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Hard tool materials and classification of applicability

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Hard tool materials and classification
of applicability

B 4053-1996

1. Scope This Japanese Industrial Standard specifies hard tool materials and classification of their applicability.

Remarks 1. The following standards are cited in this Standard:

JIS B 0601 Surface roughness—Definitions and designation

JIS B 7726 Rockwell and Rockwell superficial hardness testing machines

2. The corresponding International Standard to this Standard is shown below.

ISO 513 : 1991 Application of hard cutting materials for machining by chip removal—Designation of the main groups of chip removal and groups of application

3. In this Standard the units and numerical values shown in { } are in accordance with the conventional units and are appended for informative reference.

2. Classification and symbols of hard tool materials The classification and symbols of hard tool materials shall be divided into following four divisions:

- | | |
|-----------------------------------|----|
| (1) Hard metal | HW |
| (2) Cermet | HT |
| (3) Coated hard metal | HC |
| (4) Ultrafine particle hard metal | HF |

3. Materials Hard tool materials shall be as follows.

Further, the components shall be as given in Informative reference.

- (1) Hard metal The hard metal is composed of metal and hard metallic compound, and the main component in its hard phase is tungsten carbide.
- (2) Cermet The cermet is composed of metal and hard metallic compounds, and the main components in hard phase are carbides, carbon nitrides and nitrides of titanium and tantalum (niobium) and, less in component of tungsten carbide.

- (3) Coated hard metal The coated hard metal is made so that carbide, nitride (titanium carbide, titanium nitride, titanium carbonitride, etc.), oxide (aluminium oxide), etc. are adhered tightly chemically or physically in one layer or multilayers on the surface of hard metal.
- (4) Ultrafine particle hard metal The ultrafine hard metal is composed of metal and hard metal compound, the main component in its hard phase is tungsten carbide, and the average grain size of hard phase grains is not more than 1 μm .

4. Classification of applicability and designation

4.1 Hard tool materials for cutting tools

4.1.1 Hard metal, cermet and coated hard metal Classification of applicability and designation of hard metal, cermet, and coated hard metal shall be as given in Table 1.

Table 1

Group of applicability	Designation of applicability	Material to be machined	Cutting method	Working conditions
P	P01	Steel	Turning Boring	For high cutting speed at small chip section or for accuracy of dimensions and fine finish of surface of workpiece, provided that vibration free operation.
	P10	Steel	Turning Milling	For medium to high cutting speed at small to medium chip sections or for comparatively favorable working condition.
	P20	Steel Special cast irons (¹) (when continuous chips come out)	Cutting Milling Planing	For medium cutting speed at medium chip section or for the most general working in P series. In planing, for small chip section.
	P30	Steel Special cast irons (¹) (when continuous chips come out)	Turning Milling Planing	For low to medium cutting speed at medium to large chip sections or for unfavorable working conditions (⁷).
	P40	Steel	Turning Planing Milling	For low cutting speed at large chip section, for more unfavorable working conditions than P30, or for use of a part of small type automatic lathe turning machine or large rake angle.