Nidec Power

TECHNICAL NOTE

TN18

PAINTING SYSTEM SELECTION

Valid for LSA 52, 53, 54, 55, 56, 58, 60 and 62 alternators

The purpose of this document is to help in the selection process of a painting system for Leroy-Somer™ generators. Paint is an essential protective component for alternators, and it must be carefully selected to suit the operating conditions and location of the generator.

An alternator environment can range from heated indoor rooms to outdoor ship decks. Humidity, dust density, pollution and temperature can vary from one extreme to another.

Nidec Power painting systems have been specifically designed to address all environmental challenges.

ENVIRONMENT CLASSIFICATION

ISO standard 12944-2[1] classifies corrosivity severity according to mass loss of unpainted steel or zinc exposed one year on the site. Corrosivity categories can be identified using the table below, which is applicable to temperate climate regions.

Location and corrosivity description according to ISO 12944-2:

Corrosivity category	Mass & surface loss of low-carbon steel (after first year of exposure)		Examples of typical environments (temperate climate)	
	Mass loss (g/m^2)	Thickness loss (µm)	Exterior	Interior
C1 very low	≤ 10	≤ 1.3	-	Heated buildings with clean atmospheres, e.g. offices, shops, schools, hotels.
C2 low	> 10 to 200	> 1.3 to 25	Atmospheres with low level of pollution. Mostly rural areas.	Unheated buildings where condensation may occur, e.g. depots, sport halls.
C3 medium	> 200 to 400	> 25 to 50	Urban and industrial atmospheres, moderate sulfur dioxide pollution. Coastal areas with low salinity.	Production rooms with high humidity and some air pollution e.g. food processing plants, laundries, breweries, dairies.
C4 high	> 400 to 650	> 50 to 80	Industrial areas and coastal areas with moderate salinity.	Chemical plants, swimming polls, coastal ship-and boatyards.
CX very high (marine)	> 650 to 1500	> 80 to 200	Coastal and offshore areas with high salinity.	Buildings or areas with almost permanent condensation and with high pollution.

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

NIDEC POWER PAINTING SYSTEM

Nidec Power uses different painting systems to cover the different environments in which alternators are used. C3M painting system is the standard for large alternators.

Location		System name	Surface preparation	Primer coat	Top coat	Total thickness (µm)
		PE(2)	Powered sanding (St 2)	1	-	70
Onshore inland	Indoor(1)	**C3M**(3)		1	1	80
Onshore coastal	Indoor(1)	**C3H**		1	1	120
Onshore inland	Outdoor	**C3H-250**	Grit blasting (Sa 2 ½)	2	1	250
Offshore or Harsh environments	Indoor(1)					
Offshore or Onshore coastal	Outdoor	**CX**		2	1	350
Nuclear applications	Indoor(1)	**FNP**		2	1	120

(1) Indoor includes location in single protection roof or side open containers.
(2) PE: Primer coat only - To be top coated by customer, the location and durability correspondence of the complete system to be checked by customer.
(3) C3M is Nidec Power standard system (RAL 7032).

SURFACE PREPARATION

Nidec Power works with two surface preparations in accordance with ISO 8501-1:

- St 2 - thorough hand and powered sanding - is used to prepare metallic surfaces in case of a normal to mild-aggressive environment situation.
- Sa 2 ½ - very thorough grit blasting – is used to prepare the machine for harsh and outdoor environments.

Sa 2½ Blast cleaning with grit abrasives is a very complete treatment that includes:

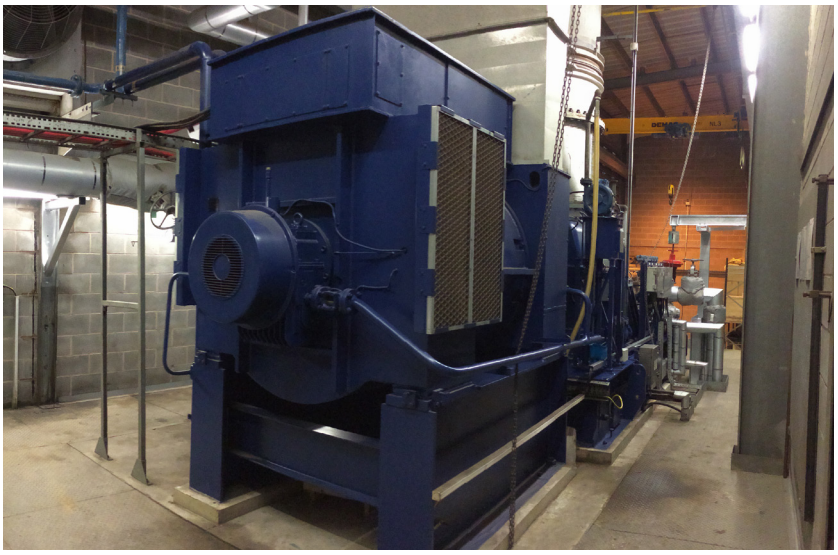
- Angles, Surfaces and welding: Grade P1 according to ISO 8501-3[2] - this means that all sharp edges and imperfections will be smoothed out to reduce over-exposed areas.
- Roughness: Medium (G) according to ISO 8503-1[3]

PAINT SPECIFICATION

- Primer: zinc rich epoxy paint
- Top coat: polyurethane paint

Nidec Power standard top coat color is RAL 7032. The complete RAL color chart is available as option, so the top coat color can be selected for the right integration of the generator in its environment.

We use only environment- and user-friendly low Volatile Organic Content (VOC) paints. All our paints (Primer, Intermediate and Top) are isocyanate acid free (CAS n° 75-13-8).



SPECIAL COMPONENTS FOR HARSH ENVIRONMENTS

When generator paint system is C3H-250 or CX, auxiliary terminal boxes are delivered in stainless steel, and auxiliary motors and accessories are compliant with the chosen generator paint system.

[2] ISO 8501-3: Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 3 Preparation grades of welds, cut edges and other areas with surface imperfections

[3] 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