



## TOOL STEELS - SPECIAL STEELS



First of all, if we describe tool steel; These are steels developed for the processing and shaping of many materials such as metal, plastic and wood. If we look at its share in total steel production, it covers an 8% segment. Of course, it is a fact that this share has to increase every year.

## TOOL STEEL AND ITS FEATURES

Tool steels; It has a much richer content than other steel groups due to its chemical composition, properties, application areas and operating conditions.

DIN 1.2714 SPECIAL STEEL  
DIN 1.2344 SPECIAL STEEL  
DIN 1.2312 SPECIAL STEEL  
DIN 1.2316 SPECIAL STEEL  
DIN 1.2738 SPECIAL STEEL  
DIN 1.2738 SPECIAL STEEL

### DIN 1.2311 SPECIAL STEEL

Hardened and tempered max. It is produced and delivered in 280-325 HB (950-1100 N / mm<sup>2</sup>) hardness.

#### Chemical Composition:

C-0.40 Mn-1.50 Cr-1.90 Mo-0.20

#### Standard Provisions:

40CrMnMo7

#### Material Properties

Hardened and tempered plastic mold steel  
High polishability  
High nitration ability  
Suitable for chrome plating  
Uniform stiffness distribution at section thicknesses up to 400 mm

#### Application Fields

Plastic molds  
Plastic and metal injection mold holders  
In extrusion press barrels



## FEATURES OF TOOL STEEL

### General Features of Tool Steels

There are certain common features in all tool steels. To list them;

Clean and homogeneous microstructure

High wear resistance

High tensile strength

Sufficient yield strength and ductility

High hardness

High toughness

It is a homogeneous hardness distribution after heat treatment.

### Tool steels according to usage area and working temperature;

Cold Work Tool Steels

Hot Work Tool Steels

High Speed Tool Steels

It is grouped as Plastic Mold Steels.

The most important feature that distinguishes these materials from each other is the hardness and the change of this hardness with the tempering temperature.

### 1-) Cold Work Tool Steels

Tool steels with carbon content varying between 0.3% - 2.5% and containing carbide forming chromium, vanadium, molybdenum and tungsten as well as nickel and manganese as alloying elements are called cold work tool steels. It has high initial hardness and when this hardness exceeds 200 ° C, it decreases rapidly. For this reason, the process is used in machining and chipless forming processes of workpieces operating at temperatures of about 200 ° C and below. According to DIN norms, some cold work tool steels are: 1.2067, 1.2080, 1.2210, 1.2312, 1.2379, 1.2767, 1.2842, 1.2550, 1.2436.

### Usage Areas of Cold Work Tool Steels

Cutting tools

Precision hole punch punches

Scraping, scraping and crushing blades

Drawing and embossing tools

Deep drawing and plastering tools

Sintering and pressing tools

### Expected Properties of Cold Work Tool Steels

Required for use in applications;

High compressive strength

High hardness

High tensile strength

High wear resistance

### Features required for production are;

Good pouring and shaping feature

Good workability

Dimensional stability and minimum distortion

It is the ability to be welded.



## 2-) Hot Work Tool Steels

It is an alloyed tool steel group that enables the forming of ferrous and non-ferrous materials under high temperature conditions (300-600 ° C) by various methods such as injection, extrusion, forging, cutting. Hot work tool steels used in the process of forming metal-based raw materials at high temperatures are a steel group with a significant usage area in today's manufacturing and mold industry. According to DIN norms, some hot work tool steels are: 1.2343, 1.2344, 1.2365, 1.2713, 1.2714.

### Usage Areas of Hot Work Tool Steels

In molds where metal materials are forged, casting, injection and extrusion processes are carried out. In mold cores, cores and pushers of metal injection molds, especially aluminum. Pressure casting molds of light and heavy metals, mold and pipe presses, inner spacers, punching punches and mandrels In hot cutting and deburring tools  
In welding reels in welded pipe production  
Used in plastic injection mold applications where high surface quality and abrasion resistance are required.

### Expected Properties of Hot Work Tool Steels

High Tempering Resistance  
High Temperature Resistance  
Thermal Shock Resistance  
Machinability  
Hot Abrasion Resistance

