American National Standard

Designation System for Aluminum Hardeners

Approved July 12, 2017 Secretariat: The Aluminum Association, Inc.

Changes are indicated by highlights in the text

1. Scope

1.1 This standard provides a system for designating aluminum hardeners used primarily for the addition of alloying or grain refining elements or modifiers to aluminum alloy melts.

2. Aluminum Hardener Designation System①

2.1 This system consists of four digit numerical designations prefixed by the letter H. The first two digits identify the aluminum hardener group by major alloying element ② ③ as shown in Table 1. The last two digits indicate the sequential registration of aluminum hardeners beginning with number H2X00 and have no other significance.

TABLE 1

Designations for Aluminum Hardener Groups④

	Major Alloying Elements	*Designation No.*
Aluminum Hardeners Grouped by Major Added Elements Other Than Aluminum	Other Elements(a)	H20XX
	Cu	H21XX
	Ti, B	H22XX
	Si	H23XX
	Mn	H24XX
	Ni	H25XX
	Zr, V	H26XX
	Two or more elements, each over 9.5%	H27XX
	Fe	H28XX
	Cr	H29XX

(a) Major elements other than those listed.

① Chemical composition limits and designations conforming to this standard may be registered with the Aluminum Association provided

(a) the aluminum hardener is offered for sale;

(b) the aluminum hardener contains more aluminum than attributable to impurity and the aluminum serves a useful function other than qualifying the aluminum hardener for inclusion in the system;

(c) the aluminum hardener must be produced specifically for and regularly used as an alloying material in the production of aluminum and aluminum alloys;

(d) the complete chemical composition limits are registered; and

(e) the composition is significantly different from that of any other aluminum hardeners for which a numerical designation already has been assigned, where "significant" is defined as:

(i) A change of the following amounts or more in arithmetic mean of the limits for each individual alloying element:

Arithmetic Mean of Limits for Alloying Elements in Registered Aluminum Hardener	*Minimum Arithmetic Changes Need for New Aluminum Hardener Issuance**
Up thru 0.30 percent	0.10
Over 0.30 thru 1.0 percent	0.15
Over 1.0 thru 2.0 percent	0.20
Over 2.0 thru 3.0 percent	0.30
Over 3.0 thru 4.0 percent	0.40
Over 4.0 thru 5.0 percent	0.50
Over 5.0 thru 6.0 percent	0.70
Over 6.0	1.00

*Lesser amounts are considered too small to issue new aluminum hardener designation.

(ii) Addition or deletion of one or more alloying elements with limits having an arithmetic mean of 0.20 percent or more.

(iii) Change in limits for impurities for which the difference between arithmetic means (existing and proposed) is at least 0.10 percent.

② For codification purposes an alloying element is any element which is intentionally added.

③ A major element is that element other than aluminum having the greatest nominal concentration. Should two or more major elements have equal nominal concentrations, that element appearing first in the element limit sequence shall be used to determine designation grouping. When nominal concentration of two or more elements are each greater than 9.5%, such aluminum hardeners are assigned to the 27XX group.

④ Standard limits for alloying elements and impurities are expressed in the following sequence: Silicon; Iron; Copper; Manganese; Chromium; Nickel; Titanium; Boron; Vanadium (See Note 1); Other (See Note 2) elements, Each; Other (See Note 2) elements, Total; Aluminum (See Note 3).

Note 1 —Additional specified elements having limits are inserted in alphabetical order by their chemical symbols between Vanadium and Other Elements, Each, or are specified in footnotes.

Note 2 —"Others" includes listed elements for which no specific limit is shown as well as unlisted metallic elements. "Total is the sum of those "Others" metallic elements 0.010 or more each, expressed to the second decimal before determining the sum. The producer may analyze samples for trace elements not specified in the registration or specification; however, such analysis is not required and may not cover all metallic "Others" elements. Should any analysis by the producer or the purchaser establish that an "Others" element exceeds the limit of "Each" or that the aggregate of several "Others" elements exceeds the limit of "Total", the material shall be considered non-conforming.

Note 3 —Aluminum is specified as a remainder for aluminum hardeners.