

# JIS

JAPANESE INDUSTRIAL STANDARD

Chromium Steels

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standard in Japanese is to be evidence



### 1. Scope

This Japanese Industrial Standard specifies chromium steels mainly for machine structural use manufactured by hot forming such as hot rolling and forging, ordinarily used after further process of forging, cutting, and heat treatment, hereinafter referred to as the "steel".

### 2. Classification and Symbol

The steel shall be classified into 6 classes and the respective symbols shall be as given in Table 1.

Table 1. Classes and Symbols

Symbol of class	Reference	Application
	Previous symbol	
SCr 415	SCr 21	SCr 415 and SCr 420 are used mainly for case hardening.
SCr 420	SCr 22	
SCr 430	SCr 2	
SCr 435	SCr 3	
SCr 440	SCr 4	
SCr 445	SCr 5	

### 3. Method of Manufacture

3.1 The steel shall be manufactured from killed steel ingot.

3.2 The steel shall be rolled or forged from steel ingot to forging ratio not less than 4 S. However, when the forging ratio of the billet for forging or rolling is less than 4 S, a prior agreement between the purchaser and the manufacturer is necessary.

3.3 Unless otherwise specified, the steel shall be left in the state as rolled or as forged.

### 4. Chemical Composition

The chemical composition of the steel shall be determined by the ladle analysis and the value shall be as given in Table 2.

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Applicable Standards and Reference Standard: See page 9.

Table 2. Chemical Composition

Symbol of class	Reference	Chemical composition %					
	Previous symbol	C	Si	Mn	P	S	Cr
SCr 415	SCr 21	0.13 ± 0.18	0.15 ± 0.35	0.60 ± 0.85	0.030 max.	0.030 max.	0.90 ± 1.20
SCr 420	SCr 22	0.18 ± 0.23	0.15 ± 0.35	0.60 ± 0.85	0.030 max.	0.030 max.	0.90 ± 1.20
SCr 430	SCr 2	0.28 ± 0.33	0.15 ± 0.35	0.60 ± 0.85	0.030 max.	0.030 max.	0.90 ± 1.20
SCr 435	SCr 3	0.33 ± 0.38	0.15 ± 0.35	0.60 ± 0.85	0.030 max.	0.030 max.	0.90 ± 1.20
SCr 440	SCr 4	0.38 ± 0.43	0.15 ± 0.35	0.60 ± 0.85	0.030 max.	0.030 max.	0.90 ± 1.20
SCr 445	SCr 5	0.43 ± 0.48	0.15 ± 0.35	0.60 ± 0.85	0.030 max.	0.030 max.	0.90 ± 1.20

Remarks 1. As impurities, Ni and Cu shall not exceed 0.25 % and 0.30 %, respectively, throughout all classes.

2. When the product analysis on steel is requested by the purchaser, the tolerance for the product analysis shall conform to Table 3 in JIS G 0321.

## 5. Appearance, Shape, Dimension and Dimensional Tolerance

### 5.1 Hot Rolled Steel Bar and Wire Rod

5.1.1 Appearance The appearance of the hot rolled steel bar and wire rod shall be well finished and free from harmful defects in use. However, the steel bar which is supplied in coil is possibly inclusive of some abnormal points.

5.1.2 Reference of Flaw Dressing The reference of flaw dressing of the hot rolled steel bar shall be as follows:

- (1) Steel Bar for General Forging Use The flaw dressing of the steel bar for general forging use shall be made smoothly and to the depth not exceeding 4 % of nominal size (maximum value 5 mm) below nominal size, and the total width not exceeding 1/4 of the circumferential length of the same section. If the dressed portions are within the permissible tolerance, however, they shall not be considered as the portions dressed.

The permissible amount of remaining flaw shall be as agreed upon between the purchaser and the manufacturer.

- (2) Round Bar for Direct Machining The permissible depth of flaw of round bar for direct machining shall conform to the value given in Table 3 deducted from the nominal size.

Table 3. Permissible Depth of Flaw of Round Bar for Direct Machining (Hot Rolled Steel Bar)

Diameter mm	Permissible depth of flaw
Under 16	Not exceeding 4 % of nominal size with the maximum of 0.5 mm
16 to 50 excl.	Not exceeding 3 % of nominal size with the maximum of 1.0 mm
50 to 100 excl.	Not exceeding 2 % of nominal size with the maximum of 1.5 mm
100 and over	Not exceeding 1.5 % of nominal size with the maximum of 3.0 mm