FUNCTIONAL PRODUCTS INC.

Innovative Chemistry for Lubricants

Application Bulletin

Mold Release Agents: CMR-1001

The most commonly used concrete release agents are kerosene based. In these products, acetic acid or a similar short chain acid is used to react with the concrete and form a surface layer of "soap". These can be effective but if not blended or applied carefully can cause blistering, porosity and "break-out" of the cement form. This is especially a concern for A rated decorative concrete.

Functional's CMR-1001 additive technology is bio-based and can be diluted with traditional solvents or vegetable based fluids. **CMR-1001** is engineered to react with the mold surface not the concrete. This eliminates the risk of porosity and surface defects usually found in traditional formulations.

As **CMR-1001** is used, a thin protective barrier is formed on the mold surface which improves release and casting surface quality. It may be tested on polyurethanes as it chemistry is not aggressive. In typical applications a treatment level of 5-10% w/w in an appropriate carrier fluid will handle the toughest casting demands.

Product Applications: mold release product: concrete forms; die casting; metal stamping; roll forming; machining, broaching, grinding, milling, and general purpose metalworking.

Concrete Mold Release Products: Application Tips

CMR-1001 controls the release and modifies coating properties of the base oil.

- When casting architectural materials the focus in on detail. The release agent should have lower surface tension to cover the intricacy of the mold. Kerosene in conjunction with **CMR-1001** provides better coverage for more detailed castings. A blend of kerosene and vegetable oil is also a viable charge.
- In situations where they are casting a large textured façade [because of the longer cure times] it may be beneficial to add some vegetable oil to provide a barrier between the mold and casting during extended cure.
- Larger, less detailed industrial castings (pipe, block barriers, man hole covers, highway partitions) would benefit from vegetable oil and **CMR-1001**. The set time is longer in larger castings.

In general as the concentration of **CMR-1001** is increased, improved release will result and more adhesion of the coating to the mold surface. The main point is to atomize the fluid into as fine a particle as possible.

- If an hydraulic spray unit {i.e. a system with no air] is used, the delivery pressure should be adjusted to maximize the atomization without rebound. In other words, the pressure should be high enough to create small droplets but low enough to so as not to blow the fluid off the mold. If they are using an air atomized system they can balance air and fluid pressure to 1:1 ratio. The idea is not to have an out of balance spray. If the air pressure is too high it will not atomize properly.

- If a swab type system [rag, sponge, mop etc] is used, it is recommended to use less carrier and more **CMR-1001** as the particles are not be atomized.

- Emulsions made with our **CMR-1001**. The emulsion should be in the pH range 4-6 . If they were to make a typical emulsion of pH 8.5-9.2 (i.e. take our **CMR-1001** and soybean oil and add 20% w/w anionic emulsifier) they would lose the release properties. They should use cationic (quaternary) surfactants similar to those used in asphalt emulsions for highway repair. (tallow diquaternary ammonium chloride at 10-20% w/w). So something like 20% cationic, 10**% CMR-1001**, 70% kerosene or soybean oil.

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Functional Products, Inc. 8282 Bavaria Rd. Macedonia, Ohio 44056
Ph: 330.963.3060 Fax: 330.963.3322