



Metric Screw Threads

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard specifies the characteristics of external and internal metric screw threads.

1.2 Applicability. This specification applies to both internally and externally threaded product of size listed in Appendix B, Table B1 and Appendix C, Table C1 for thread sizing and gauging. For externally threaded product, Table 1 is used to qualify thread damage of virgin fasteners for meeting product quality.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASME B1.3	ISO 261	ISO 965-2	ISO 6157-1
ASME B1.16M	ISO 724	ISO 965-3	ISO 6157-2
ISO 68-1	ISO 965-1	ISO 1502	ISO 6157-3

2.2 GM Standards/Specifications.

GMW25	GMW3059
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2.3 Additional References. None.

3 Requirements

3.1 Dimensions: Not applicable.

3.2 Screw Thread Conformance. Unless otherwise specified on the drawing, acceptability of screw threads shall be determined according to the following:

American Society of Mechanical Engineers (ASME) B1 Thread Acceptance and Gaging:

- **B1.3** - Screw Thread Gaging Systems for Dimensional Acceptability of Screw Threads.
- **B1.16M** - Gages and Gaging For Metric M Screw Threads.

International Organization for Standardization General Purpose Metric Screw Thread Tolerances:

- **ISO 68-1** Part 1: Basic Profile.
- **ISO 261** General Plan.
- **ISO 724** Basic Dimensions.
- **ISO 965-1** Part 1: Principles and Basic Data.
- **ISO 965-2** Part 2: Limits of Sizes for General Purpose External and Internal Screw Threads - Medium Quality.
- **ISO 965-3** Part 3: Deviations for Constructional Screw Threads.
- **ISO 1502** - Gauges and Gauging.

- **ISO 6157-1** Part 1: Bolts, Screws and Studs for General Requirements.
- **ISO 6157-2** Part 2: Nuts.
- **ISO 6157-3** Part 1: Bolts, Screws and Studs for Special Requirements.
- **GMW25** - Mechanical Properties and Material Requirements for Externally Threaded Fasteners.

3.2.1 Uncoated Fasteners. Unless otherwise specified on the drawing, acceptability of screw threads for uncoated fasteners shall be determined with gauges based on ISO 1502 or ASME B1.16M, with Class 6g tolerance applying to external threads and Class 6H tolerance applying to internal threads.

During manufacturing, the pitch or groove diameter shall be statistically monitored using variable gauges for both internal and external threads.

3.2.2 Coated/Plated Fasteners. Unless otherwise specified on the drawing, acceptability of screw threads for coated or plated fasteners shall be determined with Ring Go-gauge based on ISO 1502 or ASME B1.16M, with Class 6h tolerance applying to external threads and Class 6H tolerance applying to internal threads. The supplier is responsible to develop appropriate before coating or plating thread dimensions in order to achieve the after coating or plating thread tolerance class. Threads may be produced undersize or oversize to accommodate coating or plating, provided the finished product meets all specific material properties.

Per ISO 1502 and ASME B1.3, if any properly calibrated Go-gauge accepts the threads, the parts shall be acceptable.

3.2.3 Coated/Uncoated Internal Threaded Fasteners of 6E Classification. On GM internally threaded fasteners which are used in integral applications such as weld nuts or clinch nuts prior to coating, a 6E thread tolerance classification is utilized. In Appendix B, Table B1, the thread classification is specified for inspection purposes.

3.2.4 Coated/Uncoated External Threaded Fasteners of 6e Classification. On GM external threaded fasteners which are used in integral applications such as weld studs or clinch stud prior to coating, a 6e thread tolerance classification is utilized. In Appendix C, Table C1, the thread classification is specified for inspection purposes.

3.2.5 Maximum Allowable Torque to Overcome Thread Damage during Gauging (External Threads Only). Maximum torque allowed for a given Go-screw thread ring gauge is specified in Table 1. Allowable torques for thread sizes not listed may be calculated. (See Appendix A, Table A1). Damage to externally threaded surfaces is described, in part, in Appendix A, Table A1, and may be cause for part rejection if failing Table 1 torque values.

Table 1: Maximum Allowable Gauging Torque for Thread Size Regardless of Coating

Thread Size	Maximum Allowable Torque Nm
M6	0.32
M8	0.77
M10	1.5
M12	2.59
M14	4.12
M16	6.14
M18	8.75
M20	12

3.3 Surface Treatment. Not applicable.

3.4 Thread.

3.4.1 Externally Threaded Fasteners. Fasteners sizes $\leq$ M20 and lengths $\leq$ 150 mm, shall be roll threaded unless otherwise agreed upon. Threading practice for fasteners of all other sizes shall be at the option of the supplier.

3.4.2 Internally Threaded Fasteners. Internally threaded fasteners may be rolled or cut at the option of the supplier.

3.5 Tolerances. Not applicable.

3.6 Surface Discontinuities. Reference GMW25 for External Thread, ISO 6157-2 for Internal Thread.

3.7 Proof Load Requirements. Not applicable.

3.8 Acceptability. Not applicable.

4 Validation

4.1 General. Not applicable.

4.2 Validation Cross Reference Index. Not applicable.

4.3 Supporting Paragraphs. Not applicable.

5 Provisions for Shipping

Not applicable.

6 Notes

6.1 Glossary. Not applicable.

6.2 Acronyms, Abbreviations, and Symbols.

ASME American Society of Mechanical Engineers

IMDS International Material Data System

IP Instrument Panel

ISO International Organization for Standardization

7 Additional Paragraphs

7.1 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS).

7.2 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

7.3 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

7.4 Inspection and Rejection. Samples of components or materials released to a GM general specification shall be tested for conformity with the requirements of this general specification and approved by the responsible Engineering department prior to commencement of delivery of bulk supplies.

A new approval must be received for any changes, e.g., properties, manufacturing process, location of manufacture, etc. If not otherwise agreed, all testing and documentation normally required for initial release must be completed.

It is the responsibility of the supplier to inform the customer in a timely manner, without solicitation, and to include documentation of all modifications of materials and/or processes and to apply for a new release.

7.5 Initial Source Approval. No shipments shall be made by any supplier until representative initial production samples have been approved by the appropriate Materials Engineering department(s) as meeting the requirements of this specification.

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

GMW16551