

# STANDARISASI MATERIAL

Bahan Kuliah Bahan Teknik 1

# Definisi standarisasi material

- Standarisasi material adalah aturan yang dikeluarkan oleh asosiasi, institusi suatu negara produsen material yang meliputi pengaturan cara penulisan, pengelompokan, pengkelasan , penserian suatu material
  - ASTM (American Society for Testing Materials)
  - AISI (American Iron and Steel Institute)
  - UNS (Unified numbering system)
  - AA (Aluminum Association)
  - SAE (Society Automotive Engineering)
  - DIN (Deutch Industrial Normung)
  - NEN ( Nederland Engineering Norm)
  - JIS (Japans Industrial Standard)
  - SNI (Standard Nasional Indonesia)

# Contoh standar AISI

<i>AISI/SAE Designation<sup>a</sup></i>	<i>UNS Designation</i>	<i>Composition Ranges (wt% of Alloying Elements in Addition to C)<sup>b</sup></i>			
		<i>Ni</i>	<i>Cr</i>	<i>Mo</i>	<i>Other</i>
10xx, Plain carbon	G10xx0				
11xx, Free machining	G11xx0				0.08–0.33S
12xx, Free machining	G12xx0				0.10–0.35S, 0.04–0.12P
13xx	G13xx0				1.60–1.90Mn
40xx	G40xx0			0.20–0.30	
41xx	G41xx0		0.80–1.10	0.15–0.25	
43xx	G43xx0	1.65–2.00	0.40–0.90	0.20–0.30	
46xx	G46xx0	0.70–2.00		0.15–0.30	
48xx	G48xx0	3.25–3.75		0.20–0.30	
51xx	G51xx0		0.70–1.10		
61xx	G61xx0		0.50–1.10		0.10–0.15V
86xx	G86xx0	0.40–0.70	0.40–0.60	0.15–0.25	
92xx	G92xx0				1.80–2.20Si

<sup>a</sup> The carbon concentration, in weight percent times 100, is inserted in the place of “xx” for each specific steel.

<sup>b</sup> Except for 13xx alloys, manganese concentration is less than 1.00 wt%.

Except for 12xx alloys, phosphorus concentration is less than 0.35 wt%.

Except for 11xx and 12xx alloys, sulfur concentration is less than 0.04 wt%.

Except for 92xx alloys, silicon concentration varies between 0.15 and 0.35 wt%.

# Standar Tool Steel

<i>AISI Number</i>	<i>UNS Number</i>	<i>Composition (wt%)<sup>a</sup></i>						<i>Typical Applications</i>
		<i>C</i>	<i>Cr</i>	<i>Ni</i>	<i>Mo</i>	<i>W</i>	<i>V</i>	
M1	T11301	0.85	3.75	0.30 max	8.70	1.75	1.20	Drills, saws; lathe and planer tools
A2	T30102	1.00	5.15	0.30 max	1.15	—	0.35	Punches, embossing dies
D2	T30402	1.50	12	0.30 max	0.95	—	1.10 max	Cutlery, drawing dies
O1	T31501	0.95	0.50	0.30 max	—	0.50	0.30 max	Shear blades, cutting tools
S1	T41901	0.50	1.40	0.30 max	0.50 max	2.25	0.25	Pipe cutters, concrete drills
W1	T72301	1.10	0.15 max	0.20 max	0.10 max	0.15 max	0.10 max	Blacksmith tools, woodworking tools

<sup>a</sup> The balance of the composition is iron. Manganese concentrations range between 0.10 and 1.4 wt%, depending on alloy; silicon concentrations between 0.20 and 1.2 wt% depending on alloy.

**Source:** Adapted from *ASM Handbook*, Vol. 1, *Properties and Selection: Irons, Steels, and High-Performance Alloys*, 1990. Reprinted by permission of ASM International, Materials Park, OH.

# Standar Stainless steel

AISI Number	UNS Number	Composition (wt%) <sup>a</sup>	Condition <sup>b</sup>	Mechanical Properties			Typical Applications
				Tensile Strength [MPa (ksi)]	Yield Strength [MPa (ksi)]	Ductility [%EL in 50 mm (2 in.)]	
<i>Ferritic</i>							
409	S40900	0.08 C, 11.0 Cr, 1.0 Mn, 0.50 Ni, 0.75 Ti	Annealed	380 (55)	205 (30)	20	Automotive exhaust components, tanks for agricultural sprays
446	S44600	0.20 C, 25 Cr, 1.5 Mn	Annealed	515 (75)	275 (40)	20	Valves (high temperature), glass molds, combustion chambers
<i>Austenitic</i>							
304	S30400	0.08 C, 19 Cr, 9 Ni, 2.0 Mn	Annealed	515 (75)	205 (30)	40	Chemical and food processing equipment, cryogenic vessels
316L	S31603	0.03 C, 17 Cr, 12 Ni, 2.5 Mo, 2.0 Mn	Annealed	485 (70)	170 (25)	40	Welding construction
<i>Martensitic</i>							
410	S41000	0.15 C, 12.5 Cr, 1.0 Mn	Annealed Q & T	485 (70) 825 (120)	275 (40) 620 (90)	20 12	Rifle barrels, cutlery, jet engine parts
440A	S44002	0.70 C, 17 Cr, 0.75 Mo, 1.0 Mn	Annealed Q & T	725 (105) 1790 (260)	415 (60) 1650 (240)	20 5	Cutlery, bearings, surgical tools
<i>Precipitation Hardenable</i>							
17-7PH	S17700	0.09 C, 17 Cr, 7 Ni, 1.0 Al, 1.0 Mn	Precipitation hardened	1450 (210)	1310 (190)	1–6	Springs, knives, pressure vessels

<sup>a</sup> The balance of the composition is iron.

<sup>b</sup> Q & T denotes quenched and tempered.

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# Standar Alumunium

<b>A00001-A99999</b>	<b>Aluminum and aluminum alloys</b>
A01001-A63562	Aluminum Foundry Alloys, Ingot or Casting
A82014-A87475	Wrought Aluminum Alloys Clad with Wrought Aluminum Alloys, Non- or Heat Treatable
A91030- A91450	Wrought Aluminum Alloys, Non- Heat Treatable
A93002-A95954	Wrought Aluminum Alloys, Non- Heat Treatable
A98001-A98280	Wrought Aluminum Alloys, Non- Heat Treatable
A92001-A92618	Wrought Aluminum Alloys, Heat Treatable
A96002-A97472	Wrought Aluminum Alloys, Heat Treatable

# Standar Tembaga

C00001-C99999	Copper and copper alloys
<b>Wrought Alloys</b>	
C10100-C15760	Pure and Low Alloyed Copper (>99%Cu)
C16200-C16500	Cadmium Copper
C17000-C17700	Copper-Beryllium Alloy (Beryllium Bronzes)
C18000-C19900	Copper and High Copper Alloys (>96%Cu)
C20500-C29800	Brasses (Cu-Zn)
C31000-C35600	Leaded Brasses (Cu-Zn-Pb )
C40400-C49080	Tin Brasses (Cu-Zn-Sn-Pb)
C50100-C52900	Phosphor bronzes (Cu-Sn-P)
C53200-C54800	Leaded Phosphor Bronzes
C55180-C56000	Cu-Ag-P and Cu-P Brazing Filler Metal
C60600-C64400	Aluminum Bronzes
C64700-C66100	Silicon Bronzes
C66200-C66420	Copper Alloys
C66700-C67820	Manganese Bronzes
C68000-C69950	Silicon Brasses and Other Copper-Zinc Alloys
C70100-C72950	Copper-Nickel Alloys
C73150-C79900	Nickel Silvers and Leaded Nickel Silvers
<b>Cast alloys</b>	
C80100-C81200	Cast Coppers (>99%Cu)
C81300-C82800	Cast Chromium Copper and Beryllium Copper Alloys (>96%Cu)
C83300-C85800	Cast Red, Yellow and Leaded Brasses
C86100-C86800	Cast Manganese Bronzes and Leaded Manganese Bronzes
C87300-C87900	Cast Silicon Brasses and Bronzes
C89320-C89940	Cast Cu-Sn-Bi-(Se, Zn, Ni) Alloys
C90200-C94500	Tin Bronzes and Leaded Tin Bronzes
C94700-C94900	Cast Nickel-Tin Bronzes
C95200-C95810	Cast Aluminum Bronzes
C96200-C96800	Cast Copper-Nickel Alloys
C97300-C97800	Cast Nickel-Silver Alloys
C98200-C98840	Cast Leaded Copper Alloys
C99300-C99750	Cast Copper Alloys



# Standar SAE atau AISI

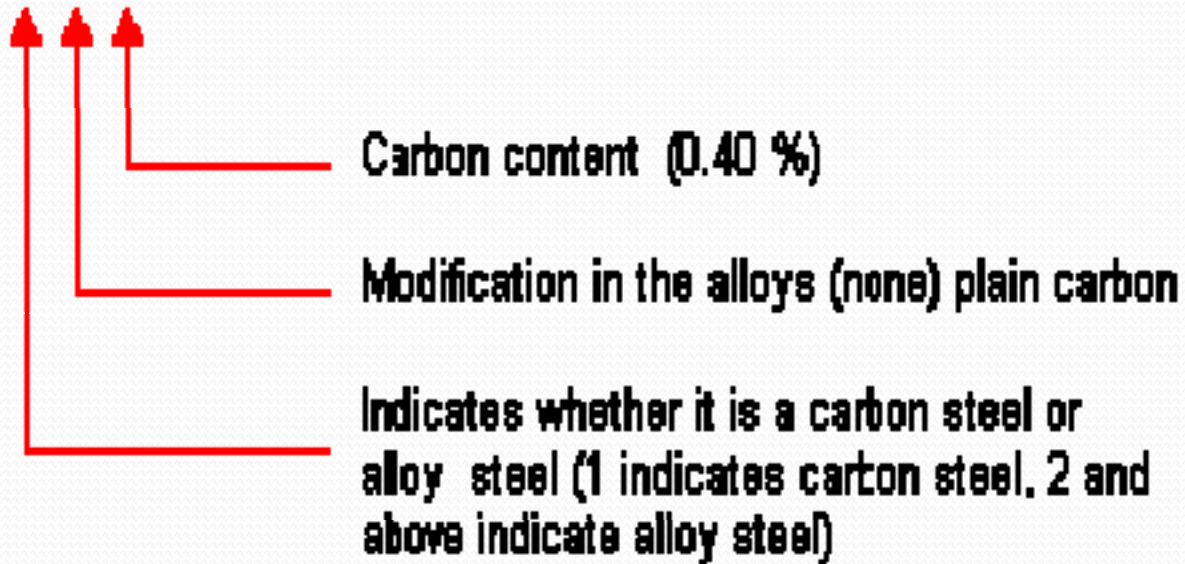
- Huruf awal memberi keterangan sebagai berikut :
  - **A = alloy, basic open hearth**
  - **B = carbon, acid Bessemer**
  - **C = carbon, basic open hearth**
  - **D = carbon, acid open hearth**
  - **E = electric furnace**

**Contoh : AISI C1050 - artinya material baja karbon yang proses peleburan menggunakan tungku basic open hearth, kadar karbon pada baja 0,50 %**

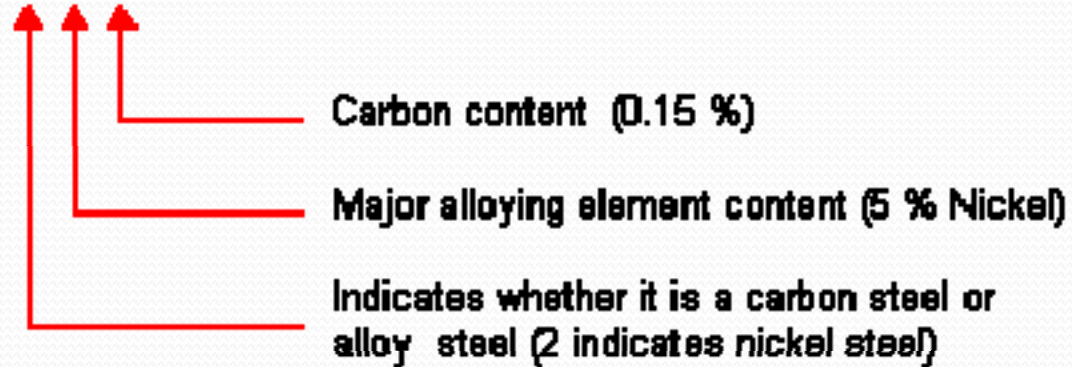


# Cara penulisan dan arti

**SAE 1040**



## **SAE 25 15**



## **SAE 5 1 20**

