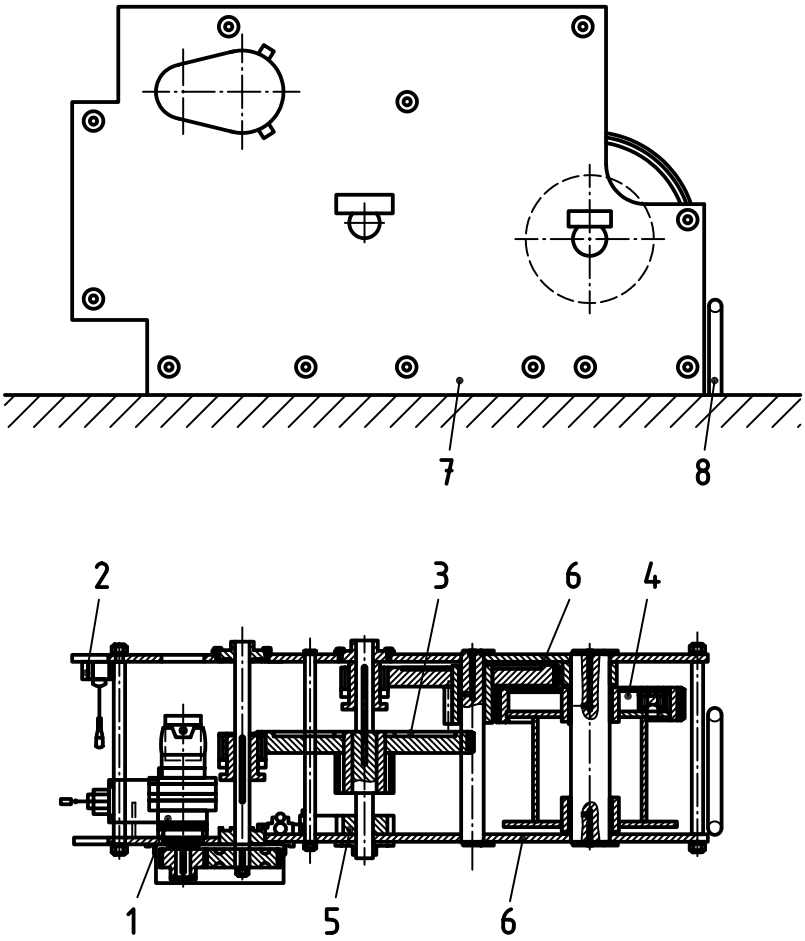
Key

1 handwheel
2 gear
3 rope drum with rope fastening
4 footbrake (only shown in side view)
5 arresting device
6 winch plate

Accessory parts:

7 foundation
8 guide track

Figure 1 — Manually operated coupling device, components



Key

1 power unit (e.g. electric motor, hydraulic motor)
2 controls
3 gear
4 rope drum with rope fastening
5 arresting device
6 winch plate

Accessory parts:

7 foundation
8 guide track

Figure 2 — Power operated coupling device, components

4.1.2 Requirements

The coupling device shall be constructed such that even under the most severe expected conditions, resulting, for example, from the size of the coupled vessels, the actuating power, the meteorological conditions, the wave height, etc., there is no danger to crew members, for example from breaking wire ropes, or crushing or shearing parts. The strength requirements according to ISO 3730 shall be fulfilled.

Combined coupling devices shall comply with the requirements for both manually- and power- operated coupling devices.

4.2 Limitation of actuating power for power operated coupling devices

The motor shall be equipped with a control device to the effect that the actuating power is limited to the maximum allowed power.

4.3 Limitation of rope speed

The maximum speed of the wire rope shall be limited to 1,0 m/s.

4.4 Strength requirements

All parts of the coupling devices shall be designed and secured such that they withstand the highest minimum breaking load of the wire rope according to Table 1.

5 Models

5.1 Operation

The distinction is made between:

— manually operated (M), or

— power operated (P), or

— combined (M/P) coupling devices.

5.2 Position of handwheel/motor

The distinction is made between

— a left hand model (L), coupling device with hand wheel or the power-driven equipment and the drum on the left hand side of the gearing, and

— a right-hand model (R) coupling device with hand wheel or the power-driven equipment and the drum on the right hand side of the gearing,

when looking in the direction in which the wire rope is paid out. See Figure 3.

a) Left hand model b) Right hand model

Key

1 wire rope
2 handwheel/power-driven equipment
3 direction of view

Figure 3 — Models

5.3 With or without tensioning device

For manually operated coupling devices, a further distinction is made between:

— without tensioning device (Type NT);

— with tensioning device (Type T).

6 Design

6.1 Rope drum

6.1.1 Drum capacity

Rope drums shall be dimensioned and constructed such that the ropes are prevented from running off at the side, e.g. by means of flanges that project above the top layer of the wire rope by at least 1,5 times the wire rope diameter.

6.1.2 Drum diameter

The drum diameter shall be not less than 16 times the maximum rope diameter.

6.1.3 Rope fastening

Wire ropes shall be fastened to the rope drum without kinking so that they do not slip off when being paid out.

6.2 Handwheel

6.2.1 Clearances

The vertical clearance between the outside diameter of the handwheel and the deck shall be at least 75 mm.

The horizontal clearance between the winch plate and the outer surface of the handwheel shall not exceed 200 mm and the horizontal clearance between the winch plate and the inner surface of the handwheel shall be at least 75 mm.

Clearances are shown in Figure 4.

6.2.2 Construction

The handwheel shall be constructed such that when the coupling device is released there is no risk of jamming with rapid rotation of the handwheel as a result of the wire rope being paid out.

The handwheel shall be constructed such that it is not possible to reach through with the arm or step in with the foot.

The clearance between the collars and the inner lining shall be at least 60 mm and shall not exceed 75 mm.

6.2.3 Handhold

Handwheels may be provided with a handhold. It shall be countersunk and shall not project beyond the outer plane of the handwheel. It shall be fitted with a rotatable grip.

6.3 Power-driven equipment

The operating shall function automatically (dead man's switch) on-site and an emergency switch off shall be available. In addition, a lead-out for a permanent installed remote control in the wheelhouse may be provided.

When releasing the coupling device, there shall be no danger to the operator. The release of the coupling device shall be controlled with a gentle start-up.

6.4 Combined operating modes

The operating modes of combined coupling devices shall be interlocked against each other in such a way that the motor cannot actuate the hand wheel.

6.5 Arresting device

6.5.1 General

Coupling devices shall be equipped with a reliable arresting device which operates automatically to prevent uncontrolled unwinding of the wire rope under load during operation.

6.5.2 Arresting devices for manually operated coupling devices

The arresting device shall be designed, constructed, and arranged such that it will be released safely and without any danger by one person operating the footbrake without any further tensioning of the wire rope by operating the handwheel.

6.5.3 Arresting devices for power-driven coupling devices

The arresting device shall be designed, constructed, and arranged such that it is possible to release the arresting device without any danger, i.e. it prevents the uncontrolled unwinding of the rope under load.

6.6 Protective device

The danger areas on the coupling devices (e.g. gearwheels) shall be fitted with a cover to prevent accidental contact. The cover shall be made of sufficiently resistant material and shall be attached in a way that it is not removable without the use of a tool.

6.7 Footbrakes for manually operated coupling devices

Manually operated coupling devices shall be equipped with a footbrake that prevents the rope from being paid out under load when the arresting device is released. The footbrake shall operate smoothly and steplessly.

It shall be capable of holding a load of 1,5 times the tension force as given in Table 1.

6.8 Brakes for power operated coupling devices

Power operated coupling devices shall be equipped with a manually operated brake that prevents the rope from being paid out under load when the arresting device is released. The brake system shall operate smoothly and shall be steplessly releasable. The brake shall be able to hold a load of at least 1,5 times the tension force given in Table 1.

6.9 Gears

Coupling devices shall be equipped with gears with which it is possible to apply the straining load to the rope as specified in Table 1. For manually operated coupling devices, the force applied to the handwheel to obtain the specified straining load shall not exceed 500 N.

6.10 Tensioning device for manually operated coupling systems

If a manually operated coupling device is equipped with a gear, which for constructional reasons cannot fulfil the requirements according to 6.9, this device shall additionally be equipped with a secondary tensioning device. This secondary tensioning device shall be designed so that with a force of maximum 500 N the tension force required in Table 1 can be applied to rope. If the handle of the secondary tensioning device is not permanently fixed to the coupling device, it shall not be possible, that it unintentionally becomes loose during operation by itself.

6.11 Change gear for manually operated coupling devices

Manually operated coupling devices may be equipped with a change gear.

NOTE A change gear is used for handwheels with a high gear transmission ratio to enable the operation in different speeds for powerful tensioning and quick winding.

6.12 Foundation

As accessory part serves a foundation (F) consisting of two flat steel bars and fastening bolts, see Figure 6 and Table 4.

6.13 Guide track

As further accessory part serves a guide track (C) consisting of a round bar, see Figure 1 and Figure 2.

7 Dimensions and characteristic values

7.1 General

For general tolerances: ISO 2768 – c (ISO 2768-1) shall apply.

Coupling devices need not comply with the design illustrated here; however, the dimensions shall be adhered to.

7.2 Characteristic values

Table 1 lays down the straining load of the coupling device and minimum breaking load of the wire rope that is required for each nominal size.

Table 1 — Characteristic values

Dimension in millimetres

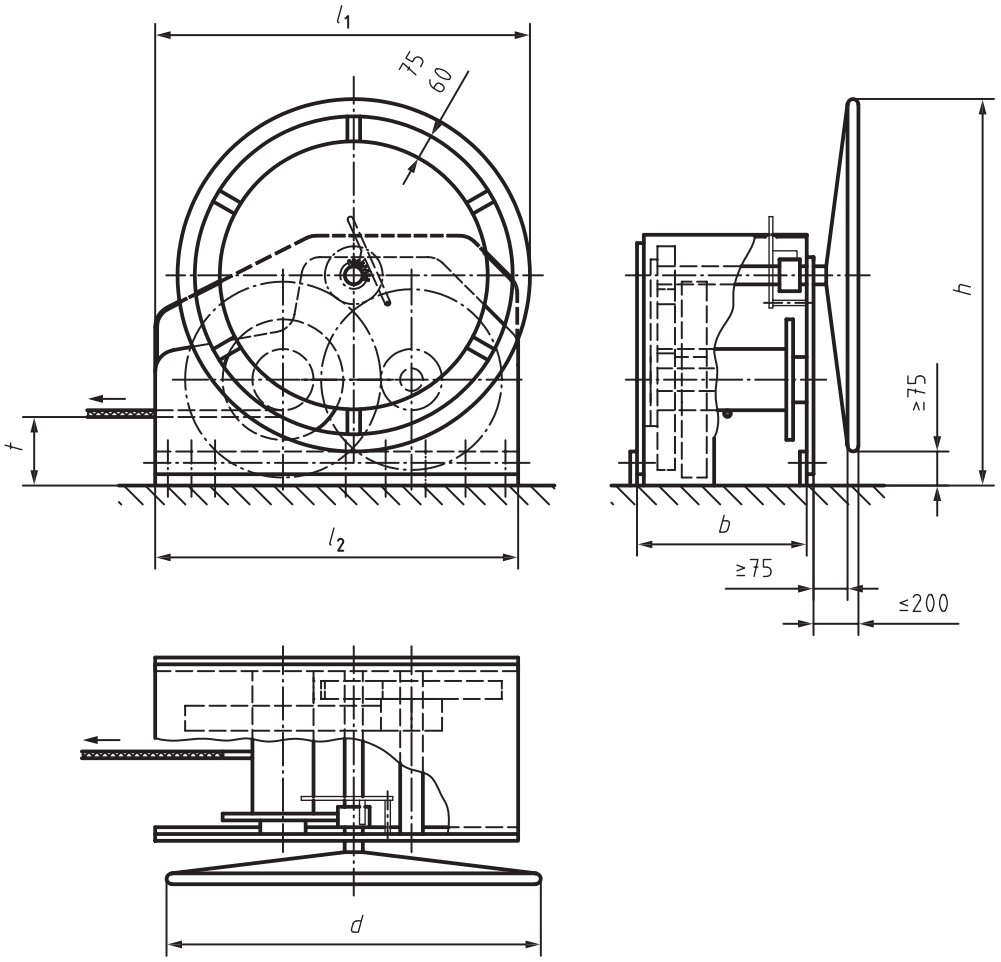
Nominal size	Straining load kN	Minimum breaking load of the wire rope shall be not higher than kN
10	18	100
25	40	250
40	45	400
60	65	600

7.3 Main dimensions of the coupling device

7.3.1 Manually operated coupling devices

The main dimensions are shown in Figure 4 and Table 2. Dimensions for d_2, e, l_2, and p_1 to p_4 as well as for number n see Table 4.

Dimensions in millimetres



Key

b width (distance from the outside of one winch plate to the inside of the other winch plate)
d diameter of the handwheel
h overall height
l_1 overall length
l_2 connecting length of the winch plate to the deck

Figure 4 — Manually operated coupling device, main dimensions (the drawing shows a right-hand model with partially braced handwheel without the protective device)

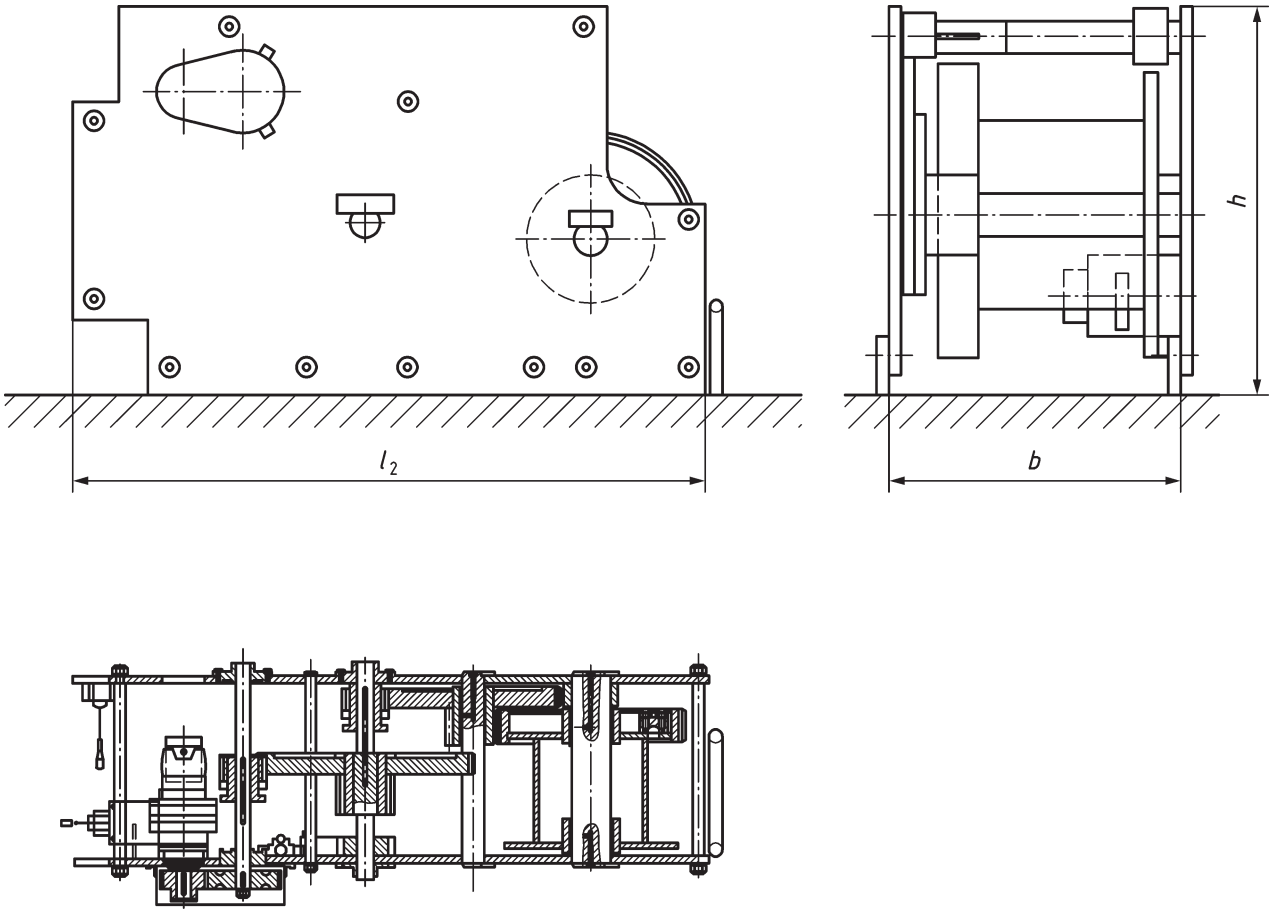
Table 2 — Main dimensions of manually operated coupling device

Dimension in millimetres

Nominal size	Main dimensions				
	b	*d*	*h*	l_1	l_2
		max.	max.	max.	
10	247	At the choice of the manufacturer			535
25	374	825	900	850	800
40	492	1 175	1 250	1 250	1 000
60	492	1 300	1 375	1 300	1 200

7.3.2 Power operated coupling devices

Main dimensions are shown in Figure 5 and Table 3. Dimensions for d_2, e, l_2, and p_1 to p_4 as well as the number n are given in Table 4.



Key

b width (distance from the outside of one winch plate to the inside of the other winch plate)

h overall height

l_2 connecting length of the winch plate to the deck

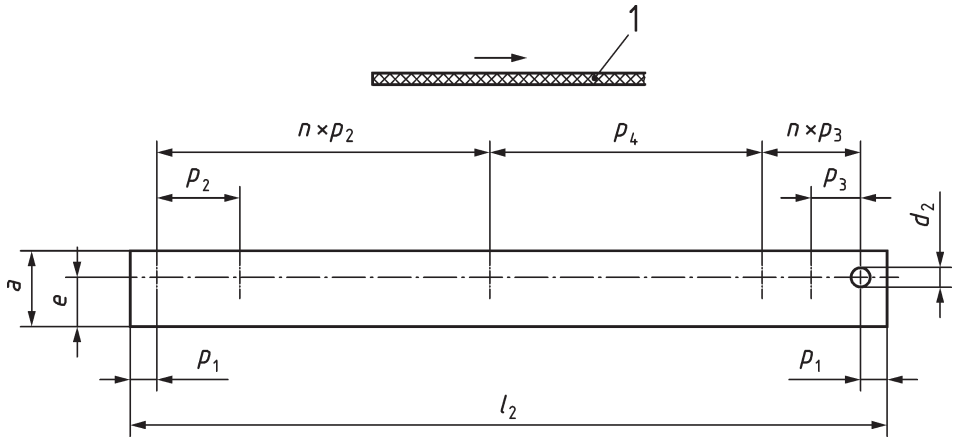
Figure 5 — Power operated coupling device — main dimensions (the figure shows a right-hand model)

Table 3 — Main dimension of power operated coupling device

Dimensions in millimetres

Nominal size	Main dimensions		
	b	h	l_2
		max.	
10	247	400	535
25	374	600	800
40	492	800	1 000
60	492	1 000	1 200

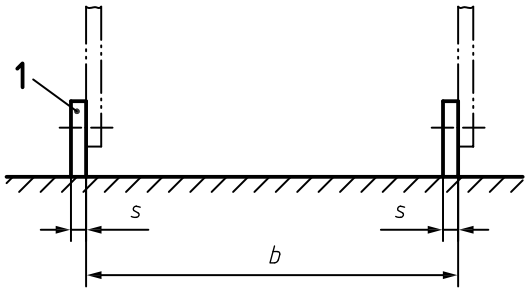
7.4 Arrangement of foundation



Key

1 direction of wire rope

Figure 6 — Foundation bar



Key

1 foundation bar

Figure 7 — Location of the foundation bar

Table 4 — Foundation dimensions

Dimensions in millimetres

Nominal size	b	Foundation bar								Fastening bolts	
		Flat bar $a \times s$	l_2	e	p_1	$n^a \times p_2$	$n^a \times p_3$	p_4	Ø d_2	Number per bar	Thread
10	247	75 × 12	535	50	35	1 × 75	1 × 75	315	22	4	M 20
25	374	75 × 15	800	50	30	1 × 100	3 × 120	280	22	6	M 20
40	492	100 × 20	1 000	65	35	4 × 110	2 × 65	360	26	8	M 24
60	492	100 × 20	1 200	65	35	4 × 145	2 × 75	400	26	8	M 24

[a] n = number of pitches.

8 Material

No component, e.g. ratchet wheels and ratchet pawls, may be made of cast iron.

The flat bar for the foundation bar shall be made of steel with a minimum tensile strength of 360 N/mm^2, e.g. in accordance with ISO 1035-3.

The fastening bolts shall be in accordance with at least ISO 4014.

9 Operating instructions and assembly instructions

9.1 General

The manufacturer shall supply operating instructions and assembly instructions in the language of the user or the purchaser.

9.2 Assembly instructions

The assembly instructions shall contain at least:

— positioning of footbrake;

— positioning of flat bars for foundation according to Figure 7;

— additional assembly instruction, particularly explaining that the walk way shall not be restricted and that parts of the coupling device may not protrude from the vessel;

— advice to position the coupling device so that the coupling device and the wire rope connection is visible from the operator's position.

9.3 Operating instructions

The operating instructions shall contain at least:

— assembly instructions, particularly for the footbrake;

— information on maintenance;

— operating instructions;

— specific safety information;

— technical data;

— information on parts subject to wear;

— requirements for the wire rope suitable for use;

— information on range and intervals of required testing.

10 Designation

Designation of a manually operated coupling device (M) according to this standard, left-hand model (L), of nominal size 25 (25) with tensioning device (T):

Coupling device ISO 6218 — M — L — 25 — T

Designation of a power operated coupling device (P) according to this standard, left-hand model (L), of nominal size 25 (25):

Coupling device ISO 6218 — P — L — 25

Designation of a foundation (F) for a coupling device according to this standard of nominal size 25 (25):

Foundation for coupling device ISO 6218 — F — 25

11 Marking

The coupling devices shall be clearly and permanently marked with the following information:

— designation in accordance with Clause 10;

— name of manufacturer or supplier;

— year of manufacture;

— serial number;

— straining load;

— highest permissible wire rope diameter;

— highest permissible minimum breaking load of the wire rope;

— highest permissible actuating power for power operated coupling devices.

Foundations shall be clearly and permanently marked with the following information:

— designation in accordance with Clause 10;

— name of the manufacturer;

— year of manufacture;

— serial number.

Annex A
(normative)

Individual and type testing

A.1 Selection of samples for type testing

For series-manufactured coupling devices, the testing is in the form of a type test.

One coupling device shall be selected at random per series of coupling devices up to a maximum of 20.

A.2 Visual examination

Prior to the loading test, a visual examination and check shall be carried out of the relevant dimensions and calculations and materials for compliance with this standard.

A.3 Loading test

A.3.1 General

The test shall not result in any permanent deformation of the coupling device.

During the test, the loads to be measured shall be held for at least 5 min.

A.3.2 Test for manually operated coupling devices

a) The tensile load of the wire rope as specified in Table 1 shall be attained with a tangential load on the handwheel of 500 N or less.

b) The braking effect of the footbrake when loaded with 60 kg shall be at least 1,5 times the tension force of the wire rope as specified in Table 1.

c) The coupling device shall be loaded with 1,25 times the minimum breaking load of the wire rope as specified in Table 1.

A.3.3 Test for power operated coupling devices

a) The straining load of the wire rope as specified in Table 1 shall reached and it shall be ensured, that the motor power is reduced automatically when the tensile force exceeds 10 % of max. tensile force.

b) The braking effect of the holding system shall be at least 1,5 times the straining load of the wire rope as specified in Table 1.

c) The coupling device shall be loaded with 1,25 times the minimum breaking load of the wire rope as specified in Table 1.

Bibliography

[1] ISO 1035-3, *Hot-rolled steel bars — Part 3: Dimensions of flat bars*

ICS 47.060
Price based on 16 pages

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™