



Metalworking

- Abrasives, Files & Deburring Tools
- Cutting Tools
- Drill Bushings
- Precision Instruments & Measuring
- Raw Materials
- Vacuum, Coolant & Lubrication Systems

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- Blades, Punches & Reamers
- Collets & Cutting Tools
- Coolants & Lubricants
- Drill Chucks, Drills, Taps & Accessories
- End Mills & Hole Saws
- Gauges, Levels, Spacers & Shims
- Grinding Wheels & Segments
- Raw Stock

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REID SUPPLY RESOURCE GUIDES

In our continuous effort to improve our offerings and meet customer needs, simplify effort and provide solutions, **Reid Supply** has separated our products into 12 easy-to-identify categories:

| | | |
|--|---|---------------|
| Manual Controls | - | Blue |
| Clamps and Workholding | - | Red |
| Tooling Components | - | Gold |
| Fasteners and Hardware | - | Blue Green |
| Leveling Devices and Vibration Control | - | Orange |
| Material Handling | - | Purple |
| Bearings and Power Transmission | - | Blue Gray |
| Metalworking | - | Brown |
| Maintenance, Repair and Operations | - | Aqua |
| Metalworking | - | Dark Red |
| Structural Systems | - | Yellow Green |
| Safety | - | Orange Yellow |

Metalworking is the seventh of a series of Resource Guides relative to each of Reid Supply's 12 product categories. Each Resource Guide will include product relative information, data and references to help our customers select the best product for their intended application.

Reid Supply welcomes your feedback and comments on any aspect of these Resource Guides. Please contact [Customer Service](#) at the number listed below or email us at mail@ReidSupply.com.

Purpose of This Resource Guide

The purpose of this manual is to aid customers in the proper selection of products in the **Metalworking** category of **Reid Supply** product offerings. It is not intended to be a how-to manual. However, much of the information presented is relative to the selection and proper use of the products referenced. The information included in this Resource Guide extends beyond the catalog to provide references to details, tables, charts and other information to further assist engineers, designers, users and others in selecting the best parts for their **Metalworking** needs.

Professional and industrial standards, along with government safety regulations, improve application design and performance. Many standards and standards organizations have roots dating back to the beginning of the industrial age and the automotive industry. Table 2 lists many of the relative standards organizations, where standards are developed and available. Table 3 lists many standards relative to **Metalworking**.

Unlike other Resource Guides, this guide primarily quantifies relative reference books available at Reid Supply. Some of this information could be included in this guide, but, due to the amount of information required, Table 5 summarizes the content of each reference book. Use Table 4 and Table 5 to select the best reference book to suit your needs. Many of the standards content listed in Table 3 can be found in one or more of the reference books listed.

Disclaimer

It should be noted that **this Resource Guide is for reference only**. The information provided is intended to assist in the selection of products sold by **Reid Supply** and its vendors. As **Reid Supply** and its vendors are not typically aware of or possess any expertise in the systems or processes for which products are to be applied, we cannot accept any responsibility or liability for the outcome thereof.

Furthermore, with new and old technologies continually expanding and changing, it is impossible to address all systems, processes and applications for which **Reid Supply** products are purchased. **Reid Supply** also has little control over materials and processes from which our products are produced.

In addition, due to the nature of some materials; colors, textures, shapes and sizes may lack consistency.

Products sold by **Reid Supply** are sold with the understanding that the purchaser is thoroughly familiar with the safe and proper use and application of the product. Responsibility for the use and application of the products rests with the user. Failure of the product can occur due to misapplication, abuse, intentional alteration or improper maintenance.

Specifications for **Metalworking** products apply at the time of purchase only. Application and use, proper or improper, can change the characteristics of the **Metalworking** system and its components. The user is solely responsible for any recommended or mandatory maintenance and inspection of these products, documented or undocumented, by the vendor, professional organization, or governmental body relative to the **Metalworking** system or component purchased. Furthermore, the user shall be solely responsible for the safe application, operation and use of all products purchased at **Reid Supply**.

Reid Supply reserves the right to modify, update and otherwise maintain this document and its content.

Terminology

Some terms used to define products may be vendor and product specific. To avoid confusion, a glossary of these terms used in this document has been included at the end of the manual.

As **Reid Supply** purchases its products from several vendors, it is sometimes difficult to sort and categorize these differences. If you find yourself confused by terminology in the catalog or this document, try shopping online using the web site listed below or contact **Customer Service** at the number listed below or email us at mail@ReidSupply.com.

DESIGN CONSIDERATIONS

As with most any product application, or industrial process, **Metalworking** design considerations are based on engineering standards, practices, knowledge, experience, and imagination. As can be seen from Table 4 and Table 5, Reid Supply's reference books include thousands of pages of relative information for all levels of **Metalworking**. Along with design considerations, equations, charts, illustrations, tables and procedures, these reference books also contain relative standards information required to apply and use cutting tools, inserts, collets, tool holders and other relative products.

Safety

Because **Metalworking**, manual or automated, requires human interaction with cutting tools, live machinery, and moving parts; safety considerations are very important and, in some cases, mandatory. There are many governmental, professional, and organizational standards and regulations for best practices and safety relative to **Metalworking**. Table 1 lists some OSHA safety regulations relative to tools and machinery.

Table 1: *Relative OSHA Regulations*

| Regulation 29 CFR | | | Description |
|--------------------------------|--|------------------------------------|---|
| P/N | Subpart | Standard | |
| 1910 General | O Machinery and Machine Guarding | 1910.211 | Definitions |
| | | 1910.212 | General requirements for all machines |
| | | 1910.213 | Woodworking machinery requirements |
| | | 1910.214 | Cooperage machinery. [Reserved] |
| | | 1910.215 | Abrasive wheel machinery |
| | | 1910.216 | Mills and calenders in the rubber and plastics industries |
| | | 1910.217 | Mechanical power presses |
| | | 1910.218 | Forging machines |
| | P Hand and Portable Powered Tools and Other Hand-Held Equipment | 1910.241 | Definitions |
| | | 1910.242 | Hand and portable powered tools and equipment, general |
| 1910.243 | | Guarding of portable powered tools | |
| 1910.244 | | Other portable tools and equipment | |
| 1915 Shipyards Equipment | H Tools and Related Equipment | 1915.132 | Portable electric tools |
| | | 1915.133 | Hand tools |
| | | 1915.134 | Abrasive wheels |

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| Regulation 29 CFR | | | Description |
|-----------------------------|--|----------|---------------------------|
| P/N | Subpart | Standard | |
| 1917 Marine Terminals | C Cargo Handling Gear and Equipment | 1917.51 | Hand tools |
| | G Related Terminal Operations and Equipment | 1917.151 | Machine guarding |
| 1918 Longshoring | G Cargo Handling Gear and Equipment Other Than Ship's Gear | 1918.69 | Tools |
| 1926 Construction | I Tools – Hand and Power | 1926.300 | General requirements |
| | | 1926.301 | Hand tools |
| | | 1926.302 | Power-operated hand tools |
| | | 1926.303 | Abrasive wheels and tools |
| | | 1926.304 | Woodworking tools |

Standards, Regulations and Policies

A majority of the standards are related to the design, application, and operation of cutting tools, components and systems. Standards for testing methods (ASTM) are also available, while other standards are related to safety. Table 2 includes common U.S. regulation and standards organizations. Along with Table 2, Table 3 includes standards, by number, relative to Metalworking. Unlike some other operations, **Metalworking** requires knowledge and understanding of relative standards, regulations and company policies by all involved, including the user. All should also be familiar with safety regulations.

As previously mentioned, Table 3 lists many standards relative to Metalworking, but not all. If more are desired, a primary source is www.NSSN.org. This resource includes a very comprehensive standards database and search engine, powered by ANSI. With basic and advance search capability, this organization includes U.S. and global standards used world wide. It also includes U.S. military specifications, SAE and other private industrial standards available in one location.

NOTE: Many regulations and standards are “recommended”. Adhering to and applying the content of these regulations and standards in mostly voluntary for manufactures, designers and operators of bearings and bearing components. In most cases, manufactures and designers will meet or exceed the documented specifications.

Regulations and standards are periodically revised, superseded or otherwise managed to keep up with changes in technology, materials, design, manufacturing, and testing methods.

The following information applies the tables included in this section:

- **Reid Supply** does not design, fabricate or manufacture any of its products. The professional, safety and standard organizations, plus related information and documentation, listed are for reference only and may not be complete or up-to-date. The vendor, customer, purchaser and user is responsible for obtaining, understanding and applying any standards, safety or otherwise, relative to the application and use of all **Reid Supply** products.
- It is not unusual for standards from one organization to be adopted by others. In this case, the original standard will be shown in bold. For dual listings, the originator is typically listed second (e.g. ANSI/ISO, ISO/ANSI, ANSI/NFPA, ASME/ASTM, etc).
- It is not uncommon for governments to adapt standards from industrial and/or professional standards. In this case, the government document will simply reference the industry standard with modifications.

Table 2: List of Common Standards Organizations

| Standards Organization | Information |
|---|---|
| AISI American Iron and Steel Institute www.steel.org | AISI serves as the voice of the North American steel industry in the public policy arena and advances the case for steel in the marketplace as the preferred material of choice. AISI also plays a lead role in the development and application of new steels and steelmaking technology. |
| ANSI American National Standards Institute www.ANSI.org www.NSSN.org | ANSI facilitates the development of American National Standards (ANS) by accrediting the procedures of standards developing organizations (SDOs). These groups work cooperatively to develop voluntary national consensus standards. Search engine, national resource for global standards, powered by ANSI. |
| ASME American Society of Mechanical Engineers www.ASME.org | Founded in 1880 as the American Society of Mechanical Engineers, today's ASME promotes the art, science & practice of mechanical & multidisciplinary engineering and allied sciences around the globe. |
| ASTM American Society for Testing and Materials www.ASTM.org | Formerly the American Society for Testing and Materials, ASTM International is one of the largest voluntary standards development organizations in the world—a trusted source for technical standards for materials, products, systems, and services. Known for their high technical quality and market relevancy, ASTM International standards have an important role in the information infrastructure that guides design, manufacturing and trade in the global economy. |
| BSI British Standards international www.bsi-global.com | Since its foundation in 1901, BSI Group has grown into a leading global independent business services organization that inspires confidence and delivers assurance to customers with standards-based solutions. Originating as the world's first national standards body, the Group has over 2,250 staff operating in over 100 countries through more than 50 global offices. |
| DIN Deutsches Institut for Normung e.V. www.DIN.de | DIN, the German Institute for Standardization, develops norms and standards as a service to industry, the state and society as a whole. A registered non-profit association, DIN has been based in Berlin since 1917. DIN's primary task is to work closely with its stakeholders to develop consensus-based standards that meet market requirements. |
| ISO International Organization for Standardization www.ISO.org | ISO is the world's largest developer and publisher of International Standards. It is a non-governmental organization network of the national standards institutes of 157 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. |
| MIL-Specs US Military Specifications www.DSCC.dla.mil | DSCC (Defense Supply Center Columbus) serves as a preparing activity or technical agent for thousands of standardization documents covering a wide variety of electronic components and other items. Our engineers and technicians coordinate and prepare technical documents in 67 Federal Supply Classes, and provide engineering support to DoD customers using these documents. (Military specifications are also listed with NSSN.) |
| NFPA National Fire Protection Association www.NFPA.org | Established in 1896, NFPA is the world's leading advocate of fire prevention and an authoritative source on public safety. NFPA develops, publishes, and disseminates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks. |
| NFPA National Fluid Power Association www.NFPA.com | NFPA membership is diverse, representing the full spectrum of our industry: hydraulic and pneumatic; large and small; supplier, distributor, educator, customer and manufacturer. NFPA is committed to advancing fluid power technology, strengthening the industry and fostering member's success through a menu of services that is broad enough to meet wide-ranging interests, yet focused enough to offer individualized assistance. |

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| Standards Organization | Information |
|--|---|
| NIOSH National Institute for Occupational Safety and Health www.CDC.gov/niosh/ | The Occupational Safety and Health Act of 1970 created both NIOSH and the Occupational Safety and Health Administration (OSHA). OSHA is in the U.S. Department of Labor and is responsible for developing and enforcing workplace safety and health regulations. NIOSH is in the U.S. Department of Health and Human Services and is an agency established to help assure safe and healthful working conditions for working men and women by providing research, information, education, and training in the field of occupational safety and health. |
| NSSN Search Engine for Standards www.NSSN.org | Powered by ANSI, this standards search engine provides users with standards and related information from a wide range of national and global standards organizations and developers. Standards can be found from organizations accredited by ANSI, many U.S. private standards bodies, government agencies, military and international organizations. |
| OSHA Occupational Safety & Health Administration www.OSHA.gov | Most government safety regulations are set by OSHA under Title 29 of the Code of Federal Regulations (CFRs). NOTE: Unlike other standards, these are available free, online or by contacting OSHA. |
| SAE International Society of Automobile Engineers www.SAE.org | Formed in 1905, by Horace Swetland in New York City, the primary goal of the SAE was to unite automotive engineers and provide an atmosphere where they could have a “free exchange of ideas” in order to expand their individual technical knowledge base. SAE International now unites automotive professionals worldwide. |
| USCTI United States Cutting Tool Institute www.USCTI.com | Formed in 1988 and resulted from a merger of the two national associations representing the cutting tool manufacturing industry: the Metal Cutting Tool Institute and the Cutting Tool Manufacturers Association. The resulting organization currently represents an estimated 80% of the domestic cutting tool market. |

Regulations and Standards serve to:

- Share knowledge and experience across time and around the globe.
- Help encourage, set, and maintain quality control concepts.
- Ensure repeatability between like parts, components, and systems.
- Ensure compatibility among like parts, components, and systems between different manufacturers.

Table 3 lists some common standards relative to Metalworking. It should be noted that, as with many ANSI, standards are developed by experienced individuals or groups that make them available for review, implementation, and distribution. For instance, many ASTM standards include an “X” in the ANSI column to indicate that ANSI also indorses and distributes ASTM standards.

Table 3: *Metalworking Related Standards*

| HYDRAULIC AND PNEUMATIC STANDARDS | | | | | | STANDARD TITLE |
|-----------------------------------|------|------|-----|-----|-----|--|
| ANSI | ASME | ASTM | BSi | ISO | SAE | |
| A156.2 | | | | | | Bored and Preassembled Locks and Latches |
| B11.1 | | | | | | Machine Tools – Mechanical Power Presses – Safety Requirements for Construction, Care, and Use |
| B11.2 | | | | | | Hydraulic Power Presses – Safety Requirements for Construction, Care, and Use |
| B11.3 | | | | | | Machine Tools – Safety Requirements for Power Press Brakes |
| B11.4 | | | | | | Machine Tools – Safety Requirements for Shears |
| B11.5 | | | | | | Machine Tools – Iron Workers – Safety Requirements for Construction, Care, and Use |
| B11.6 | | | | | | Safety Requirements for Manual Turning Machines with or without Automatic Control |
| B11.7 | | | | | | Cold Headers and Cold Formers – Safety Requirements for Construction, Care, and Use |

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|-----------------------------------|------|------|-----|-----|-----|---|
| ANSI | ASME | ASTM | BSi | ISO | SAE | |
| B11.8 | | | | | | Safety Requirements for Manual Milling, Drilling and Boring Machines with or without Automatic Control |
| B11.9 | | | | | | Safety Requirements for the Construction, Care, and Use of Grinding Machines |
| B11.10 | | | | | | Safety Requirements for Metal Sawing Machines |
| B11.11 | | | | | | Safety Requirements for Gear and Spline Cutting Machines |
| B11.12 | | | | | | Safety Requirements for Roll-forming and Roll-bending Machine |
| B11.15 | | | | | | Safety Requirements for Pipe, Tube, and Shape Bending Machines |
| B11.16 | | | | | | Safety Requirements for Powder / Metal Compacting Presses |
| B11.17 | | | | | | Safety Requirements for Horizontal Hydraulic Extrusion Presses |
| B11.18 | | | | | | Machine Tools – Safety Requirements for Machines Processing or Slitting Coiled or Non-Coiled Metal |
| B11.19 | | | | | | Performance Criteria for Safeguarding |
| B11.20 | | | | | | Machine Tools – Safety Requirements For Integrated Manufacturing Systems |
| B11.21 | | | | | | Machine Tools-Safety Requirements for Machine Tools Using Lasers for Processing Materials |
| B11.22 | | | | | | Safety Requirements for Turning Centers and Automatic, Numerically Controlled Turning Machines |
| B11.23 | | | | | | Safety Requirements for Machining Centers and Automatic, Numerically Controlled Milling, Drilling and Boring Machines |
| B11.24 | | | | | | Safety Requirements for Transfer Machines |
| B74.2 | | | | | | Specifications for Shapes and Sizes of Grinding Wheels, and for Shapes, Sizes and Identification of Mounted Wheels |
| B74.3 | | | | | | Specifications for Shapes and Sizes of Diamond or CBN Abrasive Products |
| B74.4 | | | | | | Procedure for Bulk Density of Abrasive Grains |
| B74.5 | | | | | | Capillarity of Abrasive Grains, Test for |
| B74.6 | | | | | | Sampling of Abrasive Grains, Procedure for |
| B74.8 | | | | | | Recommended Practice for Friability of Abrasive Grain, Ball Mill Test |
| B74.10 | | | | | | Abrasive Microgrits, Grading of |
| B74.11 | | | | | | Specifications for Tumbling Chip Abrasives |
| B74.12 | | | | | | Size of Abrasive Grain-Grinding Wheels, Polishing and General Industrial Uses |
| B74.13 | | | | | | Markings for Identifying Grinding Wheels and Other Bonded Abrasives |
| B74.14 | | | | | | Methods of Chemical Analysis of Aluminum Oxide Abrasive Grain and Abrasive Crude |
| B74.15 | | | | | | Methods of Chemical Analysis of Silicon Carbide Abrasive Grain and Abrasive Crude |
| B74.16 | | | | | | Checking the Size of Diamond and Cubic Boron Nitride Abrasive Grain |
| B74.18 | | | | | | Grading of Certain Abrasive Grain on Coated Abrasive Material |
| B74.19 | | | | | | Test for Determining Magnetic Content of Abrasive Grains |
| B74.20 | | | | | | Grading of Diamond Powder in Sub-Sieve Sizes |
| B74.21 | | | | | | Fatigue Proof Test Procedure for Vitrified Grinding Wheels |
| B74.22 | | | | | | Design Test for Type 27 Portable Grinding Wheels |
| B74.23 | | | | | | Measuring the Relative Crystal Strengths of a Diamond Cubic Boron Nitride Grits |

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|-----------------------------------|--------|------|------|----------------------|-----|--|
| ANSI | ASME | ASTM | BSi | ISO | SAE | |
| B165.1 | | | | | | Power Tools – Power-Driven Brushing Tools – Safety Requirements for Design, Care, and Use |
| B212.1 | | | | | | Carbide Blanks, Brazed and Solid Single-Point Tools |
| B212.1a | | | | | | Carbide Tips for Brazing on Turning Tools |
| B212.2 | | | | | | Carbide Seats Used with Indexable Inserts for Clamp Type Holders |
| B212.3 | | | | | | Cutting Tools – Precision Holders for Indexable Inserts |
| B212.4 | | | | | | Cutting Tools – Indexable Inserts – Identification |
| B212.5 | | | | 5608 5610 6261 | | Metric Holders for Indexable Inserts |
| B212.7 | | | | | | Cutting Tools – Threaded Fasteners Used in the Carbide Tooling Industry |
| B212.8 | | | | | | Cutting Tools – Carbide Blanks for Twist Drills, Reamers, End Mills, and Random Rod |
| B212.9 | | | | | | Cutting Tools – Carbide Blanks for Tipping Circular Saws |
| B212.10 | | | | | | Cutting Tools – Precision Indexable Insert Cartridges |
| B212.11 | | | | | | Cutting Tools – Indexable Insert Shank-Type Milling Cutters (Inch Series) – Designation |
| B212.12 | | | | | | Turning Tools – Commonly Used Indexable Inserts |
| | | | | | | Indexable Screw-On Inserts with Partly Cylindrical Fixing Holes Commonly Used for Turning |
| B212.13 | | | | | | Roller Turner Type Cutting Tools, Single Point |
| B212.14 | | | | | | Carbide Seats Used with Indexable Inserts for Pin Lock-Type Holders |
| B212.15 | | | | | | Cutting Tools – Carbide-Tipped Masonry Drills & Blanks for Carbide Masonary Drills |
| B212.16 | | | | | | Cutting Tools – Blanks for Carbide Tools |
| B212.17 | | | | | | Cutting Tools – Bore Type Milling Cutters (Inch Series) – Designation |
| B212.18 | | | | | | Inch Boring Bars for Indexable Inserts – Designation and Dimensions |
| B212.19 | | | | | | Cutting Tools – Indexable Inserts – Identification |
| B212.20 | | | | | | Carbide Chip Breakers Used with Indexable Inserts for Clamp Type Holders |
| | A47 | | | | | Standard Specification for Ferritic Malleable Iron Castings |
| | A197 | | | | | Standard Specification for Cupola Malleable Iron |
| | A220 | | | | | Standard Specification for Pearlitic Malleable Iron |
| | A297 | | | | | Standard Specification for Steel Castings, Iron-Chromium and Iron-Chromium-Nickel, Heat Resistant, for General Application |
| | A439 | | | | | Standard Specification for Austenitic Ductile Iron Castings |
| | A536 | | | | | Standard Specification for Ductile Iron Castings |
| | A743 | | | | | Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application |
| | B1.1 | | 1580 | | | Unified Inch Screw Threads (UN and UNR Thread Form) |
| X | B1.2 | | | | | Gages and Gaging for Unified Inch Screw Threads |
| X | B1.3 | | | | | Screw Thread Gaging Systems for Acceptability – Inch and Metric Screw Threads (UN, UNR, UNJ, M, and MJ) |
| X | B1.9 | | | | | Buttress Inch Screw Threads |
| | B1,12 | | 1580 | | | Class 5 Interference-Fit Thread (Reaffirmed 2008) |
| X | B1.13M | | 3643 | 965 | | Metric Screw Threads: M Profile |

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|-----------------------------------|---------|------|--------------|------|----------------|--|
| ANSI | ASME | ASTM | BSI | ISO | SAE | |
| X | B1.15 | | 4084 | | | Unified Inch Screw Threads (UNJ Thread Form) |
| B | B1.16M | | | | | Gages and Gaging for Metric M Screw Threads |
| X | B1.21M | | | | | Metric Screw Threads MJ Profile |
| X | B1.30 | | | | | Screw Threads Practice for Calculating and Rounding Dimensions |
| X | B4.1 | | | | | Preferred Limits and Fits for Cylindrical Parts |
| X | B4.2 | | 3643 4500 | X | | Preferred Metric Limits and Fits |
| X | B4.3 | | | | | General Tolerances for Metric Dimensioned Products |
| X | B4.4M | | | | | Inspection of Workpieces, Gagemaker |
| X | B5.1M | | | | | T-Slots Their Bolts, Nuts, and Tongues |
| X | B5.8 | | | | | Chuck and Chuck Jaws |
| | B5.9 | | | | | Spindle Noses for Tool Room Lathes, Engine Lathes, Turret Lathes, and Automatic Lathes |
| X | B5.10 | | | | | Machine Tapers (Self Holding and Steep Taper Series) |
| X | B5.11 | | | | | Spindle Noses and Adjustable Adapters for Multiple Spindle Drilling Heads |
| X | B5.18 | | | | | Spindle Noses and Tool Shanks for Milling Machines |
| X | B5.35 | | | | | Machine Mounting Specifications for Abrasive Discs and Plate Mounted Wheels |
| X | B5.38 | | | | | American Standard Threaded and Tapered Spindles for Portable Air and Electric Tools **** |
| X | B5.40 | | | | | Spindle Noses and Tool Shanks for Horizontal Boring Machines |
| X | B5.47 | | | | | Milling Machine Arbor Assemblies |
| X | B5.49 | | | | | Press Terms, Glossary of Mechanical |
| X | B5.50 | | | | | V Flange Tool Shanks for Machining Centers with Automatic Tool Changers |
| X | B5.51M | | | | | Preferred SI Units for Machine Tools |
| X | B5.54 | | | | | Methods For Performance Evaluation Of Computer Numerically Controlled Machining Centers |
| X | B5.55M | | | | | Specification and Performance Standard, Power Press Brakes |
| X | B5.56M | | | | | Specification and Performance Standard, Power Shears |
| X | B5.57 | | | | | Methods For Performance Evaluation Of Computer Numerically Controlled Lathes And Turning Centers |
| X | B5.60 | | | | | Workholding Chucks: Jaw Type Chucks |
| X | B5.61 | | | | | Power Presses – General Purpose Single Action Straight Side Type |
| X | B7.1 | | | | | The Use, Care, and Protection of Abrasive Wheels |
| X | B7.7 | | | | | Safety Requirements for Abrading Materials with Coated Abrasives Systems |
| X | B17.1 | | | | | Keys and Keyseats |
| X | B17.2 | | 46 | 3912 | J503 | Woodruff Keys and Keyseats – nomenclature, definitions, identification number, dimensions, and tolerances |
| X | B18.25 | | | 3912 | AS9841 J502 | Woodruff Keys and Keyseats – requirements for square and rectangular parallel keys and keyways intended for both alignment of shafts and hubs, and transmitting torque between the shafts and hubs |
| X | B32.100 | | | | | Preferred Metric Sizes for Flat, Round, Square, Rectangular, and Hexagonal Metal Products |
| X | B46.1 | | | 8785 | | Surface Texture (Surface Roughness, Waviness, and Lay) |

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|-----------------------------------|-------------|------|-----|-------|-----|--|
| ANSI | ASME | ASTM | BSi | ISO | SAE | |
| X | B47.1 | | | | | Gage Blanks |
| | B86.0.8 | | | | | Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings |
| X | B89.1.2 | | | | | Calibration Of Gage Blocks By Contact Comparison Methods (Through 20 in. And 500 mm) |
| X | B89.1.5 | | | | | Measurement of Plain External Diameters for Use as Master Discs or Cylindrical Plug Gages |
| X | B89.1.6 | | | | | Measurement of Qualified Plain Internal Diameters for Use as Master Rings and Ring Gages |
| X | B89.1.9 | | | | | Gage Blocks |
| X | B89.1.10 | | | | | Dial Indicators (for Linear Measurements) |
| X | B89.1.13 | | | | | Micrometers |
| X | B89.3.1 | | | | | Measurement of Out-of-roundness |
| X | B89.3.4M | | | | | Axes Of Rotation-Methods For Specifying & Testing |
| X | B89.4.1 | | | | | Methods for Performance Evaluation of Coordinate Measuring Machines |
| X | B89.4.10 | | | | | Methods for Performance Evaluation of Coordinate Measuring System Software |
| X | B89.4.19 | | | | | Performance Evaluation of Laser-Based Spherical Coordinate Measurement Systems |
| X | B89.4.22 | | | | | Methods for Performance Evaluation of Articulated Arm Coordinate Measuring Machines |
| | B89.4.10360 | | | 10360 | | Technical Report – Acceptance Test and Reverification Test for Coordinate Measuring Machines (CMMs) Part 2: CMMs Used for Measuring Linear Dimensions |
| X | B89.6.2 | | | | | Temperature and Humidity Environment for Dimensional Measurement |
| X | B89.7.2.1 | | | | | Dimensional Measurement Planning |
| X | B89.7.3.1 | | | | | Guidelines for Decision Rules: Considering Measurement Uncertainty in Determining Confirmation to Specification |
| | B89.7.3.2 | | | | | Technical Report – Guidelines for the Evaluation of Dimensional Measurement Uncertainty |
| X | B89.7.3.3 | | | | | Guidelines for Assessing the Reliability of Dimensional Measurement Uncertainty Statements |
| | B89.7.4.1 | | | | | Technical Report – The Role of Measurement Uncertainty in Conformance Testing |
| X | B89.7.5 | | | | | Metrological Traceability of Dimensional Measurements to the SI Unit of Length |
| X | B89.12M | | | | | CMM |
| X | B94.2 | | 328 | | | Reamers |
| X | B94.6 | | | | | Knurling (DRAFT STANDARD) |
| X | B94.9 | | | | | Taps, Cut and Ground Threads |
| X | B94.11M | | 328 | | | Twist Drills |
| X | B94.19 | | | | | Milling Cutters and End Mills |
| X | B94.33 | | | | | Jig Bushings |
| X | B94.33.1 | | | | | Jig Bushings (Metric) |
| X | B94.35 | | | | | Drill Drivers – Split-Sleeve, Collet-Type |
| X | B94.37 | | | | | Roller Turner Type Cutting Tools Single Point |

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| ANSI | ASME | ASTM | BSi | ISO | SAE | |
| X | B94.49 | | | | | Spade Drill Blades and Spade Drill Holders |
| X | B94.50 | | | | | Single-Point Cutting Tools, Basic Nomenclature and Definitions for |
| X | B94.51M | | | 4875 | | Specifications for Band Saw Blades (Metal Cutting) |
| X | B94.52M | | | 2336 | | Specifications for Hacksaw Blades |
| X | B94.54 | | | | | Specifications for Hole Saws, Hole Saw Arbors, and Hole Saw Accessories |
| X | B94.55M | | | | | Tool Life Testing with Single-Point Turning Tool |
| | B94.56 | | | | | Gages-Functional, Ball – Lock Punches, Inch (DRAFT STANDARD) |
| X | B107.4 | | | | | Driving and Spindle Ends for Portable Hand, Impact, Air, and Electric Tools |
| X | B107.48 | | | | | Metal Chisels, Punches, and Drift Pins: Safety Requirements |
| X | B176 | | | | | Standard Specification for Copper-Alloy Die Castings |
| X | B253 | | | | | Standard Guide for Preparation of Aluminum Alloys for Electroplating |
| X | MFC-14M | | | | | Measurement of Fluid Flow Using Small Bore Precision Orifice Meters |
| X | Y10.3M | | | | | Letter Symbols for Mechanics and Time-Related Phenomena (withdrawn 1996) |
| X | Y10.4 | | | | | Letter Symbols for Heat and Thermodynamics (withdrawn 1994) |
| X | Y14.1 | | | | | Decimal Inch Drawing Sheet Size and Format |
| X | Y14.2M | | | | | Line Conventions and Lettering |
| X | Y14.3M | | | | | Multiview and Sectional View Drawings |
| X | Y14.5M | | | 8015 | | Dimensioning and Tolerancing |
| | Y14.6 | | | | | Screw Thread Representation |
| | Y14.7.1 | | | | | Gear Drawing Standards – Part 1 for Spur, Helical, Double Helical and Rack (withdrawn March 2006) |
| | Y14.8M | | | | | Castings and Forgings |
| X | Y14.36M | | | 1302 | | Surface Texture Symbols |
| X | Y14.38 | | | | | Abbreviations and Acronyms for Use on Drawings and Related Documents |
| | | A27 | | | | Standard Specification for Steel Castings, Carbon, for General Application; referenced in 46 CFR 160.032-1 |
| | | A36/A36M | | | | Standard Specification for Carbon Structural Steel |
| | | A220 | | | | Standard Specification for Pearlitic Malleable Iron |
| | | A743 | | | | Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application |
| | | A1001 | | | | Standard Specification for High Strength Steel Castings in Heavy Sections |
| | | A1039 | | | | Standard Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial and Structural, Produced by the Twin-Roll Casting Process |
| | | B16/B16M | | | | Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines |
| | | B32-08 | | | | Standard Specification for Solder Metal |
| | | B209-07 B209M-07 | | | | Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate |
| | | B329-06 | | | | Standard Test Method for Apparent Density of Metal Powders and Compounds Using the Scott Volumeter |
| | | B571-97 | | | | Standard Practice for Qualitative Adhesion Testing of Metallic Coatings |
| | | B611-85 | | | | Standard Test Method for Abrasive Wear Resistance of Cemented Carbides |

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| | | D732 | | | | Standard Test Method for Shear Strength of Plastics by Punch Tool |
| | | D5767-95 | | | | Standard Test Methods for Instrumental Measurement of Distinctness-of-Image Gloss of Coating Surfaces |
| | | D7127-05 | | | | Standard Test Method for Measurement of Surface Roughness of Abrasive Blast Cleaned Metal Surfaces Using a Portable Stylus Instrument |
| | | D7393-07 | | | | Standard Practice for Indicating Oil in Abrasives |
| | | E18 | | | | Standard Test Methods for Rockwell Hardness of Metallic Materials |
| | | E140 | | | | Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness |
| | | E430 | | | | Standard Test Methods for Measurement of Gloss of High-Gloss Surfaces by Abridged Goniophotometry |
| | | E643-84 | | | | Standard Test Method for Ball Punch Deformation of Metallic Sheet Material |
| | | E1497 | | | | Standard Practice for Safe Use of Water-Miscible Metal Removal Fluids |
| | | E1687 | | | | Standard Test Method for Determining Carcinogenic Potential of Virgin Base Oils in Metalworking Fluids |
| | | | 949-1 | | | Screwing taps. Specification of general dimensions |
| | | | 949-4 | | | Screwing taps. Specification for metric ground thread taps: manufacturing tolerances |
| | | | 1157 | | | Recommendations for tapping drill sizes for use with fluted taps |
| | | | 1387 | | | Specification for screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads |
| | | | 2870 | | | Specification for rolled copper and copper alloys: sheet, strip and foil |
| | | | 3643 | | | ISO metric screw threads. Specification for selected limits of size |
| | | | | 230 | | Test code for machine tools – Part 1: Geometric accuracy of machines operating under no-load or finishing conditions Part 2: Determination of accuracy and repeatability of positioning numerically controlled axes Part 3: Determination of thermal effects Part 4: Circular tests for numerically controlled machine tools Part 5: Determination of the noise emission Part 6: Determination of positioning accuracy on body and face diagonals (Diagonal displacement tests) Part 7: Geometric accuracy of axes of rotation |
| | | | | 235 | | Parallel shank jobber and stub series drills and Morse taper shank drills |
| | | | | 236-1 | | Hand reamers |
| | | | | 236-2 | | Long fluted machine reamers, Morse taper shanks |
| | | | | 238 | | Reduction sleeves and extension sockets for tools with Morse taper shanks |
| | | | | 239 | | Drill chuck tapers |
| | | | | 240 | | Milling cutters – Interchangeability dimensions for cutter arbors or cutter mandrels |
| | | | | 241 | | Shanks for turning and planing tools – Shapes and dimensions of the section |
| | | | | 242 | | Carbide tips for brazing on turning tools |
| | | | | 243 | | Turning tools with carbide tips – External tools |
| | | | | 296 | | Machine tools – Self-holding tapers for tool shanks |
| | | | | 297 | | 7/24 tapers for tool shanks for manual changing |

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| | | | | 513 | | Classification and application of hard cutting materials for metal removal with defined cutting edges – Designation of the main groups and groups of application |
| | | | | 521 | | Machine chucking reamers with parallel shanks or Morse taper shanks |
| | | | | 525 | | Bonded abrasive products – General requirements |
| | | | | 603 | | Bonded abrasive products – Dimensions – Part 1: Grinding wheels for external cylindrical grinding between centres Part 2: Grinding wheels for centreless external cylindrical grinding Part 3: Grinding wheels for internal cylindrical grinding Part 4: Grinding wheels for surface grinding/peripheral grinding Part 5: Grinding wheels for surface grinding/face grinding Part 6: Grinding wheels for tool and tool room grinding Part 7: Grinding wheels for manually guided grinding Part 8: Grinding wheels for deburring and fettling/snagging Part 9: Grinding wheels for high-pressure grinding Part 10: Stones for honing and superfinishings Part 11: Hand finishing sticks Part 12: Grinding wheels for deburring and fettling on a straight grinder Part 13: Grinding wheels for deburring and fettling on a vertical grinder Part 14: Grinding wheels for deburring and fettling/snagging on an angle grinder Part 15: Grinding wheels for cutting-off on stationary or mobile cutting-off machines Part 16: Grinding wheels for cutting-off on hand held power tools |
| | | | | 666 | | Machine tools – Mounting of grinding wheels by means of hub flanges |
| | | | | 702 | | Machine tools – Connecting dimensions of spindle noses and work holding chucks – Part 1: Conical connection Part 2: Camlock type Part 3: Bayonet type Part 4: Cylindrical connection |
| | | | | 839 | | Milling machine arbors with 7/24 tapers – Part 1: Dimensions and designation Part 2: Accessories |
| | | | | 841 | | Industrial automation systems and integration – Numerical control of machines – Coordinate system and motion nomenclature |
| | | | | 1080 | | Machine tools – Morse taper shanks – Cotter slots with taper keys |
| | | | | 1180 | | Shanks for pneumatic tools and fitting dimensions of chuck bushings |
| | | | | 1302 | | Surface Texture Symbols |
| | | | | 1641 | | End mills and slot drills – Part 1: Milling cutters with cylindrical shanks Part 2: Milling cutters with Morse taper shanks Part 3: Milling cutters with 7/24 taper shanks |
| | | | | 1701 | | Test conditions for milling machines with table of variable height – Testing of the accuracy – Part 1: Machines with horizontal spindle Part 2: Machines with vertical spindle |
| | | | | 1708 | | Acceptance conditions for general purpose parallel lathes – Testing of the accuracy |
| | | | | 1832 | | Indexable inserts for cutting tools – Designation |
| | | | | 1984 | | Test conditions for manually controlled milling machines with table of fixed height – Testing of the accuracy – Part 1: Machines with horizontal spindle Part 2: Machines with vertical spindle |

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| | | | | 1985 | | Machine tools – Test conditions for surface grinding machines with vertical grinding wheel spindle and reciprocating table – Testing of the accuracy |
| | | | | 1986 | | Test conditions for surface grinding machines with horizontal grinding wheel spindle and reciprocating table – Testing of the accuracy – Part 1: Machines with a table length of up to 1600 mm |
| | | | | 2238 | | Machine bridge reamers |
| | | | | 2250 | | Finishing reamers for morse and metric tapers, with parallel shanks and morse taper shanks |
| | | | | 2306 | | Drills for use prior to tapping screw threads |
| | | | | 2336 | | Hacksaw blades – Part 1: Dimensions for hand blades Part 2: Dimensions for machine blades |
| | | | | 2402 | | Shell reamers with taper bore (taper bore 1:30 (included)) with slot drive and arbors for shell reamers |
| | | | | 2407 | | Test conditions for internal cylindrical grinding machines with horizontal spindle – Testing of accuracy |
| | | | | 2421 | | Coated abrasives – Cylindrical sleeves |
| | | | | 2423 | | Acceptance conditions for radial drilling machines with the arm adjustable in height – Testing of accuracy |
| | | | | 2433 | | Machine tools – Test conditions for external cylindrical and universal grinding machines with a movable table – Testing of accuracy |
| | | | | 2540 | | Centre drills for centre holes with protecting chamfer – Type B |
| | | | | 2541 | | Centre drills for centre holes with radius form – Type R |
| | | | | 2553 | | Welded, brazed and soldered joints – Symbolic representation on drawings |
| | | | | 2584 | | Cylindrical cutters with plain bore and key drive – Metric series |
| | | | | 2585 | | Slotting cutters with plain bore and key drive – Metric series |
| | | | | 2586 | | Shell end mills with plain bore and tenon drive – Metric series |
| | | | | 2587 | | Side and face milling cutters with plain bore and key drive – Metric series |
| | | | | 2940-1 | | Milling cutters mounted on centring arbors having a 7/24 taper – Fitting dimensions – Centring arbors |
| | | | | 2940-2 | | Milling cutters mounted on centring arbors having a 7/24 taper – Inserted tooth cutters |
| | | | | 2972 | | Numerical control of machines – Symbols |
| | | | | 2976 | | Coated abrasives – Abrasive belts – Selection of width/length combinations |
| | | | | 3002 | | Basic quantities in cutting and grinding – Part 1: Geometry of the active part of cutting tools – General terms, reference systems, tool and working angles, chip breakers Part 2: Geometry of the active part of cutting tools – General conversion formulae to relate tool and working angles Part 3: Geometric and kinematic quantities in cutting Part 4: Forces, energy, power Part 5: Basic terminology for grinding processes using grinding wheels |
| | | | | 3070 | | Machine tools – Test conditions for testing the accuracy of boring and milling machines with horizontal spindle – Part 1: Machines with fixed column and movable table Part 2: Machines with movable column and fixed table Part 3: Machines with movable column and movable table |
| | | | | 3089 | | Machine tools – Test conditions for self-centring, manually-operated chucks with one-piece jaws |

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| | | | | 3190 | | Test conditions for turret and single spindle co-ordinate drilling machines with vertical spindle – Testing of the accuracy |
| | | | | 3291 | | Extra-long Morse taper shank twist drills |
| | | | | 3293 | | Morse taper shank countersinks for angles 60 degrees, 90 degrees and 120 degrees inclusive |
| | | | | 3314 | | Shell drills with taper bore (taper bore 1:30 (included)) with slot drive |
| | | | | 3337 | | T-slot cutters with cylindrical shanks and with Morse taper shanks having tapped hole |
| | | | | 3338 | | Cylindrical shanks for milling cutters – Part 1: Dimensional characteristics of plain cylindrical shanks Part 2: Dimensional characteristics of flatted cylindrical shanks Part 3: Dimensional characteristics of threaded shanks |
| | | | | 3364 | | Indexable hardmetal (carbide) inserts with rounded corners, with cylindrical fixing hole – Dimensions |
| | | | | 3365 | | Indexable hardmetal (carbide) inserts with wiper edges, without fixing hole – Dimensions |
| | | | | 3366 | | Coated abrasives – Abrasive rolls |
| | | | | 3438 | | Subland twist drills with Morse taper shanks for holes prior to tapping screw threads |
| | | | | 3439 | | Subland twist drills with cylindrical shanks for holes prior to tapping screw threads |
| | | | | 3442 | | Machine tools – Dimensions and geometric tests for self-centring chucks with two-piece jaws – Part 1: Manually operated chucks with tongue and groove type jaws Part 2: Power-operated chucks with tongue and groove type jaws Part 3: Power-operated chucks with serrated jaws |
| | | | | 3466 | | Machine taper pin reamers with parallel shanks |
| | | | | 3467 | | Machine taper pin reamers with Morse taper shanks |
| | | | | 3611 | | Micrometer callipers for external measurement |
| | | | | 3655 | | Acceptance conditions for vertical turning and boring lathes with one or two columns and a single fixed or movable table – General introduction and testing of the accuracy |
| | | | | 3686 | | Test conditions for high accuracy turret and single spindle coordinate drilling and boring machines with table of fixed height with vertical spindle – Testing of the accuracy – Part 1: Single column type machines Part 2: Portal type machines with moving table |
| | | | | 3860 | | Bore cutters with key drive – Form milling cutters with constant profile |
| | | | | 3855 | | Milling cutters – Nomenclature |
| | | | | 3875 | | Machine tools – Test conditions for external cylindrical centreless grinding machines – Testing of the accuracy |
| | | | | 3940 | | Tapered die-sinking cutters with parallel shanks |
| | | | | 4202 | | Reduction sleeves with external 7/24 taper for tools with Morse taper shanks |
| | | | | 4204 | | Countersinks, 90 degrees, with Morse taper shanks and detachable pilots |
| | | | | 4207 | | Counterbores with Morse taper shanks and detachable pilots |
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| | | | | 4875 | | Metal-cutting band saw blades – Part 1: Vocabulary Part 2: Characteristics and dimensions |
| | | | | 4992 | | Steel castings – Ultrasonic examination |
| | | | | 5183 | | Resistance spot welding – Electrode adaptors, male taper 1:10 – Part 1: Conical fixing, taper 1:10 Part 2: Parallel shank fixing for end-thrust electrodes |
| | | | | 5414 | | Tool chucks (end mill holders) with clamp screws for flatted cylindrical shank tools – Part 1: Dimensions of the driving system of tool shanks Part 2: Connecting dimensions of chucks and designation |
| | | | | 5429 | | Coated abrasives – Flap wheels with incorporated flanges or separate flanges |
| | | | | 5608 | | Turning and copying tool holders and cartridges for indexable inserts – Designation |
| X | | | | 5609 | | Boring bars for indexable inserts – Dimensions |
| | | | | 5610 | | Single-point tool holders for turning and copying, for indexable inserts – Dimensions |
| | | | | 5967 | | Taps and thread cutting – Nomenclature of the main types and terminology |
| | | | | 6103 | | Bonded abrasive products – Permissible unbalances of grinding wheels as delivered – Static testing |
| | | | | 6106 | | Abrasive products – Checking the grit size of superabrasives |
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| | | | | 6262 | | End mills with indexable inserts – Part 1: End mills with flatted parallel shank Part 2: End mills with Morse taper shank |
| | | | | 6344 | | Coated abrasives – Grain size analysis – Part 1: Grain size distribution test Part 2: Determination of grain size distribution of macrogrits P12 to P220 Part 3: Determination of grain size distribution of microgrits P240 to P2500 |
| X | | | | 6462 | | Face Milling Cutters with Indexable Inserts – Dimensions |
| | | | | 6752 | | Tools for pressing – Round punches with 60 degrees conical head and straight shank |
| | | | | 6929 | | Steel products – Definitions and classification |
| | | | | 6983 | | CNC program format and address words |
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| | | | | 7388 | | Tool shanks with 7/24 taper for automatic tool changers – Part 1: Dimensions and designation of shanks of forms A, AD, AF, U, UD and UF Part 2: Dimensions and designation of shanks of forms J, JD and JF Part 3: Retention knobs for shanks of forms AC, AD, AF, UC, UD, UF, JD and JF |

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| | | | | 7755 | | Hardmetal burrs – Part 1: General specifications Part 2: Cylindrical burrs (style A) Part 3: Cylindrical round- (ball-) nose burrs (style C) Part 4: Spherical burrs (style D) Part 5: Oval burrs (style E) Part 6: Arch round- (ball-) nose burrs (style F) Part 7: Arch pointed-nose burrs (style G) Part 8: Flame burrs (style H) Part 9: 60 degrees and 90 degrees cone burrs (styles J and K) Part 10: Conical round- (ball-) nose burrs (style L) Part 11: Conical pointed-nose burrs (style M) Part 12: Inverted cone burrs (style N) |
| | | | | 7945 | | Woodworking machines – Single spindle boring machines – Nomenclature and acceptance conditions |
| | | | | 8015 | | Mathematical Definition of Dimensioning and Tolerancing Principles |
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| | | | | 8486 | | Bonded abrasives – Determination and designation of grain size distribution – Part 1: Macrogrits F4 to F220 Part 2: Microgrits F230 to F2000 |
| | | | | 8503 | | Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates – Part 1: Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast-cleaned surfaces Part 2: Method for the grading of surface profile of abrasive blast-cleaned steel – Comparator procedure Part 3: Method for the calibration of ISO surface profile comparators and for the determination of surface profile – Focusing microscope procedure Part 4: Method for the calibration of ISO surface profile comparators and for the determination of surface profile – Stylus instrument procedure Part 5: Replica tape method for the determination of the surface profile |
| | | | | 8504 | | Preparation of steel substrates before application of paints and related products – Surface preparation methods – Part 1: General principle Part 2: Abrasive blast-cleaning Part 3: Hand- and power-tool cleaning |
| | | | | 8662 | | Hand-held portable power tools |
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| | | | | 8695 | | Tools for pressing – Punches – Nomenclature and terminology |
| | | | | 8830 | | High-speed steel machine taps with ground threads – Technical specifications |
| | | | | 9181 | | Tools for pressing – Round punches with 60 degrees conical head and reduced shank |
| | | | | 9265 | | Woodworking machines – Multi-spindle boring machines – Nomenclature |
| | | | | 9270 | | 7/24 tapers for tool shanks for automatic changing – Tapers for spindle noses |
| | | | | 9352 | | Plastics – Determination of resistance to wear by abrasive wheels |
| | | | | 9361 | | Indexable inserts for cutting tools – Ceramic inserts with rounded corners – Part 1: Dimensions of inserts without fixing hole Part 2: Dimensions of inserts with cylindrical fixing hole |
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| | | | | 10242 | | Tools for pressing – Punch holder shanks – Part 1: Type A Part 2: Type C Part 3: Type D |
| | | | | 10303 | | Industrial automation systems and integration – Product data representation and exchange |
| | | | | 10360 | | Geometrical Product Specifications (GPS) – Acceptance and reverification tests for coordinate measuring machines (CMM) – Part 1: Vocabulary Part 2: CMMs used for measuring size Part 3: CMMs with the axis of a rotary table as the fourth axis Part 4: CMMs used in scanning measuring mode Part 5: CMMs using multiple-stylus probing systems Part 6: Estimation of errors in computing Gaussian associated features |
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| | | | | 10897 | | Collets for tool holders with taper ratio 1:10 – Collets, holders, nuts |
| | | | | 10898 | | Spot drills |
| | | | | 10899 | | High-speed steel two-flute twist drills – Technical specifications |
| | | | | 10910 | | Classification and designation of approximate chip control zones for indexable inserts with chipbreakers |
| | | | | 10911 | | Solid hardmetal end mills with parallel shank – Dimensions |
| | | | | 11054 | | Cutting tools – Designation of high-speed steel groups |
| | | | | 11124 | | Preparation of steel substrates before application of paints and related products – Specifications for metallic blast-cleaning abrasives Part 1: General introduction and classification – Part 2: Chilled-iron grit Part 3: High-carbon cast-steel shot and grit Part 4: Low-carbon cast-steel shot |
| | | | | 11125 | | Preparation of steel substrates before application of paints and related products – Test methods for metallic blast-cleaning abrasives – Part 1: Sampling Part 2: Determination of particle size distribution Part 3: Determination of hardness Part 4: Determination of apparent density Part 5: Determination of percentage defective particles and of microstructure Part 6: Determination of foreign matter Part 7: Determination of moisture |

| HYDRAULIC AND PNEUMATIC STANDARDS | | | | | | STANDARD TITLE |
|-----------------------------------|------|------|-----|-------|-----|---|
| ANSI | ASME | ASTM | BSi | ISO | SAE | |
| | | | | 11126 | | Preparation of steel substrates before application of paints and related products – Specifications for non-metallic blast-cleaning abrasives – Part 1: General introduction and classification Part 3: Copper refinery slag Part 4: Coal furnace slag Part 5: Nickel refinery slag Part 6: Iron furnace slag Part 7: Fused aluminium oxide Part 8: Olivine sand Part 9: Staurolite Part 10: Almandite garnet |
| | | | | 11127 | | Preparation of steel substrates before application of paints and related products – Test methods for non-metallic blast-cleaning abrasives – Part 1: Sampling Part 2: Determination of particle size distribution Part 3: Determination of apparent density Part 4: Assessment of hardness by a glass slide test Part 5: Determination of moisture Part 6: Determination of water-soluble contaminants by conductivity measurement Part 7: Determination of water-soluble chlorides |
| X | | | | 11529 | | Milling cutters – Designation – Part 1: Shank type end mills of solid or tipped design Part 2: Shank-type and bore-type milling cutters with indexable inserts |
| | | | | 11900 | | Tools for pressing – Ball-lock punch retainers – Part 1: Types A and B, rectangular and square for light duty Part 2: Types C and D, reduced for light duty Part 3: Type E, reduced for heavy duty |
| | | | | 11971 | | Steel and iron castings – Visual examination of surface quality |
| | | | | 12164 | | Hollow taper interface with flange contact surface – Part 1: Shanks – Dimensions |
| | | | | 12197 | | Woodruff keyseat cutters – Dimensions |
| | | | | 13041 | | Test conditions for numerically controlled turning machines and turning centres – Part 1: Geometric tests for machines with a horizontal workholding spindle Part 4: Accuracy and repeatability of positioning of linear and rotary axes Part 5: Accuracy of feeds, speeds and interpolations Part 6: Accuracy of a finished test piece Part 7: Evaluation of contouring performance in the coordinate planes Part 8: Evaluation of thermal distortions |
| | | | | 13399 | | Cutting tool data representation and exchange – Part 1: Overview, fundamental principles and general information model Part 2: Reference dictionary for the cutting items Part 3: Reference dictionary for tool items Part 4: Reference dictionary for adaptive items Part 5: Reference dictionary for assembly items Part 50: Reference dictionary for reference systems and common concepts Part 100: Definitions, principles and methods for reference dictionaries Part 150: Usage guidelines |
| | | | | 14253 | | Geometrical Product Specifications (GPS) – Inspection by measurement of workpieces and measuring equipment – Parts 1, 2, and 3 |
| | | | | 15488 | | Collets with 8 degree setting angle for tool shanks – Collets, nuts and fitting dimensions |
| | | | | 15635 | | Coated abrasives – Flap discs |
| | | | | 15637 | | Holding fixtures of cylindrical abrasive sleeves |

- Blades, Punches & Reamers
- Collets & Cutting Tools
- Coolants & Lubricants
- Drill Chucks, Drills, Taps & Accessories
- End Mills & Hole Saws
- Gauges, Levels, Spacers & Shims
- Grinding Wheels & Segments
- Raw Stock

Metalworking

| HYDRAULIC AND PNEUMATIC STANDARDS | | | | | | STANDARD TITLE |
|-----------------------------------|------|------|-----|---------|---------|---|
| ANSI | ASME | ASTM | BSi | ISO | SAE | |
| | | | | 15917 | | Solid ball-nosed end mills with cylindrical shanks made of carbide and ceramic materials – Dimensions |
| | | | | 16057 | | Coated abrasives – Vulcanized fibre discS |
| | | | | 16156 | | Machine-tools safety – Safety requirements for the design and construction of work holding chucks |
| | | | | 18084 | | Press tools for tablets – Punches and dies |
| | | | | 21538 | | Blanks for superabrasive cutting-off wheels – Mounting and fixing bores – Building construction and civil engineering |
| | | | | 21948 | | Coated abrasives – Plain sheets |
| | | | | 21949 | | Coated abrasives – Plain sheets with holes for dust extraction |
| | | | | 21950 | | Coated abrasives – Plain discs |
| | | | | 21951 | | Coated abrasives – Plain discs with holes for dust extraction |
| | | | | 22037 | | Solid end mills with corner radii and cylindrical shanks made of hard cutting materials – Dimensions |
| | | | | 22196 | | Plastics – Measurement of antibacterial activity on plastics surfaces |
| | | | | 22917 | | Superabrasives – Limit deviations and run-out tolerances for grinding wheels with diamond or cubic boron nitride |
| | | | | TR 6132 | | CNC, programming language |
| | | | | | ARP1925 | Automated Brush Deburring |
| | | | | | ARP2654 | Ultrasonic Thickness Deburring |
| | | | | | J864 | Surface Hardness Testing with Files |
| | | | | | J911 | Surface Roughness and Peak Count Measurement of Cold-Rolled Sheet Steel |
| | | | | | J2342 | Numbering Systems for End Mills |

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SUMMARY

Metalworking tools and concepts have been developing since the first discovery of metals. Regulations and standards, as previously stated, help to document and share specifications, processes, test methods, safety, and other manufacturing practices. Although standards are available through the organizations listed in Table 2, much of this same information is available in the reference books listed in Table 4.

Using the above information and references listed in Table 4 should ensure the best product selection. This Resource Guide can be viewed online at ReidSupply.com or downloaded and saved as needed at no cost. For comments on the contents of this Resource Guide, contact the [Customer Service](#) department using the toll-free number listed at the bottom of the page. Or email us at mail@ReidSupply.com (enter "Resource Guide" in the subject line).

For More Information

Although the Internet offers a vast wealth of information, it may not always be readily available. Much of the information on the Internet and in this Resource Guide comes from professional standards, government regulations and the reference manuals available at [Reid Supply](#), Table 4. The standards listed in this guide are available online, but must be purchased. OSHA, NIOSH and other government documentation can be found on the Internet and can be downloaded at no cost. Table 4 lists reference manuals offered by [Reid Supply](#) that may meet your needs.

Table 4: *Recommended Documentation and Reference Manuals*

| Ref # | Title | Cat. No. ¹ |
|-------|---|-----------------------------------|
| 1 | Machinist Calculator | TIS-MC-20 |
| 2 | Machinery's Handbook | DR-5CD DR-5C DR-5J DR-5T |
| 3 | CNC Machining Handbook | DR-9 |
| 4 | Machinery's Handbook Pocket Companion | DR-11 |
| 5 | Machinery's Handbook Guide | DR-12 |
| 6 | CNC Programming Handbook | DR-14 |
| 7 | Shop Reference for Students and Apprentices | DR-16 |
| 8 | Basic Machining Reference aHandbook | DR-17 |
| 9 | Machinist's Ready Reference | DR-18 |
| 10 | Shopform Computer Software | DR-19 |
| 11 | Blueprint Reading Basics | DR-20 |
| 12 | Mark's Standard Handbook for Mechanical Engineers | DR-26 |
| 13 | Standard Handbook of Machine Design | DR-37 |
| 14 | Metal Cutting Tool Handbook | DR-43 |
| 15 | Materials Handbook | DR-52 |
| 16 | Fundamentals of Tool Design | DR-81 |
| 17 | Engineers' Black Book | DR-95 |

NOTE: ¹ Refer to Table 5a and Table 5b for details on content relative to this Resource Guide.

Because of the amount of Metalworking related information available in reference books listed in Table 4, Table 5 has been split into two parts, Table 5a and Table 5b.

Table 5a: *Reference Manual Content Relative to This Guide*

| Information Type | TIS-MC-20 | DR-5C DR-5CD DR-5T DR-5J | DR-9 | DR-11 | DR-12 | DR-14 | DR-16 | DR-17 | DR-18 |
|----------------------------|-----------|-----------------------------------|------|---------|-------|-------|-------|-------|-------|
| Abbreviations and acronyms | | 2,9 | | | | | | | |
| Abrasives | | 2,3,7,8,9 | | 2,7,8,9 | | | | | |
| Adhesives | | 6 | | | | | | | |
| Automated tooling | | 6 | | | | | | | |

- Blades, Punches & Reamers
- Collets & Cutting Tools
- Coolants & Lubricants
- Drill Chucks, Drills, Taps & Accessories
- End Mills & Hole Saws
- Gauges, Levels, Spacers & Shims
- Grinding Wheels & Segments
- Raw Stock

Metalworking

| Information Type | TIS-1MC -20 | DR-5C DR-CD DR-5T DR-5J | DR-9 | DR-11 | DR-12 | DR-14 | DR-16 | DR-17 | DR-18 |
|------------------------------------|----------------|----------------------------------|---------|---------|-------|---------|-----------|-------|-------|
| Bar/tube weights & dimensions | | 2,6,9 | | | | | | | |
| Bending, punching and forming | | 2,3,4,7,8 | | | | | | | |
| Boring | | 2,4,7,9 | | 2,5,9 | | 7,8 | | | |
| Broaching | | 2,3,6,8,9 | | 2,5 | | 5 | | | |
| CAD/CAM | | 2,3,6,9 | | | | | | 6 | |
| Castings | | 2,6,9 | | | | | | | |
| Cemented carbides | | 2,7,9 | | 1,2,9 | | | | | |
| Chip formation and analysis | | 2,7 | | 7 | | 5 | | | |
| CNC APT programming | | 2,6,8,9 | 5 | | | 2,7,8,9 | | | |
| CNC fundamentals | | 2,6 | 7,8 | 5 | | 2,4,7,8 | | | |
| CNC operation | | | 6,8 | | | 2,7,8 | | | |
| CNC programming | | 2,6 | 2,8,9 | 2,5,9 | 2,6,8 | | | 2,7 | |
| CNC standards | | 1,2,7 | | 2 | | | | | |
| Coefficient of friction | | 2,3,7 | | | 6 | | | | |
| Compound angles | | 2,3,6 | 3,6,8 | | | | 2,3,8 | | |
| Conversion factors | 1,3 | 2,3,7 | | 2 | 2 | | 2,8 | | 1,2 |
| Cost of machining | | 2,3,7,8 | | | | | | 6,8 | |
| Countersinking/counterbore | | 2,6,9 | 5,8 | 2,5 | | 3,5 | | 6 | |
| Cutting off | | 2,6,9 | 2,6 | | | | | | |
| Cutting fluids | | 2,7,9 | 6 | 2,5,9 | | | 2,6 | 5 | |
| Cutting forces | | 2,3,7,8 | | | | | | | |
| Cutting tools, terms & definitions | | 4,7,9 | 2,6 | 2,6,9 | | 5 | 2,7,8 | | |
| Datums | | 2,6,9 | 6 | | | 7,8 | | | |
| Diamond wheels | | 1,2,3,4,7,9 | | 2,7,9 | | | 5 | | |
| Die-cutting | | 2,3,7,8 | | | | | | | |
| Drawing symbols | | 1,2 (CD only) | 2,6 | 1,2,6,9 | | | 2,7,8 | | 2,6 |
| Drill sharpening | | 3,7,8 | | 5 | | | 7,8 | | 2,7 |
| Drill sizes | | 1,2,7,9 | | 1,2,5,9 | | | | | 1,2 |
| Drill types | | 1,2,4,7,9 | | | | | | | |
| EDM | | 2,7 | | | | | | | |
| Extrusion | | 2,6,9 | | | | | | | |
| Face milling | | 2,7 | 6,8 | 2,3,5,9 | | 6,8 | | | |
| Feeds and speeds – drilling | 1,3 | 2,3,7,8 | 1,3,5,8 | 2,3,5 | 3,6,8 | 2,3,5 | 2,3,7,8,9 | 2,6 | 2 |
| Feeds and speeds – milling | 1,3 | 2,3,7,8 | 1,3,5,8 | 1,2,5 | 3,6,8 | 2,3,5 | 2,3,7,8,9 | 2,3,6 | 2,3,5 |
| Feeds and speeds – grinding | 1,3 | 2,3,7,8 | 2,6,8 | 2,6,9 | 3,6,8 | | 2,3,7,8,9 | 2,6 | |
| Feeds and Speeds – sawing | 1,3 | 2,3,7,8 | | | | | 2,3,7,8,9 | 2,3,6 | |
| Feeds and Speeds – threading | | 2,3,7,8 | 1,3,5,8 | 2,3,5 | 3,6,8 | 3,6,8 | 2,3,7,8,9 | 2,7 | |
| Feeds and Speeds – turning | | 2,3,7,8 | 1,3,5,8 | 2,3,5 | 3,6,8 | 2,3,6,8 | 2,3,7,8,9 | 2,6 | |

Metalworking

- Abrasives, Files & Deburring Tools
- Cutting Tools
- Drill Bushings
- Precision Instruments & Measuring
- Raw Materials
- Vacuum, Coolant & Lubrication Systems

| Information Type | TIS-MC -20 | DR-5C DR-CD DR-5T DR-5J | DR-9 | DR-11 | DR-12 | DR-14 | DR-16 | DR-17 | DR-18 |
|---------------------------------|---------------|----------------------------------|-------|-----------|-------|---------|-----------|---------|---------|
| Files | | 2,4,9 | | | | | | 6 | |
| Finishing operations | | 2,6 | | | | | | | |
| Fixture design | | 2,4,7,9 | | | | | | | |
| Gear hobbing | | 2,3,6,9 | | | | | 1,2,3,6,9 | | 1,2,3,5 |
| Geometric shapes | | 2,3,6 | 2,3,8 | 2,3,5,9 | 2,3,7 | 2,3,6,8 | 2,3,8 | 3,5 | 3,5 |
| Grinding processes | | 2,3,7,8 | 7,8 | 2,7 | | 5 | | 7 | 5 |
| Grinding wheels | | 1,2,3,4,7,9 | 2,7 | 1,2,7,9 | | | 2,4,6 | 2,6 | 2 |
| Grinding wheel safety | | 2,3,7,9 | | 6 | | | | 6 | |
| Hardness | | 2,7,9 | | 2 | | | 2,4,6,8 | 2,6 | 6 |
| Heat treat terms & colors | | 2,6,9 | | 5 | | | 2,6,9 | 2,6 | 2,6 |
| Jig design | | 2,4,7,9 | | | | | | | |
| Keys & keyways | | 1,2,3,6,9 | | 2,5,9 | 3,7,8 | | 1,2,3,7,9 | 6 | 2,3 |
| Knurling | | 2,3,7,8,9 | | | | | | 6 | |
| Locating holes | | 2,3,5 | 5 | | | 2,6 | | | |
| Lubrication | | 2,3,6,9 | | | | | | 5 | 2,5 |
| Machinability rating | | 2,3,7 | | | | | | 2 | 2 |
| Machining nonferrous metals | | 6 | | 5 | | | 6 | 9 | |
| Machining non-metals | | 2,3,6 | | 5 | | | 6 | | |
| Machining slots and pockets | | 2,3,6 | 5 | | | 7,8 | | 3,6 | |
| Measuring techniques, physical | | 2,3,6 | | 2,3,6 | | | 1,2,7,8 | 2,7 | 1,2,6,8 |
| Mechanics of materials | | 2,6 | | | | | | | |
| Metals, common designations | | 2,5,9 | | 2,9 | | | 6,9 | 2,6,9 | |
| Milling cutters & end mills | 2,5 | 2,3,4,7,9 | 6,8 | 2,5 | | 5 | 6 | 6 | 2 |
| Plastics | | 2,6 | | 2,6,8 | | | 6 | 5,9 | |
| Power presses | | 6 | | | | | | | |
| Power requirements | | 2,3,4,7,8 | | | 3,6,8 | | | | |
| Powdered metals | | 5 | | | | | | | |
| Preferred limits & fits | | 1,2,3,7,9 | | 1,2,4,6,9 | 7,8,9 | | 1,2,3,7 | | 1,2,6,9 |
| Properties of metals/metalloids | | 2,5,9 | | 2,7,9 | | | 2,7,9 | 9 | 2,6,9 |
| Properties of non-metals | | 2,5 | | | | | | | |
| Rake/relief angles | | 2,3,7,9 | | 2,6 | | | 2,7 | 2,6 | |
| Reamer nomenclature | | 2,7,9 | | | | 5 | | | |
| Reamer reconditioning | | 2,7 | | | | | | 6 | |
| Reamer sizes & types | | 2,7,9 | | 2,5 | | | 2,6 | 6 | |
| Saws | | 2,4,6 | | | | | | 2,3,7,8 | |
| Set-up and operation | | | 7,8 | | | 6 | | | |
| Sheet metal & wire gages | | 2,6 | | | | | | | 2 |
| Sheet metal bend allowance | | 2,6 | | | | | | | 3,6,8 |
| Sine bar application | | 2,3,6 | | 2,3,6 | | | 2,3,7,8 | | 3,5 |

- Blades, Punches & Reamers
- Collets & Cutting Tools
- Coolants & Lubricants
- Drill Chucks, Drills, Taps & Accessories
- End Mills & Hole Saws
- Gauges, Levels, Spacers & Shims
- Grinding Wheels & Segments
- Raw Stock

Metalworking

| Information Type | TIS-MC -20 | DR-5C DR-CD DR-5T DR-5J | DR-9 | DR-11 | DR-12 | DR-14 | DR-16 | DR-17 | DR-18 |
|----------------------------|---------------|----------------------------------|-------|-----------|---------|---------|-----------|-------|---------|
| Steel wool grades | | 2,6 | | | | | | | |
| Strength of materials | | 2,4,6,9 | | 2 | 3,6,8,9 | | | | 2,4,9 |
| Surface coatings | | 2,6,9 | | | | | | | |
| Surface roughness | | 2,4,7 | | 2,6 | | | 1,2,7,9 | 2,6 | 2,5 |
| Symbols for elements | | 2,7 | | 2,9 | | | | | |
| Tapers | | 1,2,7,9 | | 2,3,6 | 2,3,6 | | 2,3,7,8,9 | 3,6 | 1,2,3 |
| Taps & dies | | 1,2,3,4,7,9 | | 1,2,3,5,9 | | 3,6,9 | | 2,6 | |
| Thread types | | 1,2,7,9 | | 1,2,3,5,9 | 1,3,6 | 2,6,9 | 1,2,3,7,9 | 6 | 1,2,3 |
| Tool holders | | 1,2,4,7,9 | 2,6 | 2,5,9 | | 3,6 | | | |
| Tool inserts | | 2,4,7,8,9 | 2,7 | 2,6 | | 5 | 2,7 | | |
| Tool life | | 2,7 | | 6 | | 3,6 | | | |
| Tool sharpening | | 2,3,7,8 | | 2,3,6 | | | 6 | 7,8 | 5 |
| Tool steels | | 2,6,9 | | 2,9 | | | 2,7,9 | 2,7,9 | 2,7,9 |
| Tool/machining terminology | | 2,7,9 | 6 | 2,6,9 | | 7 | 2,7 | 2,7 | 2,6 |
| Tool wear | | 2,6 | 5 | 6 | | 6 | 6 | 6 | 5 |
| Tolerances | | 1,2,3,4,7,9 | 6 | 1,2,4,6,9 | 3,7,8,9 | 6 | 1,2,7,8 | | 1,2,6,9 |
| Trigonometric tables | | 2,3,7 | 2,3,6 | 2,3,7 | 7,8 | 3,6,8 | 2,3,8 | | 2,3 |
| Troubleshooting | | 2,7 | | 2,7 | | | 2,7 | | 6 |
| Turning | | 2,3,7,8 | 2,6,8 | 2,6,8,9 | | 2,3,7,8 | | 7,8 | |
| Welding and brazing | | 2,6 | | | | | | | |
| Weld symbols | | 2,5 | | | | | | | |
| Wood | | 2,3,6 | | | | | | | |
| Workholding | | | | | | | | | |
| Worm gear ratios | | 5,9 | | | | | 5 | | 2,3 |

- CONTENT:**
- 1 Imperial and metric systems
 - 2 Data/specification charts and tables
 - 3 Formulas
 - 4 Comparison information
 - 5 Some discussion
 - 6 Basic discussion
 - 7 Detailed discussion
 - 8 How-to information
 - 9 Regulations and standards

Table 5b: Reference Manual Content Relative to This Guide

| Information Type | DR-19 | DR-20 | DR-26 | DR-37 | DR-43 | DR-52 | DR-81 | DR-95 |
|-------------------------------|-------|-------|-------|-------|-------|-------|-----------|-------|
| Abbreviations and acronyms | | | | | | | 2 | |
| Abrasives | | | 2,6,9 | | | | | |
| Adhesives | | | | | | | | 4,5 |
| Automated tooling | | | | | | | 2,6 | |
| Bar/tube weights & dimensions | | | | | | | | 1,2,9 |
| Bending, punching and forming | | | | | | | 2,3,4,6,8 | |
| Boring | | | | | | | | |

Metalworking

- Abrasives, Files & Deburring Tools
- Cutting Tools
- Drill Bushings
- Precision Instruments & Measuring
- Raw Materials
- Vacuum, Coolant & Lubrication Systems

| Information Type | DR-19 | DR-20 | DR-26 | DR-37 | DR-43 | DR-52 | DR-81 | DR-95 |
|------------------------------------|-------|-------|-----------|-------|-----------|-------|-----------|-------|
| Broaching | | | 5 | | | | 2,6 | |
| CAD/CAM | | | | | | | | |
| Castings | | | | | | | | |
| Cemented carbides | | | 2,4,6,9 | | | | 2,4,6 | 2,4,9 |
| Chip formation and analysis | | | | | 2,7 | | 2,7 | |
| CNC APT programming | | | | | | | | |
| CNC fundamentals | | | | | | | | |
| CNC operation | | | | | | | | |
| CNC programming | | | | | | | | 2 |
| CNC standards | | | | | | | | |
| Coefficient of friction | | | 2,3,7 | | | 2,5 | | |
| Compound angles | | | | | | | | |
| Conversion factors | | | 1,2,3,4,7 | | | 2 | | |
| Cost of machining | | | 2,3,7 | | | | 2,3,6,8 | |
| Countersinking/counterbore | | | | | 2,3,7,9 | | 2,5 | 1,2 |
| Cutting off | | | 6 | | | | | 2,4,5 |
| Cutting fluids | | | 6 | | 2,5 | | 2,4,6 | 2,4 |
| Cutting forces | | | | | | | 1,2,3,7 | |
| Cutting tools, terms & definitions | | | | | 2,4,7 | | 2,3,7 | |
| Datums | | | | | | | | |
| Diamond wheels | | | | | | | | |
| Die-cutting | | | | | | | 2,3,4,7,8 | |
| Drawing symbols | | 2,7 | | | | | | 2 |
| Drill sharpening | | | | | 2,7 | | | 1,6 |
| Drill sizes | | | 1,2 | | 1,2,4,7 | | | 1,2 |
| Drill types | | | 2,6 | | 1,2,4,7 | | 2,6 | |
| EDM | | | | | | | | |
| Extrusion | | | | | | | | |
| Face milling | | | | | | | | |
| Feeds and speeds – drilling | | | 2,5 | | 2,3,7 | | | 1,2,5 |
| Feeds and speeds – milling | | | 2,5 | | 2,3,7 | | | 1,2,5 |
| Feeds and speeds – grinding | | | 5 | | 2,5 | | | |
| Feeds and Speeds – sawing | | | | | | | | 1,2,5 |
| Feeds and Speeds – threading | | | | | | | | |
| Feeds and Speeds – turning | | | 2,4,5 | | | | | |
| Files | | | | | | | | |
| Finishing operations | | | | | | | | |
| Fixture design | | | | | | | 2,4,7,8 | |
| Gear hobbing | | 2,3,5 | 2,6 | | 2,3,4,7,9 | | 2,5 | |

- Blades, Punches & Reamers
- Collets & Cutting Tools
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- Grinding Wheels & Segments
- Raw Stock

Metalworking

| Information Type | DR-19 | DR-20 | DR-26 | DR-37 | DR-43 | DR-52 | DR-81 | DR-95 |
|---------------------------------|-------|-------|-----------|-----------|---------|-------|-------------|-----------|
| Geometric shapes | | | 2,3,7 | | | | | 2,3,5 |
| Grinding processes | | | 6 | | | | | |
| Grinding wheels | | | 2,6 | | 2,6 | | | 2,4,5 |
| Grinding wheel safety | | | | | | | | |
| Hardness | | | 3,7 | | 1,2,4 | | 2,4,6,9 | 2,4 |
| Heat treat terms & colors | | | 2,7,9 | | | | 5 | 2,4,5 |
| Jig design | | | | | | | 2,4,7,8 | |
| Keys & keyways | | | | | 2,5,9 | | | 1,2,3,9 |
| Knurling | | | | | | | | |
| Locating holes | | | | | | | | |
| Lubrication | | | | 2,3,7,8 | | | | |
| Machinability rating | | | 6 | | 2,9 | | | 2,4 |
| Machining nonferrous metals | | | 2,3,4,7,9 | | | | | |
| Machining non-metals | | | 2,3,4,7,9 | | | | | |
| Machining slots and pockets | | | | | | | | |
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Other documentation is also available by contacting [Customer Service](#).

GLOSSARY

Below is a list of terms used in this document.

| Glossary Term | Definition |
|-------------------|--|
| Austenitic | Steels containing high percentages of certain alloying elements such as manganese and nickel. These are austenitic at room temperature and cannot be hardened by normal heat-treatment, but do work harden. They are also non-magnetic. Typical examples of austenitic steels include the 18/8 stainless steels and 14% manganese steel. |
| BSPT | British Standard Taper Pipe Thread |
| CFR | An acronym for "Code of Federal Regulations" that references the code used by OSHA to identify regulations. |
| eCFR | Electronic Code of Federal Regulations – is a currently updated version of the Code of Federal Regulations (CFR). It is not an official legal edition of the CFR. |



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