

Ffusion: The Solution for Pressure Die Casting of Aluminium

Together with well-known pressure die casting companies Sulzer Metaplas, a Sulzer Metco company, developed a new PVD high performance coatings: Ffusion. Ffusion belongs to the new M•A•C coatings (Micro Alloyed Coatings) which meet the special requirements for the plastics, the forming and the machining industry.

Before the pressure die casting process of aluminium starts a releasing agent has to be sprayed on the mould. This assures a better cooling and release of the casted part. Problems may occur while the releasing agent will be unevenly dispread or washed away by the aluminium during the mould filling process. A reaction between melt and mould is caused because the releasing agent can no longer protect the mould. This reaction is called sticking. It occurs mainly while cooling of the core pin, which is part of the pressure die casting tool. The adhesion of the liquid metal causes a film on the mould surface that might lead to an "out of specification tolerance", release problems and finally to the fraction of the core pin.

The new PVD coating Ffusion takes advantage of the high temperature during die casting process. It generates a protective oxide layer during the aluminium injection process as a consequence of the high temperature. This reduces sticking drastically. But Ffusion offers more benefits. Die casting companies refer that a regular PVD coating requires cleaning of the core after two days of use; with Ffusion the interval increases to seven days. The high performance coating features a hardness of 28 GPa and an elasticity modulus of 400 ± 40 GPa with coating thickness up to 10 μm .

Furthermore, dipping experiments with ventilated melt have shown that Ffusion offers better resistance to pitting corrosion.



Figure: Cores for Die Casting of Aluminium

Summarising the advantages: Field tests indicated a reduced core pin breakages and significant better process reliability with Ffusion. Additionally a reduced releasing agent failure could be shown, which lead to better forming properties. Except for the protection of the core pin other

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parts like cavities can also be protected against sticking, pitting corrosion and wear. Through the extension of life time and by reducing downtime costs can be saved.

*For further questions: Annette Norin, Telephone +49 (0)2204 / 299-262
Telefax +49 (0)2204 / 299-385, E-Mail: press.thinfilm@sulzer.com
Homepage: thinfilm.sulzernetco.com*