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Small craft — Remote hydraulic steering systems

Petits navires — Système de direction hydraulique commandé à distance

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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.

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This document was prepared by Technical Committee ISO/TC 188, *Small craft*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 464, *Small craft*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 10592:1994), which has been technically revised.

The main changes are as follows:

— in Clause 3, definitions have been updated;

— throughout the text, requirements have been updated to meet the state of the art;

— the steering wheel requirements and tests have been removed;

— former Clause 12, Designation, has been removed.

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Small craft — Remote hydraulic steering systems

1 Scope

This document specifies the requirements for the design, installation and testing of engine-mounted and craft-mounted remote hydraulic steering systems used with single and multiple engine installations of outboard engines over 15 kW per engine, as well as with single and multiple engines of inboard, sterndrive, and water jet drives, all used on small craft.

This document does not address emergency means of steering the craft.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 8848:2022, *Small craft — Remote mechanical steering systems*

ISO 12217-1:2015, *Small craft — Stability and buoyancy assessment and categorization — Part 1: Non-sailing boats of hull length greater than or equal to 6 m*

ISO 12217-2:2015, *Small craft — Stability and buoyancy assessment and categorization — Part 2: Sailing boats of hull length greater than or equal to 6 m*

ISO 12217-3:2015, *Small craft — Stability and buoyancy assessment and categorization — Part 3: Boats of hull length less than 6 m*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
burst pressure
pressure at which the system exceeds the ultimate strength of the weakest hydraulic component, resulting in a drop of hydraulic pressure

3.2
component interface
mechanical interface (3.4) or *hydraulic interface* (3.3) at a point in the *steering system* (3.14) where a connection is made between components that are not supplied as part of the same assembly kit

Note 1 to entry: If hydraulic fluid lines are not shipped as part of the steering kit, there is an interface between the helm and the fluid lines, and between the *output device* (3.12) and the fluid lines.

3.3
hydraulic interface
interface between two or more hydraulic components where force and motion are transmitted by hydraulic fluid

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3.4
mechanical interface
interface where force and motion are transmitted mechanically

3.5
component proof pressure
pressure rating for helms, lines, fittings and *output devices* (3.12) at which the component performs as intended

3.6
component maximum working pressure
pressure equivalent to one-half of the *component proof pressure* (3.5)

3.7
drag link
link rod
link arm
mechanical device used in a *steering system* (3.14) by which the force of the *output device* (3.12) is transmitted to the *steering arm* (3.22), in either a *craft-mounted steering system* (3.15) or an *engine-mounted steering system* (3.8)

3.8
engine-mounted steering system
steering system (3.14) in which the reactionary forces of the *output device* (3.12) are resisted by the propulsion device

3.9
hydraulic helm
mechanism, exclusive of the steering wheel or control element, through which remote manual effort is converted to hydraulic pressure and flow

3.10
remote hydraulic steering system
steering system (3.14) that utilizes a *hydraulic helm* (3.9) to convert operator steering inputs into hydraulic pressure and flow to actuate an *output device* (3.12) with no additional energy source

3.11
minimum retained system performance
system performance after test(s) such that at least 90 % of the *steering arm* (3.22) travel normally available on each side of the mid-position can be attained by exertion of no more than 27 Nm of torque at the helm through the steering wheel or control element

Note 1 to entry: This criterion does not define the *steering system* (3.14) performance while a *craft* (3.23) is underway, but is intended to provide quantitative limits for design and testing purposes.

3.12
output device
hydraulic cylinder, rotary actuator or other device that converts hydraulic pressure and flow into force on, and movement of, the steerable device

3.13
rate of steering response
ratio of output movement to input movement

3.14
steering system
assembly that includes all components necessary to transmit remote manual effort to the steerable device

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3.15
craft-mounted steering system
steering system (3.14) in which the reactionary forces of the *output device* (3.12) are resisted by the *craft* (3.23)

3.16
hydraulic fitting
part or design feature on a component used to join (i.e. connect) any pressure retaining components in the *steering system* (3.14)

3.17.1
system design peak pressure
<single and twin engines> greater of the pressures generated by the application of either a 1 672 Nm *system torque* (3.20) to the steering axis of the outboard engine(s), inboard engine rudder, sterndrive, or water jet drive(s), or a single tangential load of 445 N; or *system relief pressure* (3.19) if relief activates during application of a 445 N load at D_s on the steering wheel rim or at D_s on the handgrip with the largest diameter D_s wheel specified for the hydraulic helm

3.17.2
system design peak pressure
<triple and quadruple outboard engines> greater of the pressures generated by the application of either a 3 344 Nm *system torque* (3.20) to the steering axis of the outboard engines, or a single tangential load of 445 N; or *system relief pressure* (3.19) if relief activates during application of a 445 N load at D_s on the steering wheel rim or at D_s on the handgrip with the largest diameter D_s wheel specified for the hydraulic helm

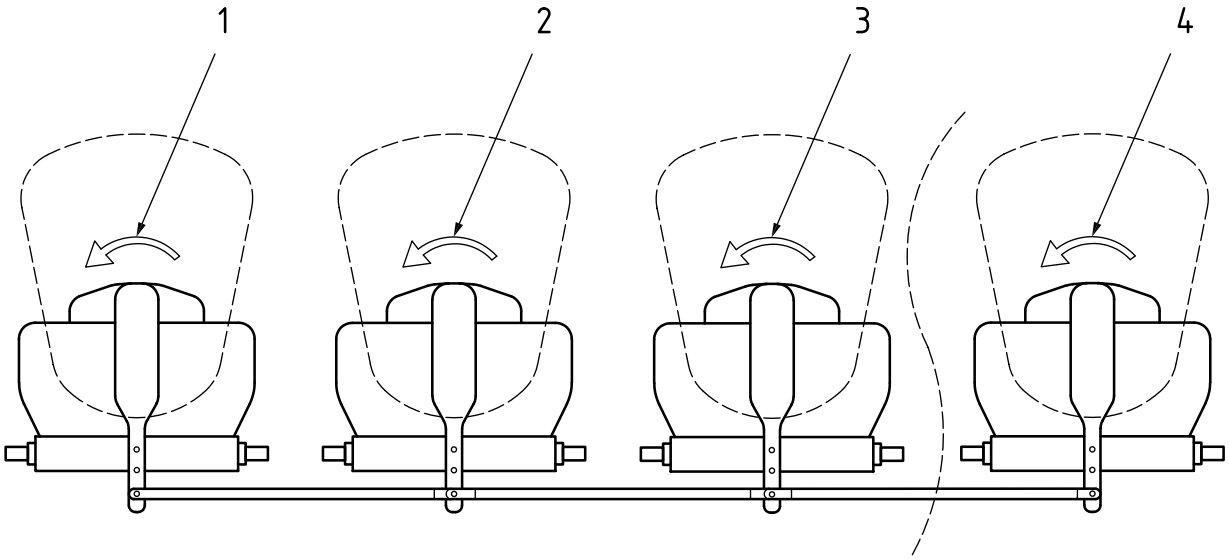
3.18
system proof pressure
pressure attained by a system if equipped with an activated pressure relief device, or a single tangential load of 450 ± 5 N at the steering wheel rim or handgrip with the largest diameter D_s wheel specified for the helm

3.19
system relief pressure
pressure limit when a pressure relief device activates

3.20
system torque
total combined torque applied to the outboard engine(s) axis (or axes), inboard rudder, sterndrive or waterjet propulsion system that is resisted by the component(s) of the *steering system* (3.14)

Note 1 to entry: Outboard engine example shown in Figure 1.

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Key

1 engine 1 torque
2 engine 2 torque
3 engine 3 torque
4 engine 4 torque

Figure 1 — System torque

3.21
multiple engine installation
two or more engines, normally used simultaneously for a *craft's* (3.23) main propulsion, controlled by a common *steering system* (3.14)

3.22
steering arm
portion of the outboard engine that the *steering system* (3.14) makes *mechanical interface* (3.4) with

3.23
craft
small craft
recreational boat, and other watercraft using similar equipment, of up to 24 m length of hull (L_H)

Note 1 to entry: The measurement methodology for length of hull is defined in ISO 8666.

[SOURCE: ISO 8666:2020, 3.15, modified — Note 1 to entry has been added.]

4 General requirements

4.1 The craft manufacturer shall install the complete remote hydraulic steering system on the craft to at least the applicable points listed in a) or b) as follows.

a) For craft with outboard engines, the steering system shall be complete from the control element to the mechanical interface for connection of the drag link supplied with the outboard engine, or shall provide an alternative means to connect the output device to the engine so that the loading magnitude and offset are consistent with the steering arm's intended purpose.

b) In all other craft, the steering system shall be complete from the control element to the output connection point on the steerable device.

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