



# INTERNATIONAL TOOL STEEL

*The World's Finest Tool Steel*

## S-7

### PRODUCT INFORMATION

#### TYPICAL PARTS

S-7 is suitable for a wide range of tool and die work where shock-resistance, medium hot-work properties, or for ease of machining due to its unusual combination of properties. Uses include hot and cold shock applications such as rivet sets, chisels, punches, hot headers and gripper dies. Also good for short run dies used in cold-forging, blanking and bending.

#### ADVANTAGES

Good Machinability . Maximum shock resistance air-hardening hot-work characteristics.

#### FORGING/ROLLING

Preheat 1200°F to 1300° F prior to raising to forging temperature at 2000 to 2050° F, stop forging at 1700° F and and reheat rather than forge below this temperature. S-7 is subject to decarburization amd should not be held at the forgeing temperture longer than needed. Following forging, slowly cool by burying in your choice of heat-insulating material to avoid cooling cracks. Do not normalize.

#### ANNEALING

1500° F to 1550° F, cool slowly to 100°F, air-cool. Brinell 197 Max.

#### HARDENING

In order to maintain the surface chemistry, S-7 should be hardened in a controlled neutral enviroment. Preheat 1200° F to 1300° F prior to raising to the hardening temperature of 1725° F, holding at this temperature for a minimum of one hour for up to one-inch thickness and one hour for each additional inch of thickness. Sections of 2 1/2 inch or less should be quenched in still air. Once it reaches 150°, the piece should be tempered immediately.

#### TEMPERING

S-7 is usually tempered 1 1/2 hours to 2 hours for each inch of greatest thickness. The tempering temperature varies according to the intended use. For cold working and similar applications, temper at 400°F to 500°F is recommended. For hot applications, temper at 900°F - 1000° F. Never temper at less than 400° F.

| Chemical Analysis |           |
|-------------------|-----------|
| Carbon            | .45/.55   |
| Phosphorus        | .030 Max  |
| Manganese         | ..20/.80  |
| Sulfur            | .030 Max  |
| Silicon           | .20/1.00  |
| Chromium          | 3.00/3.50 |
| Vanadium          | .35 Max   |
| Tungsten          | _____     |
| Molybdenum        | 1.30/1.80 |
| Cobalt            | _____     |

| Tempering Temperature °f |    |
|--------------------------|----|
| As-quenched              | 60 |
| 400                      | 58 |
| 500                      | 56 |
| 600                      | 55 |
| 700                      | 54 |
| 800                      | 53 |
| 900                      | 52 |
| 1000                     | 51 |
| 1100                     | 47 |
| 1200                     | 38 |

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