EFD-Info 111

Check list
for the use of waterborne coatings

Factors that must be always considered or checked when using water-borne coating.

1. **Substrate**
   The substrate should be no cooler than +10°C and no warmer than +30°C (ideally 18-25°C).
   The substrate temperature must be > 3°C above the dew point - parts must not “perspire”.

2. **Pretreatment**
   The substrate must be free of adhesion-impairing substances such as dust, oil, grease, rust, mill scale, wax and separating agent residue.

3 **Spray booth / spray room**

Dry aspiration:	possible
Water aspiration:	- be aware of any possible foaming in the water basin
	- the coagulant must be adapted to the water-borne coating (possibly tests with coagulant manufacturer)

4. **Curing agent/coating mixture**
   Attention! The curing agent/coating mixture must be machine-mixed, e.g. with a stirring device.
   Mixing the curing agent into the coating component by hand is inadequate for creating a homogeneous coating/curing agent mixture.

5. **Application and plant technology**
   Generally, there are no restrictions for the use of different application technologies.
   All parts in contact with the coating must be corrosion-resistant.
   Do not use mixed-metal designs, as electro-chemical processes can lead to the destruction of the less Noble metal parts. The water-borne coating may also separate or coagulate.
   New parts in contact with the coating must be thoroughly cleaned before usage.

   For electrostatic application
   - The parts to be coated must be properly grounded
   - Proper insulation of the coating lines and the entire system
   - Insulated setup of the coating supply
   - Caution! Coating lines and coating supply are under high voltage
   - External charging as an alternative to potential separation

6. **Ring main stability**
   Material-related changes may occur, e.g. thickening, and individual checks must be performed.

7. **Thinning**
   Desalinated water should be used for thinning water-borne coatings for spraying application.
   Hard, calcium-containing water can lead to coagulation (failure symptoms) of the water-borne coating.
   Unique viscosity characteristics of the water-borne coatings must be noted (water mass).

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8. Cleaning

- 1C systems as well as A-components and mixtures from A+B components of 2C systems can be made immediately with water (mains water <15° German hardness), and possibly with the addition of 5-10 wt% EFD cleaning agent 400006 or 400916 or the ready-to-use EFD cleaning agent 400486 or 400744.
- B components of 2C systems with e.g. EFD dilutions 400320, 400500 or EFD cleaning agent 400906
- With regard to parts not in contact with the coating and any coating that has dried onto the equipment, products like EFD dilutions 400424 or 400320 may also be used.
- For addition information, see EFD-Info-No.510 "Cleaning/rinsing of 2C systems"

9. Reciprocal processing of solvent-based and water-soluble coatings

- We generally advise against this because the solvent-based coatings on water-borne coatings as well as their solvents have a negative effect on each other upon contact and when mixing.
- Should this nevertheless occur, the application and plant technology must be thoroughly cleaned.
- Suggestion for cleaning solvent-based coatings on water-borne coatings:
  1. Rinse with the solvent used Rinse with the EFD cleaning agent (see point 8)
  3. Rinse with desalinated water
  4. Pour in the water-borne coating
- For cleaning in the case of a water-borne coating on a solvent-based coating, use the the reverse order

10. Ambient conditions

The following specifications are optimal empirical values and are to be regarded as reference values. Individual tests may also yield deviating values.

Application
- Rel. humidity: 40 - 65%
- Temperature: 18 - 25°C
- Air falling speed: > 0.3 m/sec

Air drying
- Rel. humidity: 40 - 65%
- Temperature: 18 - 30°C
- Air exchange per minute: min. 3
- Air falling speed: > 0.3 m/sec
- Air drying is mandatory with regard to forced drying and baking coatings.

Drying
- Rel. humidity: < 65%
- Temperature: See technical data sheet of coating system
- Air exchange per minute: min. 3
- For forced drying and baking coatings, do not place directly into the hot oven.
- For cooling, observe the barrier and packaging strength

The following applies as a general rule:
- When drying/air drying water-borne coatings, a sufficient air movement and relatively low humidity level must be ensured so that the water can be absorbed from the coating by the air and then removed, e.g.: 100 g water-borne coating with a solids content of 50% = 50 g water, at an air temperature of 20°C, 3m^3 of air without humidity is required in order to absorb the water.

Table: max. water vapour content depending on the air temperature

Air temperature	0°C	10 °C	20 °C	30 °C
max. water absorption = 100% rel. humidity	4.8 g/m³	9.4 g/m³	17.3 g/m³	30.3 g/m³

Note

The application can also be successfully carried out between temperatures from +10°C to approx. +35°C and a relative humidity of approx. 30 - 80%. The further the temperature and rel. humidity deviate from the optimal values during application, air drying and drying, the more significantly the processing of the coating and/or the coating result may change.
An inadequate coating result may require special measures during application, air drying and drying. These may vary widely and must be adapted to all prevalent factors at the customer premises.

12. 2C systems

The end of the processing time is not discernible for most water-borne 2C coatings, so a 2C system is therefore advisable.

If the specified processing time is exceeded:
- a loss of gloss is to be expected for 2C PUR top coats.
- a significant loss of adhesion and deterioration of the level of corrosion protection is to be expected for 2C EP primers.
- in the event of overcoating (>80 µm) of 2C PUR top coats, the coating may become prone to reaction Bubbles due to CO2 formation; this is caused by a secondary reaction of the polyisocyanate hardener.

13. Disposal

Water used to clean the device, coating residues as well as mixed 2C coatings after the exceeded processing time must be disposed of as hazardous waste.