DATA SHEET

LATROBE SPECIALTY STEEL COMPANY
Latrobe, PA 15650-0031 USA

Issue 1

BG42® Stainless Knife Steel

AMS 5749

Typical Composition

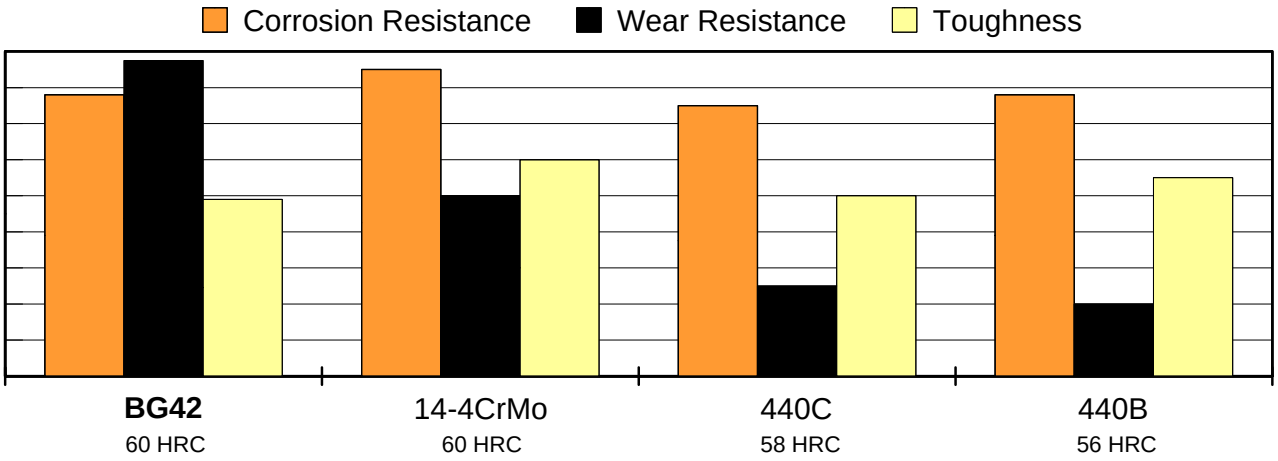
C	Mn	Si	Cr	Mo	V
1.15	0.50	0.30	14.50	4.00	1.20

LESCALLOY® BG42® VIM VAR is a double vacuum melted martensitic stainless high speed steel designed for critical aerospace structural components and high-performance bearings. The steel is vacuum induction melted (VIM) and vacuum arc remelted (VAR) to provide the extremely high cleanliness level required for these fatigue-critical applications.

When manufactured in sheet form, BG42 has proven to be an excellent knife steel. The very good wear resistance and corrosion resistance result in knife blades that exhibit excellent edge retention and long life. The molybdenum in the steel enhances the corrosion resistance provided by the high chromium content. In addition, the chromium, molybdenum, and vanadium contents provide approximately 19% carbide volume in the steel. This high carbide volume and the presence of very hard vanadium carbides enhance the wear resistance and edge retention of knife blades.

The excellent edge retention and good corrosion resistance establish BG42 as an upgrade material compared to the more commonly-known steels such as 440C stainless and the 14% chromium - 4% molybdenum stainless knife steels.

Relative Properties



Physical Properties

Machinability: 55-60% of a 1% carbon steel

BG42
HEAT TREATING INSTRUCTIONS

(See Tech-Topics Bulletin 102 for a more thorough explanation of heat treating.)

GENERAL CONSIDERATIONS

The chemical composition of BG42 is a chromium-modified high speed steel composition. As such, the steel exhibits heat treating characteristics which are similar to those of the common high speed steels,

Specifically, the steel contains a relatively high volume percentage of retained austenite in the as-quenched condition, and exhibits transformation of the retained austenite (secondary hardening) when tempered above 900°F (482°C). The steel can be underhardened to better match typical tool steel heat treating cycles, but for those treatments, the optional cryogenic treatment is recommended to achieve the desired final tempered hardness. The steel can be heat treated in standard high speed steel cycles, but austenitizing at temperatures above 2100°F (1149°C) will result in grain growth in the steel.

HARDENING:

Preheating: Heat to 1500-1550°F (816-843°C) and equalize.

Austenitizing (High Heat): Heat rapidly from the preheat, and soak for 10 to 15 minutes.

Furnace or Salt:

Typically: 2050°F (1121°C)

For underhardening, use 1950-1975°F (1066-1080°C)

Quenching: Pressurized gas, warm oil, or salt.

For pressurized gas, the furnace should have a minimum quench pressure of 4 bars. *A quench rate of approximately 400 °F (222°C) per minute to below 1000°F (538°C) is critical to obtain the desired properties.*

For oil, quench until black, about 900°F (482°C), then cool in still air to 150-125°F (66-51°C).

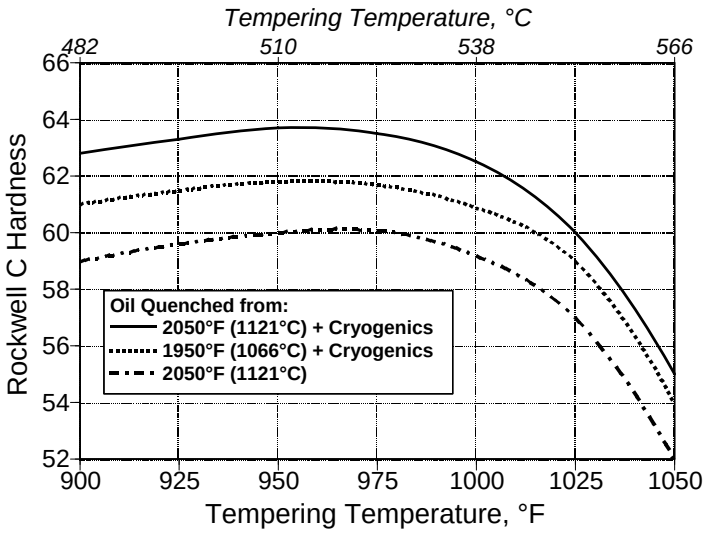
For salt maintained at 1000-1100°F (538-593°C), equalize in the salt, then cool in still air to 150-125°F (66-51°C).

Cryogenic Treatment: An optional cryogenic treatment may be used immediately after quenching to 150 to 125°F (66-51°C). Cool to -100°F (-73°C), remove from cooling medium, and allow part to warm to ambient temperature in still air.

Tempering: *Temper immediately after quenching or cryogenic treatment*. The typical temperature range for knife blades is 950-1050°F (510-566°C). Tempering below 950°F is not recommended. Hold at temperature for 2 hours then air cool to ambient temperature. *Double tempering is required.*

HEAT TREATMENT RESPONSE

As Oil Quenched from	HRC
1950°F (1066°C), 15 minutes	59.5
2000°F (1093°C), 15 minutes	62.5
2050°F (1121°C), 15 minutes	61.5
2100°F (1149°C), 10 minutes	59.0



FORGING: Heat at a rate not exceeding 400°F per hour (222°C per hour) to 2125-2175°F (1163-1191°C), and equalize. Do not forge below 1800°F (982°C), and be cautious of localized cooling at corners and thin sections.

Because of the high alloy content, BG42 must be cooled very slowly after forging. Cool slowly by placing the forging into a furnace at 1600-1625°F (871-885°C), equalize, then hold for two hours. Furnace cool to 1300°F (704°C), equalize, then hold for 12 hours. Furnace cool to 1000°F (538°C), then air cool to ambient temperature.

ANNEALING: Annealing must be performed after hot working (forging) and before rehardening.

Heat at a rate not exceeding 400°F per hour (222°C per hour) to 1625-1650°F (885-899°C), and hold at temperature for 5 hours. Then cool slowly with the furnace at a rate not exceeding 50°F per hour (28°C per hour) to 800°F (427°C). Continue cooling to ambient temperature in the furnace or in air.

The resultant hardness should be a maximum of 269 HBW.

LATROBE SPECIALTY STEEL COMPANY

Latrobe, PA Phone: 724-537-7711
FAX: 724-532-6316

Vienna, OH Phone: 800-321-6446
FAX: 330-690-2054

Marlborough, MA Phone: 800-444-4447
FAX: 508-481-6581

WEB: www.latrobesteel.com