



Standard Classification for Temper Designations for Copper and Copper Alloys— Wrought and Cast¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope *

1.1 This is a classification of temper designations for copper and copper alloys—wrought and cast. The temper designations are classified by the process or processes used in manufacturing the product involved and its resulting qualities. It is not a specification of copper and copper alloy products.

1.2 The property requirements for the tempers are given in the applicable product specification.

2. Referenced Documents

2.1 *ASTM Standards:*

B 846 Terminology for Copper and Copper Alloys²

3. Terminology

3.1 For terminology related to copper and copper alloys, refer to Terminology B 846.

4. Significance and Use

4.1 *Significance*—This classification establishes an alphanumeric code of the tempers of copper and copper alloy products.

4.2 *Use*—The alphanumeric code is used to designate product tempers in specifications and published data.

4.2.1 The letters in the code identify the type of process used to produce the product temper. For example, “H” indicates a temper resulting from cold working.

NOTE 1—These letters are frequently the same as those used in temper systems of other metal products.

5. Classification of Tempers

5.1 *Annealed Tempers, O*—Tempers produced by annealing to meet mechanical property requirements.

5.2 *Annealed Tempers, OS*—Tempers produced by annealing to meet standard or special grain size requirements.

5.3 *Manufactured Tempers, M*—Tempers produced in the product by the primary manufacturing operations of casting and hot working and controlled by the methods employed in the operations.

5.4 *Cold-Worked Tempers, H*—Tempers produced by controlled amounts of cold work.

5.5 *Cold-Worked (Drawn), Stress-Relieved Tempers, HR*—Tempers produced by controlled amounts of cold work followed by stress relief.

5.5.1 *Order-Strengthening Tempers, HT*—Tempers produced by controlled amounts of cold work followed by a thermal treatment to produce order strengthening.

5.6 *Heat-Treated Tempers, T*—Tempers that are based on heat treatments followed by rapid cooling.

5.6.1 *Quench-Hardened Tempers, TQ*—Tempers produced by quench-hardening treatments.

5.6.2 *Solution Heat-Treated Temper, TB*—Tempers produced by solution heat-treating precipitation hardenable or spinodal hardenable alloys.

5.6.3 *Solution Heat-Treated and Cold-Worked Tempers, TD*—Tempers produced by controlled amounts of cold work of solution heat-treated precipitation hardenable or spinodal hardenable alloys.

5.6.4 *Precipitation Heat-Treated Temper, TF*—Tempers produced by precipitation heat treatment of precipitation-hardenable alloys.

5.6.5 *Spinodal Heat Treated Temper, TX*—Tempers produced by spinodal heat treatment of spinodal hardenable alloys.

5.6.6 *Cold-Worked and Precipitation Heat-Treated Tempers, TH*—Tempers produced in alloys that have been solution heat treated, cold worked, and precipitation heat treated.

5.6.7 *Cold-Worked and Spinodal Heat-Treated Tempers, TS*—Tempers produced in alloys that have been solution heat treated, cold worked, and spinodal heat treated.

5.6.8 *Mill-Hardened Tempers, TM*—Tempers of heat-treated materials as supplied by the mill resulting from combinations of cold work and precipitation heat treatment or spinodal heat treatment.

5.6.9 *Precipitation Heat-Treated or Spinodal Heat-Treated*

¹ This classification is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.91 on Editorial and Publications.

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² *Annual Book of ASTM Standards*, Vol 02.01.