INTERNATIONAL STANDARD

ISO 3715-2

First edition
2001-08-01

Ships and marine technology — Propulsion plants for ships —

Part 2: Vocabulary for controllable-pitch propeller plants

Navires et technologie maritime — Installations de propulsion des navires —

Partie 2: Vocabulaire pour installations avec hélice à pas variable

Reference number
ISO 3715-2:2001(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

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 3.

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 part of ISO 3715 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 3715-2 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

ISO 3715 consists of the following parts, under the general title *Ships and marine technology — Propulsion plants for ships*:

— *Part 1: Vocabulary for geometry of propellers*

— *Part 2: Vocabulary for controllable-pitch propeller plants*

Ships and marine technology — Propulsion plants for ships —

Part 2:
Vocabulary for controllable-pitch propeller plants

Scope

This part of ISO 3715 gives terms and definitions applicable exclusively to continuously variable and hydraulic operated controllable-pitch propeller units. It does not cover controllable-pitch propeller units for which only a few specified pitch settings apply.

General vocabulary for the geometry of screw propellers is given in ISO 3715-1 and is also valid for controllable-pitch propellers.

Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 3715. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 3715 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3715-1, *Ships and marine technology — Propulsion plants for ships — Part 1: Vocabulary for geometry of propellers*

Terms and definitions

1
controllable-pitch propeller
screw propeller with controllable pitch of the blades

NOTE Figure 1 shows a controllable-pitch propeller unit and its individual components.

1.1
controllable-pitch reversible propeller
screw propeller with controllable pitch of the blades in positive and negative range of pitch angle

1.2
controllable-pitch non-reversible propeller
screw propeller with controllable-pitch of the blades in the positive range of pitch angle

1.3
controllable-pitch propeller including feathering position
screw propeller with controllable pitch of the blades in positive and negative range of pitch angle and in feathering position

2 Blade
See definition in ISO 3715-1.

2.1
blade attachment
component part for force-locking and form-locking connection of a blade with the hub

2.2
blade bearing
bearing of the blade in the hub

NOTE Diagrammatic sketches of other types of bearings are given in Figures 2, 3 and 4.

2.3
blade seal
seal between blade and hub to prevent seawater from leaking in and oil and grease from leaking out

3 Hub
See definition in ISO 3715-1.

NOTE If applicable, the cap may be part of the hub.

3.1
hub connection
component for force-locking and form-locking connection of hub with propeller shaft

4
flange protection
protection of the aft flange of propeller shaft against mechanical and/or corrosive influence

5
shaft
carrier of power and control transmission

5.1
propeller shaft
shaft with arrangement for attachment of propeller

5.2
intermediate shaft
shaft between propeller shaft and oil distribution box or gear

6
control unit
systems transforming a rated pitch value into an actual value and supporting it

7
hydraulic unit
components that serve the generation, controlling and transmission of the oil circuit/oil pressure and for operating the control transmission and control mechanism

NOTE These components include pumps, valves, pipe lines, tanks, filters, coolers, etc.

8
control system
system to feed a rated pitch value, given by a control system, into the hydraulic unit

9
pitch control
system to support the given rated pitch value

10
feedback system
system using the actual pitch value for control purposes

11
pitch indicator
device to indicate the actual pitch value

12
control transmission
device to transmit actual pitch values into the control mechanism

13
oil-distribution box
device to feed and draw the control medium to and off the shaft (axial and peripheric) to operate the control mechanism

14
servomotor
device consisting of piston and cylinder to transform oil pressure into control force and oil circuit into adjustment path

15
oil-transfer tube
connection inside the shafts between oil distribution box and servomotor

NOTE Movable pipes within the shaft may also be used for feedback of actual pitch values and for transmission of forces.

16
pitch-actuating rod
push/pull rod
connection between servomotor and control mechanism for force transmission and to feed back actual pitch values

17
control mechanism
device inside the hub to transmit the control force and to transform the path of the servomotor into a control angle of a blade

NOTE Diagrammatic sketches of other types of mechanisms are given in Figures 5 and 6.

18
take-home equipment
device that enables the propeller to operate like a fixed-bladed propeller when the control unit fails

19
control system
input device for rated pitch values

19.1
remote control system
control system separate from the control unit

NOTE This could be in the ship's control station and/or steering stand.

19.2
manual control system
control system fitted to the control unit

NOTE This could be in the back-up control.

20 Pitch
See definition in ISO 3715-1.

20.1
design pitch
positive pitch resulting from the propeller design calculation

NOTE Preferable pitch is at $0{,}7R$.

20.2
nominal pitch
positive pitch, which enables a defined operation condition such as ship speed, power, shaft speed

NOTE The nominal pitch may differ from the design pitch.

20.3
maximum ahead pitch
maximum adjustable positive pitch

NOTE The maximum ahead pitch is larger than the design pitch by a given value.

20.4
maximum astern pitch
maximum adjustable negative pitch

20.5
range of pitch angle
control angle of the blade position

20.6
commanded pitch
value of pitch given by the control system to be realized

20.7
actual pitch
value of pitch at the time of viewing

20.8
tolerance of pitch setting
permissible deviation of the actual pitch value from the commanded pitch value related to design pitch

20.9
time for pitch changing
time being necessary to move the blade from one defined pitch to another

21
zero thrust position
blade position at which the rotating propeller with the ship speed at zero does not produce any thrust

22
feathering position
pitch position at which the unrelated propeller produces the lowest resistance

23
trailing position
defined pitch for the trailed propeller when ship is going ahead

NOTE This is normally the highest possible pitch required to achieve low rotational frequency.

24
angle of blade position
angular position of the blade relative to the blade axis (spindle axis)

25
zero point of blade position
zero value of the blade angle positioned close to the zero thrust position

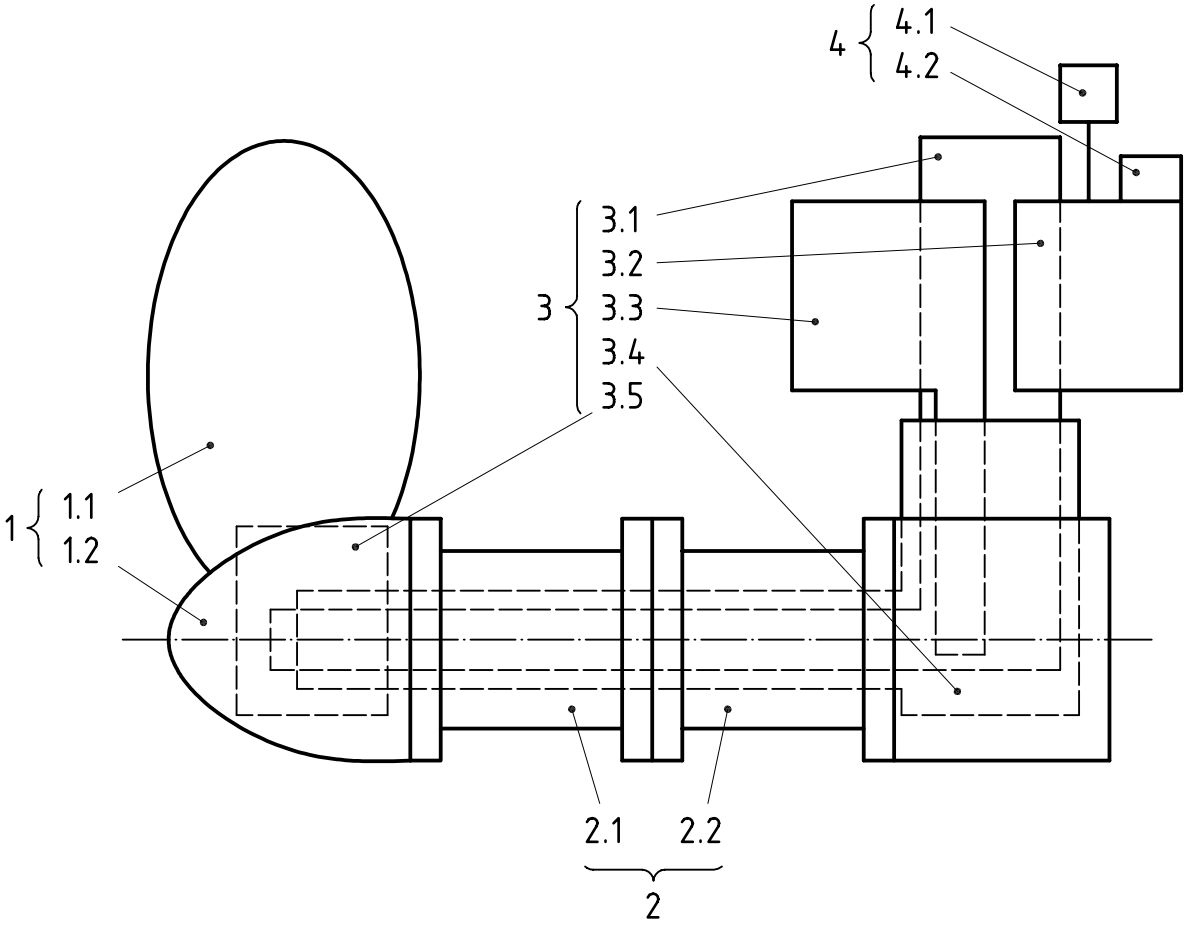
26
windmilling
propeller operating as a turbine in the wake of an operating ship and delivering power to the shaft

27
nominal pressure
pressure for which the hydraulic unit has been designed under defined operating conditions

28
testing pressure
static pressure above the nominal pressure for testing purpose of the hydraulic unit under defined conditions

29
pitch-changing pressure
pressure necessary to change the pitch of the blades

30
pitch-keeping pressure
pressure necessary to retain the blades at a given pitch



Key

1	Controllable-pitch propeller	2	Shafts	3	Control unit	4	Control system
1.1	Blade	2.1	Propeller shaft	3.1	Hydraulic unit	4.1	Remote control system
1.2	Hub	2.2	Intermediate shaft	3.2	Control equipment	4.2	Manual control system
				3.3	Pitch control		
				3.4	Control transmission		
				3.5	Control mechanism		

Figure 1 — Controllable-pitch propeller unit

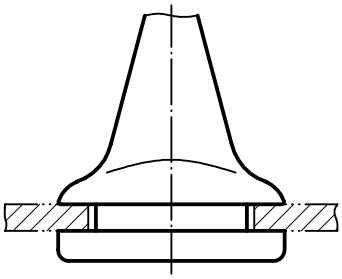


Figure 2 — Collar bearing

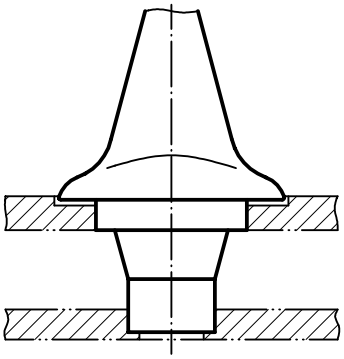


Figure 3 — Trunnion bearing

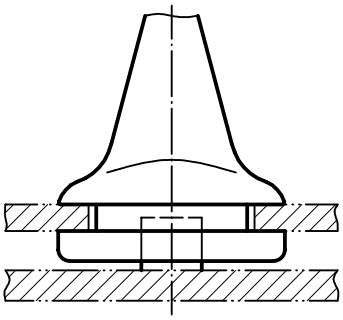


Figure 4 — Collar-trunnion bearing

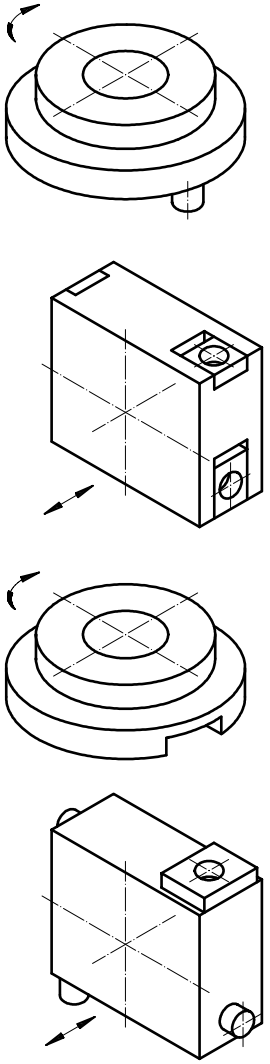


Figure 5 — Sliding block mechanism

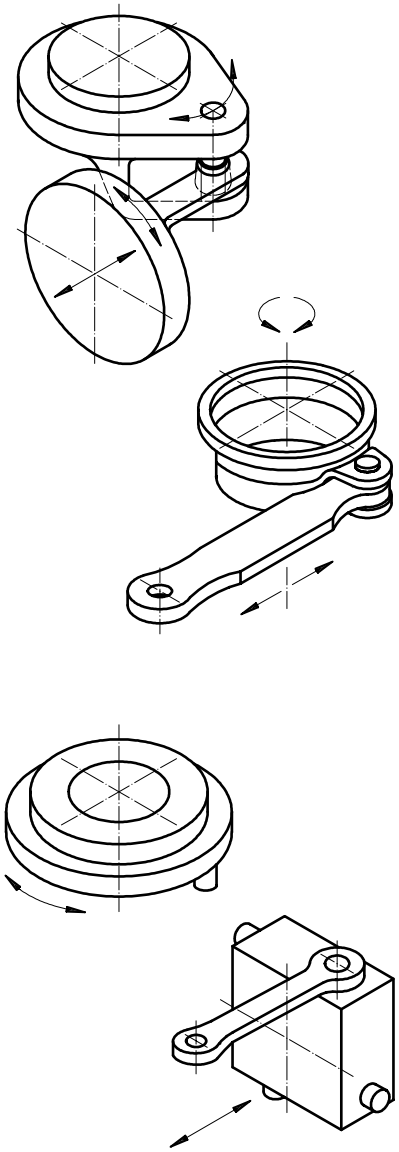


Figure 6 — Link connection mechanism

ICS 01.040.47; 47.020.20

Price based on 8 pages