



ASTM INTERNATIONAL  
Selected Technical Papers

## Bearing Steel Technologies: 12th Volume, Progress in Bearing Steel Metallurgical Testing and Quality Assurance

STP 1623  
Editor:  
John Beswick



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## Foreword

THIS COMPILATION OF Selected Technical Papers, STP1623, *Bearing Steel Technologies: 12th Volume, Progress in Bearing Steel Metallurgical Testing and Quality Assurance*, contains peer-reviewed papers that were presented at a symposium held May 15–17, 2019, in Denver, CO, USA. The symposium was jointly sponsored by ASTM International Committee A01 on Steel, Stainless Steel and Related Alloys, and Subcommittee A01.28 on Bearing and Power Transmission Steels.

Symposium Chair and STP Editor:

John M. Beswick  
*Montfoort, The Netherlands*



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# Overview

There are occasions when jewels evolve from quite mundane beginnings, and the ASTM International bearing steel symposium series, starting in 1946, is an example of something special. The symposium “Rolling Bearing Steel: Progress in Bearing Steel Metallurgical Testing and Quality Assurance” was held May 15–17, 2019, in Denver, CO, USA. Symposia dedicated to bearing steel technologies follow an established tradition of ASTM support for the topic. Information on the past ASTM bearing steel symposia and related STP publications are given as follows:

Topic	Year	Location	Chairman	STP
Symposium on Testing of Bearings	1946	Buffalo	—	70
Rating of Non-Metallic Inclusions	1974	Boston	Joe Hoo	575
Roller Contact Fatigue Testing	1981	Phoenix	Joe Hoo	771
Effect of Steel Manufacturing Processes on the Quality of Bearing Steels	1986	Phoenix	Joe Hoo	987
Creative Use of Bearing Steels	1991	San Diego	Joe Hoo	1195
Bearing Steels: Into the 21 <sup>st</sup> Century	1996	New Orleans	Joe Hoo and Bill Green	1327
Sixth International Symposium on Bearing Steels	2001	Phoenix	John Beswick	1419
Advances and State of the Art in Bearing Steel Quality Assurance	2005	Reno	John Beswick	1465
Developments on Rolling Bearing Steels and Testing	2009	Vancouver	John Beswick	1524
Advances in Rolling Contact Fatigue Strength Testing and Related Substitute Technologies	2011	Tampa	John Beswick	1548
Advances in Steel Technologies for Rolling Bearings	2014	Toronto	John Beswick	1580
Progress in Steel Technologies and Bearing Steel Quality Assurance	2016	Orlando	John Beswick	1600
Progress in Bearing Steel Metallurgical Testing and Quality Assurance	2019	Denver	John Beswick	1623

The aim of the ASTM bearing steels symposia has always been to facilitate an exchange of relevant technical information on rolling bearing steel technologies. Global participation of experts has always been a key feature, and without presenters and participants from outside North America, the symposia would not have been a success over the years. Bearing steel technologies plan and look forward to the ASTM events, and the attendance numbers are relatively stable but the global coverage continues to expand.

The majority of the presentations from the symposium have been compiled as peer-reviewed papers for publication as ASTM selected technical papers (STP1623). A rigorous peer-review process has been applied as befits a reputable technical publication. The STP editor is beholden to the peer reviews for finding time and motivation to perform this critical task. Experience has shown that the STPs are an excellent bearing steel technology reference, and the authors, their respective companies, and the anonymous peer reviewers are congratulated for their commitment to publication.

The symposium program contained 37 presentations with 110 persons registering for the 10 sessions during a two-and-half-day event. The symposium comprised the following sections:

- Rolling Bearing Failure Modes and Advanced Analysis
- Microcleanliness Relationships and Testing of Air-melt Bearing Steels
- Developments in RCF Testing of Bearing Steels
- Rolling Bearing Surface Damage and Effect on RCF Life
- Dimensional Stability
- Developments in Bearing Component Manufacturing
- Developments in Air-melt Clean Bearing Steel Steelmaking
- New and Novel Steel Compositions for Advanced Rolling Bearing Usage
- Application of Fracture Mechanics to Bearing Steel Property Characterization
- VIM-VAR Steel Know-How—Aero Steels Metallurgy and Functional Properties

Bearing metallurgists will recognize some familiar trends and some new directions in the STP1623 papers. The world is changing and the alloy steel technology trends have synergies, and the remit of the ASTM Subcommittee A01.28 has been revised since the 12th Bearing Steel Symposium. The subcommittee now covers bearing and transmission steels and as such is responsible for bearing and transmission steel specifications. The next ASTM bearing steel symposium event is destined to be the 1st ASTM Bearing and Transmission Steels Symposium, with new opportunities to apply alloy steel know-how to support the manufacture of better and added value transmission steel products. The opportunities arising from collaborations within the bearing and transmission steel technologies cannot be overestimated, and the merging of the relevant steel purchasing specifications can result in

improvements from both the technical and commercial perspectives. Merging of the specifications could improve the commercial margins to support purposeful R&D, related publications and the future ASTM symposia.

The STP editor is indebted to Jeff Fuller, the ASTM A01.28 Subcommittee Chairman, for supporting the symposium arrangements, and to the ASTM International organization for fostering the continuation of the symposia series. The following organizations provided financial support for the symposium; very many thanks for your sponsorship:

Jiangyin Xingchen Special Steel	China
Amsted Rail Co., Inc	USA
Ascometal	France
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Carpenter Technology Corporation	USA
Charter Steel	USA
FNsteel B.V.	The Netherlands
Georgsmarienhütte (GMH) GmbH	Germany
Gerdau Special Steel North America	USA
Ovako AB	Sweden
Saarstahl AG	Germany
Sanyo Special Steel	Japan
SKF B.V.	The Netherlands
Timken	USA
TimkenSteel	USA

It has been the symposium chairman's privilege to have, on behalf of ASTM International, prepared the program, chaired the symposium, and edited the STP1623.

John M. Beswick  
*Montfoort, The Netherlands*



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