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## Aluminum Temper Designations

### TEMPER DESIGNATION SYSTEM

The temper designation follows the alloy designation and is separated from it by a hyphen. The basic temper designations and subdivisions are as follows:

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1-0 Annealed, recrystallized (wrought products only): Applies to (he softest temper of wrought products.

2-H Strain-hardened (wrought products only): Applies to products which have their strength increased by strain-hardening with or without supplementary thermal treatments to produce

Subdivisions of H Temper: Strain-Hardened

The -H is always followed by two or more digits. The first digit indicated the specific combination of basic operations, as follows:

H-1 Strain-hardened only: Applies to products which are strain-hardened to obtain the desired mechanical properties without supplementary thermal treatment. The number following this designation indicates the degree of stain-hardening.

H-2 Strain-hardened and then partially annealed: Applies to products which are stain-hardened more than the desired final amount and then reduced in strength to the desired level by partial annealing, for alloys that age-soften at room temperature, the -H2 tempers have approximately the same ultimate strength as the corresponding -H3 tempers. For other alloys, the -H2 tempers have approximately the same ultimate strength as the corresponding -H1 tempers and slightly higher elongations. The number following this designation indicated the degree of stain-hardening remaining after the product has been partially annealed.

H-3 Strain-hardened and then stabilized: Applies to products which are strain-hardened and then stabilized by a low temperature heating to slightly lower their strength and increase ductility. This designation applies only to the magnesium-containing alloys which, unless stabilized, gradually age-soften at room temperature. The number following this designation indicates the degree of strain-hardening remaining after the product has been strain-hardened a specific amount and then stabilized.

The second digit indicates stain hardening to the following degrees:

2 = 1/4 hard, 4 = 1/2 hard, 6 = 3/4 hard,  
8 = full hard, 9 = extra hard

The third digit when used, indicates a variation of two-digit temper. It is used when the degree of control of temper or the mechanical properties are different from but close to those for the two-digit H temper designation to which it is added or when some other characteristic is significantly affected.

### 3-T Thermally treated

Subdivisions of T Temper: Thermally Treated

Numerals 3 through 7 following the T indicate specific sequences of basic treatments, as follows:

T3 Solution heat-treated and then cold worked. Applies to products which are cold worked to improve strength, or in which the effect of cold work in flattening or straightening is recognized in mechanical property limits.

T4 Solution heat-treated and naturally aged to a substantially stable condition. Applies to products which are not cold worked after solution heat-treatment, or in which the effect of cold work in flattening or straightening may not be recognized in mechanical property limits.

T5 Cooled from an elevated temperature shaping process and then artificially aged. Applies to products which are cooled from an elevated temperature.

T6 Solution heat-treated and then artificially aged. Applies to products which are not cold worked after solution heat-treatment, or in which the effect of cold work in flattening or straightening may not be recognized in mechanical property limits.

T7 Solution heat-treated and then stabilized. Applies to products which are stabilized to carry them beyond the point of maximum strength to provide control of some special characteristics.

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### Additional Digits for T Tempers

The following specific additional digits have been assigned for stress-relieved tempers of wrought products.

Txx51 Stress relieved by stretching. Applies to the following products when stretched the indicated amounts after solution heat-treatment or cooling from an elevated temperature shaping process.

Txx52 Stress-relieved by compressing. Applies to products which are stress-relieved by compressing after solution heat-treatment, or cooling from an elevated temperature shaping process to produce a permanent set of 1 to 5 percent.

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