

TFM-AMENDMENT

OSC-SB-O-SD-00002

F12



1107304 OCEAN SPACE CENTRE

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TFM-AMENDMENT

TFM-TAGGING OF USER EQUIPMENT AT OCEAN SPACE CENTRE

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1 OBJECTIVES

This document is an amendment to tagging requirements in TFM NS-3457 part 7, 8 and 9.

In general, this amendment outline principals for tagging and marking of user equipment (Brukerutstyr) at Ocean Space Centre.

The purpose of this document is to describe the overall coding structure's to be used during engineering and thereby give the same overall unique coding structure for all Contractors and Suppliers of user equipment in Ocean Space Centre.

2 Main process equipment

Ocean Space Centre includes the following main laboratories and facilities:

[ENG]	[Norwegian term]
• Ocean Laboratorium	Havlaboratorium
• Seakeeping and Manoeuvring Laboratorium	Sjøgangs- og manøvreringslaborium
• Marine Structures Laboratorium	Konstruksjonslaboratorium (K-lab)
• Machinery Laboratorium	Maskinlaboratorium (M-lab)
• NTNU Research and Education Laboratorium	NTNU Forsknings- og undervisningslaboratorium
• NTNU Flex Lab, Hydrodynamic Laboratorium	NTNU Flex lab, hydrodynamiske laboratorium
• Fjord Laboratorium	Fjordlaboratorium
• Workshop and Storage	Verksted og lager
• <i>Cavitation Laboratorium*</i>	<i>Kavitasjonslaboratorium</i>

* **NOTE:** The Cavitation Laboratorium is an existing laboratory and not a part of the OSC-project but is included for the purpose of describing integrations, i.e. technical, functional etc.

2.1 Abbreviations and translations

Abbreviation [ENG]	Explanation English	Abbreviation [NO]	Explanation Norwegian
DG	Design Group	PG	Prosjekteringsgruppe
UE	User Equipment	BUT	Brukerutstyr
OB	Ocean Basin		Havbasseng
SMB	Seakeeping and Manoeuvring Basin		Sjøgangs- og manøvreringslaboratorium
	Ministry of Trade, Industry and Fisheries	NFD	Nærings- og Fiskeridepartementet
NTNU	Norwegian University of Science and Technology	NTNU	Norges teknisk-naturvitenskapelige universitet
OSC	Ocean Space Centre	OSC	Ocean Space Centre
	Carriage		Kjørevogn
FRC	Fast Running Carriage		Hurtiggående kjørevogn
WGS	Wave Generation System		Bølgegenereringssystem
WAS	Wave Absorption System		Bølgeabsorberingssystem

Abbreviation [ENG]	Explanation English	Abbreviation [NO]	Explanation Norwegian
WTP	Water Treatment Plant	VBH	Vannbehandlingsanlegg

3 GENERAL REQUIREMENTS

Contractor or supplier shall follow the requirements in this document to structure tagging in all parts of their work for engineering, procurement, construction, installation and commissioning of user equipment.

3.1 TAG CODES

All physical user equipment such as valves, instruments, pumps, cables, piping, units, skids and mechanical structures (e.g. cranes, towing carriage, lifting beams etc.) shall be uniquely identified with a tag identification number.

3.2 Tagging & Marking Guideline

A "Tagging and Marking Guideline" shall be developed by Contractor and Supplier to further clarify and describe Contractor's/Supplier's tagging and marking solutions based on TFM NS-3457 part 7, 8 and 9, OSC-SB-O-SD-00004 Tagging requirements and requirements in this amendment.

3.3 ENGINEERING DATABASE

Tag identification numbers must be listed in an Engineering Database and indicated at drawings and relevant documents in the same code format by the contractor.

The coding shall ensure traceability throughout all project phases. Contractor/Supplier shall develop, administrate, and continuously update an engineering tag database as required to hold all relevant information during project execution. Each entity of tags in the database shall have a reference to relevant drawings and documents where tags are referenced (tag/document mapping). Necessary fields and properties in the database shall be allocated so that mappings between Contractor/Supplier and Statsbygg systems (dRofus) can easily be performed.

The unique engineering database Tag code shall be the written reference on all drawings and documents, regardless of where the source information came from, unless otherwise agreed with Statsbygg.

3.4 Tagging of software and hardware signals

Tagging of software and hardware signals and identification of internal components and items e.g. for electrical systems and wiring diagrams, shall follow international standards and be outlined as part of the Contractor's or Supplier's "Tagging and Marking Guideline".

3.5 Tagging of electrical equipment, cables and cabinets

NS-3457 and OSC-SB-O-SD-00004 Tagging requirements describes how this is to be completed.

4 Area Codes

The following area codes shall apply for OSC:

Area Code	Area Name	Area Name [Norwegian term]
0	Outdoor Area and Plants	Uteareal og -anlegg
2	Ocean Laboratorium with Rigg Area	Havlaboratorium med riggareal
3	Office and Education Area	Kontor- og undervisningsareal
4	Marine Structures Laboratorium	Konstruksjonslaboratorium (K-lab)
5	Machinery Laboratorium	Maskinerilaboratorium(M-lab)
6	Seakeeping and Manoeuvring Laboratorium	Sjøgangs- og manøvreringslaboratorium
7	Workshop and Storage	Verksted og lager
8	NTNU Flex Lab	NTNU Flex Lab
9	Innovation and Collaboration Centre	Innovasjons- og møteromssenter
10	Main Transport- and Gangway	Verkstedgaten
11	Parking Area	Parkeringsområde
12	Fjord Laboratorium	Fjordlaboratorium
13	<i>Cavitation Laboratorium*</i>	<i>Kavitasjonslaboratorium</i>
14	<i>Towing tank** (shortened)</i>	<i>Slepetank (forkortet)</i>

* **NOTE:** The Cavitation Laboratorium is an existing laboratory and not a part of the OSC-project but is included for the purpose of describing interfaces, i.e. technical, functional etc.

****NOTE:** The towing tank is the existing shortened towing tank. This installation will not be in use after OSC is completed.

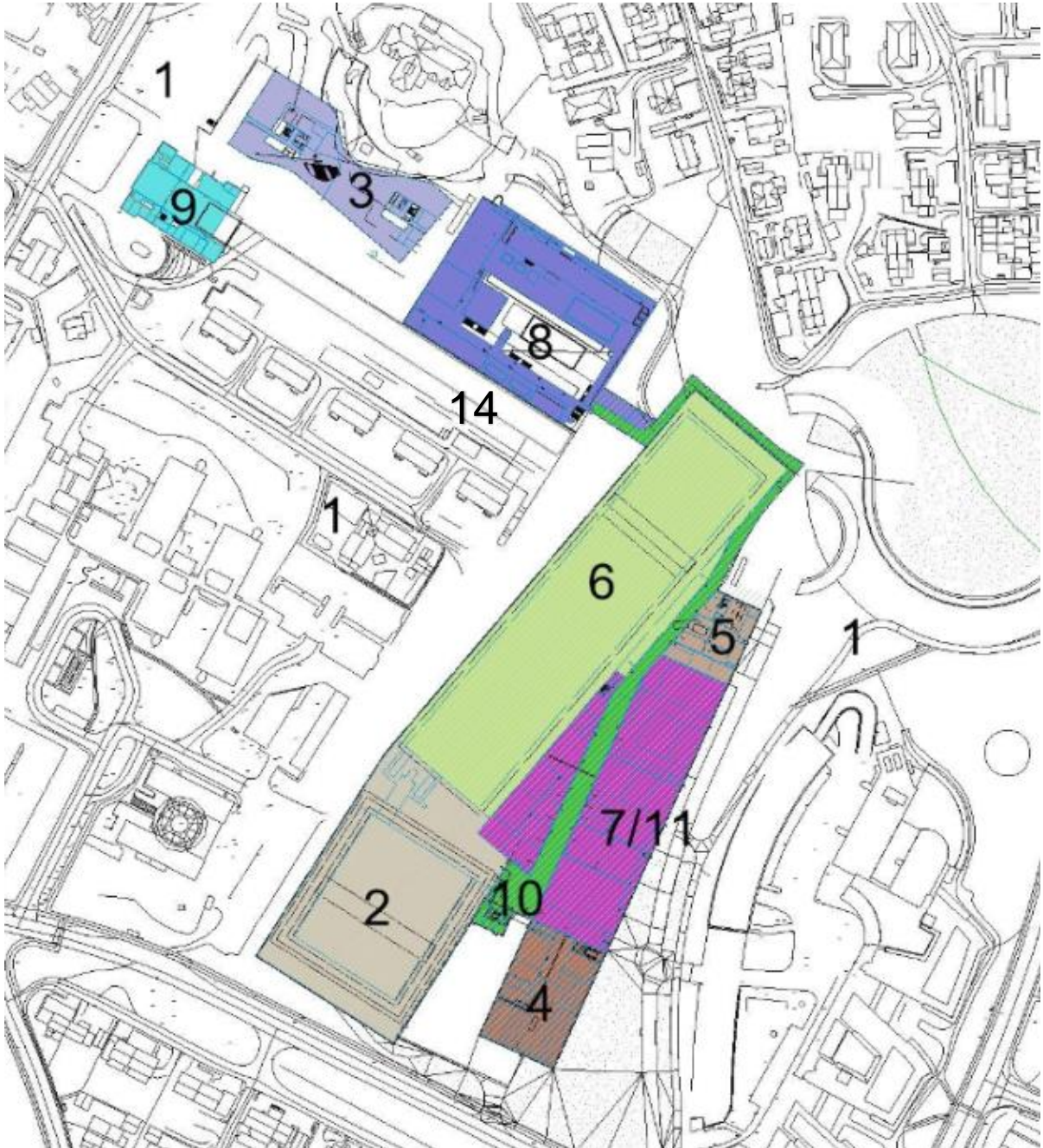


Figure: Area Coding

5 System Codes

In addition to the system codes in SB doc. NS3457, and NS3451 the following system codes shall apply for OSC:

System Codes	System Name [Norwegian term]	System Name	Note
345	Trykkluftsystem Tekniske rom k-lab: 1 kompressor	Compressed air system	From TFM NS-3451: Gass og trykkluft
349	Hydraulikksystem	Hydraulic system	TFM NS-3451: Andre installasjoner til gass- og trykkluft
354	Kjølesystem	Cooling system	TFM NS-3451: Kjølesystem for produksjonsprosesser
389	Vannbehandlingssystem	Water treatment system	From TFM NS-3451: Annen vannbehandling
391	Tungolje system	Heavy oil system	TFM NS-3451: Andre VVS-installasjoner
392	Diesel system	Diesel system	TFM NS-3451: Andre VVS-installasjoner
393	Hydrogen system	Hydrogen system	TFM NS-3451: Andre VVS-installasjoner
394	Ammoniakk system	Ammonia system	TFM NS-3451: Andre VVS-installasjoner t
395	Flytende naturgass system	Liquid natural gas (LNG) system	TFM NS-3451: Andre VVS-installasjoner
396	Avgassbehandlingssystem	Exhaust treatment system	TFM NS-3451: Andre VVS-installasjoner
397	Kjøle-/varmesystem for dynamiske testtrigge	Heating-/Cooling system for dynamic test rigs	TFM NS-3451: Andre VVS-installasjoner
660	Vinsjssystem for hybrid testing	Winch for hybrid testing	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
661	Strømningssystem	Flow generation system	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
662	Bølgegenereringssystem	Wave generation system	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
663	Bølgeabsorpsjonssystem	Wave absorption system	From TFM NS-3451: Fastmontert

System Codes	System Name [Norwegian term]	System Name	Note
			spesialutrustning for virksomhet
664	Bevegelig bunnsystem	Movable floor system	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
665	Kjørevognsystem	Carriage system	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
666	Fastmonterte verkstedsmaskiner	Fixed workshop machines	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
667	Dynamiske testmaskiner	Dynamic machines for testing	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
668	Bølgerenne	Wave chute	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
669	Diverse fastmontert utstyr	Fixed equipment	From TFM NS-3451: Fastmontert spesialutrustning for virksomhet
671	Vindgenereringssystem	Wind generation system	From TFM NS-3451: Løs spesialutrustning for virksomhet
672	Flyttbare maskiner og utstyr	Movable workshop machines and equipment	From TFM NS-3451: Løs spesialutrustning for virksomhet
673	Dykkerutrustning	Diving equipment	From TFM NS-3451: Løs spesialutrustning for virksomhet

Any additional system codes required to tag user equipment must be approved by Company and shall be listed as part of the Contractor's/Supplier's "Tagging and marking guideline".

6 Component Codes

Component codes in NS 3457 part 8, "Klassifikasjon av byggverk Del 8 Komponentkoder i bygninger" shall apply for user equipment in OSC.

In addition to the component codes in NS 3457 part 8, the following main component codes shall apply for OSC:

Component Codes	Component Name [Norwegian]	Component Name	Note
AWK	Kran	Crane	TFM NS-3457: Bærende/Romdannende Kran
AWS	Søylekran	Column crane	TFM NS-3457: Bærende/Romdannende Kran
AWT	Traverskran	Traverse crane	TFM NS-3457: Bærende/Romdannende Kran
GAA	Plansliper og høvel	Planer and planer	TFM NS-3457: Automat eller maskin
GAB	Boremaskin	Drilling machine	TFM NS-3457: Automat eller maskin
GAC	Sandblåsekabinett	Sandblasting cabinet	TFM NS-3457: Automat eller maskin
GAD	Dreiebenk	Lathe	TFM NS-3457: Automat eller maskin
GAE	Skrogfres	Hull milling machine	TFM NS-3457: Automat eller maskin
GAF	Fresemaskin	Milling Machine	TFM NS-3457: Automat eller maskin
GAG	Pusseboks	Grinding box	TFM NS-3457: Automat eller maskin
GAK	Platekutter	Cutting Machine	TFM NS-3457: Automat eller maskin
GAK	Plateknekker	Folding machine	TFM NS-3457: Automat eller maskin
GAK	Profilklipper	Profile cutter	TFM NS-3457: Automat eller maskin
GAL	Lakkboks	Painting box	TFM NS-3457: Automat eller maskin
GAM	Sag	Saw	TFM NS-3457: Automat eller maskin
GAN	Sveiseutstyr	Welding equipment	TFM NS-3457: Automat eller maskin
GAU	Gnistmaskin	Spark machine	TFM NS-3457: Automat eller maskin
GAP	3D-printer	3D printer	TFM NS-3457: Automat eller maskin

Component Codes	Component Name [Norwegian]	Component Name	Note
GAR	Presse	Press	TFM NS-3457: Automat eller maskin
GAS	Platesaks	Guillotine	TFM NS-3457: Automat eller maskin
GAV	Valse	Rolling machine	TFM NS-3457: Automat eller maskin
GAW	Vannskjærer	Water cutting machine	TFM NS-3457: Automat eller maskin
GAO	Skjærebrenner og plasmakutter	Cutting torch and plasma cutter	TFM NS-3457: Automat eller maskin
GAY	Vinkelsliper	Grinder	TFM NS-3457: Automat eller maskin
GAZ	Diverse maskiner	Various engines	TFM NS-3457: Automat eller maskin
GIA	Materiallager	Material storage	TFM NS-3457: Automat eller maskin
GIB	Verktøylagring	Tool storage	TFM NS-3457: Automat eller maskin
IHB	Hydraulisk brems	Hydraulic brake	TFM NS-3457: Produserende
IMZ	Forbrenningsmotor	Combustion engine	TFM NS-3457: Produserende
IME	Elektrisk motor	Electrical engine	TFM NS-3457: Produserende
IKK	Kjøleanlegg	Cooling system	TFM NS-3457: Produserende
IGD	Diverse utstyr generator	Various equipment generator	TFM NS-3457: Produserende
JPA	Sirkulasjonspumpe, vannstrøm	Circulating pump, Flow Generation	TFM NS-3457: Sirkulasjonspumpe
MZE	Eksosrensing	Exhaust cleaning	TFM NS-3457: Filtrerende
MWS	Scrubber	Scrubber	TFM NS-3457: Filtrerende
OFF	Drivstoffsystem	Fuel system	TFM NS-3457: Prosesserende
RYP	Partikkeldetektor	Particle detector	TFM NS-3457: Registrerende
ZAB	Bølgedemper	Wave attenuator	TFM NS-3457: Spesielt prosessutstyr Absorberende
ZAS	Støydemper	Silencer	TFM NS-3457: Spesielt prosessutstyr Absorberende

Component Codes	Component Name [Norwegian]	Component Name	Note
ZBK	Kjørevogn	Carriage	TFM NS-3457: Spesielt prosessutstyr Bevegende
ZBD	Dynamisk testmaskiner	Dynamic testing rig (DTR)	TFM NS-3457: Spesielt prosessutstyr Bevegende
ZD	Dykke- og undervannssystem	Diving- and under water system	TFM NS-3457: Spesielt prosessutstyr
ZGB	Bølgegenereringsmaskin	Wave generation machine	TFM NS-3457: Spesielt prosessutstyr Genererende
ZGV	Vindgenereringsvifte	Wind generation fan	TFM NS-3457: Spesielt prosessutstyr Genererende
ZGS	Strømgenereringssystem	Flow generation system	TFM NS-3457: Spesielt prosessutstyr Genererende
ZH	Havinstallasjoner	Ocean Basin installations	TFM NS-3457: Spesielt prosessutstyr
ZK	Kjøle/Varmeanlegg	Cooling- and heating system	TFM NS-3457: Spesielt prosessutstyr
ZMD	Diverse instrumentering	Various instrumentation	TFM NS-3457: Spesielt prosessutstyr
ZMG	Gasskromatograf	Gas chromatograph	TFM NS-3457: Spesielt prosessutstyr
ZMK	Kontrollenheter, mobile	Control units, mobile	TFM NS-3457: Spesielt prosessutstyr
ZMS	Simulatorer	Simulator	TFM NS-3457: Spesielt prosessutstyr
ZMT	Testtrigger	Test units	TFM NS-3457: Spesielt prosessutstyr
ZMZ	Annet utstyr	Other equipment	TFM NS-3457: Spesielt prosessutstyr
ZV	Verneutstyr	Safety equipment	TFM NS-3457: Spesielt prosessutstyr
Å	Diverse arbeid	Various work	

Any additional component codes required to tag user equipment shall be listed as part of the Contractor's/Supplier's "Tagging and marking guideline".

7 Sequence Line Number for Piping

The sequence line number will change as follows:

- a) At equipment connections
- b) At pipe material changes
- c) At pipe dimension changes
- d) At pipe pressure changes

The sequence line number shall not change at following cases:

- e) At valves (even if line is reduced locally to accommodate the valve)
- f) At tees for the main flow
- g) At floor or wall penetrations
- h) At change of Area Code

8 Examples of user equipment tagging

++	Lokaliserings-ID	=	Systemforekomst-ID			Komponentforekomst-ID		%	Komponenttype-ID						
			Systemkomponent		:	Under-nummer	-		Komponent-kode ^b	Nummer	-	Komponent-kode ^b	Nummer	:	Under-nummer
			System kode ^a	Nummer											

Tegnforklaring

- a Se veiledning til NS 3451
 b Se NS 3457-8:2020

Figure: User equipment tag format

«LokaliseringsID» or Localization code shall be 4-digit, where the first digit represents what NTNU Campus this is, and the last 3 digits represents what building on campus the tag represents. See the figure for area coding above.

Equipment tag	Example	Explanation
Ocean Laboratorium		
Flow generation unit	++6002=661.001-JPA-000%JPA.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 661.001 = Flow generation system JPA-000 = Flow generation (component main tag) %JPA.nn:nn = Flow generation unit type
Flow generation module 1 pump no. 001	++6002=661.001:01-JPA-001%JPA.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 661.001:01 = Flow generation system module 1 JPA-001 = Flow generation pump no. 001 %JPA.nn:nn = Flow generation pump type
Flow generation module 2 pump no. 002	++6002=661.001:02-JPA-002%JPA.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 661.001:02 = Flow generation system module 2 JPA-002 = Flow generation pump no. 002 %JPA.nn:nn = Flow generation pump type
Flow generation system module 2 & flow transmitter no. 002	++6002=661.001:02-RFB-002%RFB.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 661.001:02 = Flow generation system module 2

Equipment tag	Example	Explanation
		RFB-002 = Flow transmitter transmitter no. 002 %RFB.nn:nn = Flow transmitter type
Flow generation system module 3 & flow transmitter no. 001	++6002=661.001:03-RFB-001%RFB.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 661.001:03 = Flow generation system module 3 RFB-001= Flow transmitter no. 001 %RFB.nn:nn = Flow transmitter type
Wave generation unit (Stemplet på maskinskilt bølgemaskin)	++6002=662.001-ZGZ-000%ZGZ.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 662.001 = Wave generation system ZGZ-000 = Wave generation Unit (component code main tag) ZGZ.nn:nn = Wave generation type
Wave generation module no.1	++6002=662.001:01-ZGZ-000%ZGZ.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 662.001:01 = Wave generation system module 1 ZGZ-000 = Wave generation Unit (component code main tag) ZGZ.nn:nn = Wave generation module type
Wave generation system in Ocean Laboratoriummodule no 1 & actuator no: 001	++6002=662.001:01-XMZ-001%XMZ.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 662.001:01 = Wave generation system module 1 XMZ-001 = Motor/actuator no: 001 XMZ.nn:nn = Motor/actuator type
Wave generation system in Ocean Laboratoriummodule no 1 & actuator no: 002	++6002=662.001:01-XMZ-002%XMZ.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 662.001:01 = Wave generation system module 1 XMZ-002 = Motor/actuator no: 002 %XMZ.nn:nn = Motor/actuator type
Wave generation system in Ocean Laboratoriummodule no 2 & actuator no: 001	++6002=662.001:02-XMZ-001%XMZ.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 662.001:02 = Wave generation system module 2

Equipment tag	Example	Explanation
		XMZ-01 = Motor/actuator no. 001 %XMZ.nn:nn = Motor/actuator type
Wave generation system in Ocean Laboratoriummodule no 2 & actuator no: 002	++6002=662.001:02-XMZ-002%XMZ.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 662.001:02 = Wave generation system module 2 XMZ-02 = Motor/actuator no.: 002 %XMZ.nn:nn = Motor/actuator type
Seakeeping and Manoeuvring Basin		
Kjørevogn Sjøgangs- og manøvreringslaborium/ Carriage unit Sea keeping (Stemplet på maskinskilt til Slepevogn)	++6006=665.001-ZCZ-000%ZCZ.nn:nn	++6006= Sjøgangs- og manøvreringslaborium/Sea keeping 665.001 = Carriage system ZCZ-000 = Spesielt prosessutstyr, kjørevogn. (component code main tag) %XMZ.nn:nn = Tow carriage type
Motor for Carriage system in Sea keeping basin	++6006=665.001-XMZ-001%XMZ.nn:nn	++6006= Sjøgangs- og manøvreringslaborium/Sea keeping 665.001 = Carriage system XMZ = Engine 001 = Serial number %XMZ.nn:nn = Engine type
Instrumentation Carriage system in Sea keeping basin	++6006=665.001-RSZ-001%RSZ.nn:nn	++6006= Sjøgangs- og manøvreringslaborium/Sea keeping 665.001 = Carriage system RSZ = speedometer 001 = Serial number %RSZ.nn:nn = Instrument type
HMI-control of Carriage system in Sea keeping basin	++6006=665.001-UKZ-001%UKZ.nn:nn	++6006= Sjøgangs- og manøvreringslaborium/Sea keeping 665.001 = Carriage system UKZ = Control panel 001 = Serial number %UKZ.nn:nn = HMI/PLC type
Piping		
Piping Havbasseng TFM	++6002=661.001-KRA-001%KRA.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 661.001 = Flow system

Equipment tag	Example	Explanation
		KRA = Rør for væske 001 = Serial number %KRA.nn:nn = Pipe type
Piping Water treatment Ocean basin	++6002=389.001-KRA-001%KRA.nn:nn	++6002= Havlaboratorium/Ocean Laboratorium 389.001 = Water treatment system KRA = Rør for væske 001 = Serial number %KRA.nn:nn = Pipe type
Piping Water treatment Sea keeping basin	++6002=389.001 -KRA-001%KRA.nn:nn	++6002= Sea keeping 389.001 = Water treatment system KRA = Rør for væske 001 = Serial number %KRA.nn:nn = Pipe type
Piping Diesel M-Lab	++6005=392.001-KQA-001%KQA.nn:nn	++6005= M-Lab 392.001 = Diesel system KQA = Rør for drivstoff 001 = Serial number %KQA.nn:nn = Pipe type
Piping Hydrogen M-Lab	++6005=393.001 -KRC-001%KRC.nn:nn	++6005= M-Lab 393 = Hydrogen system KRC = Rør for gass 001 = Serial number %KRC.nn:nn = Pipe type
Piping ammonia M-Lab	++6005=394.001 -KRC-001%KRC.nn:nn	++6005= M-Lab 394.001 = Ammonia system KRC = Rør for gass 001 = Serial number %KRC.nn:nn = Pipe type
Piping LNG M-Lab	++6005=395.001-KRC-001%KRC.nn:nn	++6005= M-Lab 395.001 = LNG system KRC = Rør for gass 001 = Serial number %KRC.nn:nn = Pipe type
Piping Trykkluft M-Lab	++6005=345.001 -KRC-001%KRC.nn:nn	++6005= M-Lab 345.001 = Trykkluftsystem KRC = Rør for gass

Equipment tag	Example	Explanation
		001 = Serial number %KRC.nn:nn = Pipe type
Piping Hydraulikk M-Lab	++6005=349.001-KRA-001%KRA.nn:nn	++6005= M-Lab 349.001 = LNG system KRA = Rør for væske 001 = Serial number %KRA.nn:nn = Pipe type

9 References

Veiledning til NS 3457-7 Veiledning til bruk av TFM-systemet

Veiledning til NS3451 Veiledning til bruk av systemkoder fra NS3451 i identifikasjon og merking

NS3457-7 Klassifikasjon av byggverk Del 7 Identifikasjon i digitale modeller for merking i bygninger

NS3457-8 Klassifikasjon av byggverk Del 8 Komponentkoder i bygninger

NS3457-9 Klassifikasjon av byggverk Del 9 Merking av systemer og komponenter i bygninger