



Metallic Materials Properties Development and Standardization (MMPDS)

MMPDS-15

CHAPTER 2 STEEL ALLOYS

July 2020

Scientific Source:

Metallic Materials design data acceptable to Government
procuring or certification agencies.

***A joint effort of government, industrial,
educational, and international aerospace
organizations.***

MMPDS-15

Copyright 2020 Battelle Memorial Institute. All rights reserved. Unauthorized
duplication or distribution may violate the Copyright Laws of the United States and of
other jurisdictions.

Except as expressly provided below, the copyrighted work contained herein may not be copied, modified, adapted, translated, included in derivative works or transferred to a third party. The information may be subject to export control laws and regulations of the United States. The user represents and warrants that the information will not be exported, transferred, sublicensed, copied, shared, disclosed, or used in any way except in compliance with all applicable export control laws and regulations of the United States.

The owner of this copy of the Handbook is hereby granted a limited license to make copies of no more than 10 individual pages of the Handbook (but specifically not including multiple sections or volumes) from this copy at a time for the sole purpose of attaching as reference and supporting information to a document authored by the owner.

The user of this Handbook assumes the responsibility for the selection of material properties from it to meet their requirements. The information contained herein is provided as-is without warranty. There are no warranties of any kind, either express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

MMPDS-15 CHAPTER 2

CHAPTER 2 - STEEL	2-1
2.1 GENERAL	2-1
2.1.1 ALLOY INDEX	2-1
2.1.2 MATERIAL PROPERTIES	2-2
2.1.3 STABILIZED SPECIFICATIONS.....	2-7
2.1.4 ENVIRONMENTAL CONSIDERATIONS	2-7
2.1.5 OBSOLETE ALLOYS, HEAT TREATMENTS, AND PRODUCT FORMS	2-7
2.2 CARBON STEELS	2-11
2.2.0 COMMENTS ON CARBON STEELS	2-11
2.2.1 AISI 1025.....	2-12
2.3 LOW-ALLOY STEELS (AISI GRADES AND PROPRIETARY GRADES)	2-15
2.3.0 COMMENTS ON LOW-ALLOY STEELS (AISI AND PROPRIETARY GRADES)	2-15
2.3.1 SPECIFIC ALLOYS.....	2-19
2.4 INTERMEDIATE ALLOY STEELS	2-71
2.4.0 COMMENTS ON INTERMEDIATE ALLOY STEELS	2-71
2.4.1 COMMENTS AND PROPERTIES	2-71
2.4.2 9NI-4CO-0.20C	2-79
2.4.3 9NI-4CO-0.30C	2-84
2.5 HIGH-ALLOY STEELS	2-95
2.5.0 COMMENTS ON HIGH-ALLOY STEELS	2-95
2.5.1 18 NI MARAGING STEELS	2-97
2.5.2 AF1410	2-105
2.5.3 AERMET 100	2-108
2.5.4 FERRIUM S53	2-114
2.5.5 FERRIUM M54	2-126
2.6 COLUMNS	2-133
2.6.0 PRECIPITATION AND TRANSFORMATION-HARDENING STEELS (STAINLESS) 2-133	
2.6.1 AM-350	2-133
2.6.2 AM-355	2-140
2.6.3 CUSTOM 450	2-143
2.6.4 CUSTOM 455.....	2-153

MMPDS-15 CHAPTER 2

2.6.5 CUSTOM 465.....	2-163
2.6.6 PH13-8MO	2-170
2.6.7 15-5PH	2-190
2.6.8 PH15-7MO	2-203
2.6.9 17-4PH	2-215
2.6.10 17-7PH.....	2-233
2.6.11 HSL180 (12.5CR-1.0NI-15.5CO-2.0MO).....	2-240
2.6.12 MLX17.....	2-247
2.6.13 MLX19.....	2-256
2.7 AUSTENITIC STAINLESS STEELS	2-261
2.7.0 COMMENTS ON AUSTENITIC STAINLESS STEEL	2-261
2.7.1 AISI 301 AND RELATED 300 SERIES STAINLESS STEELS	2-263
2.8 ELEMENT PROPERTIES	2-283
2.8.1 BEAMS	2-283
2.8.2 COLUMNS	2-286
2.8.3 TORSION	2-287
REFERENCES	2-293
APPENDICES	A-1
APPENDIX A	A-1
A.0 GLOSSARY	A-1
A.1 ABBREVIATIONS	A-1
A.2 SYMBOLS.....	A-6
A.3 DEFINITIONS.....	A-6
A.4 CONVERSION OF U.S. UNITS OF MEASURE USED IN MMPDS TO SI UNITS	A-17
APPENDIX B	B-1
B.0 ALLOY INDEX.....	B-1
APPENDIX C	C-1
C.0 SPECIFICATION INDEX.....	C-1
C.1 CROSS REFERENCE OF CANCELED MIL SPECIFICATIONS	C-14
APPENDIX D	D-1
D.0 TESTING STANDARDS	D-1

MMPDS-15 CHAPTER 2

APPENDIX E	E-1
E.0 SUBJECT INDEX	E-1