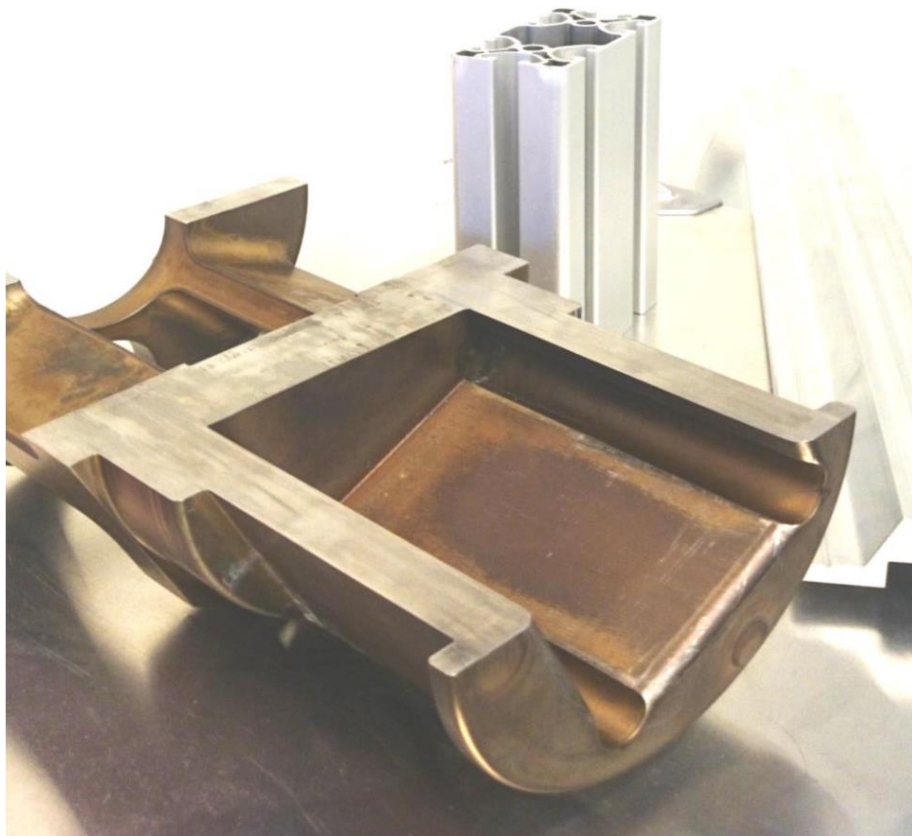


SPECIFICATION

METALLIC MATERIALS

970115748



E	Re-issued for Use	27.05.21	AT	PB	GMU
D	Re-issued for Use	21.08.17	DB	BH	GMU
C	Re-issued for Use	03.10.14	TC	DB	GMU
B	Re-issued for Use	12.03.13	DB	PB	DB
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Rev.	Reason for Issue	Date	By	Check	Approval

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1 INTRODUCTION

This document specifies which standards & codes to comply with when fabricating metallic components, additionally material selection on welded parts and structures.

For most parts, this document will be referenced on the 2D drawing. But in some cases, the specification can be communicated on the PO or other contractual document. 2D Drawing or PO notation may be accompanied by additional requirements not covered herein.

2 MATERIAL DATA SHEETS

The standards listed in Table 1, 2 and 3 include provisions which are mandatory requirements when delivering products to Oceaneering AS, in addition, the standards also include guidelines for best practice, requirements which is supplementary to notations on 2D drawing.

The supplier is required to familiarize themselves with the NORSOK hierarchy concerning materials in addition to the supplementary standards and specifications listed in Table 1. It is the suppliers' responsibility to ensure that the correct MDS is applied and that the requirements are fulfilled.

2.1 STRUCTURAL MATERIALS

Table 1 Structural materials

Description	Reference
Structural steel profiles – Rp0.2 ~ 355MPa <ul style="list-style-type: none">- Minimum requirements, unless otherwise stated on drawing: Grade S355J2 (ASTM A678(C) Grade DH36, EN 1.0577 <p>NOTE: Other equivalent material grades can be used upon express written approval from company</p> <p>NOTE: Profiles used for weldments shall be hot formed</p>	NORSOK M-120 EN 10225

Metallic Materials

970115748

Structural steel plates – Rp0.2 ~ 355MPa

- Minimum requirements, unless otherwise stated on drawing: Grade S355J2 (ASTM A678(C) Grade DH36, EN 1.0577

NORSOK M-120

EN 10025

NOTE: Profiles used for weldments shall be hot formed

NOTE: Other equivalent material grades can be used upon express written approval from company

Structural steel profiles – Rp0.2 ~ 235MPa

- Minimum requirements, unless otherwise stated on drawing: Grade S235JR

NORSOK M-120

EN 10025

NOTE: Profiles used for weldments shall be hot formed

NOTE: Other equivalent material grades can be used upon express written approval from company

Structural steel plates – Rp0.2 ~ 235MPa

- Minimum requirements, unless otherwise stated on drawing: Grade S235JR

NORSOK M-120

EN 10210

NOTE: Profiles used for weldments shall be hot formed

NOTE: Other equivalent material grades can be used upon express written approval from company

2.2 CORROSION RESISTANT ALLOYS

Table 2 Corrosion Resistant Alloys (CRA)

Description	Reference
<p>Super Duplex UNS S32750/60 – MDS D57</p> <ul style="list-style-type: none"> - PREn > 40 - Elongation less than 25% can be accepted upon express written approval from company <p>NOTE: This applies to round bars up to Ø200mm. Materials that does not comply with MDS D57 can be accepted only upon express written approval from company.</p>	NORSOK M-630
<p>Duplex UNS S31803/ S32205 – MDS D47</p> <p>NOTE: This applies to round bars up to Ø300mm. Materials that does not comply with MDS D47 can be accepted only upon express written approval from company.</p>	NORSOK M-630
UNS S20910 (Nitronic 50)	970208553
UNS S20910 (Nitronic 60)	970208556
<p>AISI 316 (18-8)</p> <ul style="list-style-type: none"> - AISI 316L, less than 0.03wt%C, shall be used on members in welded structures. 	EN 10088-3
<p>UNS S17400 (17-4PH)</p> <ul style="list-style-type: none"> - H1150 is default unless specified on drawing. - Maximum 33HRC 	<p>EN 10088-3</p> <p>NACE MR0175/ ISO 15156-3</p>
EN 1.4418 (s165m)	EN 10088-3

2.3 ALUMINIUM ALLOYS AND ASSOCIATED MATERIALS

Table 3 Aluminium alloys and associated materials

Description	Reference
Aluminium 5052-H32 or H34 <ul style="list-style-type: none">- Default alloy for sheet-metal forming.	EN-755
Aluminium 6082-T6 (6061, 6063) <ul style="list-style-type: none">- Default structural components and/ or welded structures.- Should not be used in combination with sheet-metal forming.	EN-755
Aluminium 7075-T6 <ul style="list-style-type: none">- Not to be welded.- Should not be used in combination with sheet-metal forming.	EN-755
Aluminium bronze – UNS C63000 <ul style="list-style-type: none">- Applicable when drawing state “Aluminium bronze”- Applicable when drawing state “JM7”- Applicable when drawing state “OM7”	EN 1982

Table 4 Titanium alloys

Description	Reference
Grade 2	ASTM B 367
Grade 5 - UNS R56400 (Ti-6AL-4V)	NA

NOTE: Materials that are not covered by the above tables or standards should be specified by company buyer.

3 UK SPECIFIC MATERIAL CONCESSIONS

The standards listed in Table 5 include provisions which are mandatory requirements when delivering products to Oceaneering AS, in addition, the standards also include guidelines for best practice.

The supplier is required to familiarize themselves with the British Standard hierarchy concerning materials in addition to the supplementary standards and specifications listed in Table 5. It is the suppliers' responsibility to ensure that the correct MDS is applied and that the requirements are fulfilled.

Table 5 MDS – UNITED KINGDOM CONTINENTAL SHELF

Description	Document Number
Structural steel	EN 10225
Aluminium structural material	BS 8118
Cast structural steel	NORSOK M-122
Forged structural steel	NORSOK M-123
Material data sheets and element data sheets for piping	NORSOK M-630
OAS; Material data sheet for UNS S20910 (Nitronic 50)	970208553
OAS; Material data sheet for UNS S20910 (Nitronic 60)	970208556

ACCEPTED CONCESSIONS

Material specified on drawing	Accepted equivalent
AS3678-350	Carbon Steel S355
AS3678-350	Carbon Steel S355
AS1444-4140 Condition T	708M40
AB2	Aluminium Bronze CA104
Aluminium structural material	BS 8118

4 TESTING

The material shall be tested according to the requirements listed in the MDS in addition to added requirements in purchase order or in contractual agreements. If a material is re-tested in combination with 3rd party witnessing; then Oceaneering shall be notified prior to testing and the test itself shall be performed by a recognized independent party.

5 DOCUMENTATION

The material-certificate shall satisfy EN 10204 type 3.1 as a minimum. Certificate shall reflect verification specified by the MDS or standard according to material reference in table 1, 2 and 3.