
**Ships and marine technology —
Specification of high manganese
austenitic steel used for LNG tanks on
board ships**

Navires et technologie maritime — Spécification des aciers à haute teneur en manganèse utilisés pour les réservoirs de GNL à bord des navires



This document is a preview generated by EMS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

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
Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Required specification.....	2
5 Manufacture.....	2
5.1 Steel-making practice.....	2
5.2 Steel plates.....	2
6 Chemical composition and mechanical properties.....	2
6.1 Chemical composition.....	2
6.2 Mechanical properties.....	3
6.2.1 Requirements of tensile strength and yield strength.....	3
6.2.2 Toughness requirements.....	3
6.2.3 Bend test.....	3
6.3 Supplementary requirements.....	4
7 Test procedures.....	4
7.1 Mechanical test.....	4
7.2 Retest procedures.....	4
8 Weldability.....	4
9 Marking.....	4
10 Documentation.....	5
Bibliography.....	6

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 8, *Ship design*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

There have been several requirements regarding metallic materials for cryogenic applications since the adoption of the IGC and IGF Codes. The newly developed, high manganese (Mn) austenitic steel should possess mechanical properties including Charpy impact energy values comparable to those of materials for cryogenic service listed in both the IGC Code^[1] and IGF Code^[2]. Consequently, high Mn austenitic steel is intended to satisfy the strength requirements of the structure of cargo tanks, fuel tanks and piping systems of LNG carriers and LNG-fuelled ships.

This document provides a standard specification of high manganese austenitic steel for material suppliers, ship owners, ship yards, manufacturers and shipping companies with regard to producing, purchasing and using such materials.

Ships and marine technology — Specification of high manganese austenitic steel used for LNG tanks on board ships

1 Scope

This document describes the specification of high manganese (Mn) austenitic steel plates to be used for LNG tanks on board ships.

The specification of high manganese austenitic steel can be also considered for design and manufacture of cargo tanks and process pressure vessels of LNG supply/terminal and transportation of fuels and traded gases.

This document is primarily applicable for the specification of LNG tanks below volumetric capacity of approximately 30 000 m³ using high manganese austenitic steel.

The thickness of plates is limited to between 6 mm to 40 mm.

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 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

ISO 5173, *Destructive tests on welds in metallic materials — Bend tests*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ASTM A1106/A1106M-17, *Standard specification for pressure vessel plate, alloy steel, austenitic high manganese for cryogenic application*

IACS UR W1, *Material and welding for gas tankers*

IACS UR W13, *Thickness tolerances of steel plates and wide flats*

IACS UR W16, *High strength steels for welded structures*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

high manganese (Mn) austenitic steel

steel with high amount of Mn to retain austenite as its primary phase at atmospheric and service temperature

Note 1 to entry: Refer to [Table 1](#) in [6.1](#).