

Specification for Carbon Manganese Steel Plate for Offshore Structures

API SPECIFICATION 2H
NINTH EDITION, JULY 2006

EFFECTIVE DATE: FEBRUARY 1, 2007

REAFFIRMED, SEPTEMBER 2020



American
Petroleum
Institute

Specification for Carbon Manganese Steel Plate for Offshore Structures

Upstream Segment

API SPECIFICATION 2H
NINTH EDITION, JULY 2006

EFFECTIVE DATE: FEBRUARY 1, 2007

REAFFIRMED, SEPTEMBER 2020



American
Petroleum
Institute

SPECIAL NOTES

API publications necessarily address problems of a general nature. With respect to particular circumstances, local, state, and federal laws and regulations should be reviewed.

Neither API nor any of API's employees, subcontractors, consultants, committees, or other assignees make any warranty or representation, either express or implied, with respect to the accuracy, completeness, or usefulness of the information contained herein, or assume any liability or responsibility for any use, or the results of such use, of any information or process disclosed in this publication. Neither API nor any of API's employees, subcontractors, consultants, or other assignees represent that use of this publication would not infringe upon privately owned rights.

Users of this Specification should not rely exclusively on the information contained in the document. Sound business, scientific, engineering, and safety judgment should be used in employing the information contained herein.

API publications may be used by anyone desiring to do so. Every effort has been made by the Institute to assure the accuracy and reliability of the data contained in them; however, the Institute makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use or for the violation of any authorities having jurisdiction with which this publication may conflict.

API publications are published to facilitate the broad availability of proven, sound engineering and operating practices. These publications are not intended to obviate the need for applying sound engineering judgment regarding when and where these publications should be utilized. The formulation and publication of API publications is not intended in any way to inhibit anyone from using any other practices.

Any manufacturer marking equipment or materials in conformance with the marking requirements of an API standard is solely responsible for complying with all the applicable requirements of that standard. API does not represent, warrant, or guarantee that such products do in fact conform to the applicable API standard.

All rights reserved. No part of this work may be reproduced, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. Contact the Publisher, API Publishing Services, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001.

FOREWORD

This specification is under the jurisdiction of the API Committee on Standardization of Offshore Structures.

The purpose of this specification is to provide standards for the purchase of interchangeable steel plate suitable for use in selected welded tubular joints on offshore platforms.

Nothing in this specification should be interpreted as indicating a preference for any material or process. In the selection of materials and processes, the purchaser must be guided by this experience and by the service for which the plate is intended.

The following definitions apply:

Shall: As used in a standard, “shall” denotes a minimum requirement in order to conform to the specification.

Should: As used in a standard, “should” denotes a recommendation or that which is advised but not required in order to conform to the specification.

Nothing contained in any API publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API standard. Questions concerning the interpretation of the content of this publication or comments and questions concerning the procedures under which this publication was developed should be directed in writing to the Director of Standards, American Petroleum Institute, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001. Requests for permission to reproduce or translate all or any part of the material published herein should also be addressed to the director.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. A one-time extension of up to two years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually and updated quarterly by API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001.

Suggested revisions are invited and should be submitted to the Standards and Publications Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001. standards@api.org.

CONTENTS

	Page
1 SCOPE.....	1
2 REFERENCES	1
3 GENERAL REQUIREMENTS FOR DELIVERY	2
4 MANUFACTURING	2
5 CHEMICAL REQUIREMENTS	2
6 MECHANICAL REQUIREMENTS	3
7 NOTCH TOUGHNESS REQUIREMENTS	3
8 MARKING	4
APPENDIX A SUPPLEMENTARY REQUIREMENTS	5
APPENDIX B SUGGESTIONS FOR ORDERING API 2H STEEL PLATE	9
APPENDIX C API MONOGRAM	11
Tables:	
1—Chemical Requirements	2
2—Tensile Requirements(transverse tests)	3
3—Notch Toughness Requirements Charpy V-Notch Testing	4
S2-1—Notch Toughness Requirement at Lower Temperatures Drop-Weight Testing— No-Break at -67°F (-55°C) Or Charpy Impact Testing	5

Specification for Carbon Manganese Steel Plate for Offshore Structures

1 Scope

1.1 This specification covers two grades of intermediate strength steel plates up to 4 in. thick for use in welded construction of offshore structures, in selected critical portions which must resist impact, plastic fatigue loading, and lamellar tearing. The steels are intended for fabrication primarily by cold forming and welding as per API Spec 2B. The welding procedure is of fundamental importance and it is presumed that procedures will be suitable for the steels and their intended service. Conversely, the steels should be amenable to fabrication and welding under shipyard and offshore conditions. API Specifications 2W and 2Y cover companion steels providing similar mechanical properties but with the advantage of potentially lower phosphorus, and the availability of API RP 2Z prequalification of HAZ toughness. This improvement results from a reduction in the maximum allowed chemical composition and is made possible by changes in the method of heat treatment and/or processing.

1.2 The primary use of these steels is in tubular joints, stiffened plate construction, and other intersections where portions of the plates will be subjected to tension in the thickness direction (Z-direction). Supplementary Requirement S4 provides for through-thickness (Z-direction) testing of the plates by the material manufacturer and specified limits for acceptance. Supplementary Requirement S1 provides for ultrasonic examination of the plates by the material manufacturer and specifies limits for acceptance. For applications where through-thickness properties are desirable but the expense of extra testing is not considered necessary, Supplementary Requirement S5 provides a low-sulfur chemistry intended to reduce the size and number of sulfide inclusions in the plate. Supplementary requirement S5 is neither a substitute for S4 Through-Thickness Testing nor a guarantee of a minimum level of through-thickness ductility. Experience indicates, however, that tests of low-sulfur carbon-manganese steels would usually show at least 20% reduction-of-area in a Z-direction tension test. When without S5, API Spec 2H provides a reduced sulfur level, compared to other common structural steels.

1.3 The notch toughness requirements specified in Section 7 or S12 are suitable for application below water or above water in areas of temperate climate [14°F (–10°C) minimum service temperature]. Cold-formed materials have less toughness due to straining than that of the original flat plate, especially in those areas aged by the attachment welding of stubs or braces. The requirements for plates in Section 7 include a moderate adjustment for losses in toughness due to straining and aging; however, differences in composition or fabrication practices may result in significantly greater degradation than that included. Supplementary Requirements S7 and S8 deal with the strain-aging problem and consideration should be given to invoking S7 and/or S8 when the strain exceeds 5% or when (Nitrogen x % strain) exceeds 0.040. Supplementary Requirement S8 provides for testing at the specific temperatures and strain levels of interest and is recommended for all material purchases which exceed the purchaser's experience base.

For applications with lower service temperatures, lower test temperatures should be considered. Supplementary Requirement S2 provides for impact tests at temperatures other than those specified in Section 6 or S12. S2.1 provides for Drop Weight or Charpy V-notch testing at –76°F (–60°C). S2.2 provides for such testing at temperatures less than –40°F (–40°C) but other than –76°F (–60°C).

2 References

The standards referenced herein are as follows:

API

Spec 2B *Fabrication of Structural Steel Pipe*

ASTM¹

A6/A7M *Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling*

A20/A20M *Standard Specification for General Requirements for Steel Plates for Pressure Vessels*

A370 *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

A578/578M *Standard Specification for Straight-Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications*

¹ASTM International, 100 Bar Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org