

Internal quality control system

Hot dip galvanising + polyester powder coating of twin wire panels

NB:

When drawing up this internal quality guideline all aspects were tested against the standards applicable to these activities:

- NEN- EN -ISO 1461: hot dip galvanized coatings on fabricated iron and steel articles (ISO 1461 : 1999) 1999)
- RAL-GZ 602 , Jan 2001, Gutesicherung Metallzäuntechnik
- NEN-EN 13438, 1999 : organic powder coatings for galvanised steel products for construction purposes
- BPR 1197, Sept. 2004 : quality standards for the industrial application of organic coatings on discontinuously thermally galvanised steel
- prEN 10223-7 (ECISS TC 30), 2002-02 : Stahldraht and Drahterzeugnisse für zäune- Teil 7 : Geschweiste paneele für zäune
- NEN 5254 (2003): thermally galvanised steel : the industrial application of organic coatings (duplex system).

1) Hot dip galvanisation

a) Entry check untreated materials

Upon arrival and prior to galvanisation the materials are visually checked for the following defects:

- bent bars, transport damage
- loose bars
- loose welds
- excessively sharp cutting sides
- damage to the steel surface caused by drawing
- bad wire descaling and slip agent residues
- straightness of the panel, horizontal and vertical
- length + evenness of cross wires
- corrosion

Labels are removed from the packets and remarks are placed on them if necessary before materials are accepted for processing. This information is taken over in the internal checklists after production, possibly reported to customers and filed.

Serious defects during production are reported immediately to the quality department.

The steel composition is checked on a random basis for alloy elements, which should be between the predetermined limit values. (as agreed with the steel suppliers)

b) Chemical pre-treatment prior to galvanising:

To ensure a good zinc coating structure and optimum adhesion, the material should first be made metallically clean and covered with a flux coating.

This is done by means of a chemical pre-treatment with 6 submersion stages, in which the materials are degreased, etched, fluxed and dried.

Test procedure:

The composition of these baths is checked once a day according to internally formulated analysis procedures, and if necessary replenished:

- degreasing: temperature - free alkaline - zinc content
- etching bath: temperature - free acid - iron content - 2-value, 3-value and total zinc content.
- flux bath: total salts - zinc content - ammonia content - chloride content - iron content - pH value - specific weight.

The dry oven temperature is also checked daily.

All tests are carried out in the production laboratory and the results are registered in the accompanying internal checklists. These lists contain the predetermined values with the permissible limit values. The quality department is alerted immediately if deviations are established.

Calibration measurement equipment: see also point 4

c) Hot dip galvanisation

Hot dip galvanisation with max. 1.5% alloy elements in the zinc mass, with an average coating thickness of 70 microns, measured according to the magnetic method EN ISO 2178.
(All other quality aspects are in keeping with EN ISO 1461)

Test procedure:

After drying, the steel surface must be evenly grey and completely coated with flux salts.

The following points are to be monitored during galvanisation:

- remove oxide layer from zinc surface prior to submersion
- remove ash residues from zinc surface after submersion
- check galvanised materials for flake formation when lifting out
- remove hooks
- remove burrs from the bottom of the galvanised material

As well as these galvanising activities, the following checks should be carried out both by the production personnel and the quality department. The implementation frequency is stated in the accompanying checklists.

- zinc pan temperature
- pre-treatment baths temperature
- lifting out speed
- zinc composition + additives zinc pan
- visual check of zinc coating for hard zinc, ash residues and flake formation
- zinc coating thickness measurements in μm (DIN EN ISO 2178)
- adhesion tests zinc coating (internally approved test method)

These checks are carried out in the production hall and the results are registered in the accompanying internal checklists. These lists contain the predetermined values with the permissible limit values.

The quality department is alerted immediately if deviations are established.
Calibration measurement equipment: see also point 4
All test results are checked and archived by the quality department.

2) Chemical pre-treatments

After galvanisation the materials are chemically pre-treated for optimum adhesion of the powder coating and corrosion resistance.

These treatment places an organic adhesive coating on the surface of the treated material which provides for:

- Optimum corrosion resistance.
- An ideal adhesive base for a powder coating.

The pre-treatment, combined with a powder coating, is suitable for outdoor use.

Test procedure:

The composition of these baths is checked once a day according to internally formulated analysis procedures, and if necessary replenished:

- degreasing: temperature - free alkaline - zinc content
- etching bath: temperature - free acid - zinc content - determination of etching rate
- rinsing baths: conductivity - pH value
- polymer bath strength titration - conductivity
- Demiflush : pH value - conductivity

The dry oven temperature is also checked daily.

All tests are carried out in the production laboratory and the results are registered in the accompanying internal checklists. These lists contain the predetermined values with the permissible limit values. The quality department is alerted immediately if deviations are established.
Calibration measurement equipment: see also point 4

After this pre-treatment and drying, the materials must not come into contact with the bare skin and the materials are directly powder coated (may not be stocked for longer than 16 hours after pre-treatment)

3) Powder coating

After the pre-treatment the materials are fed into the powder spraying line, powder coated, cured and packed after cooling.

Test procedure:

To guarantee optimum quality checks are carried out on the products at the workplace on the one hand and on test pieces that have gone through the procedure in the laboratory on the other.

Production checks :

- belt speed
- oven temperature + setting
- powder coating prior to curing (continuously automatic monitoring with camera system)
- curing curve: material temperature and time kept in the oven
- powder coating after curing
- powder coating thickness in μ (DIN EN ISO 2178): mean average= 70 microns
- powder coating adhesion (ISO 2409)
- visual aspect general, degassing, gloss...
- powder use - powder return
- mechanical properties of the coating, impact, bendtest, hardness
- corrosion resistance: machu tests and saltspray tests.
- resistance to humidity: long humidity test and short pressure test
- adhesion