



Technical Information: M42

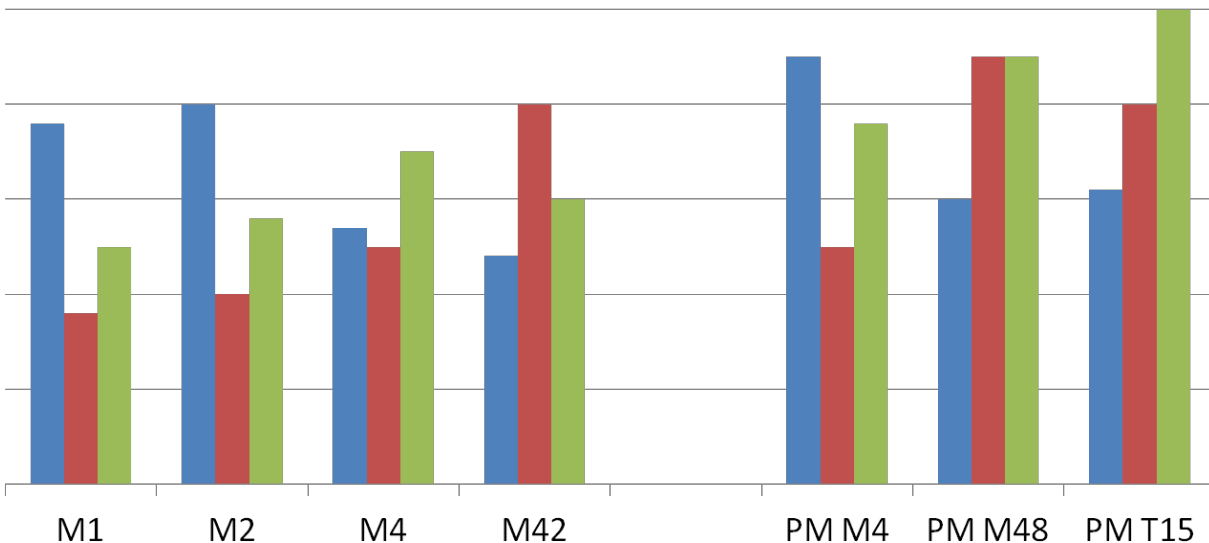
M42 IS A MOLYBDENUM/TUNGSTEN/COBALT SUPER HIGH SPEED STEEL
M42 MAY BE HEAT TREATED TO 68 HRC MAKING IT IDEAL FOR USE IN
SPECIAL PURPOSE CUTTING TOOLS AND APPLICATIONS REQUIRING HIGH WEAR RESISTANCE

TYPICAL CHEMICAL COMPOSITION

CARBON	1.10%	CHROMIUM	3.75%
MOLYBDENUM	9.50%	SILICON	0.30%
VANADIUM	1.15%	MANGANESE	0.30%
COBALT	8.00%	TUNGSTEN	1.60%

HIGH SPEED STEEL PROPERTIES COMPARISON

■ Toughness ■ Red Hardness ■ Wear Resistance



PHYSICAL PROPERTIES

MODULUS OF ELASTICITY.....30 PSI X 10⁶(207 GPa)
DENSITY..... 0.289 LB/IN³
ANNEALED HARDNESS..... 225-269 BRINELL HARDNESS (BHN)
MACHINABILITY.....SIMILAR TO T15 TOOL STEEL

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HEAT TREATMENT

ANNEALING

HEAT TO 1600°F, HOLD TWO HOURS
SLOW COOL 20°F/HOUR TO 600°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)

2075/2175°F FOR 5 TO 15 MINUTES AT HEAT.
HIGHER AUSTENITIZING TEMPERATURES REQUIRE LESS TIME 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 1200F IS
CRITICAL TO ACHIEVE BEST HEAT TREAT RESPONSE.

TEMPER IMMEDIATELY FOLLOWING QUENCH

TEMPERING

MINIMUM 1000°F TEMPERING TEMPERATURE REQUIRED.
DOUBLE TEMPERING IS REQUIRED, TRIPLE TEMPERING RECOMMENDED.
AIR COOL TO ROOM TEMPERATURE BETWEEN TEMPERS.

TYPICAL HEAT TREAT RESPONSE

TEMPERING TEMP °F	HARDENING TEMP 2075°F	HARDENING TEMP 2125°F	HARDENING TEMP 2175°F
As QUENCHED	66	66	64
1000	65	67	68
1025	64	66	68
1050	62	65	66
1100	57	60	63
1150	53	56	59

LONGITUDINAL SIZE CHANGE

APPROXIMATELY: PLUS 0.25%