

**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**

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

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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.

φ **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,

φ 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.

φ TABLE — PRIMARY SERIES OF NUMBERS

UNS Series	Metal
<b>Nonferrous metals and alloys</b>	
A00001-A9999	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
<b>Ferrous metals and alloys</b>	
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
<b>Welding filler metals</b>	
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 E00000–E00999 E01000–E20999 E21000–E45999 E46000–E47999 E48000–E49999 E50000–E51999 E52000–E55999 E56000–E57999 E58000–E67999 E68000–E68999 E69000–E73999 E74000–E77999 E78000–E78999 E79000–E82999 E83000–E84999 E85000–E86999 E87000–E87999 E88000–E89999 E90000–E99999	Actinium Cerium Mixed rare earths <sup>a</sup> 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 Beryllium Chromium Cobalt Rhenium Titanium Zirconium
K00001–K99999 Miscellaneous steels and ferrous alloys		W00001–W99999 Welding filler metals, classified by weld deposit composition W00001–W09999	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 L00001–L00999 L01001–L01999 L02001–L02999 L03001–L03999 L04001–L04999 L05001–L05999 L06001–L06999 L07001–L07999 L08001–L08999 L09001–L09999 L10001–L10999 L11001–L11999 L12001–L12999 L13001–L13999	Bismuth Cadmium Cesium Gallium Indium Lead Lithium Mercury Potassium Rubidium Selenium Sodium Thallium Tin	W10000–W19999 W20000–W29999 W30000–W39999 W40000–W49999 W50000–W59999 W60000–W69999 W70000–W79999 W80000–W89999	Zinc
M00001–M99999 Miscellaneous nonferrous metals and alloys M00001–M00999 M01001–M01999 M02001–M02999 M03001–M03999 M04001–M04999 M05001–M05999 M06001–M06999 M07001–M07999 M08001–M08999 M10001–M19999 M20001–M29999 M30001–M39999	Antimony Arsenic Barium Calcium Germanium Plutonium Strontium Tellurium Uranium Magnesium Manganese Silicon	Z00001–Z99999 Zinc and zinc alloys	

<sup>a</sup> 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

**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)