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TECHNICAL BULLETIN

LSI 3 PM



Color Code: Green/Yellow

| Typical Chemistry | | Physical Properties | |
|-------------------|------|-------------------------------|---------------------------|
| Carbon | 0.80 | Specific Gravity | 7.75 |
| Chromium | 7.50 | Density | 0.297 lb/in ³ |
| Vanadium | 2.70 | Typical Heat Treated Hardness | 59 to 63 HRC |
| Molybdenum | 1.25 | Modulus of Elasticity | 30 x 10 ⁶ psi |
| Silicon | 1.00 | Machinability | 50-60% of 1% Carbon Steel |

DESCRIPTION

Lindquist Steels 3 PM material is an advanced powdered metal cold work die steel. Our 3 PM material is often used in applications that require better impact resistance and improved wear resistance in tooling where a conventional tool steel such as D2 fails. The unique chemistry of our 3 PM material allows it to be used for slitter knives, punches, shear blades, blanking dies, plastic injection feed screws, roll form tooling, thread roll tools, and much more.

Many of the benefits realized in the use of powdered metals, such as LSI 3 PM, are a direct result of the refined microstructure (smaller, more uniformly distributed carbide particles and a finer grain size) and the lack of segregation in the powder metallurgy product. These advantages include ease of grinding, improved response to heat treatment, greater wear resistance, and increased toughness of the finished tool.

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HEAT TREATMENT

*Important Note: Always consult with your Heat Treating professional to ensure optimal results

ANNEALING

Annealing is required after hot working and prior to rehardening. Heat at 400° F per hour to 1600-1650° F. Hold at that temperature for 1 hour per inch of the maximum thickness. Cool slowly and evenly with the furnace

at a rate of 50° F per hour to 1000° F. Continue the cooling process at room temperature (77° F)

HARDENING

Hardening should occur in a modern protective vacuum furnace atmosphere. Pre-heat the furnace to 1500-1550° F. For austenitizing, heat rapidly from the pre-heat cycle.

- To achieve the maximum wear resistance a furnace temperature of 2000-2050° F is recommended.
- To achieve an equal balance of wear and toughness a furnace temperature of 1950° F is recommended.
- To achieve the maximum toughness a furnace temperature of 1875-1900° F is recommended.
- Quenching should be performed at a minimum pressure of 4 bars.

TEMPERING

The material should be tempered immediately after the quenching process. The typical temperature range for tempering is 975-1100° F. The 3 PM material should not be tempered below a temperature of 900° F. Hold temperature for a minimum of 1 hour per inch of the materials greatest thickness and then cool at room temperature (77° F). Double tempering is required for this material and a third temper is highly recommended if the material was austenitized at 2000° F or if the material is going to undergo the EDM process.

GRINDING

During the grinding process localized heating can alter the temper of the material. Caution needs to be given to avoid this. Contact your grinding wheel supplier for advice on the appropriate grinding wheel of choice.

SURFACE TREATMENTS

LSI 3 PM is a very good substrate material for various surface treatments such as PVD and CVD coatings. The material also lends itself well to nitriding.

For further information regarding LSI 3 PM please contact the Lindquist Steels branch nearest your location by logging on to www.lindquiststeels.com

Disclaimer: The information and data presented on this technical bulletin is for informational purposes only. The values listed are typical values only. Variations in chemistry, mechanical, physical properties, as well as heat treatment parameters may vary. The information contained herein should not be construed as a warranty.

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