IGP POWDER COATINGS

Technical Information

TI111 – Process-related recommendations for the powder coating of MDF

Objectives of MDF preparation

The important objectives when preparing substrates made of medium density fibreboard (MDF) include

- Homogeneously prepared MDF substrate, e.g. by sanding
- Avoidance of defects in/on the surface
- Avoidance of sanding marks

Process steps in the preparation of MDF

The finer the fibres are ground during MDF production, the better the surface quality, middle layer and homogeneity of the board. For powder coating of MDF, EGGER MBP-L is currently one of the favourites among the recommended MDF boards.

The raw fixed mass for the parts to be milled is sawn from large full-size boards. Before further Processing, if the surface sanding from the factory is not yet of the required quality, the boards should be surface sanded with min. 220 grit. The edges must be broken at least (radius > 1 mm). Sanding and subsequent cleaning with compressed air ensures that the surface is evenly finely sanded and free of impurities, minor scratches, dust, grease, etc.

The material is then milled into the desired shape on a CNC machine or a double-end tenoner, the narrow surfaces are ground and various other processing steps are carried out (drilling, milling, etc.). After processing, the material must be thoroughly cleaned of milling and grinding dust on the surfaces and narrow surfaces using compressed air. The cleaner the dust is removed from the material, the cleaner the area in which it will later be hung and coated will remain, which is an important quality factor for the end result.

In order to ensure a wider production window, it is recommended that the MDF is conditioned individually depending on the type, quality and ambient climatic conditions.

Mounting

In most cases, each workpiece has 1-2 holes in which it can be mounted. The product carrier can have a thread at the suspension point to prevent the workpiece from slipping off. Suspension points without a thread should have at least the same diameter as the hole to prevent the workpiece from slipping. The contact surface must be bright and clean in order to ensure proper removal.

The product carrier is suspended on an earthed conveyor. This ensures the required discharge of each workpiece. Before coating, each workpiece is inspected for defects while suspended under grazing light and dust is removed again using compressed air.

Before the material passes through the preheater, it must be free of any defects and dust. Any defects, scratches or impurities will reduce the quality of the coating result after coating.

Preheating

The workpiece is heated in the preheater using IR radiation. The maximum temperature on the surface should not exceed 100 °C when preheating the raw MDF. Wood fibres on the surface dry/shrink differently and therefore stand out in the coating.

At the guns, the optimum MDF surface temperature for coating is between 40 and 60 °C, depending on the geometry and type of MDF. Heating significantly increases the conductivity of the board.

In the 2-layer process, the primed workpiece can be preheated to a higher temperature before topcoating, as the primer layer can no longer cause the MDF surface to dry.

Application

A homogeneous coating must be ensured during application. The surface and narrow area must have the same Film thickness.

The powder output of the guns should not exceed 250 g/min. A higher powder output results in a lower electrical charge of the powder and therefore a poorer initial application efficiency.

The Application settings can be selected within a wide window. They depend on whether raw MDF or already coated MDF is being coated and what Film thicknesses are being aimed for. The voltage setting (kV) can be selected from 20 to 90 kV, the current between 5 and 50 µA. The optimum settings on the Application must be assessed visually on the coated parts. The workpiece should be homogeneously coated with the required Film thickness, without spattering at the corners or narrow surfaces.

The adjustable counter electrode can be used to check the Film thickness on the narrow surfaces.
The lead and lag of the guns must be adjusted individually after visual inspection. It must be ensured that the optimum amount of powder coating is applied to the front and rear narrow surfaces.

The minimum coating thicknesses can be found in the corresponding technical data sheets.

Curing

Due to the limited thermal conductivity of the substrate, the use of infrared (electric/gas catalytic) or circulating air/infrared combined ovens is common. Alternatively, under certain conditions, pure convention ovens or combined ovens with minimal infrared content can also be used.
Please refer to processing guideline 218.

The surface temperature is determined on a powder coated MDF panel with glued-on thermocouples (preferably thermocouple type K). A temperature-stable glass fibre tape (type 69; 3M) is recommended for attaching the thermocouples.

The product-specific curing conditions can be found in the respective technical data sheet. In any case, practical tests are recommended, adapted to the respective object and the curing oven, in order to determine optimum curing conditions.

Suspension

The surface temperature should not exceed 40 °C when hanging and stacking the finished coated workpieces.

Test methods

The following tests can be carried out to test the quality of the coating:

- Acetone test (IGP AA 341.44)
- Hinge hole test (IGP AA 341.42)

Please contact us for further questions.