EXPLANATORY NOTES AND DEFINITIONS

Introduction ...................................................................................... 2
Typical Value.................................................................................... 2
Chemical Composition ..................................................................... 2
Mechanical Properties ................................................................. 2
Heat Treatment ................................................................................ 3
Microstructure ................................................................................. 3
PF Material Code Designations ....................................................... 3
Obsolete Acronym ............................................................................ 3
Additional Material Code Designations ............................................ 3
Grade Selection .............................................................................. 4
Proof Testing .................................................................................... 4
Density ............................................................................................. 4
Impact Energy .................................................................................. 4
Ultimate Tensile Strength ............................................................... 4
Yield Strength ................................................................................... 4
Elongation ........................................................................................ 4
Reduction of Area ............................................................................ 4
Compressive Yield Strength .......................................................... 4
Hardness .......................................................................................... 4
Fatigue Limit and Fatigue Strength ................................................ 5
Elastic Constants ............................................................................. 5
Engineering Information ................................................................. 5
SI Units ............................................................................................. 5
Referenced MPIF Standards ........................................................... 5
Comparable Standard ...................................................................... 5

DATA TABLES – INCH-POUND
Carbon Steel............................................................................. 6–7
Copper Steel................................................................................. 8–9
Low Alloy PF-42XX Steel...................................................... 10–11
Low Alloy PF-46XX Steel............................................................ 12–13

DATA TABLES – SI UNITS
Carbon Steel............................................................................... 14–15
Copper Steel............................................................................... 16–17
Low Alloy PF-42XX Steel...................................................... 18–19
Low Alloy PF-46XX Steel............................................................ 20–21

ENGINEERING INFORMATION
Hardenability Data and Jominy Curves ...................................... 22–23

INDEX
Alphabetical Listing & Guide to Materials Systems & Designation Codes Used in MPIF Standard 35 ......................... 24

SI UNITS CONVERSION TABLE
Quantities/Terms Used in MPIF Standards ................................. 29
No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publisher.

ISBN No. 978-1-943694-13-6

© 2017 Metal Powder Industries Federation
105 College Road East
Princeton, New Jersey 08540-6692 USA

All rights reserved
Produced in the U.S.A.
Scope

MPIF Standard 35 is issued to provide the design and materials engineer with the information necessary for specifying powder metallurgy (PM) materials that have been developed by the PM parts manufacturing industry. This section of Standard 35 deals with products manufactured by powder forging (PF). It does not apply to materials for conventional PM structural, self-lubricating bearings or metal injection molded (MIM) products, which are covered in separate editions of MPIF Standard 35. Each section of this standard is divided into subsections based on the various types of PF materials in common commercial use within that section. Notes at the beginning of each subsection discuss the characteristics of that material. Users of this standard should make a determination as to the availability of any referenced material.

The use of any MPIF Standard is entirely voluntary. MPIF Standards are issued and adopted in the public interest. They are designed to eliminate misunderstandings between the producer and the purchaser and to assist the purchaser in selecting and obtaining the proper material for a particular product. Existence of MPIF Standards does not in any respect preclude any member or non-member of the Federation from manufacturing or selling products that use materials or testing procedures not included in this Standard. Other such materials may be commercially available.

By publication of these Standards, no position is taken with respect to the validity of any patent rights nor does the Metal Powder Industries Federation undertake to ensure anyone utilizing the Standards against liability for infringement of any Letters Patent or accept any such liability.

Neither MPIF nor any of its members assumes or accepts any liability resulting from use or non-use of any MPIF Standard. In addition, MPIF does not accept any liability or responsibility for the compliance of any product with any standard, the achievement of any minimum or typical values by any supplier, or for the results of any testing or other procedure undertaken in accordance with any Standard.

MPIF Standards are subject to periodic review and may be revised. Users are cautioned to refer to the latest edition. New, approved materials and property data may be posted periodically on the MPIF website. Between published editions, go to mpif.org to access data that will appear in the next printed edition of this standard.

Both the purchaser and producer should, in order to avoid possible misconceptions or misunderstandings, agree on the following conditions prior to the manufacture of a PF component: material selection, chemical composition and alloying method, proof testing, typical property values and processes, which may affect the part application.