Two questions, two answers:

1 One of the biggest issues for water-borne coatings are the limited application conditions. In your opinion, what could be done to improve the application range?

2 Where do you see the largest growth potential for water-borne coatings in the next few years and why?

Source: Ruslan Olinchuk - Fotolia

1 I'd like to respond to this question from different points of view: the application, formulation and supply chain of water-borne coatings. Aside from climatic constraints imposed on paint application, water-borne coatings still entail much more disciplined handling on the part of the processor. Parameters such as the dry film thickness of 2-component PUR coatings are more sensitive to deviations, in comparison with those of solvent-borne coatings. There is a good chance that these problems will be eliminated or, at least, alleviated in the future by alternative binders, such as NCO-free 2-component systems. The application window could also be optimised by technologies that support a lower dry film thickness while offering identical or, at any rate, similar dry film performance.

Although industrial paint shops can be equipped to control the conditions in which water-borne coatings are applied, this is not usually an option for applications involving decorative paints. Here, solvent-borne paints remain the products of choice for the majority of painters on account of their wide application window. From the formulation point of view, variations in climatic conditions could be compensated by a modular product portfolio that covers a wide range of application temperatures and conditions. Concepts like this require a high level of training, not only of customers, but also of all parties involved in the supply and distribution chain.

The main challenge from the supply chain point of view is the sensitivity of water-borne coatings to low temperatures and frost. Since the temperature has to be controlled, heated storage places and temperature-controlled trucks are needed – this increases the complexity and increases costs all along the supply chain. And as that is a "big ask", eliminating these constraints would help to boost the acceptance of water-borne coatings in the market. At Walter Mäder AG, we're focused on getting all the various aspects into alignment to yield the best application window and customer benefit possible.

"The main driver of change is regulatory pressure."

Oliver Esser
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2 This question cannot be answered by listing applications or markets. The key question is really: in which applications are solventborne coatings still being used, and why? The reasons for not replacing solvent-borne paints are multifaceted. For some applications, there are simply no water-borne alternatives available, e.g. coil coating. There is clear growth potential here for anyone who can offer a technical solution that will replace conventional systems.

In some cases, our industry is faced with a low level of acceptance due to the constraints and challenges associated with water-borne coatings. Additional inhibitory factors could be the investments that paint shops would need to make in order to use water-borne coatings. This is nothing new and, to be honest, the last decade has taught us that the main driver of change is regulatory pressure. It is new regulations that induce the paint industry and their customers to develop alternatives and to accept constraints in the paint process and, in some cases, higher costs along the value chain.

In a nutshell: growth potential is to be found wherever the paint industry can offer proper water-borne alternatives and wherever the need for change is driven by regulatory pressure that forces customers to accept compromises when using waterborne coatings.

1 Basically, as binder manufacturers, we can mitigate the disadvantages arising from the high humidity conditions in which water-borne coatings are used by carefully selecting the synthesis employed for the respective waterborne paint binder, as well as via the actual formulation of the paint.

For example, where high humidity is present, the resultant delayed drying or cross-linking can be improved by chemical modifications to the binder or the use of a suitable co-solvent, in addition to the actual water. Naturally, this is done with the aid of the numerous commercially available additives and other matching ingredients in the paint formulation.

As regards chemical modifications to the water-borne polymer, quantitative, qualitative and process-engineering changes can be made to the binder syntheses. Possibilities here include varying the molecular weight, the glass transition temperature, and the functional groups (e.g. acid, hydroxyl, amine number). Another option is to boost the non-volatile fraction and thus lower the percentage water content – this can decisively improve the application properties of water-borne binders.

We employ all these variants in our research and development laboratories when synthesising resins by means of polyaddition, polycondensation and free-radical-initiation processes. The results are the acrylic dispersions, polyurethane dispersions and also many secondary emulsions and hybridised, water-thinned film-forming binders that currently make up our delivery programme.

> "In many cases, the properties are being matched and even enhanced."

Jörg Benecke
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2 We are currently seeing growth across the full range of water-borne products in our delivery programme, such as acrylic and PUR dispersions, alkyd and acrylic emulsions, as well as radiation-curable polyurethane dispersions. We believe this market will continue to expand in the future, as well.

The reason is quite simple: the paints and coatings market, together with the can and coil coatings market, is increasingly converting to waterborne and therefore to eco-friendly binders for the corresponding applications. In many cases, the properties of the film-forming polymers are being matched and even enhanced by replacing the solvent with water.

This is particularly true in our case for the acrylic dispersions, where we are witnessing the strongest growth, followed immediately by the polyurethane dispersions. We are now offering binders from these two classes of products for the adhesive markets as well, which we now include among our clientele. The increasing volumes in this market segment, too, will also serve to boost the proportion of dispersions there.

Book tip

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