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AN 400 Part 2

Corrosion protection of purchased parts

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Innovation

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1. Scope

This standard describes the requirements for the corrosion protection of components and assembly groups which MAN Energy Solutions (MAN ES) places on their suppliers. The regulations of this standard have general application in all cases when a temporary corrosion protection or a coating is requested by the order text or by a drawing specification.

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2. General

The responsibility for the correct execution of all corrosion protection measures and for providing a corrosion and damage free delivery, rests with the supplier. The painting or preservation must produce a meaningful concept together with the packaging and suitable load carriers in all aspects so that purchased parts can be transported and stored safely in every respect. In particular for the delivery of goods at the MAN ES Augsburg site, the specifications of the Logistics Specifications must be considered. Packaging of purchased parts must be designed and implemented in such a way that it cannot lead to the formation of corrosive condensate inside the packaging during transport and storage.

Advisory support by the manufacturer is obligatory for first-time application of the required products like cleaner, paint, preservatives, VCI carrier or special packaging materials. Coating and preserving must be carried out by qualified personnel. Depending on the corrosion protection measures to be carried out, the supplier must prepare corresponding documentation such as defined in section 5 of this standard.

In any case the supplier has to take care that solvents completely evaporated out of the coating or preservative and coatings are fully dry before packing.

3. Coating

3.1 Applicable standards

The following listed standards are referenced entirely or partially in the sections 3 and 5 of AN 400 Part 2. The mentioned standards shall always be applied in their latest version.

ISO 2808, Paints and varnishes – Determination of film thickness

ISO 3274, Geometrical Product Specifications (GPS) – Surface texture: Profile method – Nominal characteristics of contact (stylus) instruments

ISO 4287, Geometrical Product Specifications (GPS) – Surface texture: Profile method – Terms, definitions and surface texture parameters

ISO 8501-1, Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings

ISO 8502-3, Preparation of steel substrates before application of paints and related products – Test for the assessment of surface cleanliness – Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)

ISO 8502-4, Preparation of steel substrates before application of paints and related products – Test for the assessment of surface cleanliness – Part 4: Guidance on the estimation of the probability of condensation prior to paint application

ISO 8502-6, Preparation of steel substrates before application of paints and related products – Test for the assessment of surface cleanliness – Part 6: Extraction of soluble contaminants for analysis – The Bresle method

ISO 8502-9, Preparation of steel substrates before application of paints and related products – Test for the assessment of surface cleanliness – Part 9: Field method for the conductometric determination of water-soluble salts

ISO 8503-1, Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates – Part 1: Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast-cleaned surfaces

ISO 8503-2, Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates – Part 2: Method for the grading of surface profile of abrasive blast-cleaned steel – Comparator procedure

ISO 8503-4, Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates – Part 4: Method for the calibration of ISO surface profile comparators and for the determination of surface profile – Stylus instrument procedure

ISO 12944-1, Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 1: General introduction

ISO 12944-2, Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 2: Classification of environments

ISO 12944-4, Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 4: Types of surface and surface preparation

ISO 12944-7, Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 7: Execution and supervision of paint work

ISO 19840, Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Measurement of, and acceptance criteria for, the thickness of dry-films on rough surfaces

3.2 Occupational safety, health and environmental protection

It must be ensured that risks to health, safety, and the environment are kept to a minimum. The specifications of ISO 12944 Part 1, as cited under point 6, apply. The safety data sheets and product information from the manufacturer regarding the coating products specified in this standard must be observed.

3.3 Approved coating products

Annex 1 of this standard details the coating systems intended for various applications. The coating systems are tailored according to the requirements of the respective areas of application, including their thermal and chemical resistance, the required corrosivity category as well as the decorative requirements. Each coating system has a specific coating product or several alternative coating products from various manufacturers associated to it. If several coating products are stated for a coating system, the alternatives are considered equivalent. However, it must be ensured that within individual customer projects only one product alternative is consistently used throughout for the final coat in visible areas. If certain products are superseded due to a new version of AN 400 Part 2, the stocked products from the previous version may still be used up in line with their shelf life. This applies unless the use of a particular coating product is explicitly ruled out.

3.4 Requirements for the surface profile

To guarantee the required adhesion of the coating on one hand and to ensure that the peaks of the surface profile are also sufficiently coated on the other hand, the following specifications apply regarding the roughness of metal substrates.

Roughness of smooth (e.g. machined) metal surfaces:
Metal surfaces intended for coating must have a roughness at least equal to that of the Rugotest reference sample N 7 pertaining to the respective machining method. This corresponds to a mean roughness value R_a of at least 1.6 µm or rather a mean maximum peak-to-valley height $R_{y5} \geq 8$ µm. The profile method according to ISO 3274 can be applied alternatively. These surface roughness values must already be defined in the drawing and taken into consideration during manufacturing. Otherwise, too flat surfaces must be roughened accordingly as part of the surface preparation.

Roughness of blasted metal surfaces:
Surfaces to be blasted must achieve a mean maximum peak-to-valley height R_{y5} of 25-100 µm using an appropriate blasting process and blasting media. A R_{y5} value of up to max. 300 µm is permitted for large cast iron parts such as crankcases. ISO surface profile comparators according to ISO 8503-1 or stylus instrument procedure according to ISO 8503-4 can be used to check the roughness depth.

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3.5 Surface preparation

Adequate surface preparation is a fundamental prerequisite for the functionality of the subsequent coating. Prior to coating, surfaces must be prepared in such a way that all requirements of the respective coating agent are satisfied and the coating can exert its full capability. In particular, surfaces to be coated must be free from grease, dust and moisture. Furthermore, they may not exhibit any impurities, such as sand residue, remaining blasting media, rust, dross, welding splatter, or welding separation agents. An appropriate method must be chosen for the preparation of surfaces to be coated from point 6 of ISO 12944 Part 4. The following points must be observed for blasted surfaces on cast iron, steel and aluminum that are intended for coating:

- The conditions for surface preparation grade Sa 2½ according to ISO 8501 Part 1 must be satisfied and visually checked.

- The quantity and size of dust particles, as defined according to ISO 8502 Part 3, may not exceed class 3 in each case.

- The salt content on the surface, determined with a Bresle test according to ISO 8502 Part 6 and 9, may not exceed 42 mg/m^2.

- With respect to the subsequent measurement of the dry-film thickness, the correction value must be determined according to ISO 19840.

Prior to coating of a smooth metal surface, it must be cleaned until wettability can be achieved through a test ink with a surface tension of 38 mN/m or higher. Test inks with a defined surface tension, e.g. from arcotest GmbH, Mönsheim, www.arcotest.info, can be used for testing. Also, the salt content on the surface, determined with a Bresle test according to ISO 8502 Part 6 and 9, may not exceed 42 mg/m^2.

Prior to subsequent coating of an already coated surface, it is necessary to clarify first by the help of the manufacturers product information of the base coat, whether an intermediate sanding is required and if required to perform this.

During all coating works, it must be ensured that no moisture deposits on the substrate. Therefore, the temperature of the surface to be coated must be at least 3 K above the dew point defined according to ISO 8502 Part 4 for the duration of the entire coating process. In case of fluctuating climatic conditions, a relative humidity of over 85 %, an ambient temperature of under 5 °C, or a substrate surface temperature of over 30 °C, coating may generally not be carried out.

3.6 Base coat for engine and turbocharger components

The base coating for purchased parts which is required by this standard relates to the first coat that is applied to the metal surface of a component. The base coat is not always followed by a subsequent coat or topcoat. This means that in some cases, the base coat is also the only coat and also constitutes the final coat of a surface. In individual cases, the base coat of a part can also be specified as a multilayer structure. With cast iron parts, the base coat generally takes place before mechanical processing. In case of parts that require approval, coating may only take place after approval.

The required coatings for purchased parts are specified by the order text, by drawing specifications or by quality guidelines and they will be part-related disclosed to the supplier. In case of inconsistent data, the order text takes precedence. If a wet coating is intended, it will normally be referred to the approved coating systems of Annex 1. For cathodic EPD or powder coatings see sections 3.8 and 3.8. If no shade is specified, the standard shade of the respective coating system applies.

For additional clarification of the order text information, the coated and uncoated surfaces on turbine inlet and outlet cases as well as on bearing and compressor cases are available in the form of a separate Annex 3 to AN 400 Part 2 using colored example pictures.

In a drawing disclosed machined surfaces must not be pime coated or top coated unless otherwise stated in the order text, in a drawing or in a quality guideline. In cases in which a coating is asked for difficult to access areas - interior spaces in particular - and if the supplier cannot ensure a process reliable surface preparation, coating and subsequent quality control, the coating must remain undone and MAN SE must be consulted. The specifications of ISO 12944-7 apply to the execution of the coating work. All metal surfaces at risk of corrosion must be well preserved. Uncoated metal surfaces at risk of corrosion receive temporary corrosion protection according to section 4.

3.7 Testing coatings

The coating agents listed in Annex 1 have been tested for suitability for the respective application and satisfy all requirements placed on them when correctly applied. The following tests have to be performed, to ensure the quality of layers applied:

- To control the wet-film thickness during application, the measuring with a comb gauge according to ISO 2808 is recommended. When doing so, the percentage volume solids of the respective coating product and the degree of dilution must be taken into consideration.

- The thickness of dry-films is determined based on ISO 19840 and the nominal dry-film thickness or maximum dry-film thickness (max. DFT) specified for each coating product. The approval criteria of ISO 19840 apply.

- The curing of two-component coating agents is tested via a wipe test according to Annex 2.

- After a coating has cured, the coated part must be visually checked to determine possible coating errors and defects, such as bubbles, pores, or runs.

- Destructive tests for the evaluation of adhesion, such as cross-cut tests or pull-off tests are only necessary and permitted in special cases. Areas in a coating that have been damaged due to testing must be repaired.

The specifications of ISO 12944-7 apply to the supervision of the coating work.

3.8 Cathodic electrophoretic deposition (Cathodic EPD)

For cases in which a cathodic EPD base coat is requested by the order text or by a drawing, the following coating products are admitted:

- *25 µm nominal dry-film thickness, 40 µm maximum dry-film thickness*
  Axalta Aqua EC 3000
  Epoxy-based cathodic electrocoat
  www.axalta.com

- *25 µm nominal dry-film thickness, 45 µm maximum dry-film thickness*
  PPG Powercron 6200HE
  Cationic epoxy-electrocoat
  www.ppg.com

To repair small paint damages and only for non-media-bearing areas, the following product is admitted:

PPG EDP-repair-spray
SPR 51133-ZL
P166-6200-EE3
Acrylic coating semi-gloss, black
www.ppg.com

3.9 Powder coating

If the drawing requests a powder coat on cathodic EPD primed areas, the following coating system is admitted:

70 µm nominal dry-film thickness, 130 µm maximum dry-film thickness
Pulverit polyester resin powder coat, series 50
Pulverit Deutschland GmbH, 73560 Böbingen / Rems

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4. Temporary corrosion protection

4.1 Applicable standards

The following listed standards are referenced entirely or partially in the sections 3 and 5 of AN 400 Part 2. The mentioned standards shall always be applied in their latest version.

DIN 55474, Auxiliary means of packaging – Desiccants in bag – Application, calculation of the required number of desiccant units

ISO 8502-6, Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 6: Extraction of soluble contaminants for analysis – The Bresle method

ISO 8502-9, Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness – Part 9: Field method for the conductometric determination of water-soluble salts

4.2 Requirements

All metal surfaces which are endangered by corrosion must be well protected against a corrosive attack. The corrosion protection must be ensured during the transportation and while a subsequent storage for at least 12 months in total. For shipment and storage industrial climate conditions need to be assumed.

The corrosion protection method favored by MAN ES for the continental transport is the VCI corrosion protection method described in section 4.3. The VCI method is mandatory in the case of sea or air freight. In the case of sea freight or in foreseeable adverse weather conditions on the transport route, an additional barrier layer packing is required as described in section 4.4. In particular for the delivery of goods at the MAN ES Augsburg site, the specifications of the Logistics Specifications must be observed.

Prior to preservation the parts must be cleaned. Surfaces need to be dry, free of dirt and any residues, completely degreased as well as free of any traces of corrosion. Bare metal surfaces must not come into contact with hand or body perspiration. Gloves must always be worn when handling the parts. The salt content on the surface, determined with a Bresle test according to ISO 8502 Part 6 and 9, may not exceed 36 mg/m^2. Cleaning media must be monitored and kept in good condition accordingly.

With all applied corrosion protection methods and products it must be possible to use the purchased part without extensive removal of the preservative agent. It’s only allowed for very big parts (e.g. crankcase, base frame, or crankshaft) and only after consultation and written approval from MAN ES, to apply preservative agents which need to be removed before usage of the part (e.g. high-viscosity oils and greases). Disproportionately large excess of preserving agent must be avoided. When using anti-corrosive oils, it must be ensured that no risk to health is present during normal use, that they are compatible with the engine fluids (e.g. lube oil) and that they do not contain silicone oils. This is ensured by using the products listed as examples hereafter:

- *PrimeServ Protect*
  Fully synthetic, low viscous protection oil; free of VOC, acid, silicone and resin
  Distributed by: MAN Energy Solutions 86224 Augsburg, Germany
  Phone: +49 821 322-0, Fax: +49 821 322-3574, E-mail: primeserv-aug-commercial@man-es.com

- *Rivolta K.S.P. 204 non VOC*
  Oily, full synthetic corrosion preservative; VOC- and silicone-free
  Distributed by: Bremer & Leguil GmbH, Am Burgacker 30-42, 47051 Duisburg, Germany
  www.bremer-leguil.de

4.3 Volatile corrosion inhibition (VCI)

VCI stands for *Volatile Corrosion Inhibitor* and is the term for a method where corrosion preventive active ingredients vaporize from a carrier material within a draught-free enclosed packaging and create a protective layer on the metal surface. After opening the packaging, the active ingredients evaporate and the component part is ready for assembly without any residues.

Typical VCI carriers are coated plastic films, foil bags, VCI impregnated paper, cardboard or pulp boards and specific corrosion protection oils (e.g. Branorol 32/10 from Branopac or Rivolta K.S.P. VCI or rather Rivolta K.S.P. 252 VCI Depot Oil from Bremer & Leguil). There is a variety of different producers of VCI products, including international acting companies like for example Branopac (www.branopac.de) who is available in the Asian region, too.

For big components MAN ES recommends single wrapping in VCI foil and additional use of one of the protection oils named above to preserve bare metal surfaces and drill holes. Smaller parts and bulk goods can be compiled in reasonable packaging units and either be packed in VCI foil or single wrapped in VCI paper and bundled in a box.

VCI packaging units should be designed in a way that allows resealing after a partial taking or rather a repacking after a short removal – for example in the context of a quality check. Under these circumstances the protective atmosphere can recover and further preservation is given. Additionally the amount of VCI active component within the packaging can be increased by adding new VCI carrier material.

To achieve a reliable corrosion protection by VCI materials, particularly the following points have to be considered:

- Only new and intact VCI materials can be used. The use of recyclate is not allowed.

- With the choice of a certain foil thickness, the respective capability to block intruding moisture must be taken into consideration.

- The utilized VCI materials must be suitable for the respective materials to be protected.

- During packing the temperature of the component may not deviate from the ambient temperature. Otherwise there is a risk of condensation.

- To strengthen the VCI effect, it is recommended to add additional VCI carrier into the packaging. A given maximum distance between VCI carrier and the surface to be protected must not be exceeded. Depending on the packaging volume, a certain amount of VCI active ingredient must be added. To achieve this, the part could for example first be wrapped in VCI paper and then be packed in VCI foil.

- No moisturizing materials like wood, cardboard or untreated fibrous materials are allowed within the packaging.
- VCI active ingredients are only able to provide protection within a closed package. Thus, the foil need to be sealed in a way that guarantees draught-free conditions in the packing unit during the requested preservation period and the VCI atmosphere won't evaporate.
- The enclosed air volume and the associated air humidity must be kept as low as possible.
- After packing, the manufacturers instructions regarding the waiting time and the temperature must be adhered so that the protection atmosphere can form optimally and preservation is given.
- Prerequisite for a reliable preservation is that the foil will not be damaged during transport. This should be achieved by selecting a suitable load carrier an appropriate packaging and by labeling.
- Attention must be paid to weather-proof conditions while transport and storage.
- The ambient temperatures for VCI packed goods need to be in the range of -20 to +50 °C during transport and storage. In case of momentary deviations, the foil packaging need to stay closed and must not be mechanically stressed.

All metal surfaces which are endangered by corrosion need an additional protection by corrosion protection oil to ensure a 12 month corrosion protection period even in case of a damaged VCI packaging.

4.4 Barrier layer method

If sea freight is intended for a purchased part or adverse weather conditions are foreseeable on the transport route, an additional barrier layer packing must be considered in the preservation and packaging concept. This additionally required barrier layer packing around the already preserved part must be either completely impermeable to water vapor in relation to the packaging material itself and the sealing method, or must have a suitably low water vapor permeability in order to provide adequate protection against the specific external conditions of the given transport conditions. In particular, in combination with a desiccant that initially binds the entrapped humidity in the packaging, the barrier layer packing should be designed to reliably prevent the penetration of water, water vapor and harmful gases for the duration of the transport and subsequent storage.

For example, a component that is already preserved with oil and packaged in VCI material can additionally be protected for sea freight with a dry packaging. Such a dry packaging can be implemented with an hermetical heat sealed aluminum compound foil. Desiccant bags can be placed between the barrier layer film and the VCI packaging.

For effective corrosion protection with the barrier layer packing method, the following points in particular must be taken into account:

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- No moisturizing materials like wood, cardboard or untreated fibrous materials are allowed within the barrier layer.
- A sufficient number of desiccant units must be introduced in the packaging to reliably protect the packaged goods from corrosion for the duration of the transport and subsequent storage. Thus, the specifications of DIN 55474 must be taken into account.
- The desiccant must be protected against moisture before its application and the barrier layer must be heat sealed directly after the desiccant is introduced.
- The desiccant must preferably be distributed evenly in the upper area of the packaging.
- The desiccant must be of such a type and positioned such that it can be removed easily when unpacking, so that it cannot contaminate the component with dust and loose particles or that it cannot move or spread within the packaging in an uncontrolled manner.
- The desiccant must not rest directly on bright or coated metal surfaces of the component.
- Reliable preservation with the barrier layer method presupposes that the barrier layer is perfectly sealed and not damaged during transport. This must be ensured by selecting a suitable load carrier, using edge protection materials, suitable packaging and a corresponding labeling on the packaging.
- The enclosed air volume and the associated air humidity must be kept as low as possible by extracting it prior to sealing the barrier layer.
- Required breakthroughs in the barrier layer packing, for example at attachment points, must be sealed in a suitable manner.
- As barrier layer packing is generally not transparent and the condition of the packaged goods is not directly visible, it is recommended that humidity indicators be used to monitor the existing relative humidity within the barrier layer packing in different ways.

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5. Testing and documentation

All written agreements between the supplier and MAN ES, made in addition to the information in the order text, drawings, quality guidelines and standards and which relate to corrosion protection, must be kept in paper form or as digital data for at least 10 years by the supplier, and if required, must be presented to MAN ES.

For compulsory labeled parts (All components which already carry a serial number or have to be labeled accordingly) the supplier is obliged to determine the dry-film thickness according to ISO 19840 and to document the values. While doing this, the specific correction value determined according to ISO 19840 must be used. The test report should be created following Annex E of ISO 19840.

For compulsory labeled parts the supplier is additionally obliged to document all applicable points of the following list clearly assigned to the respective part. Together with the test report of the dry-film thickness, this information must be kept in paper form or as digital data for at least 10 years by the supplier, and if required, must be presented to MAN ES:

Details of surface preparation

- Surface roughness R_{y5} (Mean maximum peak-to-valley height in µm) of the area to be coated, as a value or range according to ISO 8503-1, -2, -4 or with the help of a Rugotest reference sample
- Correction value of rough surfaces to be coated, in µm according to ISO 19840
- Description of the used cleaning agents
- Visually assessed preparation grade of blasted Surfaces according to ISO 8501-1 (Requested: Sa 2½)

Details of coating – for each coating material and each coating step

- Location of the layer in the coating build-up (Primer, intermediate coat or top coat)
- Name of the coating material
- Manufacturer of the coating material
- Shade of color
- Lot number (of component A) (Verification via delivery note)
- Potentially, lot number of component B (Verification via delivery note)
- Mixing ratio and information if it was mixed by weight or volume
- Name of the thinner
- Lot number of the thinner (Verification via delivery note)
- Share of the thinner (% by volume or by weight)
- Description of the application method or rather the application device
- Determination of the dew point with the underlying data (Relative humidity in % as well as ambient and surface temperature in °C)
- Description of the drying conditions
- Date
- Name of the painter
- Examination of the curing of tow-comoponent coating products by the curing test according to Annex 2 (no, minor or significant residue)
- When and by whom the goods got released for packaging and shipping? (date, name)

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Details of temporary corrosion protection – for each preservation agent

- Designation of the protected component areas
- Name of the preservative
- Manufacturer of the preservative
- Lot number of the preservative (Verification via delivery note)
- Details about additional used substances (e.g. thinner)
- Name of the executing worker
- Date
- Description of the drying conditions

To determine the surface tension by test inks, to perform a curing test, to assess dust and to determine the salts on the surface can be demanded by the order text.

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Annex C of AN 410 Part 1.1 / Annex 1 of AN 400 Part 2

Coating systems and validated coating products

Coating system		Alternative I **Mankiewicz Gebr. & Co.** Georg-Wilhelm-Straße 189 21107 Hamburg, Germany www.mankiewicz.com	Alternative II **Süddeutsches Lackwerk Zelle GmbH+Co.KG** Velaskostraße 10 85622 Feldkirchen, Germany www.wetterwart.com
D1	Designation:	Seevenax Protective Coating 112-42	UHS Rust Barrier SL-2306
	Standard color:	RAL 7040 Window gray	RAL 7040 Window gray
	Gloss level:	glossy	gloss-reduced
	Nominal DFT:	90 µm	90 µm
	Max. DFT:	180 µm	140 µm
	Remarks:	Consider project-specific colour shade!	Consider project-specific colour shade!
D5	Designation:	Alexit Top Coat 461-H2	2K Thermo Acrylic Coating
	Standard color:	White aluminium	Silver
	Gloss level:	silk-matt	gloss-reduced
	Nominal DFT:	100 µm	90 µm
	Max. DFT:	150 µm	140 µm
	Remarks:	-	-
D6	Designation:	Alexit Top Coat 461-H2	2K Thermo Acrylic Coating
	Standard color:	RAL 9005 Jet black	Black
	Gloss level:	silk-matt	gloss-reduced
	Nominal DFT:	100 µm	90 µm
	Max. DFT:	150 µm	140 µm
	Remarks:	-	-
F	Designation:	Seevenax Base Coat 113-77	-
	Standard color:	Window gray	
	Gloss level:	matt	
	Nominal DFT:	90 µm	
	Max. DFT:	180 µm	
	Remarks:	-	
G1	Designation:	Finalux Universal Adhesive Primer 823-14	1K Alkyd-/Cyclo-Rubber Primer 992 Tropical
	Standard color:	Light gray	RAL 7040 Window gray
	Gloss level:	-	matt
	Nominal DFT:	40 µm	40 µm
	Max. DFT:	80 µm	60 µm
	Remarks:	-	-
G3	Designation:	Celerol Thermo-Protection 997-09	-
	Standard color:	9M42 MAN White aluminium	
	Gloss level:	matt	
	Nominal DFT:	80 µm	
	Max. DFT:	120 µm	
	Remarks:	-	
G4	Designation:	Alexit Top Coat 461-H2	2K Thermo Acrylic Coating SL-2107
	Standard color:	White aluminium	Silver
	Gloss level:	silk-matt	gloss-reduced
	Nominal DFT:	40 µm	20 µm
	Max. DFT:	80 µm	40 µm
	Remarks:	-	-
G7 / G8	Designation:	Alexit Top Coat 461-H2	-
	Standard color:	White aluminium	
	Gloss level:	silk-matt	
	Nominal DFT:	100 µm	
	Max. DFT:	150 µm	
	Remarks:	-	

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Annex 2

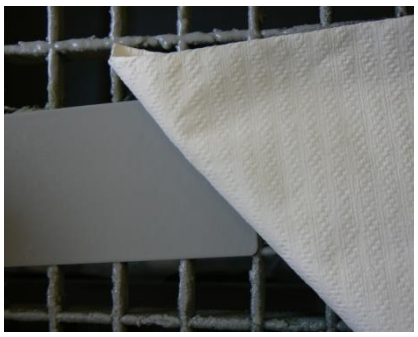
Curing test to determine the cross linking of a two component coating system

If performed accurately and after an accordant drying, the requested two component coating systems are resistant against their respective thinner. The grade of cross linking can easily and cheap be determined by performing a curing test. On the basis of the curing test, the coating quality at a certain time can be determined.

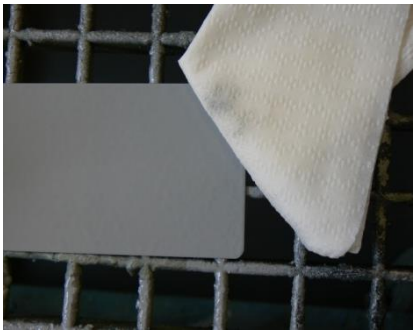
Test procedure:

- A white, robust, absorbent, disposable cloth (e.g. Kimberly-Clark Wypall X70) is soaked with the respective thinner of the tested coating system.
- This cloth is than rubbed along the coated surface with medium pressure and over a distance of approx. 30 cm for three times back and forth.
- The abrasion residue on the cloth is inspected and documented by taking a picture of it.

Evaluation:



no residue
acceptable



minor residue
acceptable

significant residue
not acceptable

In many cases black abrasions appear when metal pigmented (e.g. aluminum) coatings are tested. Those abrasions must not be confused with the residues of binder dissolved by the thinner. Factual bad results are characterized by a sticky and weak surface which thwarts the wiping.