Base Load Power Hub (BLPH)

HV-LV SWG PAINTING PROCEDURE

Document Number: 1723002197-MAT-PRO-00004

Document Class: 3

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
2	MINOR COMMENTS - REVISE AND RESUBMIT - WORK MAY PROCEED
3	MAJOR COMMENTS – REJECTED – DO NOT PROCEED
4	APPROVAL NOT REQUIRED

NOTE: Approval doesn't relieve the supplier from mandatory compliance with contractual documents and specifications. Comments made do not imply acceptance of any cost or delivery impact.

Sign	Date
Michele Sacchi	20/05/2024

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IMESA ELECTRICAL ENGINEERING IMESA Doc. 231151/SD/004

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Revision / Change Log

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Table of contents

1. GENERAL INFORMATION 5

2. DESCRIPTION AND CHARACTERISTICS OF SYSTEMS 7

2.1 CYCLE A 7

2.1.1 PRETREATMENT 7

2.1.2 PAINTING PROCESS 7

2.1.3 CHARACTERISTICS 8

3. PAINTING CHECKS 9

3.1 APPEARANCE 9

3.2 THICKNESS CHECK 9

3.3 ADHESION CHECK 9

3.4 GLOSS CHECK (this test will be made if required in a external laboratory) 9

3.5 SALINE FOG TEST (this test will be made if required in a external laboratory) 10

3.6 HUMIDISTAT TEST (this test will be made if required in a external laboratory) 10

4. INDICATIONS ON THE DRAWINGS 11

5. PAINT TECHNICAL DATA SHEET 12

6. ANNEX

Annex 01 – WI 18 REV. 09

Annex 02 – Technical specifications Elcometer 107

Annex 03 – Paint technical data sheet

Annex 04 – Education course/Training Activity Report

Annex 05 - Technical data sheet Gardobon A4818

Annex 06 – Quality control for painted parts

Annex 07 – Control sheet painting plants

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1. GENERAL INFORMATION

NORMATIVE REQUIREMENTS

- Standards series UNI EN ISO 12944: 2018
- ISO 6270-1: 2018 (humidistat)
- ISO 8501.1:2012 (surface preparation for painting treatment)
- DIN EN ISO 9227:2023 (saline fog chamber)
- UNI EN ISO 2813:2014 (Gloss)
- ISO 2409:2020-12
- UNI ISO 2178:2016

IMESA takes painting systems for indoor installations with power paint through electrostatic application.

IMESA defines the correct painting system for HV/LV electrical switchboards according on relevant protection against corrosion in the installation environment.

The installation environments are identified in 6 classes of atmospheric corrosion (C1 ÷ C5-M) and 3 classes of durability (low, medium, high) according to ISO 12944:2018.

IMESA guarantees the systems in the below table, where there are also the relative classes of atmospheric corrosion.

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Treatment cycle	**A**
Corrosion - durability class	C3M
Installation environment	Unpolluted urban and industrial areas
Degreasing	X
Phosphatising	X
Wash 1	X
Wash 2	X
Passivation in demineralized product with nanotechnology	
Drying	X
Epoxy polyester powder coating	X
Kiln polymerisation	X

Tables 1

There must be no traces of calamine or soldering slag, lamination etc, on the parts to be painted before the phosphatising treatment, in compliance with Directive ISO 8501.1:2012.

The colours used correspond to the standardised RAL colours.

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2. DESCRIPTION AND CHARACTERISTICS OF SYSTEMS

2.1 CYCLE A

2.1.1 PRETREATMENT

The surfaces to be painted must be prepared in compliance with Directive ISO 8501-1:2012 (rusting and preparation grades of steel surfaces); the part is then chemically prepared according to the following cycle:

HOT DEGREASING (40 ÷ 50°C)

HOT PHOSPHATING (40 ÷ 50°C)

SPRAY WASH

SPRAY RINSE

KILN DRYING (110°C)

The surface must be dry, clean and degreased.

The powder is guaranteed for 24 months since production date whether stored in a temperature not over 30°C and in the original packaging.

2.1.2 PAINTING PROCESS

Electrostatic epoxy polyester powder paint coating,

RAL according to the technical specification,

polymerization at 180°C, 60/70 gloss (*),

smooth or orange peel finish according to the technical specification,

minimum thickness 60 micron (dry film).

In this phase the process parameters are monitored in order to obtain an excellent powder paint coating (See Annex 01 - WI 18 Rev. 09).

(*) The check of gloss is not significant for surface treatment with orange peel finish. Infact the value will be non compliant to what the data sheets because the brilliance depends on the type of surface treatment and the orange peel finish makes impossible a correct evaluation of gloss.

The evaluation of smooth finish is significant

2.1.3 CHARACTERISTICS

Exposure in a saline fog chamber in compliance with ISO DIN EN ISO 9227:2023 with resistance more than 240 hours.

Exposure in a humidistat in compliance with ISO 6270 – 1: 2018 with resistance more than 120 hours.

Adhesion: in compliance with Standard ISO 2409:2020-12 (See Annex 02)

N.B. All the characteristics guaranteed by the paint manufacturer must however be complied with.

3. PAINTING CHECKS

Since some of the checks are destructive tests, we recommend painting sheet plate specimens in sizes suitable for the destructive tests, with the same paintwork cycle used for the lot.

The specific modes of the checks that are performed internally are described in Annex 1 IL CAR.18

3.1 APPEARANCE

The paint on the painted sheet plate must be uniformly coated. There must be no signs of sagging, local thickening or other paintwork defects.

In any case the thickness' must not be under the minimum values requested. Moreover, the undercut and areas which are difficult to reach with normal painting tools, must be retouched by hand.

Boxed areas (e.g. doors, armour - plated switchboards) must be protected against corrosion with suitable protecting means at the discretion of the manufacturer provided the same ensure a lasting protection.

In cases of small defects in the surface it's possible to make retouches with spray paint or with a hand brush on the same RAL of specification; in case of bigger defects, the surface paint must be removed and a new treatment must be done.

3.2 THICKNESS CHECK

This check is carried out by means of magnetic induction readings in compliance with Directive UNI ISO 2178:2016. The readings must be carried out on the diagonal of the part; areas which are difficult to reach during painting, must have at least the minimum values indicated in this specification.

3.3 ADHESION CHECK

Carried out in compliance with Standard ISO 2409:2020-12 (See Annex 02).

3.4 GLOSS CHECK (THIS TEST WILL BE MADE IF REQUIRED IN AN EXTERNAL LABORATORY)

This check is carried out on smooth surfaces in compliance with UNI EN ISO 2813:2014.

3.5 SALINE FOG TEST (THIS TEST WILL BE MADE IF REQUIRED IN A EXTERNAL LABORATORY)

In compliance with ISO 9227:2023 (duration of the test according to the painting system carried out).

3.6 HUMIDISTAT TEST (THIS TEST WILL BE MADE IF REQUIRED IN AN EXTERNAL LABORATORY)

According to ISO 6270-1:2018 (duration of the test according to the painting system carried out).

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4. INDICATIONS ON THE DRAWINGS

The painting cycle must be indicated on the drawing by the letter of the system and the thickness to be used. Painting cycle and RAL colour is mentioned on following doc:

- 1723002197-EL-DA-00006 / SG-100D1 GA DWG AND FOUNDATION LOAD CALCULATION INCLUDING COG
- 1723002197-EL-DA-00007 / SG-200N1 GA DWG AND FOUNDATION LOAD CALCULATION INCLUDING COG
- 1723002197-EL-DA-00008 / SG-200D2 GA DWG AND FOUNDATION LOAD CALCULATION INCLUDING COG
- 1723002197-EL-DA-00009 / DP-200N1 GA DWG AND FOUNDATION LOAD CALCULATION INCLUDING COG

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5. PAINT TECHNICAL DATA SHEET

EUROPOLVERI S.p.A.
Sede e stabilimento: Via Galvani, 69
36066 Sandrigo (Vicenza) Italy
Telefono: +39.0444.750643
Telefax: +39.0444.750653
www.europolveri.it
info@europolveri.it

TECHNICAL DATA SHEET

DURPOL EE 9B2870303T000 (EX 9068A6522) GREY ENEL TEXT HG TS X R7030

Composition

Powder based on polyester saturated carboxylated resins hardened in stoichiometrically relation with epoxy resins and formulated with pigments and inert fillers appropriate to guarantee good resistances in places do not exposed to direct weathering agents

Recommended uses

Powder indicated for a wide range of artefacts having excellent aesthetical finishing level and good resistance to yellowing such as: radiators, domestic appliances, tools, metallic furniture, scaffolding, indoor lighting, electric cabinets, office equipment.In order to obtain a good protection, it is necessary to spray an average thickness of 80- 100 micron.

Substrate pre-treatment

Powders adhere to most metal surfaces provided these are dry, clean and degreased. A chemical pre-treatment of the surface is required in order to improve the resistance against the corrosion, based on the kind of metallic support.

Application

This powder is suitable for use with electrostatic spraying equipments whose voltage is between 40 and 90 KV. Where acronym "TS" is present, our products are working also with triboelectical guns.
A difference of thickness of applied coating can generate modification of the appearance of hardened coating.In case of products having special effects, the use of overspray is not advised except for bonded products.

Polymerization conditions

170°C x 25', 180°C x 15', 190°C x 10' (piece temperature)

Characteristics after polymerization (application on steel panel)

Erichsen Drawing:	>=5 mm	ISO 1520
Mandrel Bend Test:	>= 4 mm	ISO 1519
Impact Resistance:	>= 2,5 Nm	ASTM D2794
Buchholz Hardness:	>= 80	ISO 2815
Cross Cut Test:	Gt0	ISO 2409
Gloss 60°:	Not applicable.	ISO 2813

Chemical resistance

The product has good resistance to most 10% acids and to ethylalcohol at room temperature (25°C).
For specific requests we invite you to contact our technical assistance.

Corrosion resistance (application on iron-phosphate bonder)

Humidity Chamber:	After 500 hours no change.	ISO 6270
Kesternich:	After 10 cycles no loss of adhesion.	ISO 22479
Salt Spray:	After 1000 hours < 1 mm penetration.	ISO 9227

Accelerated ageing (QUV-B) (313 nm) with QUV/SE cycle 4 hours, condensation at 40°C/4 h irradiation 50°C (0,75 W/m²/nm. Application on aluminium panel)

Test:	Not applicable.	ISO 16474:3

Storage

The product is guaranteed for 24 months since production date whether stored in a temperature not over 30°C and in the original packaging.

Notes:

* The above data are the results of careful researches and our long experience, nevertheless considering the large number of factors concurring to determine the values in the present technical data sheet, the utilizer will have the duty to effect the best conditions so as to get the best result.
* This product is destined to be used only in industrial plants. The manipulation of the product from the utilizer must be conform to laws concerning the use of powder coatings and to information described in our technical data sheet sent together with the product itself.

Revision 3/June. 2019

EUROPOLVERI S.p.A.

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IMESA ELECTRICAL ENGINEERING	**Work Instruction: powder coating**	IL CAR.18 Issue 03/01/2002

Processed and Verified by: Lorenzo Piersigilli	Approved by: Cristiano Stefano Chiappa
Lorenzo Piersigilli	

Iss./Rev.	Date	Description of modifications made
First issue	04/03/2002	
Revision 01	04/11/2002	Adaptation of environmental controls
Revision 02	06/12/2006	General revision
Revision 03	02/07/2007	Maintenance Sheets Update
Revision 04	14/09/2011	Deleted form VER 03
Revision 05	27/01/2017	General revision
Revision 06	20/11/2020	Control revision
Revision 07	06/04/2023	General revision
Revision 08	15/05/2023	Paint operator training
Revision 09	16/10/2023	Paint thickness upper limit insertion

DISTRIBUTION: all functions

ANNEXES:

- ✓ Form VER 01 – Painted parts control board,
- ✓ Form VER 02 – Painting system control board
- ✓ Form MAN 18 – Painting system periodic maintenance registration sheet
- ✓ Sheet 18 – Periodic maintenance of the Painting Plant

APPLICABLE DOCUMENTS:

- ✓ Work order

APPLICABILITY AND LIABILITY

The purpose of this Work Instruction is to describe and define the checks and tests to perform during the powder coating work phase, in order to keep this process under control.

The Body responsible for the correct implementation of the following WI is the CAR/LAV Department

GENERAL INFORMATION

The automatic powder coating system is described in detail in the manuals of the BIV, CAM and WAGNER manufacturers and consists mainly of:

- **Pre-treatment tunnel;**
- **Cabins and equipment for powder application;**
- **Drying and curing ovens;**
- **Overhead conveyor.**

The process is kept under control by measuring the fundamental parameters (listed below) such as to ensure the desired product quality.

ACTIVITY SEQUENCE

1 The department head, according to WO, must communicate to the operators in charge of painting:

- the type of treatment to perform;
- the method of execution of the painting (automatic or manual);
- the pieces to be treated, divided by order/construction;

2 The operator must activate the preheating of the phospho-degreasing tank and ovens, by operating the selectors of the burners and fans, on the control panel.

3 Examine the pieces or the batch to be processed, accompanied by the relative WP and visually verify the absence of defects such as:
- extensive rust or calamine presence;
- unbrushed welds.

4 Check that the colour of the powder in the container is that of the batch to be painted.

5 Operate the overhead conveyor with the appropriate button and start hanging the pieces on the hooks. For each batch, also hang 1 sample of the same material as the first piece .

6 Operate the pumps for phospho-degreasing and the following rinses according to the type of painting cycle when the first piece approaches the entrance of the first tunnel.

7 At the exit of the drying oven, after degreasing, check that the first piece is well cleaned.

If the piece is not clean, stop the conveyor belt and check with the department head the operation of the phospho-degreasing tunnel and the bath titration. After eliminating any inconvenience, repeat the pre-treatment on the pieces made.

8 Activate the suction of the expected painting cabin (automatic or manual) and ensure that the operator is ready on his platform, for painting or only for touch-ups depending on the cabin used.

9 In the case of automatic painting, activate the reciprocators and guns, using the appropriate control panel.

10 As soon as the last piece of each batch has been painted, make a first brief cleaning of the cabin used and move on to the other cabin already prepared for the colour of the second batch of pieces, or clean the manual guns and change the powder with its container.

11 Remove the painted pieces from the hooks and place the WP in the pallet.

12 Store the pieces with their drawings in the dedicated area awaiting collection by the Assembly Department.

13 To turn off the system, deactivate the pretreatment tunnel, turn off the burner of the drying oven just after the last piece has been rinsed; after painting the last piece, turn off the burner of the curing oven and finally stop the conveyor belt.

14 Turn off the air extraction fans 30 minutes after turning off the ovens.

Quality CHECK of painted parts

During the unloading phase, at the end of the cycle, perform the following checks:

A. Visually inspect all painted parts;

B. On the sample, at each colour change, check the adhesion of the paint with the UNI EN ISO 2409 DIN 53151 squaring method as indicated on "Guide 01" and record the check on the form VER 01

C. On all the samples, measure the thickness of the paint and record the value detected on the form VER 01

D. The minimum reference thickness is that indicated in the Work Order, if not indicated, use the standard of **60** mμ for "Cycle A" and **90** mμ for "Cycle B" (see Guide 01). In any case, the maximum thickness must not exceed 200 microns unless expressly requested in writing by the Customer in the work order.

E. On the painted pieces make **6 thickness measurements** (3 front and 3 back), the frequency of the control is indicated at the next point.

F. The frequency of thickness control on the painted pieces is as follows

Take measurements on the first 3/4 pieces; then check **one piece every 15** of the batch.

G. If all thickness measurements indicate a value ≥ to the reference value, the piece is **ACCEPTED**

H. If **2 or +** thickness measurements indicate a value < to the reference value, the part must be considered **DEFECTIVE;** in this case, the matter must be submitted to the Department Head, who decides how to proceed.

CHECKS ON THE SYSTEM

Checks and tests are performed on the system both before and during the special painting process, in the following ways:

1. **Checks on the degreasing tank**

Before each painting cycle, check the PH of the phospho-degreasing bath by viewing it in the monitor of the degreasing product dosing pump.

The value must be within the range established in the technical data sheet of the product used as a degreaser and check that the tank temperature is between 40 and 50°C.

The values detected must be recorded on the VER 02 form "Painting system control sheet"

2. **Oven temperature control**

The correct curing of paint, being the length of the section travelled inside the oven constant, depends on the curing temperature and the speed of the conveyor belt.

Based on the indications provided by the paint manufacturer, the temperature must be between 180 and 210 °C and the speed must be adjusted between 1 m/min and 1.5 m/min.

For this purpose, it must be verified at each cycle that the actual temperature indicated on the control panel corresponds to that set, with a tolerance of ± 10 °C.

The values detected must be recorded on the form VER 02 "Painting system control sheet".

Check that the temperature set for the drying oven is 90°C and that the temperature actually detected does not deviate by more than ± 10°C.

Record the check performed on the form VER 02

3. **Check of hook cleanliness and bias voltage**

For a correct adhesion of the powder to the piece to be painted (electrostatically biased at a voltage between 60-80 kV managed automatically by the WAGNER equipment), it is necessary to periodically clean the hooks used to hang the pieces on the conveyor belt.

At the points of contact between the hook and the workpiece, the thickness of dry paint present must be less than 2÷4 mm. If there are hooks with more paint attached than indiacted above, the operators must collect these hooks and the department head must send them to the external supplier for cleaning.

4. **Other checks**

Checks to be performed **weekly** taking as reference the values and parameters indicated in the manual or set by the manufacturers:

- check the pressure of the pumps (must be between 0.8 and 2 bar);
- check the correct setting of the paint guns according to the manufacturer's parameters

on board of the painting cabin or near **the manual guns**

Record the operations carried out on the form MAN 18 – Periodic maintenance registration of the painting system.

It is implied that if the system remains stationary for the entire week, the check is postponed to the following week.

If powder paint is used that has exceeded the validity period recommended by the supplier, IMESA reserves the right, before painting the batch in production, to perform adhesion and thickness tests on specific samples. Only after verifying the suitability and goodness of the characteristics of the painting process, can the batch be processed.

CHECK TOOLS

- Painting Thickness Gauge (magnetic type).
- Cross Hatch Tester for Adhesion Tests.
- Electrode for checking the pH of the phospho-degreasing liquid.
- Instruments for measuring temperature.

DOCUMENTATION FOR THE VALIDATION OF THE SPECIAL PROCESS

The duly completed forms VER 01 and VER 02 and the storage of the painted samples are the objective evidences that demonstrate the control of the process in question.

The process must be validated by three-year external laboratory tests (See PO 7.17) to verify the salt spray resistance of components made according to the above process parameters and according to the technical data sheets of the products used.

Resistance in salt spray must be at least 100 hours.

QUALIFICATION OF OPERATORS

The qualification of the painting plant operators takes place through education, handover with more experienced operators and training.
These activities are internal to IMESA and for safety aspects the Competent Physician is also called into question.
The training topics are reported in the relevant form and in any case concern the operation and management of the plant, environmental, safety aspects and practical tests on samples that will be made available in the department.
This qualification activity must be performed for each new operator or, for experienced operators, every three years (See PO 7.17).
If the experienced operator is dedicated to another task for more than one year, he/she must repeat the qualification activity.

SYSTEM MAINTENANCE

Given that the preventive maintenance is performed by an external company, for the correct operation of the system it is necessary to carry out the operations provided for in Sheets 18 "Maintenance activities of the painting system" and 19 "Maintenance activities of the tanks" and the related records must be indicated in the Form "MAN 18 – Periodic maintenance record sheet for the painting system."

ENVIRONMENTAL REQUIREMENTS

The cleaning of the painting system must be performed at the end of each working day, in particular the powder paint deposited on the ground must be carefully collected in the appropriate airtight bags, to be subsequently disposed of according to the regulations in force.

In the same way, proceed with separate collection for other types of waste.

The emissions into the atmosphere of the painting plant are sampled annually by competent external companies and the results obtained communicated to the local authorities responsible for controls.

The disposal of the liquids contained in the pretreatment tunnel, when they are "exhausted", is entrusted to authorised companies.

SAFETY REQUIREMENTS

The maintenance operations of the system must always be carried out with the machine stopped and with the power switched off.

During the painting and loading activities of the parts, use the appropriate PPE as indicated in the company Risk Assessment Document.



Do not stand under the conveyor if the pieces are at the top.

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Elcometer 107 Cross Hatch Cutter



The coating may be continuous and look good, but how well is it connected to the substrate? The Elcometer 107 Cross Hatch Cutter provides an instant assessment of the quality of the bond to the substrate. Due to is rugged construction this gauge is ideal for thin, thick or tough coatings on flat or curved surfaces. An ideal field or laboratory test.

- Low cost
- Robust design
- Easy to change cutters
- Large Non slip grip
- Ideal for thick or hard coatings
- Large selection of cutters, each with four cutting faces
- Can be converted into the Elcometer 141 Paint Inspectors Gauge (P.I.G.)

The Elcometer 107 Cross Hatch Cutter is available in two versions.

- *The Basic Kit comes complete with:*
  Robust handle, the cutter of your choice (see below), Allen Key (wrench), presentation storage case and instructions (together with the Classification of Adhesion Test Results Chart)
- *The Full Kit includes all that is supplied in the Basic Kit, and also includes:*
  An eye glass, brush, and adhesive tape (either ASTM or ISO tape), all in a plastic ABS carrying case.

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test method **specifications** **standards** **data sheet**

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specifications

Elcometer 107 Cross Hatch Cutter

SELECTING THE APPROPRIATE TEST KIT				
Cutter Type	Number of Teeth	Part Number		
		Full Kit with ISO Tape	Full Kit with ASTM Tape	Basic Kit
1mm	6	F10713348-6	F10713348-1	F10713222-1
1mm	11	-	F10713348-2	F10713222-2
1.5mm	11	-	-	F10713222-3
2mm	6	F10713348-9	F10713348-4	F10713222-4
3mm	6	-	-	F10713222-5

SELECTING THE APPROPRIATE ELCOMETER 107 CUTTER						
Coating Thickness		Substrate Type	Cutting Teeth	Tooth / Slot Spacing	Test Method	Part Number
µm	mils/thou					
0 - 50	0 - 2	Metal	11	1mm	ASTM D3359B	T10713700-2
0 - 60	0 - 2.4	Hard	6	1mm	BS EN ISO 2409	T10713700-1
0 - 60	0 - 2.4	Medium	11	1.5mm	-	T10713700-3
0 - 60	0 - 2.4	Soft	6	2mm	BS EN ISO 2409	T10713700-4
50 - 125	2 - 5	Hard and Soft	6	2mm	ASTM D3559B	T10713700-4
61 - 120	2.4 - 4.7	Hard and Soft	6	2mm	BS EN ISO 2409	T10713700-4
125 - 250	5 - 10	Hard and Soft	6	3mm	Quick Check Only	T10713700-5
Accessories		ASTM D3359 Adhesive Tape (2 rolls)				T1078894-
		ASTM D3359 Adhesive Tape (1 roll)				K0001542M001
		ISO 2409 Adhesive Tape (2 rolls)				T9999358-
		ISO 2409 Adhesive Tape (1 rolls)				K0001542M002
Packing List		***Basic Kit:*** Cross Hatch Cutter handle, Cutter blade, Hexagonal wrench, Carry case & Operating instructions ***Full Kit:*** Cross Hatch Cutter handle, Cutter blade, Hexagonal wrench, Adhesive Tape (ISO or ASTM), Eye Glass, Brush, Carry case & Operating instructions				

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test method standards data sheet product page

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standards

Elcometer 107 Cross Hatch Cutter

Can be used in accordance with:	
ASTM D 3359-B	ASTM D 3002
BS 3900-E6	BS EN ISO 2409
DIN 53151	ISO 2409
NF T 30-038	

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test method specifications data sheet product pag

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Elcometer 107 Cross Hatch Cutter



Elcometer 107 Cross Hatch Cutter

At a glance

- *Ideal for thin, thick or tough coatings.*
- *Available as a basis or a full kit.*
- *ASTM & ISO versions available.*

Can be used in accordance with:	
ASTM D387	ASTM D332
ISO 8780-5	ISO 787/16
NFT 30 023	

Elcometer 107 Cross Hatch Cutter
The coating may be continuous and look good, but how well is it connected to the substrate? The Elcometer 107 Cross Hatch Cutter provides an instant assessment of the quality of the bond to the substrate. Due to is rugged construction this gauge is ideal for thin, thick or tough coatings on flat or curved surfaces. An ideal field or laboratory test.

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- *The Basic Kit comes complete with:*
  Robust handle, the cutter of your choice (see below), Allen Key (wrench), presentation storage case and instructions (together with the Classification of Adhesion Test Results Chart)
- *The Full Kit includes all that is supplied in the Basic Kit but also includes:*
  An eye glass, brush, and adhesive tape (either ASTM or ISO tape), all in a plastic ABS carry case.

Adhesion

From the largest man-made structures to the smallest household appliances, most manufactured products have a protective or cosmetic coating. Premature failure of this coating can, at the very least, result in costly penalties or rework.

Adhesion testing during the coating process will quantify the strength of the bond between substrate and coating, or between different coating layers or the cohesive strength of some substrates. Routine testing is also used as part of inspection and maintenance procedures to help detect potential coating failures.

Elcometer offer a highly comprehensive range of Adhesion Gauges designed specifically to meet your requirements. These gauges can be split into three categories:

Cross Hatch / Cross Cut Method
The coating is cut into small squares, thereby reducing lateral bonding, and the adhesion assessed against ISO, ASTM or Corporate Standards

Pull Off Adhesion Method
Tensile Dollies (or stubs) are glued to the coating and, once the adhesive has cured, the force required to pull the dolly off the surface is measured.

Push Off Adhesion Method
Similar to the Pull Off Adhesion Test, a dolly is glued to the coating, once the adhesive has cured, however, the dolly is pushed off the surface by the adhesion gauge.

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SELECTING THE APPROPRIATE TEST KIT				
Cutter	Number of Teeth	Part Number		
		Full Kit with ISO Tape	Full Kit with ASTM Tape	Basic Kit
1mm	6	F10713348-6	F10713348-1	F10713222-1
1mm	11	-	F10713348-2	F10713222-2
1.5mm	11	-	-	F10713222-3
2mm	6	F10713348-9	F10713348-4	F10713222-4
3mm	6	-	-	F10713222-5

SELECTING THE APPROPRIATE ELCOMETER 107 CUTTER						
Coating Thickness		Substrate Type	Cutting Teeth	Tooth / Slot Spacing	Test Method	Part Number
µm	mils/thou					
0 – 50	0 - 2	Metal	11	1mm	ASTM D3359B	T10713700-2
0 – 60	0 - 2.4	Hard	6	1mm	BS EN ISO 2409	T10713700-1
0 – 60	0 - 2.4	Medium	11	1.5mm	-	T10713700-3
0 – 60	0 - 2.4	Soft	6	2mm	BS EN ISO 2409	T10713700-4
50 – 125	2 – 5	Hard and Soft	6	2mm	ASTM D3559B	T10713700-4
61 – 120	2.4 – 4.7	Hard and Soft	6	2mm	BS EN ISO 2409	T10713700-4
125 – 250	5- 10	Hard and Soft	6	3mm	Quick Check Only	T10713700-5
Accessories		ASTM D3359 Adhesive Tape (2 rolls)				T1078894-
		ASTM D3359 Adhesive Tape (1 roll)				K0001542M001
		ISO 2409 Adhesive Tape (2 rolls)				T9999358-
		ISO 2409 Adhesive Tape (1 roll)				K0001542M002
Packing List		***Basic Kit:*** Cross Hatch Cutter handle, Cutter blade, Hexagonal wrench, Carry case & Operating instructions				
		Full Kit: Cross Hatch Cutter handle, Cutter blade, Hexagonal wrench, Adhesive Tape (ISO or ASTM), Eye Glass, Brush, Carry case & Operating instructions				

HOW TO SELECT THE CORRECT ADHESION GAUGE

Cross Hatch Cutters

Advantages:
A fast, low cost, comparison method

Possible Limitations:
A subjective test for flat surfaces for a limited thickness range.

Applications:
Paint and powder coating adhesion up to a thickness of 125µm (5 mils).

Pull Off Adhesion Testers

Advantages:
Simple to use, quantitative range – giving you a definitive adhesion value

Possible Limitations:
Time required for adhesive to cure

Applications:
Ideal gauge for the laboratory or field – flat or curved substrate applications

Push Off Adhesion Testers

Advantages:
Fast cure time adhesives can be used, ideal for curved surfaces

Possible Limitations:
High forces exerted by gauge may cause thin substrates to deform

Applications:
Pipelines and metal spray coatings.

EDUCATION COURSE/TRAINING ACTIVITY REPORT

Location of the course/training	**IMESA S.p.A. – Via G. Di Vittorio, 14, Zona Industriale JESI (AN), 60035**
Date / Period	**10/16/2023 2023**
Duration in "h"	**15 hours – TRAINING**
Title of the course/training	**Education/training in the use of POWDER COATING SYSTEM**
Name of Speaker/Trainer	**Cristiano Stefano Chiappa**
Signature Speaker/Trainer	
Main topics covered	**Correct use of the system – Environmental and safety regulations – Creation of samples and tests**
Illustration of procedures for the safe use of the system (Reference Work Instructions – Risks evaluation document - Risk assessment sheets)	
Information on the risks associated with the use of the system and correct use of the PPE/CPE associated with it (Reference Work Instructions - Risks evaluation document - Risk Assessment Sheets)	
Examination of the main accident prevention regulations and extracts of specific risks from the company risks evaluation document (Reference Work Instructions - Risks evaluation document - Risk assessment sheets)	
Illustration of the Use and maintenance manual (System use and maintenance manual)	
Analysis of foreseeable abnormal situations, safety and alarm systems (System use and maintenance manual)	
Environmental regulations and methods of disposing of waste products (Reference Work Instructions)	
Process control parameters and their recording - Spill test (System use and maintenance manual - paint and chemical products technical data sheets)	
Product control parameters and their recording (paint and chemical products technical data sheets)	
Technical and safety data sheets of the products used	
Training through practical test – see images	

LIST OF PARTICIPANTS			
Ref.	**Name**	**Company**	**Signature**
1.	Andrea Di Re	IMESA	

SAMPLES AND TESTS (if the test is passed, enter an X in the box - otherwise write NO)			
SAMPLE	**THICKNESS MEASURE**	**ADHESION**	**NOTE**
A	X	X	
B	X	X	

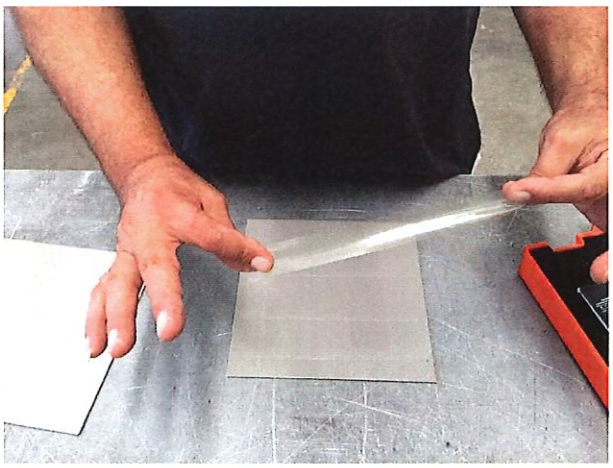
- The thickness must be between 60 and 200 microns
- For adhesion, a classification of at least 1 must be guaranteed according to the UNI EN ISO 16276-2 standard

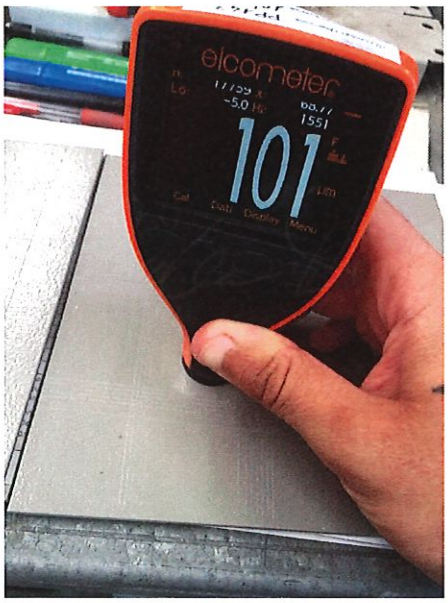
Speaker Notes:

IMAGES









LEARNING TEST

For each question, tick only one answer		
1.	What is the reference instruction for painting?	1. WI CAR.17
		2. WI CAR.18
		3. WI CAB.06
2.	Are exposed surfaces of the component permitted after painting?	1. Yes
		2. No
		3. Only for a surface area less than 3 cm2
3.	Which instrument is used for thickness measurement?	1. Gauge
		2. Cross hatch
		3. Thickness gauge
4.	Which instrument is used for adhesion measurement?	1. Gauge
		2. Cross hatch
		3. Thickness gauge
5.	What is the optimal thickness range for an A cycle?	1. 60-200 microns
		2. 30-60 microns
		3. 200 – 400 microns
6.	What is the optimal speed of the painting system chain?	1. 0.5m/s
		2. 1.2m/s
		3. 3 m/s
7.	What temperature should the cooking oven be set at?	1. 60°C
		2. 400°C
		3. 190°C

OUTCOME OF EDUCATION AND TRAINING

POSITIVE ☒

NEGATIVE ☐

TRAINER SIGNATURE



Gardobond® A 4818

Amorphous iron phosphate pre-treatment

Scope

Gardobond A 4818 is a liquid concentrate, combined cleaner and amorphous iron phosphate solution designed to simultaneously degrease and pre-treat metal ferrous substrates.

The surfaces of parts made of aluminium and zinc materials can be cleaned and slightly tarnished by this process.

Gardobond A 4818 is applied by spray.

Physical properties

Appearance:	colourless to bright yellow liquid
Density (20ºC):	approx. 1.2 g/cm³
pH value (10 g/l, 20ºC):	approx. 3.0
Flash point (DIN 51755 / 53213):	non-flammable

Process sequence

Combined cleaning and phosphating

Cleaning / phosphating – rinsing – demin rinsing / post rinsing – drying and painting.

Separate cleaning and phosphating

Cleaning – rinsing – phosphating – rinsing – demin rinsing / post rinsing – drying and painting.

Chemicals required

Gardobond A 4818 (make-up and replenishment solution)

Gardobond-Additive H 7143 (to reduce pH), either ***Gardobond-Additive H 7141*** (to increase pH)

CHEMETALL GMBH

Surface Treatment

Trakehner Straße 3
D-60487 Frankfurt a. M.
P. O. Box 90 01 70
D-60441 Frankfurt a. M.
Phone: +49 (69) 7165-0
Fax: +49 (69) 7165-3018
Internet: http://www.chemetall.com

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The above data have been compiled to the best of our knowledge on the basis of thorough tests and with regard to the current state of our long practical experience. No liabilities or guarantee deriving from or in connection with this leaflet can be imputed to us. - Reproduction, in whole or in part, only with our express permission.

Bath make-up

Add per 1.000 litres of working solution:

10 – 30 kg of ***Gardobond A 4818***

Mix and heat to operating temperature. This may be varied dependant on the degree and type of soiling to be removed.

Bath operation

Spray time:	1 - 3 minutes
Spray pressure:	1 - 2 bar
Bath temperature:	40 - 60 °C
Bath concentration:	1.0 - 3.0 % ***Gardobond A 4818***
pH value:	4,5 – 5,3

These operating limits are for guidance only. Plant conditions will vary and your Chemetall Field Support Engineer may recommend operation close to or even outside the limits quoted under certain circumstances.

Bath control

Testing chemicals required

Test Indicator 2 (phenolphthalein)
Testg Solution 1 (0.1 M sodium hydroxide)

Total acid pointage

Take a 10 ml sample of the working solution, dilute with approx. 50 ml of distilled water add 5 drops of Test Indicator 2 and titrate with Test Solution 1 until the colour changes from colourless to pink. The number of mls of Test Solution 1 required is known as the Total Acid Pointage of the solution.

Gardobond A 4818 is normally used in the range of 3.0 to 9.0 Total Acid Points.

Bath replenishment

An addition of 3.3 kg (2.8 litres)of ***Gardobond A 4818*** per 1000 litres of working solution will raise the Total Acid Pointage by one.

Pre-treatment

Separate cleaning and degreasing

Alkali cleaners are well suited for cleaning and degreasing.
Alkali cleaners are supplied by Chemetall under the designation ***Gardoclean***.

Cleaning additives

In general, the built-in cleaning properties of ***Gardobond A 4818*** will be sufficient for most requirements. Slightly more difficult cleaning jobs can usually be handled by a slight increase in the ***Gardobond A 4818*** pointage.

If, however, difficult cleaning tasks are encountered, use may be made of a Gardobond-Additive surfactant additive. This additive is used to increase the cleaning and degreasing performance of the process without generating excessive amounts of foam.

Gardobond-Additive should be added in increments of 0.5 litres per 1000 litres of working solution, until the cleaning performance is satisfactory.

Equipment materials

Tank and Heating element

General-purpose constructional steels to DIN EN 10025, with acid-resistant rubber lining. Chromium nickel steel, material no. 1.4541

Labour and environmental protection

For transport, storage, use and waste treatment of chemicals in concentrated or diluted form as well as bath solutions, the appropriate local legislation must be followed.

Further specific information on the products can to be obtained from the EC Safety Data Sheets. For the used solutions the hazard code on the label should be followed.

Waste disposal

All effluent discharge must be treated in accordance with national legislation and local regulations prior to discharge to the sewer.

DES 02 / 10-1

IMESA ELECTRICAL ENGINEERING

SCHEDA CONTROLLO PEZZI VERNICIATI
QUALITY CONTROL FOR PAINTED PARTS

Mese/*Month* : _____ **Anno**/*Year* : _____

Giorno *Day*	**Numero pezzi** *Pieces Number*	**Progetto N°** Project N°	**RAL**	**Controllo visivo** *Visual check*		**Misura spessore (µm) (a)** *Measurement of thickness (µm) (a)*							**Controllo Spessore** *Thickness Check*		**Strumento Equipment**	**Controllo aderenza sul provino** *Check adhesion on the specimen*		**Strumento Equipment**	**Codice operatore operator code**	**Note** *Notes*
				OK	**KO**	**Richiesto** *Required*	**Valore delle prime 6 misurazioni effettuate** *Value of the first 6 Measurements taken*						**OK**	**KO**	**serial number**	**OK**	**KO**	**serial number**		
															PP 127			**PP 160**		
															PP 127			**PP 160**		
															PP 127			**PP 160**		
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															PP 127			**PP 160**		

(a) Effettuare la misura dello spessore sul provino e su un pezzo ogni 15 del lotto (o almeno un pezzo tra i componenti con stesso RAL), indicando il valore misurato sullo spazio apposito, la prova di aderenza va eseguita esclusivamente sul provino (una ogni RAL diverso)

N.B. Il provino per commessa deve essere il primo pezzo montato sulla catena, per ogni commessa/costruzione

(a)Measure the thickness on the specimen and on one piece every 15 of the lot (or at least one piece among the components with the same RAL), indicating the value measured on the space provided, the adhesion test must be performed exclusively on the specimen (one each different RAL)

N.B. The order specimen must be the first piece mounted on the chain, for each order / construction

SCHEDA CONTROLLO IMPIANTO VERNICIATURA

CONTROL SHEET PAINTING PLANT

Mese/Month: _____ **Anno**/Year: _____

N° Commessa *Job N°*	**Data** *Date*	**Velocità catena (cm/min)** *Chain Speed (cm/min)*	**Vasca Sgrassaggio** *Degreasing tank*		**Temperatura forno cottura** *Baking oven temperature*		**Pulizia ganci** *cleaning hooks*		**Acqua Demineralizzata** *Demineralized Water*	**Temperatura forno asciugatura** *Drying oven temperature*		**Firma** *Signature*
			pH	**Temp. Liq. (°C)** *Liq. Temp. (°C)*	**Impostata** *Set*	**Rilevata** *Detected*	**OK**	**KO**		**Impostata** *Set*	**Rilevata** *Detected*	

NOTE