AQUALAC waterborne industrial coatings

**TIGER AQUALAC**, a newly-developed industrial water-based paint for spray, dip and electrostatic applications owes its breakthrough to the need to meet the increasing challenges of environmental protection, primarily with regard to emissions prevention.

In addition, the shift to **TIGER AQUALAC** is occurring, in practice, on the basis that any loss of quality compared to conventional solvent-based paints is unacceptable and that the cost of the coating material must not increase.

Arguments that water-based paints will only shift environmental problems from exhaust air to waste water can be ruled out based on practical experience. Therefore, it is essential to use coating systems and processing techniques that enable extensive recycling of paint and process media.

As a highly affordable alternative, **TIGER Drylac®** powder coatings have been a success for environmental protection reasons; emissions, odors, water pollution, fire hazard and waste are minimized. However, to an increasing degree, powder coating has to compete alongside water-based paint systems, for example:

- frequent changes in color: powder coating overspray recovery is inefficient
- non-heat resistant parts: required powder coating curing temperature range from 160-200 °C (320-392 °F)
- coating of bulky items: limitations due to curing oven size
- certain cavity coatings: not possible with all-round powder coating
- high temperature resistant coatings: powder coating is only durable short-term up to a maximum of 250 °C (482 °F)

The term “water-based paint” refers to:

- coating systems with maximum 10% organic solvents
- waterborne plastic dispersions with maximum 6% organic solvents
- plastic emulsions with maximum 3% organic solvents

Depending on the coating type, given that the water volume is usually up to 70%, it plays a key function regarding solvency, film formation, processability and other properties.

When diluting water-soluble paints - which should preferably be done with distilled water, there is no steady drop in viscosity, as with conventional solvent-based paints. Rather, the viscosity increases after an initial drop very sharply, and then very quickly drops again after exceeding a maximum (= water bulge).

Furthermore, it should be noted that each waterborne plastic dispersion has what is known as a minimum film-forming temperature (MFT), below which no useful films are developed, and an upper temperature limit above which the paint begins to block, for example a reduction of surface hardness starts.

The crosslinking mechanism during paint drying follows the chemical nature of the film-forming agent and depends on the type and quantity of the functional groups incorporated. A distinction is made between the following types of drying:

- drying at room temperature
- two-component system drying
- drying in a curing oven
The following water-soluble binders are in use

Alkyd resins
Compared to other binding systems, the benefits of alkyd resin coatings lays in their large range of variations; whether they are one-component air-drying or oven-drying. This allows for customized settings for certain properties and applications. Alkyd resin paints are distinguished by ease of processing and application.

Polyester resins
Mainly used for combination paints. In connection with melamine resins oven, dry one-component and two-component coatings have been developed. These are scratch resistant, high gloss and resistant to yellowing.

Vinyl chloride-acrylic polymers
Used with physically very rapidly drying one-component anticorrosive coatings that are air-drying.

Acrylic dispersions
For acrylic resins; used in one-component or two-component flexible, highly resistant, chemically and mechanically durable paints, there is a difference between self and externally crosslinking types. The air-drying or oven-drying films provide good corrosion protection and color retention even when exposed to elevated temperatures or UV light. They are mainly used for single coats, such as household appliances, as they form a non-porous film and bond well without special primers, even on difficult substrates.

Butadiene-styrene copolymers
With higher levels of butadiene in the copolymer, the film formation can also take place at just above zero °C (32 °F). Because of the residual content of unsaturated double bonds, the dispersion films are capable of oxidative crosslinking. These air-drying one-component coating materials are suitable for corrosion protection primers, stone chip and underbody coatings.

Polyurethane
Produces high molecular films with excellent properties. Special mention should be made of the good adhesion, high flexibility and also the adjustable hardness of the films, high abrasion resistance, high weather resistance, resistance to chemicals and solvents with simultaneous corrosion protection. One-component or two-component coatings are air-drying or oven-drying.

Epoxy resins
They are particularly suitable for the production of air-drying or oven-drying lacquer coatings and provide films of exceptional adhesion on nearly all metallic substrates. They provide high chemical and mechanical resistance but are less resistant to yellowing. In this one-component or even two-component systems it is important to watch for the chalking tendency when the systems are exposed to weathering.

Phenoxy resins
This type of resin yields air-drying or oven-drying coatings in one-component or two-component designs that offer excellent adhesion to steel, zinc and aluminum surfaces. They provide very high flexibility, impact strength, hardness and abrasion resistance.

Silicon resins
Used in heat resistant one-component paints with permanent heat resistance up to a maximum of 250 °C (482 °F). They are oven-dry systems.

About TIGER
A family-owned global manufacturer of surface finishes, TIGER is considered the fifth largest powder coating producer on a global level, counting 1,100 employees worldwide including 100 in technical functions.

TIGER Drylac U.S.A., Inc. was established in 1984. TIGER Drylac Canada Inc. was established in 1991. TIGER Drylac Mexico S.A. de C.V. was established in 2008. All TIGER manufacturing facilities are ISO 9001 and ISO 14001 certified.