

International Designations and Chemical Composition Limits for Unalloyed Aluminum

(North American and International Registration Record)



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FOREWORD

Listed herein are designations and chemical composition limits for unalloyed aluminum registered with The Aluminum Association. The designations are assigned in accordance with the Recommendation—International Designation System for Unalloyed Aluminum. Additions may be made in accordance with the rules outlined in the Declaration of Accord.

Some of the registered designations may be the subject of patent or patent applications, and their listing herein is not to be construed in any way as the granting of a license under such patent right.

This registration record is not intended to address all regulatory requirements that may be imposed by local, national or international governing bodies. Regulatory requirements, which vary by region and end use, can further restrict the chemical composition within the registered limits. When applicable, inclusion of such requirements in the sales agreement is advised.

The following organizations are signatories to the Declaration of Accord on an International Alloy Designation System for Unalloyed Aluminum which is printed on page 8 of this publication.

Australia

Australian Aluminium Council Limited
<https://aluminium.org.au>

Austria

Fachverband der Nichteisenmetallindustrie
<https://wko.at>

Canada

Aluminium Association of Canada
<https://aluminium.ca>

China

China Nonferrous Metals Techno-Economic Research Institute
<http://www.cnsmq.com>

European Union

European Aluminium
<https://european-aluminium.eu/>

Germany

Gesamtverband der Aluminiumindustrie e.V.
<https://www.aluminiumdeutschland.de/>

Japan

Japan Aluminium Association
<https://aluminum.or.jp/>

Netherlands

Metaal Nederland
<https://metaalnederland.com/>

Romania

ALSO S.A.
<https://alro.ro/>

South Africa

Aluminium Federation of South Africa
<https://afsa.org.za>

South Korea

Korea Institute of Materials Science
<https://kims.re.kr/>

Spain

Centro Nacional de Investigaciones Metalurgicas
<https://cenim.csic.es>

Switzerland

Aluminium-Verband Schweiz (alu.ch)
<https://alu.ch>

United Kingdom

Aluminium Federation Ltd.
<https://alfed.org.uk>

United States of America

The Aluminum Association
<https://aluminum.org>

CHEMICAL COMPOSITION LIMITS^{1,2}

Only composition limits which are identical to those listed herein or are registered with The Aluminum Association should be designated as "AA" unalloyed aluminum.

R e g i s t e r e d								Others ⁵		Aluminum ⁴
Designation	Date	By	Si	Fe	Zn	Ga	V	Each	Total ³	
P0202A	1993-03-16	USA	0.02	0.02	0.02	0.02	0.01	⁶	0.01 0.02	Remainder
P0303A	1982-03-29	USA	0.03	0.03	0.03	0.03	0.01	⁶	0.01 0.02	Remainder
P0303B	1993-03-02	USA	0.03	0.03	0.03	0.03	0.02	⁶	0.01 0.02	Remainder
P0304A	1995-09-12	USA	0.03	0.04	0.03	0.03	0.01	⁶	0.01 0.02	Remainder
P0305A	1995-09-12	USA	0.03	0.05	0.03	0.03	0.01	⁶	0.01 0.02	Remainder
P0404A	1982-03-29	USA	0.04	0.04	0.03	0.03	0.01	⁶	0.01 0.03	Remainder
P0404B	1993-03-02	USA	0.04	0.04	0.03	0.03	0.02	⁶	0.01 0.03	Remainder
P0405A	1982-03-29	USA	0.04	0.05	0.03	0.03	0.02	⁶	0.02 0.03	Remainder
P0406A	1982-03-29	USA	0.04	0.06	0.03	0.03	0.02	⁶	0.02 0.04	Remainder
P0506A	1982-03-29	USA	0.05	0.06	0.03	0.03	0.02	⁶	0.02 0.05	Remainder
P0506B	1982-03-29	USA	0.05	0.06	....	....	....	⁶	0.05 0.10	Remainder
P0507A	1982-03-29	USA	0.05	0.07	0.03	0.03	0.02	⁶	0.02 0.05	Remainder
P0507B	1982-03-29	USA	0.05	0.07	....	....	....	⁶	0.05 0.10	Remainder
P0608A	2003-06-16	AUSTRALIA	0.06	0.08	0.03	0.03	0.02	⁶	0.02 0.05	Remainder
P0610A	1982-03-29	USA	0.06	0.10	0.03	0.04	0.02	⁶	0.02 0.05	Remainder
P0610B	1982-03-29	USA	0.06	0.10	....	....	....	⁶	0.05 0.10	Remainder
P0610C	1992-08-19	USA	0.06	0.10	....	....	....	⁶	0.10 0.20	Remainder
P1015A	1982-03-29	USA	0.10	0.15	0.03	0.04	0.03	⁶	0.03 0.10	Remainder
P1015B	1982-03-29	USA	0.10	0.15	....	....	....	⁶	0.05 0.10	Remainder
P1015C	1992-08-19	USA	0.10	0.15	....	....	....	⁶	0.10 0.20	Remainder
P1015D	1992-08-19	USA	0.10	0.15	....	....	....	⁶	0.15 0.30	Remainder
P1020A	1982-03-29	USA	0.10	0.20	0.03	0.04	0.03	⁶	0.03 0.10	Remainder
P1020B	1982-03-29	USA	0.10	0.20	....	....	....	⁶	0.05 0.10	Remainder
P1020C	1992-08-19	USA	0.10	0.20	....	....	....	⁶	0.10 0.20	Remainder
P1020D	1992-08-19	USA	0.10	0.20	....	....	....	⁶	0.15 0.30	Remainder
P1020G	1999-03-17	SWITZERLAND	0.10	0.20	0.03	0.04	0.03	^{6, 7}	0.03 0.10	Remainder
P1520A	1982-03-29	USA	0.15	0.20	0.03	0.04	0.03	⁶	0.03 0.10	Remainder
P1520B	1982-03-29	USA	0.15	0.20	....	....	....	⁶	0.05 0.10	Remainder
P1520C	1992-08-19	USA	0.15	0.20	....	....	....	⁶	0.10 0.20	Remainder
P1520D	1992-08-19	USA	0.15	0.20	....	....	....	⁶	0.15 0.30	Remainder
P1535A	1982-03-29	USA	0.15	0.35	0.03	0.04	0.03	⁶	0.03 0.10	Remainder
P1535B	1982-03-29	USA	0.15	0.35	....	....	....	⁶	0.05 0.10	Remainder
P1535C	1992-08-19	USA	0.15	0.35	....	....	....	⁶	0.10 0.20	Remainder
P1535D	1992-08-19	USA	0.15	0.35	....	....	....	⁶	0.15 0.30	Remainder

CHEMICAL COMPOSITION LIMITS^{1,2}

Only composition limits which are identical to those listed herein or are registered with The Aluminum Association should be designated as "AA" unalloyed aluminum.

R e g i s t e r e d								Others ⁵			
Designation	Date	By	Si	Fe	Zn	Ga	V	Each	Total ³	Aluminum ⁴	
See Footnotes on page 8											
P2055A	1982-03-29	USA	0.20	0.55	0.03	0.04	0.04	⁶	0.05	0.15	Remainder
P2055C	1992-08-19	USA	0.20	0.55	....	....	....	⁶	0.10	0.20	Remainder
P2055D	1992-08-19	USA	0.20	0.55	....	....	....	⁶	0.15	0.30	Remainder
P2070A	1982-03-29	USA	0.20	0.70	0.03	0.04	0.04	⁶	0.05	0.15	Remainder
P2070B	1992-08-19	USA	0.20	0.70	....	....	....	⁶	0.15	0.30	Remainder
P2585A	1982-03-29	USA	0.25	0.85	0.03	0.04	0.04	⁶	0.05	0.15	Remainder
P2585B	1992-08-19	USA	0.25	0.85	....	....	....	⁶	0.15	0.30	Remainder
See footnotes on page 3											

FOOTNOTES

1. Composition in percent maximum unless shown as a minimum.

Standard limits for impurities are expressed to the following places:

Less than 0.001 percent	0.000X
0.001 but less than 0.01 percent	0.00X
0.01 but less than 0.10 percent	0.0X
0.10 percent and over	0.XX

2. Except for "Aluminum" and "Others", analysis is required for elements for which specific limits are shown. For purposes of determining conformance to these limits, an observed value or a calculated value obtained from analysis is rounded off to the nearest unit in the last right-hand digit used in expressing the specified limit, in accordance with the following:

When the digit next beyond the last place to be retained is less than 5, retain unchanged the digit in the last place retained.

When the digit next beyond the last place to be retained is greater than 5, increase by 1 the digit in the last place retained.

When the digit next beyond the last place to be retained is 5, and there are no digits beyond the 5, or only zeroes, increase by 1 the digit in the last place retained if it is odd, leave the digit unchanged if it is even. Increase by 1 the digit in the last place retained, if there are non-zero digits beyond this 5.

3. The sum of those "Others" metallic elements 0.010 or more each, expressed to the second decimal before determining the sum.
4. Aluminum is specified as a remainder for all the unalloyed aluminum designations. The aluminum content for unalloyed aluminum not made by a refining process is the difference between 100.00 percent and the sum of all other analyzed metallic elements together with silicon present in amounts of 0.010 percent or more each, expressed to the second decimal before determining the sum. For unalloyed aluminum not made by a refining process, when the specified maximum limit is 0.XX, an observed value or a calculated value greater than 0.005 but less than 0.010 percent is rounded off and shown as "less than 0.01".
5. "Others" includes listed elements for which no specific limit is shown as well as unlisted metallic elements. 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 "other" 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.
6. Cd + Hg^a + Pb 0.0095 percent max^b ; As^a 0.009 percent max.
 - a. Surveillance testing for As and Hg shall be performed at a frequency defined by the supplier's quality plan. For North America, surveillance testing shall be performed quarterly for each metal source to indicate compliance.
 - b. CONEG model legislation combined limit of less than 100 ppm includes hexavalent chromium; however, since Cr⁺⁶ is not present in primary metal or alloyed ingot, it is omitted from this algorithm.
7. Li 0.0001 max; Mg 0.003 max; Na 0.0010 max.

+ Designations registered since previous issue.

INACTIVE REGISTRATIONS

REGISTERED DESIGNATION	DATE RECLASSIFIED
P1020E	1997-10-13
P1535E	1997-10-13
P2055E	1997-10-13
P2070E	1997-10-13
P2585E	1997-10-13

RECOMMENDATION

INTERNATIONAL DESIGNATION SYSTEM FOR UNALLOYED ALUMINUM

This Recommendation is based on the designation system for unalloyed aluminum which was adopted in the U.S.A. in the early 1970's, and which became its national standard in 1980. Several other countries have since adopted the same system with minor modifications.

Designations, registered in accordance with this Recommendation, may be used by any country. For use, see Appendices A, B, and C.

A designation assigned in conformance with this Recommendation should only be used to indicate unalloyed aluminum having chemical composition limits identical to those registered with the Signatories to the Declaration of Accord on an International Designation System for Unalloyed Aluminum.

1. Scope

- 1.1 This recommendation describes a system for designating unalloyed aluminum not made by a refining process and used primarily for remelting.
- 1.2 Unalloyed wrought aluminum designations (10xx series with specified minimum aluminum and limits for natural impurities), are registered separately through the "International Designation System for Wrought Aluminum and Wrought Aluminum Alloys."

2.1.1 Each basic unalloyed aluminum designation is identified by the letter A following the numerical designation, i.e., PXXYYA.

2.1.2 Variations of a basic unalloyed aluminum, i.e., having the same individual silicon and iron limits but having different individual limits for elements other than silicon and iron, are identified by substituting a serial letter in place of the letter A. The serial letters are assigned in alphabetical sequence starting with B but omitting I, O, and Q.

2. Unalloyed Aluminum Designation System¹

- 2.1 This system consists of four digit numerical designations prefixed by the letter P (Purity) and suffixed by a serial letter. The first two numerical digits, XX, indicate the two digits to the right of the decimal place in the limit for maximum silicon, 0.XX. The last two numerical digits, YY, indicate the two digits to the right of the decimal place in the limit for maximum iron, 0.YY.

2.2 Maximum limits for the following, expressed as a multiple of 0.01 percent, are registered for each designation: Silicon; Iron; Other Elements, Each; Other Elements, Total. Aluminum is specified as a remainder for unalloyed aluminum². Maximum limits for individual elements other than silicon and iron may be registered.³

FOOTNOTES

1. Chemical composition limits and designations conforming to this standard may be registered with The Aluminum Association provided (a) the unalloyed aluminum is offered for sale currently and shall have been sold within the 12 months immediately preceding the date of registration request, in both cases in commercial quantities, (b) the complete chemical composition limits are registered, (c) the composition is different from that of any other unalloyed aluminum for which a designation already has been assigned.
2. The aluminum content for unalloyed aluminum not made by a refining process is the difference between 100.00 percent and the sum of all other analyzed metallic elements together with silicon present in the amounts of 0.010 percent or more each, expressed to the second decimal before determining the sum. For unalloyed aluminum not made by a refining process, when the specified maximum limit is 0.XX, an observed value or a calculated value greater than 0.005 but less than 0.010% is rounded off and shown as "less than 0.01".

3. Standard limits for impurities are expressed in the following sequence: Silicon; Iron; Zinc; Gallium; Vanadium (See Note 1); Other (See Note 2) Elements, Each; Other 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. 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 "Remainder" for unalloyed aluminum.

APPENDIX A

USE AND ASSIGNMENT OF DESIGNATIONS

USE OF DESIGNATIONS

- A.1 Unalloyed aluminum designations used in accordance with this Recommendation shall have chemical composition limits identical to the registered limits of that designation.
- A.2 Designations that could be mistaken for a designation described in the Recommendation (shown on page 10) shall not be used for unregistered unalloyed aluminum.
- A.3 Unalloyed aluminum having chemical composition limits that differ from registered designations should be submitted for the assignment of a designation.
- A.4 Each designation should be used with a suffix letter to clearly indicate the associated chemical composition limits registered for that designation.
 - A.4.1 A basic designation, for each unalloyed aluminum designation, is identified by the suffix letter A, (i.e., PXXYYA).
 - A.4.2 Variations to the basic designation should use a serial suffix letter, other than the letter A, to indicate chemical composition limits which are different from the basic designation but have the same individual iron and silicon limits as the basic designation, (i.e., PXXYYB).

ASSIGNMENT OF DESIGNATIONS

- A.5 Designations for a new unalloyed aluminum shall be assigned in the following order of precedence:
 - A.5.1 Any proposed chemical composition limits for unalloyed aluminum that are identical to a registered designation shall use the registered designation.
 - A.5.2 If the chemical composition limits of an unalloyed aluminum meet the requirements for a variation of a previously registered designation (i.e., having the same individual silicon and iron limits but having different limits for elements other than silicon and iron), the next serial suffix letter in sequence shall be assigned (see 2.1.2 of the Recommendation).
 - A.5.3 A new basic unalloyed aluminum designation shall be assigned only for an unalloyed aluminum having chemical composition limits which do not meet the requirements of A.5.1 or A.5.2.

APPENDIX B

DEACTIVATION OF REGISTERED UNALLOYED ALUMINUM DESIGNATIONS

- B.1 All countries using designations in accordance with this Recommendation should review, at least once in every five years, the unalloyed aluminum designations registered by them to see if these designations are still commercially active. If not, unalloyed aluminum designations should be proposed for deactivation. Any inactive unalloyed aluminum designation can still be reactivated when such need arises.

APPENDIX C

GENERAL GUIDELINES FOR DETERMINING COMPLIANCE WITH "SALE OF UNALLOYED ALUMINUM" AND "COMMERCIAL QUANTITY" FOR PURPOSES OF REGISTERING UNALLOYED ALUMINUM (See Declaration of Accord, Item 1)

C.1 Sale of Unalloyed Aluminum

- C.1.1 Sale of unalloyed aluminum shall have been made to external user/customers (i.e., internal use and/or transfer of unalloyed aluminum within a company does not meet the stated criteria).

C.2 Commercial Quantity

- C.2.1 The unalloyed aluminum has undergone *bona fide* mill production and is NOT a "laboratory" scale volume.
- C.2.2 The unalloyed aluminum is cast and fabricated in standard production facilities and is NOT a one-time production.
- C.2.3 There is an expected and ongoing commercial demand and/or need for the unalloyed aluminum.
- C.2.4 The unalloyed aluminum must be purchased and sold in a standard business context, which indicates that the unalloyed aluminum is actually "sold" and not "given away" for uses such as promotional evaluations.

DECLARATION OF ACCORD ON AN INTERNATIONAL DESIGNATION SYSTEM FOR UNALLOYED ALUMINUM

It is agreed by the parties hereto that the following rules shall apply in assigning unalloyed aluminum designations in accordance with the Recommendation dated January 5, 1999, and last revised August 2015, for an International Designation System for Unalloyed Aluminum:

1. To be eligible for registration:
 - 1.1 The unalloyed aluminum shall be offered for sale currently and shall have been supplied in the previous twelve months, in both cases in commercial quantities;
 - 1.2 The complete chemical composition limits shall be registered and the former national or international designation, if any, shall be shown in the registration request;
 - 1.3 The composition shall be different from that of any unalloyed aluminum for which a designation has already been assigned.
2. All requests for international registration shall be submitted to The Aluminum Association by a signatory of the Declaration of Accord. The signatory, in carrying out this function, shall endeavor to restrict registrations to those required for international, regional or national standards or standards of equivalent importance in the commercial field. In view of its historic usage of these designations, more latitude is ceded to the Aluminum Association in this regard.
3. It shall be the duty of each signatory to copy all other signatories on any correspondence during the registration process. The unalloyed aluminum designation shall be assigned by The Aluminum Association when negotiations on composition limits are complete among all signatories to the Declaration of Accord.
4. No designation or chemical composition limits shall become final until at least 60 days after announcement to all signatories. During this 60-day period, all questions and objections regarding the designation or chemical composition limits shall be submitted; or an extension of the period shall be requested. Technical objections shall be substantially resolved prior to final registration.
5. After the 60-day period or any extension thereof, The Aluminum Association shall confirm the registered designation and the composition limits to all signatories.
6. No changes in chemical composition limits are allowed after registration is final.
7. This Declaration of Accord may be executed in several counterparts and all so executed shall constitute one agreement.

Organization

Representative

Address

Date

Signature

DÉCLARATION D'ACCORD SUR UN SYSTÈME DE DÉSIGNATION INTERNATIONALE POUR L'ALUMINIUM NON ALLIÉ

Il est convenu entre les participants que les règles suivantes seront appliquées dans la désignation des alliages non alliés en concordance avec la recommandation du 5 Janvier 1999, dernièrement révisée en août 2015, pour un système de désignation internationale pour l'aluminium non allié.

1. Pour être admis à l'enregistrement:
 - 1.1 L' aluminium non allié devra être offert en vente et avoir été fourni au cours des douze derniers mois, en quantités commerciales dans les deux cas;
 - 1.2 Les limites de composition chimique complètes devront être enregistrées ainsi que le désignation internationale ou nationale précédente, s'il y a lieu, doit paraître;
 - 1.3 La composition devra être différente de celle de tout aluminium non allié pour lequel une désignation a déjà été assignée.
2. Toute demande d'enregistrement international doit être soumise à l'Aluminum Association par un signataire de la Déclaration d'Accord. Ledit signataire, dans l'exercice de cette fonction, s'appliquera à limiter les enregistrements à ceux requis pour les normes internationales, régionales ou nationales, ou autres normes d'importance équivalente dans le secteur commercial. Compte tenu de l'utilisation historique de ces désignations, l'Aluminum Association dispose d'une plus grande latitude à cet égard.
3. Il appartiendra à chaque signataire d'informer toutes les organisations des pays participants de toutes correspondances pendant le processus d'enregistrement. Les attributions de désignations d'alliage non-alliés seront effectuées par l'Aluminum Association dès l'achèvement des négociations sur les limites de composition par tous les signataires de la Déclaration d'Accord.
4. Aucune désignation ou limites de composition chimique ne sera définitive avant au moins 60 jours à compter de la date d'annonce donnée aux organisations participantes. Durant ces 60 jours, toutes questions et objections concernant cette désignation ou les limites de composition chimique devront être soumises; sinon, une extension de la période devra être demandée à l'Aluminum Association. Toutes objections techniques devront être résolues de façon substantielle avant l'enregistrement final.
5. Après la période de 60 jours, ou de l' extension de période demandée, l'Aluminum Association devra confirmer la désignation enregistrée et les limites de composition chimique à chaque organisation participante.
6. Aucun changement dans les limites de composition chimique est autorisé après l'enregistrement final.
7. Cette Déclaration d'Accord pourra être reproduite en plusieurs exemplaires tout en constituant un seul agrément.

Organisation

Représentant

Adresse

Date

Signature

OTHER ALUMINUM ASSOCIATION REGISTRATION RECORDS AND REFERENCES

- **INTERNATIONAL ALLOY DESIGNATIONS AND CHEMICAL COMPOSITION LIMITS FOR WROUGHT ALUMINUM AND WROUGHT ALUMINUM ALLOYS** (Teal Sheets).
- **DESIGNATIONS AND CHEMICAL COMPOSITION LIMITS FOR ALUMINUM ALLOYS IN THE FORM OF CASTINGS AND INGOT** (Pink Sheets).
- **DESIGNATIONS AND CHEMICAL COMPOSITION LIMITS FOR ALUMINUM POWDERS AND ALUMINUM ALLOY POWDERS** (Purple Sheets).
- **INTERNATIONAL DESIGNATIONS AND CHEMICAL COMPOSITION LIMITS FOR ALUMINUM HARDENERS** (Gray Sheets).
- **COMPONENTS OF CLAD ALUMINUM ALLOY PRODUCTS** (Lt. Green Sheets).
- **TEMPERS FOR ALUMINUM AND ALUMINUM ALLOY PRODUCTS** (Yellow Sheets).
- **TEMPERS FOR ALUMINUM AND ALUMINUM ALLOY PRODUCTS—METRIC EDITION** (Tan Sheets).
- **ALUMINUM STANDARDS AND DATA**
A reference book containing data on chemical compositions, mechanical and physical properties, tolerances and other information on aluminum mill products in general use, in U.S. Customary units.
- **ALUMINUM STANDARDS AND DATA Metric SI**
A reference book containing data on chemical compositions, mechanical and physical properties, tolerances and other information on aluminum mill products in general use, in Metric (SI) units.

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