DRAFT INTERNATIONAL STANDARD

ISO/DIS 24044

ISO/TC **8**/SC **4**	Secretariat: **SAC**
Voting begins on: **2020-03-16**	Voting terminates on: **2020-06-08**

Ships and marine technology — Deck machinery — Multifunctional manipulator

ICS: ISO ics

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4bed7dfd-3e50-47cc-8020-0c7fc7b4cda1/iso-dis-24044

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 24044:2020(E)

© ISO 2020

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4bed7dfd-3e50-47cc-8020-0c7fc7b4cda1/iso-dis-24044

COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4bed7dfd-3e50-47cc-8020-0c7fc7b4eda1/iso-dis-24044

© ISO 2020 – All rights reserved

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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and deck machinery*.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4bed7d6f-3e50-47cc-8020-0c7fc7b3cda1/iso-dis-24044

© ISO 2020 – All rights reserved

Ships and marine technology — Deck machinery — Multifunctional manipulator

1 Scope

This document specifies classifications, requirements, test methods, inspection rules, marking, packaging, transportation and storage of the multifunctional manipulator for deck operation (hereinafter referred to as "multifunctional manipulator").

It is applicable to the design, manufacture and acceptance of the double folding multifunctional manipulator for clamping and tidying the anchor chain and ropes in deck operation.

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 780, *Packaging — Distribution packaging — Graphical symbols for handling and storage of packages*

ISO 3828, *Shipbuilding and marine structures — Deck machinery — Vocabulary and symbols*

IEC 60447:2004, *Basic and Safety Principles for Man-Machine Interface Marks and Identifications — Actuating Principles*

IEC 60529, *Degrees of Protection Provided By Enclosure (IP Code)*

ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4be77d01-3e50-47cc-8850-0c2fc7b4cda1/iso-dis-24044

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 3828 and the following shall apply.

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

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

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

3.1
jib
second movable arm of the multifunctional manipulator used to lift and hook tension free ropes

3.2
multifunctional head
operating device of the multifunctional manipulator used to grasp, clamp and tidy the anchor chain and ropes

3.3
multifunctional boom
second movable arm of the multifunctional manipulator used to connect the multifunctional head

3.4
main boom
first movable arm of multifunctional manipulator used to connect the slewing tower body and the second movable arm of the double folding boom

3.5
luffing
movement made by the main boom, jib and multifunctional boom of the multifunctional manipulator in changing the range in a reach direction

3.6
safe working load (SWL)
maximum static load (kN) that the multifunctional manipulator can hoist or the multifunctional head operates under design working conditions

3.7
travelling mechanism
mechanism of the travelling multifunctional manipulator used to complete the movement with load along the guide rail, consisting of carrier, roller train, guide pulley set, travel driving unit, cable reel, pay-out stand, rail clamping device, speed control valve, buffer, lubrication line and other components

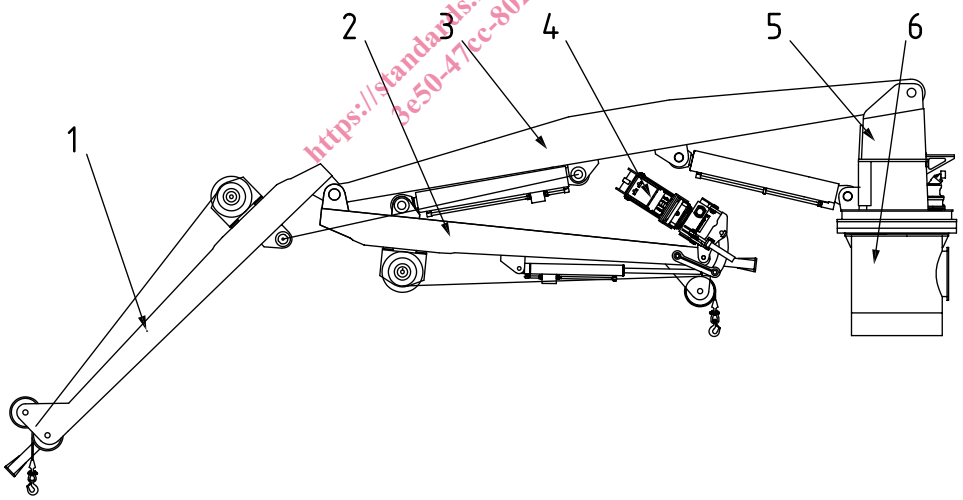
4 Classification

4.1 Structural types

4.1.1 The multifunctional manipulator can be divided into fixed and travelling types according to the structure (installation) form.

4.1.2 The multifunctional manipulator can be divided into two types: multifunctional boom only and the combination of multifunctional boom and jib according to compositions. See Figure 1 and Figure 2.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4bed7dfd-8e50-47cc-8020-0cf6c7b4cda1/iso-dis-24044

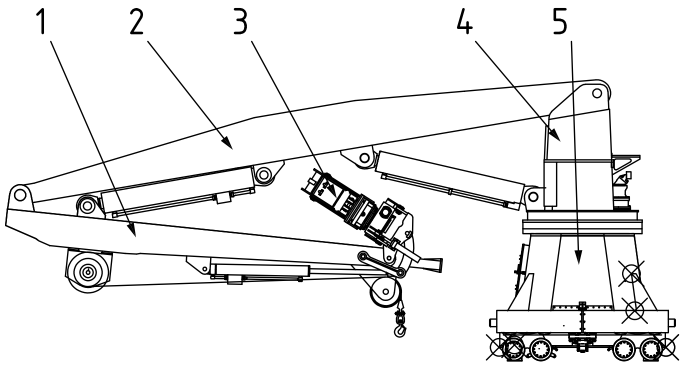


Key

1	jib	4	multifunctional head
2	multifunctional boom	5	slewing tower body
3	main boom	6	fixed base

Figure 1 — Fixed multifunctional manipulator with multifunctional boom and jib

© ISO 2020 – All rights reserved



Key

1 multifunctional boom

2 main boom

3 multifunctional head

4 slewing tower body

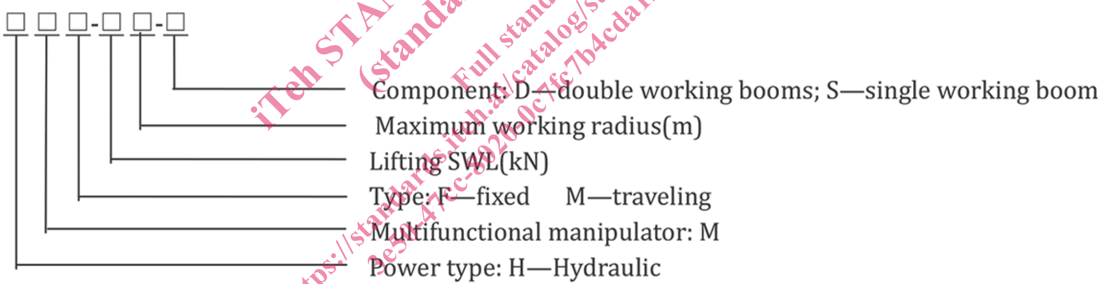
5 travelling mechanism

Figure 2 — Travelling multifunctional manipulator with multifunctional boom

4.2 Product designation

4.2.1 Designation

The multifunctional manipulator shall be designated as follows:



iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4bed7dfd-8e58-47cc-8020-0cfc7b4cda1/iso-dis-24044

4.2.2 Designation example

Designation of a multifunctional manipulator with lifting SWL of 30 kN and maximum working radius of 12 m, hydraulic-driven, fixed type and double working booms:

Multifunctional manipulator HMF-3012-D

4.2.3 Appearance

The color of the multifunctional manipulator surface shall be uniform, and the outer surface and the coating layer shall be free from scratching, peeling, cracks and rust. The SWL logo shall be clearly visible to the operator.

4.3 Basic parameters

The basic parameters of the multifunctional manipulator shall conform to Table 1.

© ISO 2020 – All rights reserved

Table 1 — Basic parameters of multifunctional manipulator

Type			HMF-2010-D	HMF-3012-D	HMR-3012-D	HMR-3014-D
SWL	Lifting	(kN)	20	30	30	30
	Multifunctional head operation	(kN)	20			
Lifting speed		(m/s)	0.46			
Maximum working radius		(m)	10,2	12,2	12,2	14
Minimum working radius		(m)	2,6	2,5	2,5	3,4
Slewing angle		(°)	360° full slewing			
Main boom luffing		(°)	0°~ 60°			
Jib luffing		(°)	20°~ 150°			
Multifunctional boom luffing		(°)	20°~ 150°			
Swinging luffing of the multifunctional head along the boom		(°)	120°			
Self swinging of the multifunctional head		(°)	±40°			
Self slewing luffing of multifunctional head		(°)	360° full slewing			
Size range for multifunctional head clamping anchor chain		(mm)	φ50~φ120			
Size range for multifunctional head clamping rope		(mm)	φ50~φ84			

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4bed7dd3-5e50-47cc-8020-0c7fc7b4cda1/iso-dis-24044

5 Requirements

5.1 Design and structure

5.1.1 Environmental conditions

The multifunctional manipulator shall be able to work normally in the following environment:

a) sea state: Level 4

b) ambient temperature: -25 °C~45 °C

c) vibration and shock generated during the normal operation of the ship

d) humidity greater than 95 % with oil mist, salt spray, and mildew

5.1.2 Steel wire rope

The steel wire rope shall be non-rotating steel wire, and the nominal tensile strength of a single steel wire shall be not less than 1 440 MPa and not greater than 2 200 MPa.

5.1.3 Hook

The hook shall be of rotating type and shall reach the lifting capability of lifting SWL in the design sea state.

5.1.4 Pulley

5.1.4.1 There shall be a proper inclined angle , which is usually between 35° and 45°, at the pulley rope groove side and the inclined angle at the pulley rope groove side in Level 4 sea state shall be taken as 40°.

© ISO 2020 – All rights reserved

5.1.5 Boom, slewing tower body, base and carrier structure

5.1.5.1 The main boom, jib, multifunctional boom, etc. shall adopt box shaped variable section boom structure. The boom, slewing tower body, base and carrier shall be subjected to stress relief treatment after welding.

5.1.5.2 The slewing tower body shall be subjected to watertight inspection.

5.1.6 Slewing mechanism

5.1.6.1 If there are special requirements for the slewing tower body to limit the slewing angle, the mechanical and electric limits shall be set.

5.1.6.2 The slewing angle measurement shall be measured using an encoder enclosed inside a hydraulic/electrical adapter.

5.1.6.3 The slewing mechanism has two slewing hydraulic drive mechanisms which are respectively arranged on both sides of the lower plane of the slewing tower body. The slewing hydraulic drive mechanism is composed of a planetary speed reducer, a brake and a gear, and the brake is normally closed. The slewing hydraulic drive mechanism shall leave 1,5 mm eccentricity with the mounting axis to ensure that the slewing support meshes well with the slewing hydraulic drive mechanism gear and compensates for wear during use.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/4fed7d1c-3e60-47cc-8620-0c7fc7b4eda1/iso-dis-24044

5.1.7 Fixed base/travelling mechanism

5.1.7.1 The fixed base shall be of sufficient rigidity to prevent the system from shaking due to excessive elastic deformation.

5.1.7.2 For roller trains of the travelling mechanism, the two roller trains mounted on the front and rear ends of the lower portion of the carrier respectively shall be used, each roller train consisting of one mounting shaft, four positive rollers, four return rollers and two swing frames, to accommodate to the vertical plane motion and horizontal yaw of the ship. Travelling drive should adopt the pinion and rack driving mode.

5.1.7.3 The cable length of the cable reel on the travelling mechanism is one-half of the travelling stroke of the travelling multifunctional manipulator plus the safety ring number.

5.1.7.4 The role of the speed control valve of the travelling mechanism is to automatically slow down and stop travelling near the stroke destination. The travelling mechanism of the hydraulic drive shall be equipped with a speed control valve to ensure the system travelling safety and buffers shall be installed at both ends of the travel stroke.

5.1.7.5 The roller of travelling mechanism shall be of curved tread and the guide rail shall be of flat tread.

5.1.7.6 The lubrication for the roller train and guide pulley set shall be carried out with wheel-side manual lubrication.

© ISO 2020 – All rights reserved