



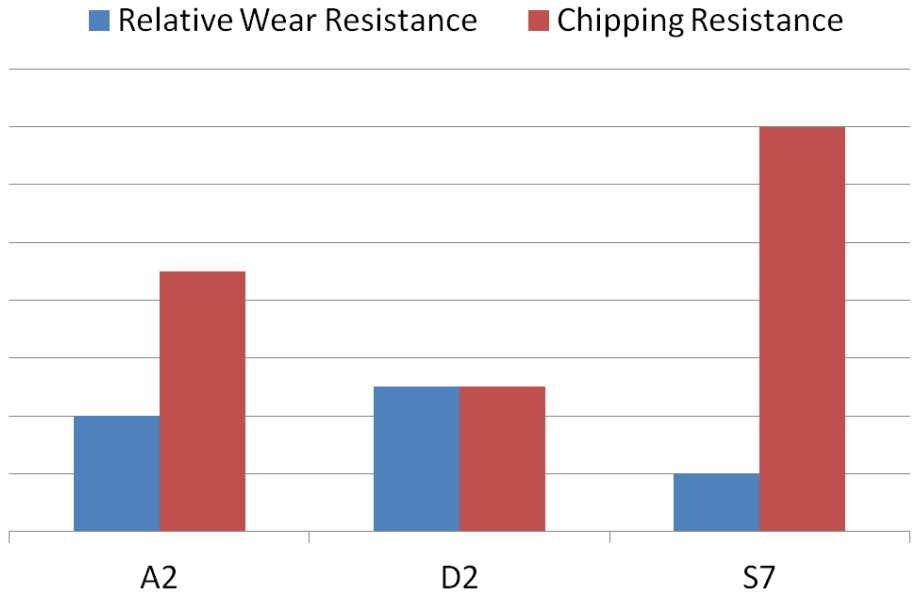
Technical Information: S7

S7 IS AN AIR HARDENING, SHOCK RESISTANT, COLD WORK TOOL STEEL
S7 IS CHARACTERIZED BY HIGH IMPACT TOUGHNESS AT RELATIVELY HIGH HARDNESS LEVELS
S7 IS ALSO USED FOR PLASTIC MOLD TOOLING REQUIRING HIGH TOUGHNESS LEVELS

TYPICAL CHEMICAL COMPOSITION

| | | | |
|------------|-------|-----------|-------|
| CARBON | 0.55% | CHROMIUM | 3.25% |
| MOLYBDENUM | 1.40% | SILICON | 0.35% |
| VANADIUM | 0.25% | MANGANESE | 0.70% |

SBSM TOOL STEEL PROPERTIES COMPARISON



PHYSICAL PROPERTIES

MODULUS OF ELASTICITY.....30 PSI X 10⁶(207 GPA)
 DENSITY..... 0.283 LB/IN³
 ANNEALED HARDNESS.....210-225 BRINELL HARDNESS (BHN)
 MACHINABILITY.....SIMILAR TO A2 TOOL STEEL



Technical Information: S7

HEAT TREATMENT

ANNEALING

HEAT TO 1550°F, HOLD TWO HOURS
SLOW COOL 20°F/HOUR TO 900°F
THEN AIR OR FURNACE COOL TO ROOM TEMPERATURE

STRESS RELIEVING

PERFORMED PRIOR OR AFTER MACHINING TO MINIMIZE DISTORTION IN HEAT TREATING
1100/1200°F, HOLD TWO HOURS
THEN AIR COOL TO ROOM TEMPERATURE

HARDENING

SALT BATH, PROTECTIVE ATMOSPHERE, OR VACUUM FURNACE EQUIPMENT PREFERRED.

HIGH HEAT (AUSTENITIZING)

1750°F FOR 30 MINUTES AT HEAT.

QUENCH

SALT BATH QUENCH TO 1000-1100°F, EQUALIZE, THEN AIR COOL TO 150°F .
VACUUM OR ATMOSPHERE QUENCH RATE OF A MINIMUM 50 DEGREES F PER MINUTE DOWN TO 900°F IS
CRITICAL TO ACHIEVE BEST HEAT TREAT RESPONSE.

TEMPER IMMEDIATELY FOLLOWING QUENCH WHEN MATERIAL REACHES 150°F OR BELOW.

TEMPERING

MINIMUM 400°F TEMPERING TEMPERATURE REQUIRED.
DOUBLE TEMPERING IS REQUIRED, TRIPLE TEMPERING RECOMMENDED.
AIR COOL TO ROOM TEMPERATURE BETWEEN TEMPERS.

TYPICAL HEAT TREAT RESPONSE

| TEMPERING TEMP | | HARDENING | |
|----------------|-----|-----------|-------|
| °F | °C | TEMP | TEMP |
| | | 1750°F | 955°C |
| As QUENCHED | | 59 HRC | |
| 400 | 205 | 57 HRC | |
| 500 | 260 | 55 HRC | |
| 600 | 315 | 54 HRC | |
| 700 | 371 | 53 HRC | |
| 800 | 427 | 53 HRC | |
| 900 | 480 | 52 HRC | |
| 1000 | 538 | 51 HRC | |
| 1100 | 552 | 47 HRC | |