

New Release Systems For Technical Parts With Polyurethane Gelcoats

Within the last few years there has been a massive upsurge of demand for renewable, environmentally acceptable energies. Mainly this energy is won from sun, wind, water or biomass.

By means of wind energy converters it is possible to produce energy from wind.

Within the last few years so-called wind parks with several wind energy converters were built all over Germany, mainly in the North. Especially wind energy stations on the high seas, so-called offshore parks, are under construction since the energy efficiency is extremely high.



Wind energy converters largely consist of a glass fibre-reinforced epoxy resin system which is equipped with a special coat, a so-called polyurethane gel coat, to be protected from weather or environmental influences.

Depending on the production process, this coat is either 1.) applied onto the rotor blade after production or 2.) added to the mould prior to production already.

Both procedures are of particular interest to ACMOS since we have developed a novel release system consisting of a sealer and a water-based, semi-permanent release agent in order to guarantee an excellent demoulding.

For several years our customers have been approaching us for water-based release agents more frequently as the companies are forced by legislation to observe the VOC values (**V**olatile **O**rganic **C**ompounds).

For over 20 years ACMOS CHEMIE have gained experience with traditional, solvent-based products in the field of semi-permanent release agents. For about 5 years water-based release agents have been developed for this application area.

Here the water-based release agent naturally should fulfil the same requirements covered by a solvent-based product. The classical solvent-based release agent combinations allow up to 30 demouldings after one system coating – by means of a water-based system already 9 – 15 demouldings can be achieved.

The build-up behaviour of the release agent residues in the mould also plays an important part and should be as small as possible in order to minimise the high cleaning costs. Guaranteeing a cycle time of up to 100 demouldings is required in order to keep the afore-said cost factors as low as possible.

Naturally defects such as release problems, detachments, surface or wetting disturbances of the gelcoat should be avoided for the most part. In most cases, however, these defects are not due to product properties but caused by application errors such as applying too much/too little release agent, a poorly polymerised release film or perhaps a release agent overspray.

Another difficulty is to make sure, despite a faultless release, that a tackytape (adhesive tape made of butyl rubber) adheres to the mould surface.

This is necessary in order to guarantee the sealing of the foils which are needed for the injection procedure.

A balancing act between release and adhesive properties was not to be neglected either.

Moreover it has to be observed that the production of rotor blades is extremely cost- and time-consuming since the average cycle time till the

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demoulding of the rotor blade amounts to 8-10 hours. Preparatory operations such as the release system application were not considered here.

In order to rule out any defects it has to be guaranteed that a reaction between the release film and the polyurethane gelcoat within the long period until demoulding is avoided.



In close cooperation with a renowned company of the wind energy sector we now

have succeeded in meeting all afore-said requirements. As mentioned above, the new release system contains of a sealer, ACMOSAN 82-9100, the active substance contents of which are pre-solved in alcohol, plus a water-based, semi-permanent release agent, ACMOSAN 82-9055.

After being applied in three layers the sealer needs a cumulative polymerisation time of approx. 75 minutes. The release agent is applied in 3-5 layers, a waiting period of approx. 60 minutes has to be observed.

After careful preparation of the mould the polyurethane gelcoat can be applied. Then the mould is covered with glass cloth and glass fibres and filling, reinforcing and assembly elements.

We daily endeavour to put the ACMOS guiding principle into action which means a continuous optimisation of our products.

We also aim at offering a solvent-based sealer in future. Realisation is possible, the problem to be solved is that this sealer has to develop its efficiency on cold moulds as well. So we have to guarantee a complete polymerisation – this is extremely complex at room temperature.

We are on the right path and will inform you of novelties at the next opportunity.



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