

NORSOK U-102 ROV Services : 2020

New revision walkthrough

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NORSOK EG_UB Expertgroup

U-102 revision work group

Appointed by the expertgroup

The NORSOK standard is developed in collaboration with Standard Norway with broad participation from interested parties in the Norwegian petroleum industry.

The standards are owned by the Norwegian petroleum industry represented by Norwegian Oil and Gas, Norwegian Industry, the Norwegian Shipowners' Association and Standard Norway.

The administration and management have been assigned to Standard Norway.

U-Underwater Operation

If you have comments on existing NORSOK standards, please use [the comment form](#). Please note that standards are subject to review **at least every five years**.

NORSOK Standards

U-100	Manned underwater operations (Edition 5, December 2015, corrected version 2016-05-09)
U-100N	Bemannede undervannsjøoperasjoner (Utgave 5, desember 2015)
U-101	Diving respiratory equipment (ed. 2, January 2013)
U-103	Petroleum related manned underwater operations inshore (2019)
U.103N	Petroleumsrelaterte bemannede undervannsjøoperasjoner inshore (2019)
U-102	Remotely operated vehicle (ROV) services (2020)

[Show withdrawn NORSOK standards](#)

STANDARDS

- o C-Architect
- o D-Drilling
- o E-Electrical
- o G-Geotechnology
- o H-HVAC
- o I-Instrumentation
- o I-Metering
- o I-ISSC Integrated Control and Safety System
- o J-Marine Operation
- o L-Piping / Layout
- o M-Material
- o N-Offshore Structures
- o O-Operation
- o P-Process
- o R-Lifting Equipment
- o R-Mechanical
- o S-Safety (SHE)
- o T-Telecommunication
- o U-Subsea
- o U-Underwater Operation
- o WF-Well fluids
- o Y-Pipelines
- o Z-E&I Installation
- o Z-MC and Preservation
- o Z-Reliability engineering and technology
- o Z-Risk analyses
- o Z-Stand. Cost Coding
- o Z-Technical Information
- o Z-Temporary Equipment



Introduction

New since last revision;

This revision of NORSOK U-102 is capturing feedback from the industry since last revision. Description of new technology has been included in the standard as seen applicable.

The ROV classes have been aligned with the classes as defined by IMCA. New classes have also been added to capture systems that are not defined in the previous revision of this document.

The technical requirements have been put into a tabular form, enabling users to better understand the differences between the classes.

Annex A and Annex B are informative. Annex C was made normative in this edition (2020)



Chapter 1

Scope

This document defines basic requirements for personnel, equipment and systems for ROV operations related to the petroleum industry.



Chapter 2

Normative references

The referenced documents contain text which fully or in part is part of the requirements in the document. For dated references, only the edition cited applies. For undated references, the latest edition of the cited document applies (including amendments).

Chapter 4

Abbreviations

- Chapter have been cleaned up.
- All abbreviations from the standard and attachments have been moved to this chapter.



Chapter 3

Terms and definitions

Chapter have been cleaned up after the the revision.

Please make a note of the following definitions that have been added.



3.6

competent person

1: person performing certification in accordance with the applicable rule or code applied

2: person possessing the knowledge and experience required for the performance of thorough examinations and tests if lifting appliances and loose gears and who is acceptable to the competent authority

Note 1 to entry:

The person shall be qualified in accordance with the same rule or code for certification of offshore cranes or other relevant approval for certification of cranes subject to dynamic loads.

3.7

competent authority

means a minister, government, department or other authority empowered to issue regulations, orders or other instructions having the force of law



Chapter 5

ROV classification

Expanded standard to cover more classes



Previous version of standard did only cover class I to class III B

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Chapter 5

ROV classification

5.10 added to capture future technology



5.10 Emerging technologies

If an ROV is meant to reside for longer periods in water at or close to seabed (more resident) it should be designed to be more resilient to corrosion. The maintenance intervals and philosophy should also be adjusted accordingly.

Remote piloting from shore-based control room is also a tendency that will be more common in the future.

New technology for wireless communication in water can enable ROV's to operate without tether bringing along greater freedom, but also challenges. Due to this the ROV's should be equipped with batteries to enable tetherless manoeuvring.

Better sensors and increased computing power can also enable more autonomous features for piloting the ROV and/or manipulators during "flying" and interventions.

NOTE 1 One common term often used for these vehicles is Underwater Intervention Drones (UID).

NOTE 2 Information regarding wireless communications in water can be found through Subsea Wireless Group (SWiG). SWiG is an international oil and gas industry network promoting interoperability for subsea wireless communications (radio frequency, acoustic, free-space optic, inductive power, hybrid).



Chapter 6

Administrative requirements

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Old

- New chapter number
- Same content, only updated text with reference to normative and informative references.
- Introduced table 1 to better summarize the expected documentation requirements



Chapter 6

Administrative requirements

- Table 1
- Documentation during different phases of project execution
- References to where in U-102 the requirement is found

Table 1 – Minimum documentation requirements

As a minimum, contractor shall ensure availability of updated editions of the following documents at the work site ^a	ROV system mob/ demobilisation ^b	Project mob/ demobilisation ^c	During operations
Mob/demobilisation plan, see 10.4.	Y	Y	N
List of services required from work-site, see 8.	Y	Y	N
Structured plan for system acceptance test, see 10.5.	Y	Y	N
Contractors project quality assurance (QA) manual/plan.	Y	Y	Y
Contractors HSE plan for the work-site.	Y	Y	Y
Organogram, see 6.2.	Y	Y	Y
Contractors' operational manuals, pertaining to relevant contract.	Y	Y	Y
Procedure for normal and emergency operation of the equipment, see 6.3.	Y	Y	Y
Procedure for maintenance of all equipment under the services, see 6.3, 6.6 and 10.1.	Y	Y	Y
Minimum list for spare parts, see 6.6.	Y	Y	Y
Inventory list of spares, see 6.6.	(Y)	(Y)	Y
Contractors contingency plan for the relevant contract, interfaced with clients plan for the relevant area.	Y	Y	Y
Procedures for all activities pertaining to the relevant contract.	Y	Y	Y
Relevant risk analysis, see 10.2.	Y	Y	Y
Log to document operational activities, see 10.3.	(Y)	(Y)	Y
Maintenance programmes and records for last 12 months, see 6.6.	(Y)	(Y)	Y
Personnel competency matrix for allocated personnel.	Y	Y	Y
Certificates for ROV system, see 6.6, 10.9, C.3 & C.4.	Y	(Y)	Y

Key

- Y Required
- (Y) Recommended
- N Not required

^a With reference to 6.4

^b When new ROV spread is mobilised onto vessel/installation.

^c When new project specific equipment is mobilised onto vessel/installation.



Chapter 7

Personnel qualification requirements

7.2 Crew requirements

It is the ROV contractors' responsibility to have a system to document that the crew have the necessary competence requirements at work site. The documentation/information shall be made available if requested by client during e.g. audit.

See Annex A for further recommendations of training modules content and duration.

7.3 Manning Level

- The system manning level shall be based on the planned tasks and duties that are required to perform the work.
- For shore based remotely operated and partly shore based controlled systems, other manning levels may be used as agreed between contractor and client.



Chapter 7

Personnel qualification requirements

7.4.2 Personnel requirements - high voltage ROV system

The person responsible for isolating and power-up High Voltage system shall, as a minimum, be qualified as follows (all bullets below):

- a) skilled worker from the electrical trade degree (This means the following Norwegian trade degrees: Elektriker, Energimontør, Skipselektriker, FU-operatør and Automatiker) or equivalent,
 - b) additional training in maintaining high voltage systems,
 - c) additional course for the high voltage equipment in question,
 - d) updated on technological developments and current regulations, and
 - e) completed yearly FSE refresher training.
- At clients request, the contractor shall be able to document the above qualifications at worksite.
 - “Equivalent” shall be a formal education for being an electrician and have a skilled worker certificate for completed apprenticeship. This education lasts typically more than 3 years.



Chapter 8

Worksite interface requirements

- These interfaces should be defined prior to issue scope of work to the contractor. All interfaces shall be addressed and agreed between client and contractor prior to mobilising equipment to site.
- IMCA R018 should be used as a guidance on the installation of an ROV system, or systems, on to vessels and/or platforms.



Chapter 9

Technical requirements

This clause specifies the minimum technical requirements for ROV systems in the various classes, measurement requirements and units to be used.

Table example



Key to table requirements



Table 3 – Technical equipment specification

Clause	Sensors	Class I		Class II		Class III		Class IV		Class V		Class VI		Class VII		Class VIII		
		-	A	B	A	B	A	B	A	B	A	B	A	B	-	-	-	-
9.4.2	Buoyancy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sufficient to trim vehicle neutrally	Y	Y	(Y)	N	N	N	N	N	O	Y	Y	(Y)	N				
	Sufficient to trim vehicle neutrally and have capacity for additional 50 kg payload	N	(Y)	Y	Y	Y	N	N	O	N	(Y)	Y	N					
	Sufficient to vehicle neutrally and have capacity for additional 200 kg payload	N	N	N	Y	Y	N	N	O	N	O	O	O	N				
9.4.3	Cameras and lights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Low light navigation camera	(Y)	Y	Y	Y	Y	O	Y	O	(Y)	Y	Y	Y	Y				
	Colour camera	Y	Y	Y	Y	Y	O	Y	O	(Y)	Y	Y	Y	(Y)				
	HD camera	O	O	O	(Y)	(Y)	O	(Y)	O	O	(Y)	Y	(Y)					
	Super wide navigation camera	O	O	O	(Y)	(Y)	O	(O)	O	O	O	(Y)	N					
	Lights	Y	Y	Y	Y	Y	O	Y	Y	Y	Y	Y	Y	Y				
	Emergency flasher	O	(Y)	Y	Y	Y	N	(Y)	(Y)	(Y)	(Y)	(Y)	(Y)	O				
9.4.4	Sonar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Type 1- Key	(Y)	Y	Y	(Y)	(Y)	(Y)	(Y)	(Y)	(Y)	N	N	N	O				

- Y Required
- (Y) Recommended
- O Optional
- N Not Required
- "Intentionally left blank"

Chapter 9

Technical requirements

Table explanation



Buoyancy shall ensure stability of the vehicle with neutral trim.

Installed ballast weights and weight of installed non-standard equipment shall be verified.

9.4.3 Cameras and lights

The cameras and lights constitute the viewing system. Acceptance criteria for the viewing system shall be as follows:

- a) interference-free pictures;
- b) the video system shall be able to record a minimum of 400 lines.

The cameras and lights are specified as listed below. Standard outfit of cameras shall minimum include:

- c) 1 ea. low light navigation camera;
- d) 1 ea. colour camera or (1 ea. optional HD camera).

The **Low light camera** is used primary for navigation. The camera is placed in front of the vehicle and shall provide high quality images enabling safe navigation with a wide-angle view over long distances. Low light cameras shall satisfy the following technical requirements:

- e) minimum light sensitivity: 3×10^{-2} lux at face plate and 3×10^{-1} lux at scene;
- f) horizontal resolution > 400 lines.



Chapter 10

Operational requirements

- New chapter number
- 10.1 Prerequisite expectations for the planning and execution
- 10.3 Operational log and management, added MOC requirement
- 10.4 Mobilization/demobilization, updated and now with reference to IMCA R009
- 10.5 Function testing prior to use, added text regarding function test requirements to cover a broader area
- 10.6 Familiarisation, added text for clarifications

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9.9	Umbilical/tether cables	24
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New

Old



Chapter 10

Operational requirements

- 10.7 Revised text and heading regarding ROV & Diving. Now refer to IMCA D054-R020
- 10.8 Tether management system (TMS), revised and clarified text. Added requirement for log of cutback
- 10.9 Revised heading, handling system vs Launch and recovery System LARS. Revised and added text regarding requirements for winch, umbilical and “bullet”
- 10.10 Control facilities, minor text revision. Added text regarding shore based control room

New

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Annex A (informative)

Personnel qualification requirements details

This annex serves to outline in greater detail a recommended program of training modules and estimated duration for such training. The duration may vary based upon the individual ROV company's basic training philosophy.

Figure A.1 describes a typical career path for all levels in the ROV operational environment including the training elements within each level.

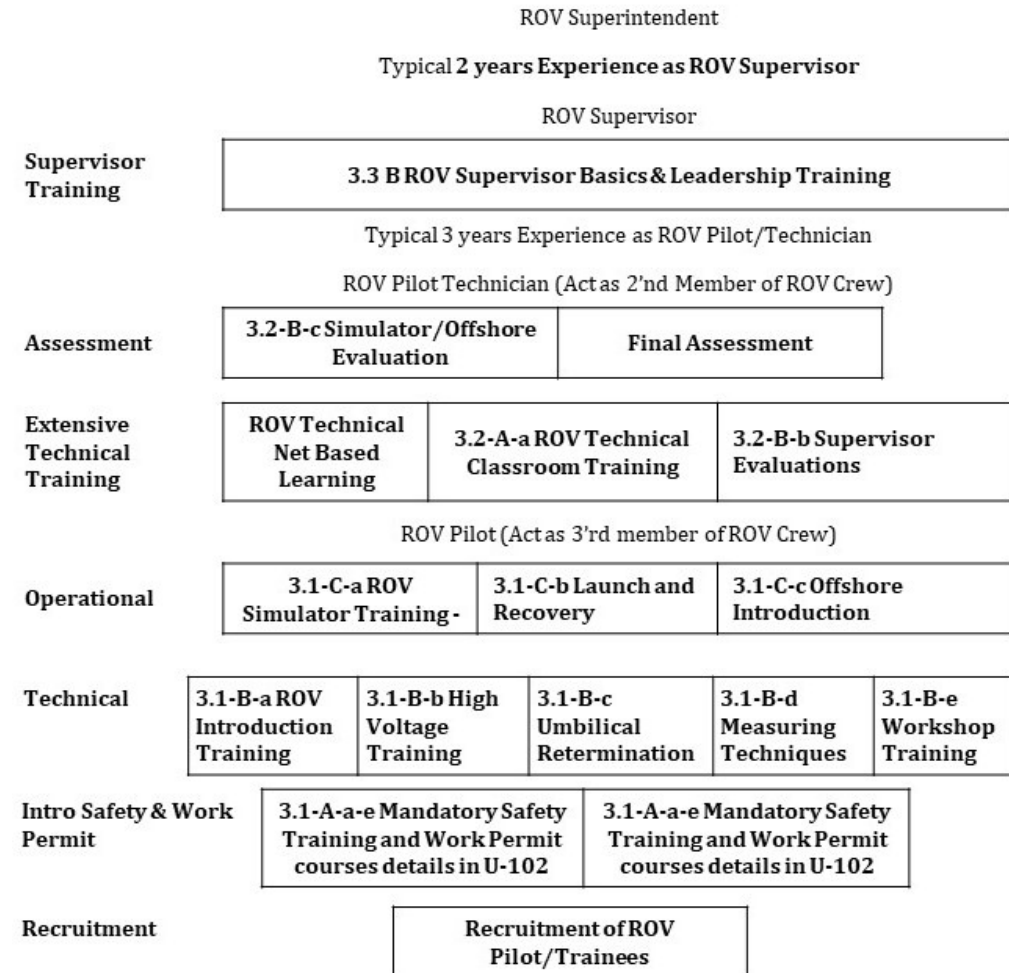


Figure A.1 - Personnel category requirements



Annex B (informative) ROV system requirements

- Same heading structure as old
- Updated table layout based on new overall U-102 layout
- Reference to the relevant clause in the U-102 document

New

Annex B (informative) ROV system requirements 33

Old

Annex B (informative) Remotely operated vehicle (ROV) system requirements 31

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Annex C (normative)

Design and certification of ROV launch and recovery systems

- Changed from informative to normative
- Previous version based on a JIP in 2015 and could act as a stand alone document. New Annex C is more integrated into the actual document.
- C.2 “*LARS design report*” revised name to “*LARS hydrodynamic analysis report*” as it is a more correct description
- Content of LARS hydrodynamic analysis report is unchanged, except for some minor clarifications.

New

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Annex C (normative)

Design and certification of ROV launch and recovery systems

- C.3 LARS certification (old C.6) Content unchanged, minor layout change
- C.4 ROV and TMS certification (old C.7) Content unchanged
- C.5 Inspection and verification (old C.8) Content unchanged except for C.5.6 (old 8.6) Clarification text added, no new requirements added.

New

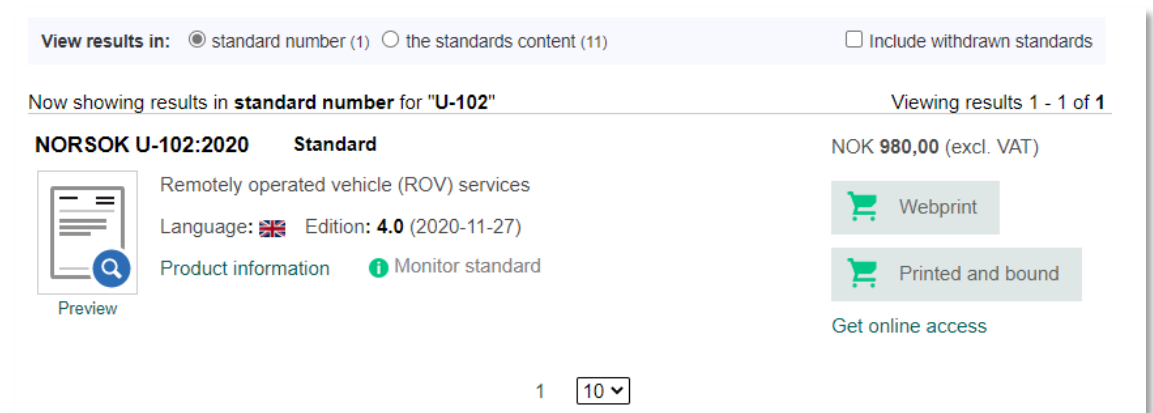
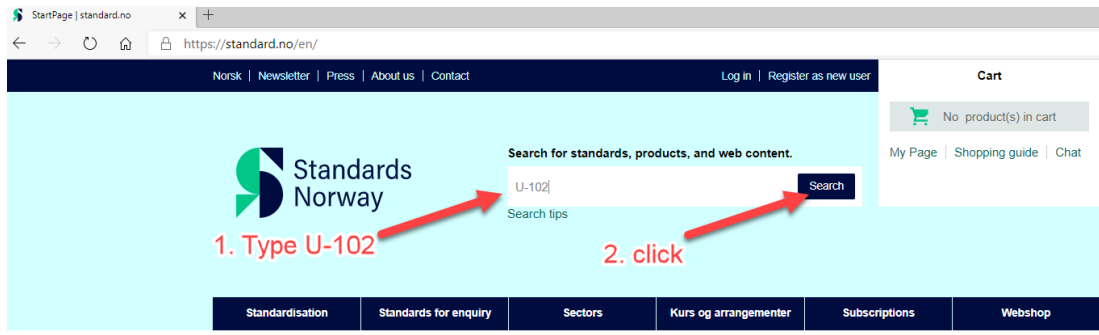
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- <https://standard.no/>





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