

NORSOK Standard

M-121

Edition 2, September 2015

Aluminium structural material

This NORSOK standard is developed with broad petroleum industry participation by interested parties in the Norwegian petroleum industry and is owned by the Norwegian petroleum industry represented by the Norwegian Oil and Gas Association and The Federation of Norwegian Industries. Please note that whilst every effort has been made to ensure the accuracy of this NORSOK standard, neither the Norwegian Oil and Gas Association nor The Federation of Norwegian Industries or any of their members will assume liability for any use thereof. Standards Norway is responsible for the administration and publication of this NORSOK standard.

Standards Norway
P.O. Box 242, 1326 Lysaker
NORWAY
Visiting address
Mustads vei 1, 0283 Oslo
Copyrights reserved

Telephone: + 47 67 83 86 00
Fax: + 47 67 83 86 01
Email: petroleum@standard.no
Website: www.standard.no/petroleum

© NORSOK. Any enquiries regarding reproduction should be addressed to Standard Online AS. www.standard.no

Document ID: 123456789

Aluminium structural material

Content

Foreword.....	2
Introduction	2
1 Scope	3
2 Normative references	3
3 Definitions and abbreviations	3
3.1 Definitions	3
3.2 Abbreviations	3
4 Selection of material.....	3
5 Quality control testing of extruded profiles and selection of relevant MDS.....	7
5.1 General	7
5.2 Prequalification of Group B extrusions.....	8
5.3 Production testing of Group B extrusions	8
Annex A (normative) Material data sheets	9

Foreword

NORSOK (the competitive standing of the Norwegian offshore sector) is the industry initiative to add value, reduce cost and lead time and remove unnecessary activities in offshore field developments and operations.

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for petroleum industry developments and operations. Furthermore, NORSOK standards are, as far as possible, intended to replace oil company specifications and serve as references in the authorities' regulations.

The NORSOK standards are normally based on recognised international standards, adding provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with the support by the Norwegian Oil and Gas Association, The Federation of Norwegian Industries, Norwegian Shipowners' Association and the Petroleum Safety Authority Norway.

NORSOK standards are administered and published by Standards Norway (SN).

Annex A is normative.

Introduction

The enclosed material data sheets are prepared as separate documents to be used in purchasing of plates and profiles in aluminium for structural use. The MDSs specifies the selected options of the referred standard and additional requirements which shall be added or supersede the corresponding requirements of the referred standard.

The following technical information has to be defined in the purchase order:

- alloy and temper;
- product form, dimensions and special tolerances;
- marking requirements.

1 Scope

This standard gives recommendations for selection of aluminium alloys, tempers and relevant material data sheets (MDS) for use in aluminium structures. The MDSs are included in annexes.

2 Normative references

The following standards include provisions which, through reference in this text, constitute provisions of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet or exceed the requirements of the selected referred standards.

NORSOK N-001, *Integrity of offshore structures*

NORSOK M-102, *Structural aluminium fabrication*

EN 485, *Aluminium and aluminium alloys – Sheet, strip and plate (all parts)*

EN 755, *Aluminium and aluminium alloys – Extruded rod/bar, tube and profiles (all parts)*

EN 1999-1-1, *Eurocode 9: Design of aluminium structures – Part 1-1: General structural rules*

EN ISO 8493, *Metallic materials – Tube – Drift-expanding test*

EN 10204, *Metallic products – Types of inspection documents*

3 Definitions and abbreviations

3.1 Definitions

3.1.1

company

purchasing body (buyer)

3.1.2

temper

designation of processing condition of an aluminium alloy (strain hardening, heat treatment)

3.2 Abbreviations

EN	European Standard
EXC	execution class
HAZ	heat affected zone
ISO	International Organization for Standardization
MDS	material data sheet (material specification)
MTDS	material test data sheet

4 Selection of material

The primary alloy selection for main structure component should be EN AW 5083 according to MDS M01 for plates and alloy EN AW 6005A or EN AW 6082 according to MDS M04/M05 for profiles. The other alloys listed should only be used for secondary applications. For weld filler material alloy 5183 should be the primary selection. For further details reference is made to Table 1 which also summarise the alloys and tempers included in the established MDSs. Other alloys and tempers may also be used if found more relevant for the particular construction.

The number of different alloys, tempers and type of filler materials selected should be minimized to ease material purchasing and fabrication, and to reduce risk for mixing up materials.

For structures submerged in seawater, the alloy EN AW 5083 and/or EN AW 6082 should be used. Submerged structures shall be protected for possible corrosion. Special attention should be made to galvanic corrosion.

When designing structures for use at elevated temperatures creep and strength properties shall be especially considered. Table 1 gives recommendations and guidelines for selection of aluminium alloy, temper and relevant MDS and weld filler material for use in offshore and marine environments.

For secondary structures, such as e.g. stairs, handrails, walkways, access platforms, the requirements in EN 485 and EN 755 may be used instead of enclosed MDSs.

For use of alloys and tempers not given in Table 1, the following properties shall be documented:

- 0,2 % proof strength (incl. 0,2 % proof strength of HAZ);
- ultimate tensile strength (incl. ultimate tensile strength for HAZ);
- characteristic strength of weld metal when welding this alloy and temper;
- buckling class (A or B);
- corrosion resistance;

Any use of alloys and tempers not given in Table 1 shall be approved by Company.

Table 1 gives recommendations and guidelines for selection of aluminium alloys, tempers, relevant MDSs and weld filler materials for structural use in offshore and marine environments.

Table 2 defines the temper designations.

Table 3 gives an overview of typical applications for the different aluminium alloys.