Internal Releases (IMRs) / Lubricants for Pultrusion

What is an internal mold release (IMR)?
IMRs are additives that are mixed directly into the resin to improve release and processing/lubrication properties AXEL's MoldWiz IMRs for pultrusion are proprietary polymeric formulations of complex fatty acids, phosphate esters and organic acid derivatives.

Why is an IMR used?
External mold release applied to dies does not offer adequate release for the pultrusion process. Only an IMR can offer release at the die interface and sufficient lubrication of the resin for the pultrusion process to take place without the risk of "locking up". Easier release with less friction means longer die life, reduced pull force and improved line speeds. In addition, IMRs reduce resin viscosity which allows resin to flow better with improved wetout of glass and fillers. This actually contributes to stronger composite matrices. Lower viscosity as the result of an IMR can also reduce the amount of styrene and air release that needs to be added to the resin - reducing VOC's.

How does an IMR promote release?
MoldWiz internal mold releases are proprietary polymeric products designed to be partially compatible with resin. IMR's require heat to function. Heat can be generated by the exotherm of the resin, or by heated dies. This permits some of the IMR to cross-link with the resin during the cure, while the balance is emitted as a vapor, creating the release interface between the part and die.

Will IMRs affect the physical properties of molded parts? Will it change their color?
When used in the recommended additive range, IMR's can actually improve physical properties. Because these materials tend to reduce resin viscosity they permit the resin to wetout fiber better and this results in correspondingly stronger matrixes. Better wetout at the mold surface means smoother parts with more consistant surface gloss. Axel's IMR's are effective at very low additive levels and generally have no effect on resin color. If color or fillers are being added to resin, IMR's will make it easier to disperse these materials in the resin mix.

Does an IMR change gel time or cure schedule?
Axel manufactures many different IMRs. Each is resin and application specific. This vast array of products allows us to match a internal mold release to the resin and cure which are being used, minimizing the effect of the IMR on gel time and resin cure. We suggest that customers run gel tests with and without internal mold release to evaluate any changes prior to using the IMR in production. Should a radical change occur, a different IMR should be considered.

If an internal mold release is used, will parts need to be cleaned before they can be painted or bonded?
Absolutely not. MoldWiz IMRs do not contain silicone, waxes, or metallic stearates so they leave surfaces clean and ready for painting or bonding operations.

How is an internals added, and how much is used?
Although the resin manufacturer can add internal mold releases to the resin most pultruders choose to add it themselves. AXEL's MoldWiz IMRs for pultrusion are liquids which are easily added to resin component before mixing. AXEL recommends a range of 0.75% to 2.0% of the resin weight.

Can I use the same IMR in different types of resin? How do I select the right product?
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AXEL's pultrusion focus sheet contains a useful chart, which describes some major resin/cure categories and suitable MoldWiz internal lubricants. Popular products include: INT-PS125 and INT-PUL24 for polyester and vinyl ester.

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If an internal mold release is used, will parts need to be cleaned before they can be painted or bonded?
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If an internal mold release is used, will parts need to be cleaned before they can be painted or bonded?
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If an internal mold release is used, will parts need to be cleaned before they can be painted or bonded?
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If an internal mold release is used, will parts need to be cleaned before they can be painted or bonded?
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