

SAE BAR COMPOSITIONS

REFERENCE ASTM A29 & SAE J403

Nonresulfurized Carbon Steels

Table with 5 columns: SAE No., C, Mn, P Max., S Max. Rows include grades 1005, 1006, 1008, 1010, 1011, 1012, 1013, 1015, 1016, 1017, 1018, 1019, 1020, M1020, 1021, 1022, 1023, 1025, 1026, 1029, 1030, 1034, 1035, 1037, 1038, 1039, 1040, 1042, 1043, 1044, M1044, 1045, 1046, 1049, 1050, 1053, 1055, 1059, 1060, 1064, 1065, 1069, 1070, 1071, 1074, 1075, 1078, 1080, 1084, 1086, 1090, 1095.

*Prefix M denotes merchant quality grades with wider carbon and manganese ranges than standard steels.

When Silicon is required, the following ranges and limits are commonly used for basic oxygen steel grades:

Table with 2 columns: Standard Steel Designation, Silicon Ranges or Limits. Rows: Up to 1015 Incl., 1015 to 1025 incl., Over 1025.

When lead or copper are required, they are added elements to a standard steel. Lead is generally added in amounts ranging from 0.15 to 0.35%.

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Nonresulfurized Carbon Steels

High Manganese Carbon Steel*

Table with 5 columns: SAE No., C, Mn, P Max., S Max. Rows include grades 1513, 1514, 1522, 1524, 1525, 1526, 1527, 1536, 1541, 1547, 1548, 1551, 1582, 1581, 1586, 1572.

*Boron treated steels range 0.0005-0.003%. These grades are identified by inserting the letter "B" between the second and third numbers of the grade, for example: 1584B1.

SAE BAR COMPOSITIONS

Resulfurized Carbon Steels

Heat Chemical Ranges and Limits

Table with 5 columns: SAE No., C, Mn, P Max., S Max. Rows include grades 1108, 1110, 1117, 1116, 1118, 1119, 1137, 1139, 1140, 1141, 1144, 1145, 1146, 1151.

Rephosphorized and Resulfurized Carbon Steels

Heat Chemical Ranges and Limits

Table with 6 columns: SAE No., C, Mn, P, S, Pb. Rows include grades 1211, 1212, 1213, 12L13, 12L15, 12L14, 12L15 (Ladloy 300).

*All are basic oxygen steels.

When lead or copper are required, they are added elements to a standard steel. Lead is generally added in amounts ranging from 0.15 to 0.35%. Such a steel is identified by inserting the letter "L" between the second and third numbers of the AISI number (example: 12L14).

SAE BAR COMPOSITIONS

Standard Alloy Steels

Basic Oxygen and Electric Furnace

Table with 7 columns: SAE No., C, Mn, Ni, Cr, Mo, Other Elements. Sections: MOLYBDENUM STEELS, CHROMIUM-MOLYBDENUM STEELS, NICKEL-CHROMIUM-MOLYBDENUM STEELS, NICKEL 1.75%-MOLYBDENUM 0.25% STEEL, NICKEL 1.05%-CHROMIUM 0.45% MOLYBDENUM 0.20%.

* Prefix E denotes electric furnace steel; all other analyses are oxygen steels.

(a) Phosphorus content for basic oxygen process steel is .025%; for electric furnace steel, .025%. Sulfur content for basic oxygen process steel is .040%; for electric furnace steel, .025%.

(b) Silicon content is .15 to .35%.

(c) Sulfur content is .035 to .030%.

SAE BAR COMPOSITIONS

Standard Alloy Steels

Basic Oxygen and Electric Furnace

Table with 7 columns: SAE No., C, Mn, Ni, Cr, Mo, Other Elements. Sections: CHROMIUM STEEL, CHROMIUM-VANADIUM STEELS, NICKEL 0.50%-CHROMIUM 0.50% MOLYBDENUM 0.10%, NICKEL 1.25%-CHROMIUM 1.20% MOLYBDENUM 0.10%.

* Prefix E denotes electric furnace steel; all others are basic oxygen steels.

(a) Phosphorus content for basic oxygen process steels is .025%; for electric furnace steel, .025%. Sulfur content for basic oxygen steels is .040%; for electric furnace steel, .025%.

SILICON CONTENT: (b) .15 to .35%; (c) 1.80-2.20.

SAE BAR COMPOSITIONS

Standard Alloy Steels

Basic Oxygen and Electric Furnace

Table with 7 columns: SAE No., C, Mn, Si, Ni, Cr, Mo. Section: STANDARD BORON STEELS. Rows include grades 50840, 50844, 50846, 50850, 50860, 51900, 61845, 61845, 94815, 94817, 94830.

NOTE: Phosphorus is 0.35% max., sulfur, 0.040% max.

NOTES ON ALLOY STEELS

NOTE 1: Grades shown with prefix letter E are normally made by the electric furnace process. All others are normally manufactured by basic oxygen processes but may be manufactured by the electric furnace process with adjustments in phosphorus and sulfur.

NOTE 2: Phosphorus and sulfur limits for each process are:

Table with 3 columns: Steel Making Process, Phosphorus (P), Sulfur (S). Rows: Basic electric furnace, Basic oxygen.

NOTE 3: Small quantities of certain elements are present in alloy steels which are not specified or required. Elements considered incidental which may be present to the following maximum amounts: copper, 0.30%; nickel, 0.20%; chromium, 0.20%; and molybdenum, 0.06%, per ASTM A204.

NOTE 4: Where minimum and maximum sulfur content is shown it is indicative of resulfurized steel.

NOTE 5: Standard alloy steels can be produced with a lead range of 0.15 to 0.35%. Such steels are identified by inserting the letter "L" between the second and third numerals of the SAE number (example: 41L40). Lead analysis for lead is not determinable since lead is added to the ladle stream while liquid is poured.