



Coating Systems for
Valves
Actuators
Control Units

Type Series Booklet



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Type Series Booklet

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Accessories

Coating Systems for Valves, Actuators and Control Units

Coating Systems

General

Apart from its aesthetic function, the essential purpose of protective coating is to protect the product against corrosion in an industrial environment.

The coating system quoted as standard is a basic coating system.

Depending on the product's application, multi-layer coating systems can also be provided.

All available coating systems are described in the following tables.

The products used for coating are either made by HEMPEL (a worldwide manufacturer of coatings for all markets) or by other manufacturers.

Scope

The following components are coated:

- Valve bodies
 - Exterior surfaces of valve types BOAX-S, BOAX-SF, BOAX-B, ISORIA 10/16/20/25, MAMMOUTH, KE and OXYRIA
 - DANAIS/TRIODIS (steel):
 - Interior surfaces and flange faces, polyvinyl butyral
 - Exterior surfaces, selected coating system
 - SERIE 2000 (cast iron and steel):
 - Interior surfaces and flange faces, epoxy coating suitable for drinking water
 - Exterior surfaces, selected coating system
- Exterior surfaces of the actuator, except for pneumatic actuator housings made of anodised aluminium in the case of a standard coating system
- Levers
- Handwheels of manual actuators (for MC, MR and EMO only; with the exception of stainless steel handwheels)
- Exterior surfaces of control equipment (as applicable):
 - Valve neck extension
 - Deck stand
 - EMO declutchable manual override and its handwheel
- Installation kits for actuator/valve and actuator/control unit interface (as applicable)

This document does not cover the coating of the valve disc.

Procedure

After surface preparation (degreasing and – where required – blasting, depending on the parts and/or the type of primer to be applied), coating is applied on a coating line (single-coat system) or with a pneumatic or electrostatic spray gun, depending on the size of the parts and the number of coats to be applied.

Inspection

- Visual inspection of the finished coating
- Measurement of the film thickness to ISO 19840
 - The thickness recorded is the average value of all measurements taken.
 - Acceptance criteria and tolerances to ISO 12944-5

Warranties

The warranty period for products with a standard coating is 1 year from delivery as indicated in the following tables.

For a longer warranty period, multi-layer coating systems are required.

Standard coating

The standard coating is a protective coating designed for use in typical industrial environments.

The recommended coating has the following characteristics:

- Good light resistance
- Good moisture resistance
- Good weather resistance
- Good resistance to slightly corrosive chemical environments

Except in some special cases, it is a single-coat system of an acrylic polyurethane or polyester powder coating with a film thickness of 80 µm.

Special cases:

- Pneumatic actuators and control unit housings made of aluminium
 - The following products are subjected to a special anti-corrosive treatment:
 - AMTROBOX: cathodic electrocoating, thickness: 25 µm
 - Base of AMTRONIC U / SMARTRONIC U: cathodic electrocoating, thickness: 25 µm
- Actuators and control units for severe applications: marine - corrosive.

Some products or product variants are designed for use under severe conditions, e.g. in corrosive or salty environments, for underground or submerged installation. The standard coating for these products is a two-coat system:

- One system comprising:
 - Cathodic primer e-coat, thickness: 25 µm
 - Polyurethane top coat, thickness 80 µm
 - Applies to: AMTROBOX R, AMTROBOX R Ex ia
- One system comprising:
 - Zinc epoxy primer, thickness 50 µm
 - Polyurethane top coat, thickness 80 µm
 - Applies to: MC

The housings of AMTRONIC and SMARTRONIC are made of plastic (excluding the base). Therefore, no coating is required.

Note: The standard coating system sometimes allows the exterior surfaces to be provided with additional layers of coating or touched up on site after having cleaned and pre-treated the relevant areas.

Please contact us to check for coating compatibility.

Optional coatings

Optional coatings are available:

- For special environments, e.g. in food chemistry
- According to customer's specifications (EDF, etc.)

Multi-layer coating systems can also be optionally employed in marine, corrosive or humid environments (for the exterior of vessels, in coastal plants, in tropical climates, in underground installations in damp chambers, for temporarily submerged products, etc).

Such systems are in compliance with standard EN ISO 12944 (Paints and varnishes - Corrosion protection of steel structures by protective paint systems).

This standard defines

- In Part 2: Corrosivity categories and environments
- In Part 5: Suitable protective paint systems (number of coats and film thickness)

EN ISO 12944-2			EN ISO 12944-5	
Classification of environments			Coating systems	
Corrosivity category of environment	Examples of typical environments in a temperate zone (for guidance only)		Recommended number of coats	Nominal dry film thickness [µm]
	Exterior	Interior		
C3	Urban and industrial atmosphere, low pollution by sulphur dioxide; coastal areas with low salinity	Production rooms with high humidity and some air pollution, e.g. food processing plants, laundries, breweries, dairy factories	3	160
C4	Industrial atmosphere and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal ship- and boatyards	3	230
C5	Industrial, coastal and offshore areas with high humidity, aggressive atmosphere and high salinity	Buildings or areas with permanent condensation and high air pollution	4	280
Im1 Fresh water	River structures, hydropower stations	Cathodic protection required	2-4	450
Im2 Seawater or brackish water	Harbour areas with structures such as sluice gates, locks, jetties; offshore structures			
Im3 Soil	Buried tanks, steel piles, steel pipes			

Durability to EN ISO 12944-5:

Durability is a technical criterion that enables building owners to draw up a maintenance schedule.

Durability:

- Short: up to 7 years
- Medium: 7 to 15 years
- High: 15 to 25 years
- Very high: more than 25 years

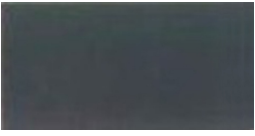
The durability must not be confused with the warranty period.

Standard colours

Each product family or product type is assigned a standard colour.

This applies to:

- Standard coating
- Multi-layer coating systems (colour of the top coat), optionally available

Colour		Product
Orange - RAL 2002		- Butterfly valve types BOAX-S / BOAX-SF - Lever type LP for BOAX-S / BOAX-SF
Light blue - RAL 5012		- Butterfly valve type BOAX-B
Yellow - RAL 1023		- Lever for ISORIA for gas applications
Blue - RAL 5002		- Butterfly valves: ISORIA MAMMOUTH KE OXYRIA DANAIS TRIODIS Valve neck extensions - Check valves: SERIE 2000 (cast iron or steel body) - Actuators: Lever types CR, CM, S, SR, SP (with square end to ISO 5211) MA, MS and MC manual gearboxes EMO declutchable manual override Double-acting pneumatic actuator ACTAIR EVO 1 to 700: end caps (anodised gear housings) Single-acting pneumatic actuators: DYNACTAIR EVO 1 to 350: end caps (anodised gear housings) Hydraulic actuators: HQ EVO 10 to 1600 - Deck stand - Hydraulic control system for HQ EVO
Blue - RAL 5005		- Submerged operation in drinking water: - Interior walls of SERIE 2000 bodies - Exterior walls of submerged versions of ISORIA - Neck extensions of submerged versions
Anthracite grey - RAL 7016		- Lever types CR, CM, S, SR, SP (with square end to ISO 5211 and flat end) - AMTROBOX M R1020 / R1021 - AMTROBOX R
Black - RAL 9011		- Lever type LP for BOAX-S / BOAX-SF - Handwheel for MA manual gearbox - MA manual gearbox - AMTROBOX in standard design
Black - RAL 9005		- Handwheel for EMO declutchable manual override as well as for MS and MC manual gearboxes - Specification for conventional energy and nuclear energy according to EDF requirements - Specific applications (submerged applications, etc.)

Note: The colours shown are for guidance only. For the exact colour refer to the RAL code.

Special coatings on request.

Definition of the various protective coating systems classified per product

The references used in the tables below are given for information only and may be replaced by equivalent references, where applicable.

Building Services / General Services

BOAX-S / BOAX-SF

Table 1: Coating system for BOAX-S and BOAX-SF

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating:	Code	Temperature		Nominal dry film thick- ness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Typical in- dustrial en- vironment	Single- coat system	-	Polyurethane or polyester, orange RAL 2002 - 80 µm	P14	-50	130	80	✓	-	-

Industry / Water / Energy

BOAX-B

Table 2: Coating system for BOAX-B

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Typical in- dustrial en- viron- ment	Single- coat sys- tem	-	Polyurethane or polyester, light blue RAL 5012 - 80 µm	P36	-50	130	80	✓	-	-

ISORIA 10, 16 and 20

Table 3: Coating system for ISORIA 10, 16 and 20

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-
			Polyurethane or polyester, light blue RAL 5012 - 80 µm	P36	-50	130	80	-	✓	-
			Polyurethane, red RAL 3002 - 80 µm ¹⁾	P32 ¹⁾	-50	130	80	-	✓	-
	Two- coat sys- tem	-	Zinc epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P29	-50	130	130	-	✓	-
			Zinc epoxy - 50 µm + polyurethane, light blue RAL 5012 - 80 µm	P55	-50	130	130	-	✓	-
			Zinc epoxy only - 50 µm (top coat to be applied by customer) Note: Top coating by customer is mandatory. The epoxy layer alone does not create a tight seal and must quickly be provided with a top coat. Otherwise, rusting will occur within 14 days to 2 months under storage and/or transport conditions.	P04	-50	130	50	-	✓	-
C3		Very high (interior)	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
		Very high	Epoxy – 100 µm + polyurethane RAL 9010 – 40 µm	P67	-50	130	140	-	-	✓

¹ ISORIA 20 only

Corrosivity category Environment	Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
				Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	✓	-
		Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, light blue RAL 5012 - 80 µm	P75	-50	130	255	-	✓	-
C5	Very high	Zinc epoxy - 50 µm + epoxy - 65 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P80	-50	130	320	-	✓	-
Im1, Im2, Im3	High	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 3x135 µm	P90	-50	130	455	-	-	✓
Food chemistry	-	Polyamide 11, RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-
Submerged in drinking water	-	Epoxy ACS, WRAS, DVGW blue RAL 5005 - 2x125 µm	P26	-50	130	250	-	✓	-
EDF	-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

ISORIA 25 and MAMMOUTH

Table 4: Coating system for ISORIA 25 and MAMMOUTH

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal industrial environment	Single-coat system	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-
		-	Polyurethane or polyester, light blue RAL 5012 - 80 µm	P36	-50	130	80	-	✓	-
	Two-coat system	-	Zinc epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P29	-50	130	130	-	✓	-
		-	Zinc epoxy - 50 µm + polyurethane, light blue RAL 5012 - 80 µm	P55	-50	130	130	-	✓	-
		-	Zinc epoxy only - 50 µm (top coat to be applied by customer) Note: Top coating by customer is mandatory. The epoxy layer alone does not create a tight seal and must quickly be provided with a top coat. Otherwise, rusting will occur within 14 days to 2 months under storage and/or transport conditions. ²⁾	P04²⁾	-50	130	-	-	✓	-
C3	Very high (interior)	-	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
	High	-	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
C4	High	-	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	✓	-
		-	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, light blue RAL 5012 - 80 µm	P75	-50	130	255	-	✓	-
C5	Very high	-	Zinc epoxy - 50 µm + epoxy - 65 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P80	-50	130	320	-	✓	-
Submerged in drinking water	-	-	Epoxy ACS, WRAS, DVGW blue RAL 5005 - 2x125 µm ²⁾	P26²⁾	-50	130	250	-	✓	-
EDF	-	-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm ³⁾	PI series³⁾	-50	130	200	-	✓	-

² For ISORIA 25 only

³ MAMMOUTH only

Neck extension

Table 5: Coating system for valve neck extension

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal industrial environment	Single-coat system	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-
	Two-coat system	-	Zinc epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P29	-50	130	130	-	✓	-
		-	Zinc epoxy - 50 µm + polyurethane, light blue RAL 5012 - 80 µm	P55	-50	130	130	-	✓	-
C3		Very high (interior)	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
C4		High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	✓	-
			Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, light blue RAL 5012 - 80 µm	P75	-50	130	255	-	✓	-
C5		Very high	Zinc epoxy - 50 µm + epoxy - 65 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P80	-50	130	320	-	✓	-
Im1, Im2, Im3		High	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 3x135 µm	P90	-50	130	455	-	-	✓
Submerged in drinking water		-	Epoxy ACS, WRAS, DVGW blue RAL 5005 - 2x125 µm	P26	-50	130	250	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

Gas applications

Levers for ISORIA for gas applications

Table 6: Coating system for levers for gas applications

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Typical industrial environment	Two-coat system	-	Epoxy - 50 µm + polyurethane RAL 1023 yellow - 80 µm	P41	-50	130	130	✓	-	-

Chemical environments

KE Plastomer / KE Elastomer

Table 7: Coating system for KE Plastomer / KE Elastomer

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating:	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Typical industrial environment	Single-coat system	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-
			Phenolic epoxy RAL 7035 - 100 µm	P37	-196	230	100	-	-	✓

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating:	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Typical industrial environment	Two-coat system	-	Zinc epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P29	-50	130	130	-	✓	-
C3		Very high (interior)	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	-	✓
C4		High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	-	✓
C5		Very high	Zinc epoxy - 50 µm + epoxy - 65 µm - epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P80	-50	130	320	-	-	✓
Food chemistry		-	Polyamide 11 RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-

Offset-disc butterfly valves for industrial applications

DANAIS 150 and MT II Steel

Table 8: Coating system for DANAIS 150 and DANAIS MT II steel

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Corrosion protection treatment		-	Polyvinyl butyral primer coat (silicone-free) - 35 µm Corrosion resistance: 3 months	P17	-20	260	35	✓	-	-
Normal industrial environment	Single-coat system	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	-	✓	-
		-	Phenolic epoxy RAL 7035 - 100 µm	P37	-196	230	100	-	-	✓
	Two-coat system	-	Zinc epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P29	-50	130	130	-	✓	-
C3		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
C4		High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	-	✓
C5		Very high	Zinc epoxy - 50 µm + epoxy - 65 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P80	-50	130	320	-	-	✓

DANAIS 150 Cast iron

Table 9: Coating system for DANAIS 150 Cast iron

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
C4		High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane blue RAL 5002 - 80 µm	P70	-50	130	255	-	-	✓
C5		Very high	Zinc epoxy - 50 µm + epoxy - 65 µm - epoxy - 125 µm + polyurethane blue RAL 5002 - 80 µm	P80	-50	130	320	-	-	✓

DANAIS MT II Stainless Steel / DANAIS 150 Stainless Steel

Table 10: Coating system for DANAIS MT II Stainless steel / DANAIS 150 Stainless steel

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Anti-corrosive sur- face treatment		-	Passivation	P16	No limit		Not relev- ant	✓	-	-
Typical in- dustrial environ- ment	Single- coat sys- tem	-	Phenolic epoxy RAL 7035 - 100 µm	P37	-196	230	100	-	-	✓
	Two- coat sys- tem	-	Epoxy - 125 µm + top coat to be applied by cus- tomer	P56	-50	130	125	-	✓	-

DANAIS CRYO AIR

Table 11: Coating system for DANAIS CRYO / CRYO AIR

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Anti-corrosive sur- face treatment		-	Passivation	P16	No limit		Not relev- ant	✓	-	-
Typical in- dustrial environ- ment	Single- coat sys- tem	-	Modified titanium inorganic copolymer coating - colour: aluminium - 75 µm	P18	-196	600	75	-	-	✓
	Two- coat sys- tem	-	Epoxy - 125 µm + top coat to be applied by cus- tomer	P56	-50	130	125	-	✓	-
C3		Very high	Epoxy - 125 µm + polyurethane blue RAL 5002 - 80 µm	P64	-50	130	205	-	✓	-

BT3 / BT4 PRODUCT DANAIS HT STEEL

Table 12: Coating system for BT3 and BT4 products / DANAIS HT Steel

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Typical in- dustrial environ- ment	Single- coat sys- tem	-	Inorganic polymer coating - colour: aluminium - 75 µm	P18	-196	600	75	✓	-	-
		-	Phenolic epoxy RAL 7035 - 100 µm	P37	-196	230	100	-	-	✓
	Two- coat sys- tem	-	Zinc-ethyl silicate - 60 µm + inorganic polymer coating (colour: aluminium) 75 µm	P57	-50	400	135	-	-	✓
C3		Very high	Zinc-ethyl silicate - 60 µm + inorganic copolymer coating - 75 µm + inorganic polymer coating - colour: aluminium - 75 µm	P65	-50	400	210	-	-	✓

BT3 / BT4 PRODUCTS and DANAIS HT STAINLESS STEEL

Table 13: Coating system for BT3 and BT4 products and DANAIS HT Stainless steel

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Anti-corrosive sur- face treatment		-	Passivation	P16	No limit		Not relev- ant	✓	-	-

TRIODIS 150 - 300 - 600 STEEL

Table 14: Coating system for TRIODIS 150 / TRIODIS 300 / TRIODIS 600 Steel

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Anti-corrosive sur- face treatment		-	Vinyl butyral primer coat (silicone-free) - 35 µm Corrosion resistance: 3 months	P17	-50	260	35	✓	-	-
Typical in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	-	✓	-
		-	Phenolic epoxy RAL 7035 - 100 µm	P37	-196	230	100	-	-	✓
	Two- coat sys- tem	-	Zinc-ethyl silicate - 60 µm + inorganic polymer coating (colour: aluminium) 75 µm	P57	-50	400	135	-	✓	-
		-	Zinc epoxy - 50 µm + polyurethane blue RAL 5002 - 80 µm	P29	-50	130	130	-	✓	-
C3		Very high	Zinc-ethyl silicate - 60 µm + inorganic polymer coating - 75 µm + inorganic polymer coating - col- our: aluminium - 75 µm	P65	-50	400	210	-	✓	-
C4		High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyureth- ane blue RAL 5002 - 80 µm	P70	-50	130	255	-	-	✓
C5		Very high	Zinc epoxy - 50 µm + epoxy - 65 µm - epoxy - 125 µm + polyurethane blue RAL 5002 - 80 µm	P80	-50	130	320	-	-	✓

TRIODIS 150 - 300 - 600 STAINLESS STEEL

Table 15: Coating system for TRIODIS 150 / TRIODIS 300 / TRIODIS 600 Stainless steel

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Anti-corrosive sur- face treatment		-	Passivation	P16	No limit		Not relev- ant	✓	-	-
		-	Phenolic epoxy RAL 7035 - 100 µm	P37	-196	230	100	-	-	✓
Typical in- dustrial en- viron- ment	Single- coat sys- tem	-	Inorganic polymer coating - colour: aluminium - 75 µm	P18	-196	600	75	-	✓	-
	Two- coat sys- tem	-	Epoxy - 125 µm + top coat to be applied by cus- tomer	P56	-50	130	125	-	✓	-

Dual-plate check valve - SERIE 2000

SERIE 2000: PN16, Class 150 steel/cast iron, Class 300 steel/cast iron

Table 16: Coating system for SERIE 2000 PN16, Class 150 steel/cast iron, Class 300 steel/cast iron

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal in- dustrial en- viron- ment	Single- coat sys- tem	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-
C3		Very high (interior)	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
Submerged in drink- ing water		-	Epoxy ACS, WRAS, DVGW blue RAL 5005 - 2x125 µm	P26	-50	130	250	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy - 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

SERIE 2000: Class 150 stainless steel / Class 300 stainless steel

Table 17: Coating system for SERIE 2000 PN16, PN25, Class 150 stainless steel and SERIE 2000 Class 300 stainless steel

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Anti-corrosive surface treatment		-	Passivation	P16	No limit		Not relev- ant	✓	-	-

Levers and AMTROBOX M

S / SR / SP Levers

Table 18: Coating system for lever types S/SR/SP with flat end

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane or polyester, grey RAL 7016 - 80 µm	P28	-50	130	80	✓	-	-
Food chemistry		-	Polyamide 11, white RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

Table 19: Coating system for lever types S/SR/SP with square end to ISO 5211 (ensuring mounting in correct position)

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-
Food chemistry		-	Polyamide 11, white RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

CM Levers

Table 20: Coating system for lever type CM with flat end / square end, not marked

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Cathodic electrocoating - 25 µm + polyurethane, grey RAL 7016 - 80 µm	P58	-50	130	105	-	✓	-
C3		Medium (interior)	Cathodic electrocoating - 25 µm + epoxy GFA, black RAL 9005 - 150 µm	P35	-50	130	175	-	✓	-
		Medium	Cathodic electrocoating - 25 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P62	-50	130	155	✓	-	-
C4		High	Cathodic electrocoating - 25 µm + epoxy - 135 µm + polyurethane, grey RAL 7016 - 80 µm	P72	-50	130	240	-	✓	-
C5		High	Cathodic electrocoating - 25 µm + epoxy - 70 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P82	-50	130	300	-	✓	-
Food chemistry		-	Polyamide 11, white RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

Table 21: Coating system for lever type CM with square end to ISO 5211 (ensuring mounting in correct position)

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Cathodic electrocoating - 25 µm + polyurethane, blue RAL 5002 - 80 µm	P44	-50	130	105	-	✓	-
C3		Medium (interior)	Cathodic electrocoating - 25 µm + epoxy GFA, black RAL 9005 - 150 µm	P35	-50	130	175	-	✓	-
		Medium	Cathodic electrocoating - 25 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P47	-50	130	155	✓	-	-
C4		High	Cathodic electrocoating - 25 µm + epoxy - 135 µm + polyurethane, blue RAL 5002 - 80 µm	P76	-50	130	240	-	✓	-
C5		High	Cathodic electrocoating - 25 µm + epoxy - 70 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P86	-50	130	300	-	✓	-
Food chemistry		-	Polyamide 11, white RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

CR Levers

Table 22: Coating system for lever type CM with flat end / square end, not marked

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Typical in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane or polyester, black RAL 9011 - 80 µm	P02	-50	130	80	✓	-	-

Table 23: Coating system for lever type CM with square end, marked to ISO 5211 (ensuring mounting in correct position)

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Typical in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-

AMTROBOX M for levers

Table 24: Coating system for AMTROBOX M R1020 and R+1020 limit switch boxes

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane or polyester, grey RAL 7016 - 80 µm	P28	-50	130	80	✓	-	-
Food chemistry		-	Polyamide 11, white RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

AMTROBOX M for manual gearboxes

Table 25: Coating system for control unit types AMTROBOX M R1021 and R+1021

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Typical industrial environment	Single-coat system	-	Polyurethane or polyester, grey RAL 7016 - 80 µm	P28	-50	130	80	✓	-	-
		-	Polyurethane, black RAL 9011 - 80 µm	P02	-50	130	80	-	✓	-

MA + MS + MC + MR manual gearboxes + accessories / ACTELEC

MA

Table 26: Coating system for gearbox type MA with flat-end actuating bush

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Typical industrial environment	Single-coat system	-	Polyurethane, black RAL 9011 - 80 µm	P02	-50	130	80	✓	-	-

Table 27: Coating system for gearbox type MA with square-end actuating bush to ISO 5211

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Typical industrial environment	Single-coat system	-	Polyurethane, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-

MS

Table 28: Coating system for gearbox type MS

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Typical industrial environment	Two-coat system	-	Epoxy - 90 µm + polyurethane, blue RAL 5002 - 60 µm	P33	-50	130	150	✓	-	-

MC

Table 29: Coating system for manual gearbox type MC

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Epoxy - 90 µm + polyurethane, blue RAL 5002 - 60 µm	P33	-50	130	150	✓	-	-
	C3	Very high (interior)	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
	C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	✓	-
	C5	Very high	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, blue RAL 5002 - 80 µm	P85	-50	130	320	-	✓	-

MR 400 to 1600

Table 30: Coating system for manual gearbox types MR 400 to 1600

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Zinc epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P30	-50	130	130	✓	-	-
	C3	Very high (interior)	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P61	-50	130	180	-	✓	-
	C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P71	-50	130	255	-	✓	-
	C5 (marine)	Very high	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, grey RAL 7016 - 80 µm	P81	-50	130	320	-	✓	-
	EDF	-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

ACTELEC 31

Table 31: Coating system for ACTELEC 31

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Single- coat sys- tem	-	Polyurethane or polyester, grey RAL 7016 - 80 µm	P28	-50	130	80	✓	-	-
	Two- coat sys- tem	-	Zinc epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P30	-50	130	130	-	✓	-
	C3	Very high (interior)	Zinc epoxy - 50 µm + epoxy GFA, black RAL 9005 - 150 µm	P03	-50	130	200	-	✓	-
		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P61	-50	130	180	-	✓	-
	C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P71	-50	130	255	-	✓	-

Corrosivity category Environment	Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
				Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
C5	Very high	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, grey RAL 7016 - 80 µm	P81	-50	130	320	-	✓	-
Food chemistry	-	Polyamide 11, white RAL 9010 - 110 µm	P11	-50	130	110	-	✓	-
EDF	-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

ACTELEC 200 to 1600

Table 32: Coating system for ACTELEC 200 to 1600

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal industrial environment	Two-coat system	-	Zinc epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P30	-50	130	130	✓	-	-
C3		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P61	-50	130	180	-	✓	-
C4		High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P71	-50	130	255	-	✓	-
C5		Very high	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, grey RAL 7016 - 80 µm	P81	-50	130	320	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

Further information

Additional information for the following manual gearboxes:

- **MS, MC and EMO**

Coating of handwheel:

- For all applications in normal industrial environments the handwheel is provided with standard coating P05.
- For corrosivity categories C4 and C5 and in the case of a special coating, coating systems of identical protective levels are applied to the handwheel and the actuator.

Coating of universal joint made of steel / chain wheel / hydrant wrench:

- These accessories are provided with the standard corrosion protection coating irrespective of the actuator's coating.

- **ACTELEC 31 and ACTELEC 200 to 1600**

The coatings shown in the table only refer to the gear component of ACTELEC. The motor part is coated to corrosivity category C5, grey RAL 7037.

- **MR 400 to 1600**

Coating of handwheel:

- For all applications in normal industrial environments the handwheel is provided with standard coating P05.
- For corrosivity categories C3, C4 and C5, the PI series, and in the case of a special coating, coating systems of identical protective levels are applied to the handwheel and the actuator.

Coating of universal joint made of steel / chain wheel / hydrant wrench:

- These accessories are provided with the standard corrosion protection coating irrespective of the actuator's coating.

Deck stand for MC

Table 33: Coating system for deck stand for MC

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [μm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal industrial environment	Single-coat system	-	Polyurethane or polyester, blue RAL 5002 - 80 μm	P27	-50	130	80	✓	-	-
	Two-coat system	-	Zinc epoxy - 50 μm + polyurethane, blue RAL 5002 - 80 μm	P29	-50	130	130	-	✓	-
C3	Very high (interior)		Zinc epoxy - 50 μm + epoxy GFA, black RAL 9005 - 150 μm	P03	-50	130	200	-	✓	-
	High		Zinc epoxy - 50 μm + epoxy - 50 μm + polyurethane, blue RAL 5002 - 80 μm	P60	-50	130	180	-	✓	-
C4	High		Zinc epoxy - 50 μm + epoxy - 125 μm + polyurethane, blue RAL 5002 - 80 μm	P70	-50	130	255	-	✓	-
C5	Very high		Zinc epoxy - 50 μm + epoxy - 50 μm + epoxy - 140 μm + polyurethane, blue RAL 5002 - 80 μm	P85	-50	130	320	-	✓	-
Food chemistry		-	Polyamide 11, white RAL 9010 - 110 μm	P11	-50	130	110	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 μm 1 epoxy top coat - 60 μm	PI series	-50	130	200	-	✓	-

Deck stand for MR 400 to 1600

Table 34: Coating system for deck stand for MR 400 to 1600

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [μm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal industrial environment	Single-coat system	-	Polyurethane or polyester, grey RAL 7016 - 80 μm	P28	-50	130	80	✓	-	-
	Two-coat system	-	Zinc epoxy - 50 μm + polyurethane, grey RAL 7016 - 80 μm	P30	-50	130	130	-	✓	-
C3	Very high (interior)		Zinc epoxy - 50 μm + epoxy GFA, black RAL 9005 - 150 μm	P03	-50	130	200	-	✓	-
	High		Zinc epoxy - 50 μm + epoxy - 50 μm + polyurethane, grey RAL 7016 - 80 μm	P61	-50	130	180	-	✓	-
C4	High		Zinc epoxy - 50 μm + epoxy - 125 μm + polyurethane, grey RAL 7016 - 80 μm	P71	-50	130	255	-	✓	-
C5	Very high		Zinc epoxy - 50 μm + epoxy - 50 μm + epoxy - 140 μm + polyurethane, grey RAL 7016 - 80 μm	P81	-50	130	320	-	✓	-
Food chemistry		-	Polyamide 11, white RAL 9010 - 110 μm	P11	-50	130	110	-	✓	-
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 μm 1 epoxy top coat - 60 μm	PI series	-50	130	200	-	✓	-

Pneumatic actuator types ACTAIR EVO / DYNACTAIR EVO + accessories

ACTAIR EVO 1 to 160 / DYNACTAIR EVO 1 to 80

Table 35: Coating system for pneumatic actuator types ACTAIR EVO 1 to 160 and DYNACTAIR EVO 1 to 80

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating ⁴⁾	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal in- dustrial environ- ment	Single- coat sys- tem	-	Gear housing anodised - 20 µm + end caps with blue polyurethane coating RAL 5002 - 150 µm	P42	-50	150	20	✓	-	-
		-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	-	✓	-
		(Interior)	Epoxy GFA, black RAL 9005 - 150 µm	P53	-50	130	150	-	✓	-
	Two- coat sys- tem	-	Epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P48	-50	130	130	-	✓	-
C4		Very high	Epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P77	-50	130	205	-	✓	-
C5		Very high	Epoxy - 70 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P87	-50	130	275	-	✓	-
Chemistry / food chemistry		-	Phenolic epoxy, grey RAL 7035 - 2x80 µm	P12	-50	130	160	-	✓	-

ACTAIR EVO 240 to 700 / DYNACTAIR EVO 120 to 350

Table 36: Coating system for pneumatic actuator types ACTAIR EVO 240 to 700 and DYNACTAIR EVO 120 to 350

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating ⁵⁾	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal in- dustrial environ- ment	Single- coat sys- tem	-	Gear housing anodised - 20 µm + middle cylinder anodised, black - 20 µm + end caps with blue polyurethane coating RAL 5002 - 150 µm	P45	-50	150	20	✓	-	-
		(Interior)	Epoxy GFA, black RAL 9005 - 150 µm	P53	-50	130	150	-	✓	-
	Two- coat sys- tem	-	Epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P48	-50	130	130	-	✓	-
C4		Very high	Epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P77	-50	130	205	-	✓	-
C5		Very high	Epoxy - 70 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P87	-50	130	275	-	✓	-
Chemistry / food chemistry		-	Phenolic epoxy, grey RAL 7035 - 2x80 µm	P12	-50	130	160	-	✓	-

⁴ The gear housing surfaces of these actuators are anodised, film thickness: 20 µm.

⁵ The gear housing surfaces of these actuators are anodised, film thickness: 20 µm.

ACTAIR 400 to 1600 / DYNACTAIR 200 to 800

Table 37: Coating system for pneumatic actuator types ACTAIR 400 to 1600 and DYNACTAIR 200 to 800

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system			
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options	
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Zinc epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P30	-50	130	130	✓	-	-	
		C3	Medium	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P61	-50	130	180	-	✓	-
		C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P71	-50	130	255	-	✓	-
		C5	Very high	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, grey RAL 7016 - 80 µm	P81	-50	130	320	-	✓	-
		EDF	-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

Hydraulic actuators and accessories

HQ EVO 10 to 1600 + hydraulic control systems

Table 38: Coating system for hydraulic actuator type HQ EVO + hydraulic control systems

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Cathodic electrocoating - 25 µm + polyurethane, blue RAL 5002 - 80 µm	P44	-50	130	105	✓	-	-
		-	Cathodic electrocoating - 25 µm + epoxy, blue RAL 5002 - 125 µm	P43	-50	130	150	-	✓	-
C3	Medium (interior)	Medium	Cathodic electrocoating - 25 µm + epoxy GFA, black RAL 9005 - 150 µm	P35	-50	130	175	-	✓	-
		Medium	Cathodic electrocoating - 25 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P47	-50	130	155	-	✓	-
C4	High	High	Cathodic electrocoating - 25 µm + epoxy - 135 µm + polyurethane, blue RAL 5002 - 80 µm	P76	-50	130	240	-	✓	-
C5	High	High	Cathodic electrocoating - 25 µm + epoxy - 70 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P86	-50	130	300	-	✓	-
EDF	-	-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

Hydraulic hand pump, portable / stationary

Table 39: Coating system for hydraulic hand pump

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Zinc epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P29	-50	130	130	✓	-	-
	C3	High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
	C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	✓	-
	C5	High	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, blue RAL 5002 - 80 µm	P85	-50	130	320	-	-	✓
	EDF	-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

Additional information on hydraulic actuator type HQ EVO

All coatings are applied before final customisation of the fitted and tested actuator.

The coating of the hand pump is identical to that of the actuator.

Example: If HQ EVO is coated to C3/P47, the hand pump is coated to C3/P60.

EMO declutchable manual override

Table 40: Coating system for manual override type EMO 0 to 4

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Epoxy - 90 µm + polyurethane, blue RAL 5002 - 60 µm	P33	-50	130	150	✓	-	-
	C3	High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
	C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	✓	-
	C5	High	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, blue RAL 5002 - 80 µm	P85	-50	130	320	-	✓	-
	Chemistry / food chemistry	-	Phenolic epoxy, grey RAL 7035 - 2x80 µm	P12	-50	130	160	-	✓	-

Table 41: Coating system for manual override type EMO 5 to 7

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal industrial environment	Two-coat system	-	Zinc epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P29	-50	130	130	✓	-	-
	C3	High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, blue RAL 5002 - 80 µm	P60	-50	130	180	-	✓	-
	C4	High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, blue RAL 5002 - 80 µm	P70	-50	130	255	-	✓	-
	C5	High	Zinc epoxy - 50 µm + epoxy - 50 µm + epoxy - 140 µm + polyurethane, blue RAL 5002 - 80 µm	P85	-50	130	320	-	✓	-
	Chemistry / food chemistry	-	Phenolic epoxy, grey RAL 7035 - 2x80 µm	P12	-50	130	160	-	✓	-

Further information

Note:

All coatings are applied before final customisation of the fitted and tested actuator.

The coating of the EMO manual override is identical to that of the actuator.

Example: If HQ EVO is coated to C3/P47, the EMO manual override is coated to C3/P60.

Control units

AMTROBOX

Table 42: Coating system for AMTROBOX limit switch box

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options
Normal industrial environment	Single-coat system ⁶⁾	-	Cathodic electrocoating, black - 25 µm	P50	-50	130	30	✓	-	-
	C3 ⁷⁾	Medium (interior)	Cathodic electrocoating - 25 µm + epoxy GFA, black RAL 9005 - 150 µm	P35	-50	130	175	-	✓	-
		Medium	Cathodic electrocoating - 25 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P62	-50	130	155	-	✓	-
	C4 ⁷⁾	High	Cathodic electrocoating - 25 µm + epoxy - 135 µm + polyurethane, grey RAL 7016 - 80 µm	P72	-50	130	240	-	✓	-
	C5 ⁷⁾	High	Cathodic electrocoating - 25 µm + epoxy - 70 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P82	-50	130	300	-	✓	-
Chemistry / food chemistry ⁶⁾		-	Phenolic epoxy, grey RAL 7035 - 2x80 µm	P12	-50	130	160	-	✓	-
EDF ⁷⁾		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-

⁶ Coating of cover only

⁷ Coating of base and cover

AMTROBOX R

Table 43: Coating system for AMTROBOX R limit switch box

Corrosivity category Environment		Durability to EN ISO 12 944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system			
					Min. [°C]	Max. [°C]		Standard	Config- urable options	Options	
Normal in- dustrial environ- ment	Two- coat sys- tem	-	Cathodic electrocoating - 25 µm + polyurethane, grey RAL 7016 - 80 µm	P58	-50	130	105	✓	-	-	
		-	Cathodic electrocoating - 25 µm + epoxy, grey RAL 7016 - 125 µm	P52	-50	130	150	-	✓	-	
C3		Medium (interior)	Cathodic electrocoating - 25 µm + epoxy GFA, black RAL 9005 - 150 µm	P35	-50	130	175	-	✓	-	
		Medium	Cathodic electrocoating - 25 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P62	-50	130	155	-	✓	-	
C4		High	Cathodic electrocoating - 25 µm + epoxy - 135 µm + polyurethane, grey RAL 7016 - 80 µm	P72	-50	130	240	-	✓	-	
C5		High	Cathodic electrocoating - 25 µm + epoxy - 70 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P82	-50	130	300	-	✓	-	
EDF		-	Black EDF SP429 - 50212 RAL 9005 2 epoxy 2x70 µm 1 epoxy top coat - 60 µm	PI series	-50	130	200	-	✓	-	

AMTROBOX R Ex ia

Table 44: Coating system for control unit type AMTROBOX R Ex ia

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Typical industrial environment	Two-coat system	-	Cathodic electrocoating - 25 µm + polyurethane, grey RAL 7016 - 80 µm	P58	-50	130	105	✓	-	-
		-	Cathodic electrocoating - 25 µm + epoxy, grey RAL 7016 - 125 µm	P52	-50	130	150	-	✓	-
C3		Medium (interior)	Cathodic electrocoating - 25 µm + epoxy GFA, black RAL 9005 - 150 µm	P35	-50	130	175	-	✓	-
		Medium	Cathodic electrocoating - 25 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P62	-50	130	155	-	✓	-

AMTROBOX X1140 / X1149

Table 45: Coating system for control unit types AMTROBOX X1140 / X1149 (ATEX-compliant version)

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configurable options	Options
Typical industrial environment	Single-coat system	-	Cathodic electrocoating, black - 25 mm	P50	-50	130	25	✓	-	-
	C3		Medium (interior)	Cathodic electrocoating - 25 µm + epoxy GFA, black RAL 9005 - 150 µm	P35	-50	130	175	-	✓
		Medium	Cathodic electrocoating - 25 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P62	-50	130	155	-	✓	-
Chemistry / food chemistry		-	Phenolic epoxy, grey RAL 7035 – 2x80 µm	P12	-50	130	160	-	✓	-

Actuator/valve interface

For all applications in normal industrial environments the flange or spacer ring is provided with the standard protective coating.

For corrosivity categories C3, C4 and C5 (coating P11, PI series, chemistry/food chemistry applications, special coating) the coating system of the flange or spacer ring is identical to that of the actuator. Exceptions are installation kit parts made of stainless steel.

Actuator/control unit interface

For all applications in normal industrial environments the flange or spacer ring is provided with the standard protective coating.

For corrosivity categories C3, C4 and C5 (coating P11, PI series, chemistry/food chemistry applications, special coating) the coating system of the flange or spacer ring is identical to that of the actuator. Exceptions are installation kit parts made of stainless steel.

OXYRIA

Table 46: Coating system for OXYRIA

Corrosivity category Environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Typical industrial environment	Single-coat system	-	Polyurethane or polyester, blue RAL 5002 - 80 µm	P27	-50	130	80	✓	-	-

Actuators with counterweight

Table 47: Coating system for actuator with counterweight

Corrosivity category of environment		Durability to EN ISO 12944-5	Coating	Code	Temperature		Nominal dry film thickness [µm]	Coating system		
					Min. [°C]	Max. [°C]		Standard	Configur- able options	Options
Typical industrial environment	Two-coat system	-	Zinc epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P30	-50	130	130	✓	-	-
C3		High	Zinc epoxy - 50 µm + epoxy - 50 µm + polyurethane, grey RAL 7016 - 80 µm	P61	-50	130	180	-	✓	-
C4		High	Zinc epoxy - 50 µm + epoxy - 125 µm + polyurethane, grey RAL 7016 - 80 µm	P71	-50	130	255	-	✓	-
C5		Very high	Zinc epoxy - 50 µm + epoxy - 50 µm - epoxy - 140 µm + polyurethane, grey RAL 7016 - 80 µm	P81	-50	130	320	-	✓	-

Coatings / specific applications

This section covers protective coatings for external surfaces which are mandatory for specific constructions/applications. Examples:

Submerged in drinking water

Two-component epoxy resin coating:

- Code: P26
- Colour: blue RAL 5005
- Total film thickness: 250 µm (2x125 µm)
- This coating is certified to **ACS, WRAS, DVGW (UBA + W270)**.
- Used for:
 - The bodies of butterfly valve type ISORIA 10/16/20/25 (version S31)
 - The bodies of check valve type SERIE 2000 PN 16 / Class 150 steel / Class 300 steel
 - Valve neck extension

Special requirements

Other coating systems are available on request and/or according to customer's specification.

Examples:

- Different top coat colour.
In this case, the standard primer and standard intermediate coat(s) are applied.
Only the top coat differs.
- Special single-coat and multi-coat systems (specified coating type and manufacturer, film thickness, etc.)

Cathodic protection

If cathodic protection is requested by the customer, a zinc-rich primer and suitable surface preparation (blasting treatment) are required.

Application not possible

Zinc-rich primer cannot be applied to the following:

- Parts made of aluminium: not technically feasible.
- Parts pre-treated with cathodic electrocoating: not technically feasible.
In this case, mechanical stripping must be performed before applying the coat of zinc.
Consult us for details.

Coating of bought-in products

Bought-in products are regarded as complete products and/or integrated into our products:

- AUMA multi-turn actuator
- Positioners, other than SMARTRONIC
- NAMUR or ISO directional control valves
- Limit switch boxes on VDI/VDE brackets
- Pneumatic equipment
- Electric or pneumatic actuator as specified / according to customer's specification
- etc.

These products are supplied with the manufacturer's standard coating.

Please consult us for special requirements.

Supplementary technical information

Hard anodisation on gear housings of ACTAIR EVO / DYNACTAIR EVO

Besides offering excellent protection against corrosion (salt spray testing to NF X41-002), hard anodisation provides treated surfaces with greater resistance to wear and friction.

It uses a low-temperature electrolytic process to modify the properties of the metal.

The surface layer of the aluminium alloy is transformed into aluminium oxide with a thickness of between 20 and 80 µm and a hardness of 350 to 600 Vickers.

Thanks to its high durability and abrasion resistance, it can be used in adverse conditions (high temperatures, friction, electric insulation).

One or more coats can be applied to surfaces that are pre-treated in this way, **except zinc-based coating materials as these are not compatible with aluminium alloys.**

Cataphoretic coating

The cataphoretic coating process is based on a coating material in an aqueous solution which acts like an electrolyte. The coating particles migrate onto the part to be coated and are deposited to form a protective coating of uniform thickness.

The organic epoxy coating, which is 25 to 30 µm thick, provides the parts with an extraordinary level of corrosion resistance and

- excellent resistance to chemicals as well as excellent corrosion behaviour (salt spray testing to NFX 41-002),
- good resistance to solvents and insulating characteristics,
- good mechanical properties, etc.

This elastic coating is insensitive to scratches and impacts.

One or more coats of paint can be applied, **except zinc-based coating materials, which are not compatible with aluminium alloys.**



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