



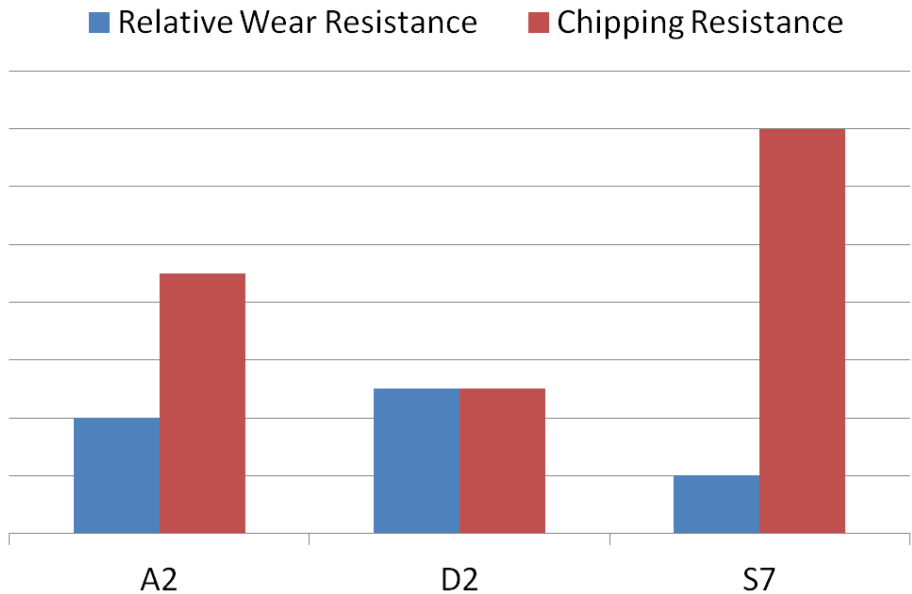
Technical Information: D2

D2 IS AN AIR HARDENING COLD WORK TOOL STEEL
D2 IS CHARACTERIZED BY GOOD WEAR RESISTANCE COMBINED WITH MODERATE TOUGHNESS
D2 IS USED IN A VARIETY OF GENERAL PURPOSE, HIGH WEAR, COLD WORK APPLICATIONS

TYPICAL CHEMICAL COMPOSITION

| | | | |
|-------------------|--------------|------------------|---------------|
| CARBON | 1.55% | CHROMIUM | 11.50% |
| MOLYBDENUM | 0.90% | SILICON | 0.45% |
| VANADIUM | 0.80% | MANGANESE | 0.35% |

SBSM TOOL STEEL PROPERTIES COMPARISON



PHYSICAL PROPERTIES

MODULUS OF ELASTICITY.....30 PSI X 10⁶(207 GPA)
DENSITY..... 0.280 LB/IN³
ANNEALED HARDNESS.....220-235 BRINELL HARDNESS (BHN)



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HEAT TREATMENT

ANNEALING

HEAT TO 1600°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)

1850°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 |
| | | 1850°F | 010°C |
| As QUENCHED | | 62 HRC | |
| 400 | 205 | 61 HRC | |
| 500 | 260 | 60 HRC | |
| 600 | 315 | 59 HRC | |
| 700 | 371 | 58 HRC | |
| 800 | 427 | 57 HRC | |
| 900 | 480 | 56 HRC | |
| 1000 | 538 | 55 HRC | |
| 1100 | 552 | 50 HRC | |