

**SAE and ASTM RECOMMENDED
PRACTICE J1086 and E527**

APPROVED AS ANSI/SAE J1086 APR83 and ASTM E527-1984
BY AMERICAN NATIONAL
STANDARDS INSTITUTE

**Numbering Metals and Alloys –
SAE J1086 APR83
and ASTM E527**

SPONSORED BY:
SAE, INC.

PUBLISHED BY:
SAE, Inc., 400 Commonwealth Drive, Warrendale, PA 15096

**S. A. E.
LIBRARY**

SAENORM.COM : Click to view the full PDF of J1086_198304

Report of the Unified Numbering System Advisory Board, approved August 1974, revised April 1983.

UNS designations shall not be used for metals and alloys which are not registered under the system described herein, or for any metal or alloy whose composition differs from those registered.

1. Scope

1.1 This recommended practice describes a unified numbering system (UNS) for metals and alloys which have a "commercial standing" (see Note 1), and covers the procedure by which such numbers are assigned.

Section 2 describes the system of alphanumeric designations or "numbers" established for each family of metals and alloys.

Section 3 outlines the organization established for administering the system.

Section 4 describes the procedure for requesting number assignment to metals and alloys for which UNS numbers have not previously been assigned.

1.2 The UNS provides a means of correlating many nationally used numbering systems currently administered by societies, trade associations, and individual users and producers of metals and alloys, thereby avoiding confusion caused by use of more than one identification number for the same material; and by the opposite situation of having the same number assigned to two or more entirely different materials. It provides, also, the uniformity necessary for efficient indexing, record keeping, data storage and retrieval, and cross referencing.

1.3 A UNS number is not in itself a specification, since it establishes no requirements for form, condition, quality, etc. It is a unified identification of metals and alloys for which controlling limits have been established in specifications published elsewhere. (See Note 2.)

2. Description of Numbers (or Codes) Established for Metals and Alloys

2.1 The unified numbering system (UNS) establishes 18 series of numbers for metals and alloys, as shown in Table 1. Each UNS number consists of a single letter-prefix followed by five digits. In most cases the letter is suggestive of the family of metals identified, for example, A for aluminum, P for precious metals, S for stainless steels. Table 2 shows the secondary division of some primary series of numbers.

2.2 Whereas some of the digits in certain of the UNS number groups have special assigned meaning, each series is independent of the others in such significance; this practice permits greater flexibility and avoids complicated and lengthy UNS numbers. (See Note 3.)

2.3 Wherever feasible, identification "numbers" from existing systems are incorporated into the UNS numbers. For example: The carbon steel which is presently identified by "AISI 1020" (American Iron & Steel Institute), is covered by "UNS G10200" and the free cutting brass, which is presently identified by "CDA (Copper Development Association) C36000," is covered by "UNS C36000."

2.4 Welding filler metals fall into two general categories: those whose compositions are determined by the filler metal analysis (e.g., solid bare wire or rods and cast rods) and those whose composition is determined by the weld deposit analysis (e.g., covered electrodes, flux-cored and other composite wire electrodes). The latter are assigned to a new primary series with the letter W as shown in Table 1. The solid bare wire and

rods continue to be assigned in the established number series according to their composition.

(Readers are cautioned *not* to make their own "assignments" of numbers from such listings, as this can result in unintended and unexpected duplication and conflict.)

2.5 The ASTM and the SAE periodically publish up-to-date listings of all UNS numbers assigned to specific metals and alloys, with appropriate reference information on each. (See Note 6.) Many trade associations also publish similar listings related to materials of primary interest to their organizations.

3. Organization for Administering Unified Numbering System for Metals and Alloys

3.1 The organization for administering the UNS consists of: (1) an advisory board, (2) several number-assigning offices, (3) a corps of volunteer consultants, and (4) staffs at ASTM and SAE. In addition, SAE and ASTM committees dealing with various groups of materials may be consulted.

TABLE 1—PRIMARY SERIES OF NUMBERS

| UNS Series | Metal |
|-------------------------------------|---|
| Nonferrous metals and alloys | |
| A00001–A99999 | Aluminum and aluminum alloys |
| C00001–C99999 | Copper and copper alloys |
| E00001–E99999 | Rare earth and rare earth-like metals and alloys (18 Items, see Table 2) |
| L00001–L99999 | Low melting metals and alloys (14 Items, see Table 2) |
| M00001–M99999 | Miscellaneous nonferrous metals and alloys (12 Items, see Table 2) |
| N00001–N99999 | Nickel and nickel alloys |
| P00001–P99999 | Precious metals and alloys (8 Items, see Table 2) |
| R00001–R99999 | Reactive and refractory metals and alloys (14 Items, see Table 2) |
| Z00001–Z99999 | Zinc and zinc alloys |
| Ferrous metals and alloys | |
| D00001–D99999 | Specified mechanical properties steels |
| F00001–F99999 | Cast irons |
| G00001–G99999 | AISI and SAE carbon and alloy steels (except tool steels) |
| H00001–H99999 | AISI H-steels |
| J00001–J99999 | Cast steels (except tool steels) |
| K00001–K99999 | Miscellaneous steels and ferrous alloys |
| S00001–S99999 | Heat and corrosion resistant (stainless) steels |
| T00001–T99999 | Tool steels |
| Welding filler metals | |
| W00001–W99999 | Welding filler metals, covered and tubular electrodes, classified by weld deposit composition (see Table 2) |

The ϕ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

φ TABLE 2—SECONDARY DIVISION OF SOME SERIES OF NUMBERS

| UNS Series | Metal | UNS Series | Metal |
|--|---|---|---|
| E00001–E99999 Rare earth and rare earth-like metals and alloys | Actinium Cerium Mixed rare earths* Dysprosium Erbium Europium Gadolinium Holmium Lanthanum Lutetium Neodymium Praseodymium Promethium Samarium Scandium Terbium Thulium Ytterbium Yttrium | P00001–P99999 Precious metals and alloys P00001–P00999 P01001–P01999 P02001–P02999 P03001–P03999 P04001–P04999 P05001–P05999 P06001–P06999 P07001–P07999 | Gold Iridium Osmium Palladium Platinum Rhodium Ruthenium Silver |
| F00001–F99999 Cast irons | Gray, malleable, pearlitic malleable, and ductile (nodular) cast irons | R00001–R99999 Reactive and refractory metals and alloys R01001–R01999 R02001–R02999 R03001–R03999 R04001–R04999 R05001–R05999 R06001–R06999 R07001–R07999 R08001–R08999 R10001–R19999 R20001–R29999 R30001–R39999 R40001–R49999 R50001–R59999 R60001–R69999 | Boron Hafnium Molybdenum Niobium (Columbium) Tantalum Thorium Tungsten Vanadium Zirconium |
| K00001–K99999 Miscellaneous steels and ferrous alloys | | W00001–W99999 Welding filler metals, classified by weld deposit composition W00001–W09999 W10000–W19999 W20000–W29999 W30000–W39999 W40000–W49999 W50000–W59999 W60000–W69999 W70000–W79999 W80000–W89999 | Carbon steel with no significant alloying elements Manganese-molybdenum low alloy steels Nickel low alloy steels Austenitic stainless steels Ferritic stainless steels Chromium low alloy steels Copper base alloys Surfacing alloys Nickel base alloys |
| L00001–L99999 Low-melting metals and alloys | Bismuth Cadmium Cesium Gallium Indium Lead Lithium Mercury Potassium Rubidium Selenium Sodium Thallium Tin | Z00001–Z99999 Zinc and zinc alloys | Zinc |
| M00001–M99999 Miscellaneous nonferrous metals and alloys | Antimony Arsenic Barium Calcium Germanium Plutonium Strontium Tellurium Uranium Magnesium Manganese Silicon | | |

* Alloys in which the rare earths are used in the ratio of their natural occurrence (that is, unseparated rare earths). In this mixture, cerium is the most abundant of the rare earth elements.

3.1.1 The Advisory Board has approximately 20 volunteer members who are affiliated with major producing and using industries, trade associations, government agencies, and standards societies, and who have extensive experience with identification, classification, and specification of materials. The Board is the administrative arm of SAE and ASTM on all matters pertaining to the UNS. It coordinates thinking on the format of each series of numbers and the administration of each by selected experts. It sets up ground rules for determining eligibility of any material for a UNS number, for requesting such numbers, and for appealing unfavorable rulings. It is the final referee on matters of disagreement between requesters and assigners.

3.1.2 UNS number assigners for certain materials are set up at trade associations which have successfully administered their own numbering systems; for other materials, assigners are located at the offices of SAE and ASTM. Each of these assigners has the responsibility for administering a specific series of numbers, as shown in Table 3. Each considers requests for assignment of new UNS numbers, and informs applicants of the action taken. Trade association UNS number assigners also report immediately to both SAE and ASTM details of each number assignment. ASTM and SAE assigners collaborate with designated consultants when considering requests for assignment of new numbers.

3.1.3 Consultants are selected by the Advisory Board to provide expert

knowledge of a specific field of materials. Since they are utilized primarily by the Board and the SAE and ASTM number assigners, they are not listed in this recommended practice. At the request of the ASTM or SAE number assigner, a consultant considers a request for a new number in the light of the ground rules established for the material involved, decides whether a new number is justified, and informs the ASTM or SAE number assigner accordingly.

This utilization of experts (consultants and number assigners) is intended to insure prompt and fair consideration of all requests. It permits each decision to be based on current knowledge of the needs of a specific industry of producers and users.

3.1.4 Staff members at SAE and ASTM maintain duplicate master listings of all UNS numbers assigned.

3.1.5 Established SAE and ASTM committees which normally deal with standards and specifications for the materials covered by the UNS, and other knowledgeable persons, are called upon by the Advisory Board for advice when considering appeals from unfavorable rulings in the matter of UNS number assignments.

4. Procedure for Requesting Number Assignment to Metals and Alloys Not Already Covered by UNS Numbers (or Codes)

4.1 UNS numbers are assigned only to metals and alloys which have a commercial standing (as defined in Note 1).

APPLICATION FOR UNS NUMBER ASSIGNMENT
and
Data Input Sheet for Entering a Specific Material in the
SAE-ASTM Unified Numbering System for Metals and Alloys
(See Reverse Side for Instructions for Completing This Form)

Material Description _____

_____ Suggested UNS No. _____

*UNS Assigned Description _____

_____ *UNS Assigned No. _____

***Chemical Composition (percent by wt.)**

| | | | | | | | | |
|-----------|----|-------|------------|----|-------|-----------|----|-------|
| Aluminum | Al | _____ | Indium | In | _____ | Selenium | Se | _____ |
| Antimony | Sb | _____ | Iridium | Ir | _____ | Silicon | Si | _____ |
| Arsenic | As | _____ | Iron | Fe | _____ | Silver | Ag | _____ |
| Beryllium | Be | _____ | Lead | Pb | _____ | Sulfur | S | _____ |
| Bismuth | Bi | _____ | Lithium | Li | _____ | Tantalum | Ta | _____ |
| Boron | B | _____ | Magnesium | Mg | _____ | Tellurium | Te | _____ |
| Cadmium | Cd | _____ | Manganese | Mn | _____ | Thorium | Th | _____ |
| Carbon | C | _____ | Mercury | Hg | _____ | Tin | Sn | _____ |
| Chromium | Cr | _____ | Molybdenum | Mo | _____ | Titanium | Ti | _____ |
| Cobalt | Co | _____ | Nickel | Ni | _____ | Tungsten | W | _____ |
| Columbium | Cb | _____ | Nitrogen | N | _____ | Uranium | U | _____ |
| Copper | Cu | _____ | Oxygen | O | _____ | Vanadium | V | _____ |
| Germanium | Ge | _____ | Phosphorus | P | _____ | Zinc | Zn | _____ |
| Gold | Au | _____ | Platinum | Pt | _____ | Zirconium | Zr | _____ |
| Hafnium | Hf | _____ | Rhenium | Re | _____ | | | _____ |
| Hydrogen | H | _____ | Rhodium | Rh | _____ | | | _____ |
| Other | | _____ | | | | | | |

***Cross References**

AA _____

ACI _____

AISI _____

ANSI _____

AMS _____

ASME _____

ASTM _____

AWS _____

CDA _____

FED _____

MIL SPEC _____

SAE _____

OTHER _____

Requesting Person and Organization (full address) _____

_____ Date of Request _____

*Assigning Org. _____ *Date of UNS Assignment _____

Assigner's Name and Office _____

Applicant: DO NOT write in shaded areas.

* These items for Computer Operator

FIG. 1—APPLICATION FORM FOR UNS NUMBER ASSIGNMENT (FRONT)

GENERAL

Before attempting to complete this form, the applicant should be thoroughly familiar with the objectives of the UNS and the "ground rules" for assigning numbers, as stated in Section 4 of SAE J1086 and ASTM E 527.

MATERIAL DESCRIPTION

Identify the base element; the single alloying element that constitutes 50% or more of the total alloy content; other distinguishing predominant characteristics (such as "casting"); and common or generic names if any (such as "ounce metal" or "Waspalloy"). When no single element makes up 50% or more of the total alloy content, list in decreasing order of abundance, the two alloying elements which together constitute the largest portion of the total alloy contents; except that if no two elements make up at least 50% of the total alloy content, list the three most abundant, and so on. Instead of "iron", use "steel" to identify the base element of those iron-low-carbon alloys commonly known as steels.

When mechanical properties or physical characteristics are the primary defining criteria and chemical composition is secondary or nonsignificant, enter such properties and characteristics with the appropriate values or limits for each.

SUGGESTED UNS NO.

While applicant's suggestion may or may not be the one finally assigned, it will assist proper identification of the material by the UNS Number Assigner.

CHEMICAL COMPOSITION

φ Enter limits such as 0.13–0.18 (not .13–.18 or 0.13 to 0.18), 1.5 max, 0.040 min, and balance. In space designated "other," enter information such as "Each 0.05 max, Total 0.15 max" and "Sn plus Pb 2.0 min". Additional specific elements not included in the list on this form may be entered in the spaces provided at the end of the list.

CROSS REFERENCES

Letter symbols listed indicate widely known trade associations and standards issuing organizations. Enter after appropriate symbols any known specification numbers or identification numbers issued by such groups to cover material equivalent to, similar to, or closely resembling the subject material.

Examples ; SAE J404 (50B44), AISI 415, ASTM A638 (660)

In space designated "other" enter any pertinent numbers issued by groups not listed above. In these instances, the full name and address of the issuing group shall be included.

SUBMIT COMPLETED FORM TO
APPROPRIATE UNS NUMBER
ASSIGNER, AS LISTED IN
SAE J1086 AND ASTM E527

FIG. 1—APPLICATION FORM FOR UNS NUMBER ASSIGNMENT (BACK)