

Replaces:
RN 79:2021-03-04
(together with RN 79 and RN 79-b)

Colour Coating

General requirements and pre-treatment

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Changes

2023-10-27:

The following changed in comparison to RN 79:2021-03-04:

- a) New part of standard added
- b) updated references
- c) Chapter 5: Extension of the general requirements
- d) editorially revised

Responsible division: PK	Editor Förste, Maike	Approval: see doc. workflow	Technical reference: C. Eschert	Page: 1 / 13
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1 Scope

This factory standard applies to the coating of REINTJES products as well as the associated components with different coating systems. This part of the standard describes the basics of the coating system and general requirements for coating systems used for REINTJES products as well as the requirements for the respective preparation for coating.

The described coating systems are designed as passive atmospheric corrosion protection in the specified corrosivity categories for a medium protection duration.

The order variants of the coating systems for gears used at REINTJES and referred to in this standard can be found in RN 79. The standard part RN 79-b provides supplementary coating variants for individual parts and components.

If there are any uncertainties regarding the intended variant and/or surface preparation, REINTJES should be contacted in advance for clarification and, if necessary, approval.

2 References

The following documents, cited in part or in whole, shall apply for the use of this standard. In the case of dated references, only the referenced edition applies; in the case of undated references, the latest edition of the referenced document (including all amendments) applies. The applicable version of the standards listed below shall apply to all contents not covered by this factory standard.

EN ISO 8501	Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness
EN 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
EN ISO 12944	Paints and varnishes - Corrosion protection of steel structures by protective paint systems
MTV 5011	Coating procedure - Coating with solvent-based two-component EP primer and solvent-based two-component PUR top coat paint
MTV 5074	Coating procedure - Coating with 2-component EP Hydro primer and 2-component PUR Hydro top coat paint
Regulation (EC) No. 1272/2008	Classification, packaging and labelling of chemical substances and mixtures
RN 71	Packaging and preservation; Initial preservation, transport and storage of REINTJES products
RN 79	Colour Coating; Coating variants for gearboxes
RN 79-b	Colour Coating; Coating variants for individual parts and components

3 Terms and Definitions

Coating system:	Totality of all layers of coating materials applied to effect corrosion protection.
Corrosivity categories:	Classification of atmospheric ambient conditions for the estimation of corrosion exposure taking into account relative humidity, condensation and contamination by aerosols (see Table 1)
Protection period:	Expected service life of a coating system until the first partial renewal. The protection period is not a "warranty period", but a technical term that can help to define a maintenance programme. It starts on the day the coating system is completed (see Table 2)
Rust grade Ri:	Rating characterising the rust formation on a coating (rust breakthroughs and visible under-rusting)
Surface preparation grades:	Classification of cleaned, uncoated workpiece surfaces on the basis of representative photographic examples or reference surfaces, taking into account the surface preparation process used (see Table 3).

Table 1 Corrosivity categories acc. to EN ISO 12944-2 (extract)

Corrosivity category	Examples of typical environments	
	Inside	Outside
C2 (low)	Unheated buildings with intermittent condensation, e.g. warehouses, sports halls	Low-polluted atmosphere, dry climate, mostly rural areas
C3 (moderate)	Rooms with high relative air humidity and low levels of contamination, production rooms	Urban/industrial atmosphere with moderate SO ₂ pollution or temperate coastal climate
C4 (strongly)	Chemical plants, swimming pools, boat sheds over seawater	Industrial areas and coastal areas with salt pollution
C5 (very strong)	Buildings or areas with almost constant condensation and with heavy contamination	Industrial areas with high humidity and aggressive atmosphere and coastal atmosphere with high salt load

Table 2 Time periods for the duration of protection acc. to EN ISO 12944-1 (extract)

medium	(M)	7 to 15 years
high	(H)	15 to 25 years

Table 3 Surface preparation grade by blasting acc. to EN ISO 12944-4 (extract)

Surface preparation grade	Features of prepared surfaces
Sa2	Nearly all rolling skin/scale, nearly all rust, nearly all coatings and nearly all foreign contaminants have been removed. All remaining residues must adhere firmly.
Sa2½	Rolling skin/scale, rust, coatings and foreign impurities have been removed. Remaining traces can at best be recognised as light blotchy or streaky shading.
Sa3	Rolling skin/scale, rust, coatings and foreign impurities have been removed. The surface must have a uniform metallic appearance.

Table 4 Preparation grades for the application of coating materials according to EN ISO 8501-3 (welds, edges and other surfaces with surface irregularities) (extract)

Preparation grade	Features of prepared surfaces
P1	Light preparation: No preparation or only minimum preparation considered necessary before application of coating materials.
P2	Thorough preparation: Most of the irregularities have been resolved.
P3	Very thorough preparation: The surface is free of significant visible irregularities.

4 General requirements

Surface roughness	<ul style="list-style-type: none"> • min. type G, segment 3 acc. to EN ISO 8503-1 • tested with reference sample
Ambient conditions during application	<ul style="list-style-type: none"> • relative humidity < 80 % • air and object temperature 10 °C and 35 °C
Other	<ul style="list-style-type: none"> • coating agents and thinners supplied must be compatible with the primer used at REINTJES and meet the requirements of the respective variant • unknown lacquers or lacquer systems must be technically tested and approved by REINTJES. This may cause additional time expenditure which has to be taken into account • safety data sheets/technical data sheets must be supplied at least digitally • coordination with the production planning department is required for variants 3.9, 7 and 8.9

5 Coating products

a) General requirements	<ul style="list-style-type: none"> supplied components, including electric motors, pumps, brackets, consoles and other attachments, can be procured with an adequate primer coating according to the manufacturer's standard, provided that the resistance of the overall coating is guaranteed and the other requirements are met (for this purpose it may be necessary to produce a coating sample and have this confirmed by REINTJES) preferably use only products of one manufacturer per coating system good resistance to oil, seawater, anaerobic surface sealants and VCI preservatives (Branorol) suitable for airless spraying (pressure ratio 35:1) max. hazard classification R10 "flammable" (according to Regulation (EC) No. 1272/2008) ignition temperature > 200 °C or temperature class T3 safety and product data sheets must be supplied with the product 	
b) Primer	Colour, standard:	RAL 7032 (pebble grey)
	Colour, alternative:	RAL 9010 (pure white) for all white top coats
c) Top coat, standard	Colour, standard:	RAL 7001 (silver grey)
	Colour, alternative:	RAL 5019 (capri blue) RAL 6011 (reseda green) RAL 6019 (pastel green) RAL 7023 (concrete grey) RAL 7035 (light grey) RAL 9010 (pure white) RAL 9016 (traffic white) CAT yellow (further colours on request)
d) Top coat, optional	Colour:	on request
	with hardener:	on request
	Application:	Only permissible after consultation with Dept. VA (customer) resp. PM/PMP, especially to shorten painting work, e. g. through
		<ul style="list-style-type: none"> shorter drying time omission of a coating shorter procurement time as a substitute for colours not in stock

6 Preparation variants

6.1 Basic variant

Note: If the ordered variant refers to a surface pre-treatment for yacht gears (see chapter 0), supplementary or deviating specifications must be observed.

a) Coated are	<ul style="list-style-type: none"> • housing (inside and outside) • before machining with a primer coating: external components made of grey cast iron or steel such as covers, brackets, flanges • after assembly with a primer coating: external metallic surfaces, incl. piping, attachments, screws and exposed machined surfaces • after assembly with a top coat: all previously primed surfaces 						
b) Do not coat	<ul style="list-style-type: none"> • functional surfaces, e.g. housing separation surfaces and shaft lead-throughs (conserve these surfaces with corrosion protection oil) • interior components • end-treated components, displays, signs • flexible parts (rubber elements) 						
c) Surface preparation	<ul style="list-style-type: none"> • all surfaces, edges and, if applicable, weld seams must be suitably pre-treated for the application of a coating, i.e. they must be clean, dry, free of oil, grease and burrs. Dirt, rust, scale, chips, grease, etc. must be thoroughly removed. • individual parts made of aluminium alloys must be cleaned by steam blasting • in the case of repaired parts with damaged paint, remove loose components before coating • complete gearboxes must be cleaned with residue-free solvents and must be clean, dry and dust-free before starting coating work • surface preparation grade Sa2½ acc. to EN ISO 12944-4 • preparation grade P2 acc. to EN ISO 8501-3 for welds, edges and steel surfaces in general 						
d) Processing	<ul style="list-style-type: none"> • observe drying times, processing and safety instructions according to manufacturer's specification • layer structure and layer thicknesses according to variants in RN 79 • tolerances for individual measured values of the total dry film thickness acc. to EN ISO 12944-5: <table border="0"> <tr> <td>single value_{min.}:</td> <td>0.8 x nominal layer thickness</td> </tr> <tr> <td>single value_{max.}:</td> <td>3 x nominal layer thickness</td> </tr> <tr> <td>mean value_{arithm.}:</td> <td>≥ nominal layer thickness</td> </tr> </table> 	single value _{min.} :	0.8 x nominal layer thickness	single value _{max.} :	3 x nominal layer thickness	mean value _{arithm.} :	≥ nominal layer thickness
single value _{min.} :	0.8 x nominal layer thickness						
single value _{max.} :	3 x nominal layer thickness						
mean value _{arithm.} :	≥ nominal layer thickness						
e) Electrical installation	<ul style="list-style-type: none"> • uniform appearance (wiring, corrugated tubes, etc.) • do not coat cables and terminal boxes • standard designs: <ul style="list-style-type: none"> ○ do not dismantle fixed installations (cables without plug(s) connected), coat corrugated tubes and their holders as well ○ remove detachable installations (cables with plug(s)), do not coat corrugated tubes, coat holders as well 						

6.2 Yacht variants

Supplementary/different to chapter 6.1 the following applies:

a) Coated are	primed: <ul style="list-style-type: none"> • housings • mounted components such as <ul style="list-style-type: none"> ○ oil filter ○ attached mechanical pump ○ heat exchanger ○ pump units, electric standby/trailing pumps ○ electric motors be primed selectively: <ul style="list-style-type: none"> • contact surfaces of attached components, concealed surfaces under pipe supports, valves, etc. (see also Appendix B) be end-coated (specified in the order): <ul style="list-style-type: none"> • mechanical reserve pump • starter box, engine switchgear
b) Do not coat	<ul style="list-style-type: none"> • <i>oil preheater</i> (acc. to manufacturer's specification) • torsionally flexible couplings • indicating instruments, operating instruments, signs, sight glasses and decorative surfaces • electrical components and covers made of plastic (e.g. plugs within electrical wiring, cable entries into plugs) • plastic and rubber parts, as well as flexible connections / components (e.g. hoses, hose clamps, plastic handles) • shaft ends • cables, corrugated tubes (remove before painting) • cable entry sleeves • terminal box • machined surfaces on the housing • fittings and plugs of pipelines (metallic bright)
(additionally only with variant 8.2)	<ul style="list-style-type: none"> • insulating mats • threaded holes and components that have to be removed regularly for maintenance work • all mechanically moving parts

c) Surface preparation	<ul style="list-style-type: none"> thoroughly remove inscriptions on the parts (e.g. with fibre pens) or remnants of red/white tests no marking with impact numbers in visible areas very careful processing, no runners in visible areas; avoid noses or other damage to the lacquer very clean processing (masking), no paint residues on uncoated surfaces careful masking of all surfaces not to be coated in the transition area to surfaces that are to be coated no scratches or other damage to the paint or to uncoated surfaces no colour deviations, no discolouration due to heat prime adequately under pipe clamps surface preparation grade Sa3 acc. to EN ISO 12944-4 preparation grade P3 acc. to EN ISO 8501-3 for weld seams, edges and steel surfaces in general flush-machined parting lines mechanically process cover if necessary eliminate surface defects/damage (blowholes, prominent machining marks): <ul style="list-style-type: none"> remove machining marks on clamps and welded attachments (e.g. foot angle) by glass bead blasting no flaws, spatulas or other rework marks on casings; remove rework marks on visible surfaces (e.g. by plastering on cast casings) by glass bead blasting
(additionally only with variant 8.2)	<ul style="list-style-type: none"> covers are to be coated separately total dry film thickness under screw heads, screw nuts and washers max. 100 µm sand the primer coat with a grain size of min. P320 on machined and smooth metal surfaces before applying the top coat for the coating, the specifications from MTV 5074 resp. MTV 5011
d) Electrical installation	<ul style="list-style-type: none"> carefully bundle and label cables / cores in the switch box provide switch boxes, monitoring devices and E-valves with shrink sleeves, wire markings and cable designations close unused cable entries in terminal or control boxes with plugs use cable entry sleeves of the same colour, chromium-plated cables and corrugated tubes: <ul style="list-style-type: none"> bundle several cables into a cable harness and fasten them in a corrugated tube to the gearbox using suitable clamps do not lay on pipelines or functional components ensure good mounting/dismounting facilities wiring <ul style="list-style-type: none"> black with shrink sleeves at open ends metallic cable bushings

e) Attachments, components	<ul style="list-style-type: none"> • if possible, only procure and install primed components such as heat exchangers, filters, electric motors, pumps, pump units, etc. that are supplied and are to be mounted on the outside of the gearbox • prime contact surfaces of components selectively • procure and install terminal boxes and motor switchgear with a final coat of paint
f) Assembly condition	<ul style="list-style-type: none"> • use uniform screw connections and pressure gauges for gearboxes that belong together and ensure the same signs, pipe and line routing • drill all necessary holes (also for the attachment of parts provided) • seal forcing threads and other threaded holes with suitable means (e.g. plugs) • mount the gearbox completely, i.e. including all attachments such as heat exchanger, terminal box, piping, cables, signs, etc. and, if necessary, with the flexible coupling fitted • document the signs with photos and provide a second set of signs, including tools for their installation (glue, notched nails, etc.) with the gear unit • do not preserve the gearbox before coating with paint (also applies to outer, bare metal surfaces) • CAUTION! Danger of corrosion if stored unpacked! • protect gearboxes against corrosion during transport by means of suitable film packaging (the specifications of RN 71 on packaging and corrosion protection must be observed)
(additionally only with variant 8)	<ul style="list-style-type: none"> • do not secure stopcock for Bedia probe with metal wire but with cable tie, enclose metal wire
g) Aftercare	<ul style="list-style-type: none"> • remove material for covering/masking as well as paint residues on non-coated surfaces • Important: Do not damage type plates; make sure they are perfectly legible! • preserve outer, bare metal surfaces in a suitable manner • protect components from dirt and corrosion during transport, e.g. by means of film packaging with desiccants (further specifications of RN 71 on packaging and corrosion protection must be observed)

6.3 Industrial gearboxes

In addition/different to the chapter 6.1, the following applies to variants 3, 3.1 and 3.2:

a) Coated are	<ul style="list-style-type: none"> • housings (only outside) • with a primer coating before assembly: unfinished parts such as pipelines, brackets, covers, flanges • after assembly with a primer coating: screws and exposed, machined surfaces (except shafts)
b) Do not coat	<ul style="list-style-type: none"> • taper pins and forcing threads on housings and attachments
c) Surface preparation	<ul style="list-style-type: none"> • blast the surface with sharp-edged abrasive before coating
d) Processing	<ul style="list-style-type: none"> • priming no later than 6 hours after blasting • measurement of dry film thickness (DFT): individual values: $\geq 0.8 \times \text{total dry film thickness}$ maximum layer thickness: $< 3 \times \text{total nominal layer thickness}$

Appendix A Measurement of wet film thickness

(informative)

By measuring the wet film thickness, the expected dry film thickness can be well estimated via the solid volume of the coating material.

Checking the wet film thickness with a "wet film comb" is a suitable method for self-monitoring, which is also mentioned in the relevant regulations and standards as an instrument for achieving the target film thickness more easily.

Procedure:



The wet film comb is placed vertically into the still wet coating immediately after application of the coating.

The measured wet film thickness is read off the last wetted tooth of the comb.

Picture B.1 Wet-layering comb

Formula for determining the wet film thickness: $T_w = 100/V_s \cdot T_d$

with T_w = wet film thickness, V_s = solid volume (in %), T_d = dry layer thickness

Important:

The wet film thickness is to be considered as an approximate value for achieving the target film thickness and is not used for the actual documentation.

- When calculating the required wet film thickness, dilution must be taken into account if necessary.

Appendix B Example illustrations of gearbox preparation for Yacht Premium versions

(informative)

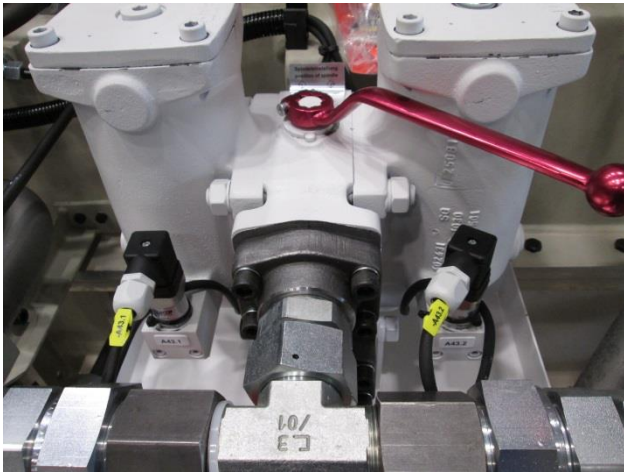


Figure 1 double changeover filter



Figure 2 Earthing with corrugated protection tube



Figure 3 Bracket, machined housing edges



Figure 4 Heat exchanger, machined pipe bend

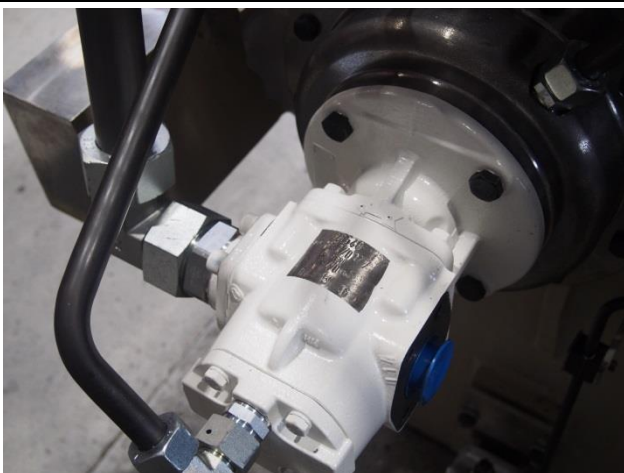


Figure 5 Gearbox oil pump

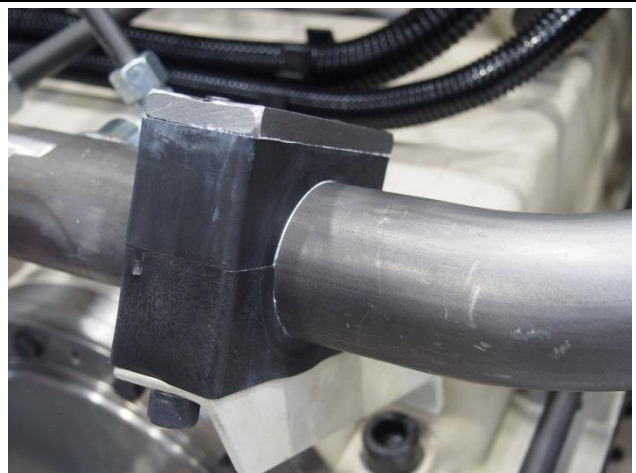


Figure 6 Bracket



Figure 7 Machined pipeline, corrugated protection tubes



Figure 8 Bracket, housing edges



Figure 9 Connections on the terminal box



Figure 10 Bracket on primed cultivation surfaces



Figure 11 Heat exchanger, bracket

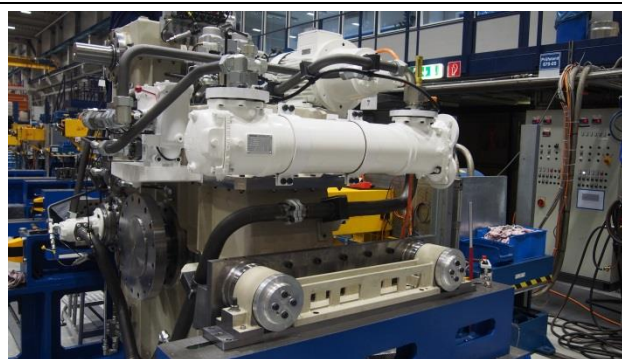


Figure 12 General view