TERVES
ENGINEERED RESPONSE

BEST PRACTICES

Magnesium Machining[1]

General Information:

Check with all local codes before machining magnesium. No eating or drinking around magnesium.

Always have dry sand, flux (such as M310), or a Class D fire extinguisher available when machining magnesium. If magnesium fines or dust catches fire, **DO NOT use water** as hydrogen gas will be generated along with extreme heat.

Machining Magnesium:

Magnesium machining is normally done without any coolant. If it is necessary to use coolant, a light mineral oil will suffice. Never use water based coolant because of the risk of any reaction with the chips during storage.

Dry machining is usually easier, cleaner and more attractive than using coolants, which adds to cost, requires maintenance and causes problems with chip storage and handling. Machining dry results in easier reclamation and recycling of magnesium chips and also eliminates the chance of developing hydrogen gases.

High-speed tools or carbide tipped tools are preferred for the machining of magnesium. It is important to keep the cutting tool sharp to avoid sparks and heat generation during cutting.

When machining magnesium, avoid continuous ribbon type chips as these get extremely hot and can ignite. The optimal chips are small well broken discontinuous chips. Well broken chips help to take away heat from the cutting face and tool (see photographs below).

[1] **Reference: ASM Handbook Volume 16**: Machining: Machining Magnesium and Magnesium Alloys pages **820-830**

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Machining Magnesium (continued from page one):

We advise the installation explosion proof electric motors, particularly when the magnesium fines are very small or there is magnesium dust generated with machining.

If vacuum extraction of chips and fines is used, use only an explosion proof vacuum system.

Clean the machine frequently to keep the amount of magnesium fines and chips to manageable levels in case of a fire. Machines should be kept clean and the turnings should be stored in steel drums or bins which can be closed. **Local codes should also be reviewed to assure that standards are being met.** Never leave a machine with chips unattended

Magnesium Chip Storage:

Keep magnesium chips dry and separate from the chips of all other metals or alloys to prevent the generation of heat that results from oxidation of metals in the presence of water and air. This presents an extremely dangerous fire hazard for magnesium chips. **Local codes should also be reviewed, and all local storage guidelines met.**

Examples of suitable storage equipment are type 1A2 UN approved steel drums with removable lids. Storage buildings should be non-combustible and have explosion proof venting.

[1] **Reference: ASM Handbook Volume 16:** Machining: Machining Magnesium and Magnesium Alloys pages **820-830**

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