

2009

ISO 12944-6

CERTIFICATION

Paint and varnishes – Corrosion protection of steel structures by protective paint systems.

Laboratory performance tests and assessment.

SELEMIX SYSTEM PAINT

- 2K High build anticorrosive epoxy primer code 2.704.0440
- 2K high build acrylic topcoat code 1.771.1300

STAZIONE SPERIMENTALE PER LE INDUSTRIE
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31/03/2009



GENERAL INFORMATIONSAMPLE DESCRIPTION : **PAINT SYSTEM FOR CORROSION PROTECTION**PURCHASER: **PPG ITALIA BUSINESS SUPPORT SRL
RESEARCH & DEVELOPMENT LABORATORY
VIA COMASINA, 121
20161 MILAN - ITALY**IDENTIFICATION: **SELEMIX SYSTEM PAINT**CORROSION CATEGORY TARGET: **C5****TEST PANELS**

Zinc galvanized steel according to point 5.1.2

- size: 150x100 mm
- thickness: 3.5 mm

PROTECTIVE PAINT SYSTEM DESCRIPTION

	Product code	Colour	Commercial name	NDFT (μm)
1st Coat	2.704.0440	grey	2K High build anticorrosive epoxy primer	150
2nd Coat	1.771.1300	black	2K High build acrylic topcoat	120

Total NDFT (μm)**270**

APPLICATION AND CONDITIONING/DRYING/ CURING

Test panels coated and cured by the paint manufacturer (purchaser).

The coated test panels are conditioned for three weeks at a variable temperature of $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ relative humidity as defined in ISO 554, before testing. Substrate, protective paint system and conditioning description are stated by the paint manufacturer.

DESCRIPTION AND DURATION OF TEST CARRIED OUT

TEST REGIME	TEST	METHOD	START DATE	END DATE
1	THICKNESS	ISO 2808	10/11/2008	10/11/2008
1	ADESION BEFORE EXPOSURE	ISO 4624	11/11/2008	12/11/2008
1	NEUTRAL SALT SPRAY	ISO 9227	21/11/2008	19/02/2009
1	EVALUATION AFTER SALT FOG	ISO 4628 -2/5	21/11/2008	19/02/2009
1	ADESION AFTER SALT FOG	ISO 4624	19/02/2009	20/02/2009
1	WATER CONDENSATION	6270-1	21/11/2008	22/12/2008
1	EVALUATION AFTER HUMIDITY	ISO 4628 -2/5	21/11/2008	22/12/2008
1	ADESION AFTER HUMIDITY	ISO 4624	22/12/2008	23/12/2008
1	CHEMICAL RESISTANCE	ISO 2812-1	27/02/2008	06/03/2008
1	EVALUATION AFTER CHEMICAL RESISTANCE	ISO 4628 -2/5	06/03/2008	06/03/2008

DETERMINATION OF FILM THICKNESS (ISO 2808 – 2007)

METHOD 7B – MAGNETIC-FLUX GAUGE



Sample n.	Readings	Thickness (μm)	Mean value (μm)	Min (μm)	Max (μm)	DFT < 1.2 NDTF
1	1	187	198	187	211	COMPLY
	2	190				
	3	203				
	4	211				
	5	197				
2	1	198	193	184	200	COMPLY
	2	196				
	3	184				
	4	186				
	5	200				
3	1	184	186	178	197	COMPLY
	2	197				
	3	178				
	4	189				
	5	181				
4	1	181	186	178	193	COMPLY
	2	178				
	3	193				
	4	189				
	5	190				
5	1	220	209	199	220	COMPLY
	2	218				
	3	201				
	4	206				
	5	199				
6	1	201	199	183	212	COMPLY
	2	193				
	3	212				
	4	183				
	5	206				
7	1	186	194	185	207	COMPLY
	2	203				
	3	185				
	4	189				
	5	207				
8	1	213	200	188	213	COMPLY
	2	211				
	3	188				
	4	197				
	5	189				
9	1	170	182	170	191	COMPLY
	2	191				
	3	180				
	4	180				
	5	187				
10	1	213	199	191	213	COMPLY
	2	202				
	3	195				
	4	191				
	5	192				

**RESISTANCE TO NEUTRAL SALT SPRAY
(ISO 9227 - 2006)**Test conditions

- Chamber temperature 35 +/- 2 °C
- Test panels conditions scored
- Exposure period 2160 h
- Salt solution 5% NaCl
- Sample inclination to vertical direction 25°

Visual assessment after exposure

- Blistering immediately assessed (ISO 4628-2) 0(S0)
- Rusting immediately assessed (ISO 4628-3) Ri0
- Cracking immediately assessed (ISO 4628-4) 0(S0)
- Flaking immediately assessed (ISO 4628-5) 0(S0)

**RESISTANCE TO WATER CONDENSATION
(ISO 6270/1 - 1998)**Test conditions

- Chamber temperature 38 +/- 2 °C
- Exposure period 720 h
- Chamber humidity 100 %
- Sample inclination to vertical direction 25°

Visual assessment after exposure

- Blistering immediately assessed (ISO 4628-2) 0(S0)
- Rusting immediately assessed (ISO 4628-3) Ri0
- Cracking immediately assessed (ISO 4628-4) 0(S0)
- Flaking immediately assessed (ISO 4628-5) 0(S0)



**RESISTANCE TO CHEMICALS
(ISO 2812-1 - 2007)**

Test conditions

- Test temperature 23 +/- 2 °C
- Contact liquids 10 % NaOH aqueous solution (m/m)
10 % H₂SO₄ aqueous solution (m/m)
Mineral spirit (aromatics content 18% v/v)
- Test duration 168 h

Visual assessment after exposure to NaOH solution

- Blistering immediately assessed (ISO 4628-2) 0(S0)
- Rusting immediately assessed (ISO 4628-3) Ri0
- Cracking immediately assessed (ISO 4628-4) 0(S0)
- Flaking immediately assessed (ISO 4628-5) 0(S0)

Visual assessment after exposure to H₂SO₄ solution

- Blistering immediately assessed (ISO 4628-2) 0(S0)
- Rusting immediately assessed (ISO 4628-3) Ri0
- Cracking immediately assessed (ISO 4628-4) 0(S0)
- Flaking immediately assessed (ISO 4628-5) 0(S0)

Visual assessment after exposure to mineral spirit

- Blistering immediately assessed (ISO 4628-2) 0(S0)
- Rusting immediately assessed (ISO 4628-3) Ri0
- Cracking immediately assessed (ISO 4628-4) 0(S0)
- Flaking immediately assessed (ISO 4628-5) 0(S0)

**ADHESION
(ISO 4624 - 2002)**

Test conditions

- Apparatus POSITEST
- Adhesive type two-component adhesive UHU PLUS

Test	Mean value (MPa)	Type of detachment
Adhesion before exposure	8.7	100% B
Adhesion after neutral salt fog	9.2	95% B - 5% C
Adhesion after water condensation test	8.6	80% B - 20% C

DETACHMENTS LEGEND

- A = cohesive failure of substrate
- A/B = adhesive failure between substrate and first coat
- B = cohesive failure of first coat
- B/C = adhesive failure between first and second coats
- C = cohesive failure of second coat
- C/D = adhesive failure between second and third coats
- D = cohesive failure of third coat
- /Y = adhesive failure between coat and adhesive
- Y = cohesive failure of adhesive
- Y/Z = adhesive failure between adhesive and dolly

ASSESSMENT OF ESSENTIAL TEST

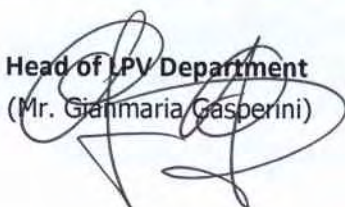
TEST REGIME	TEST	METHOD	REQUIREMENT	LABORATORY PERFORMANCE ASSESSMENT
1	THICKNESS	ISO 2808	DFT < 1.2 NDTF	COMPLY
1	ADESION BEFORE EXPOSURE	ISO 4624	> 5.0 MPa	COMPLY

ASSESSMENT OF CORROSION CATEGORY

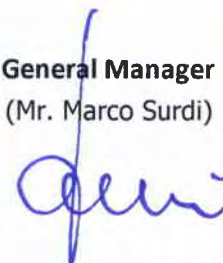
TEST REGIME	TEST	METHOD	CORROSION CATEGORY TARGET	LABORATORY PERFORMANCE ASSESSMENT
1	NEUTRAL SALT SPRAY	ISO 9227	C5-I High C5-M High	COMPLY
1	EVALUATION AFTER SALT FOG	ISO 4628 -2/5	C5-I High C5-M High	COMPLY
1	ADESION AFTER SALT FOG	ISO 4624	C5-I High C5-M High	COMPLY
1	WATER CONDENSATION	6270-1	C5-I High C5-M High	COMPLY
1	EVALUATION AFTER HUMIDITY	ISO 4628 -2/5	C5-I High C5-M High	COMPLY
1	ADESION AFTER HUMIDITY	ISO 4624	C5-I High C5-M High	COMPLY
1	CHEMICAL RESISTANCE	ISO 2812-1	C5-I High C5-M High	COMPLY
1	EVALUATION AFTER CHEMICAL RESISTANCE	ISO 4628 -2/5	C5-I High C5-M High	COMPLY

WE CERTIFY THAT SELEMIX SYSTEM PAINT ABOVE DESCRIBED PASSED ALL THE TESTS IN ACCORDANCE TO ISO 12944-6 FOR THE CORROSION CATEGORY C5-I AND C5-M - DURABILITY RANGE HIGH

Head of LPV Department
(Mr. Gianmaria Gasperini)



General Manager
(Mr. Marco Surdi)



ANNEX 1 – DIGITAL PHOTOS

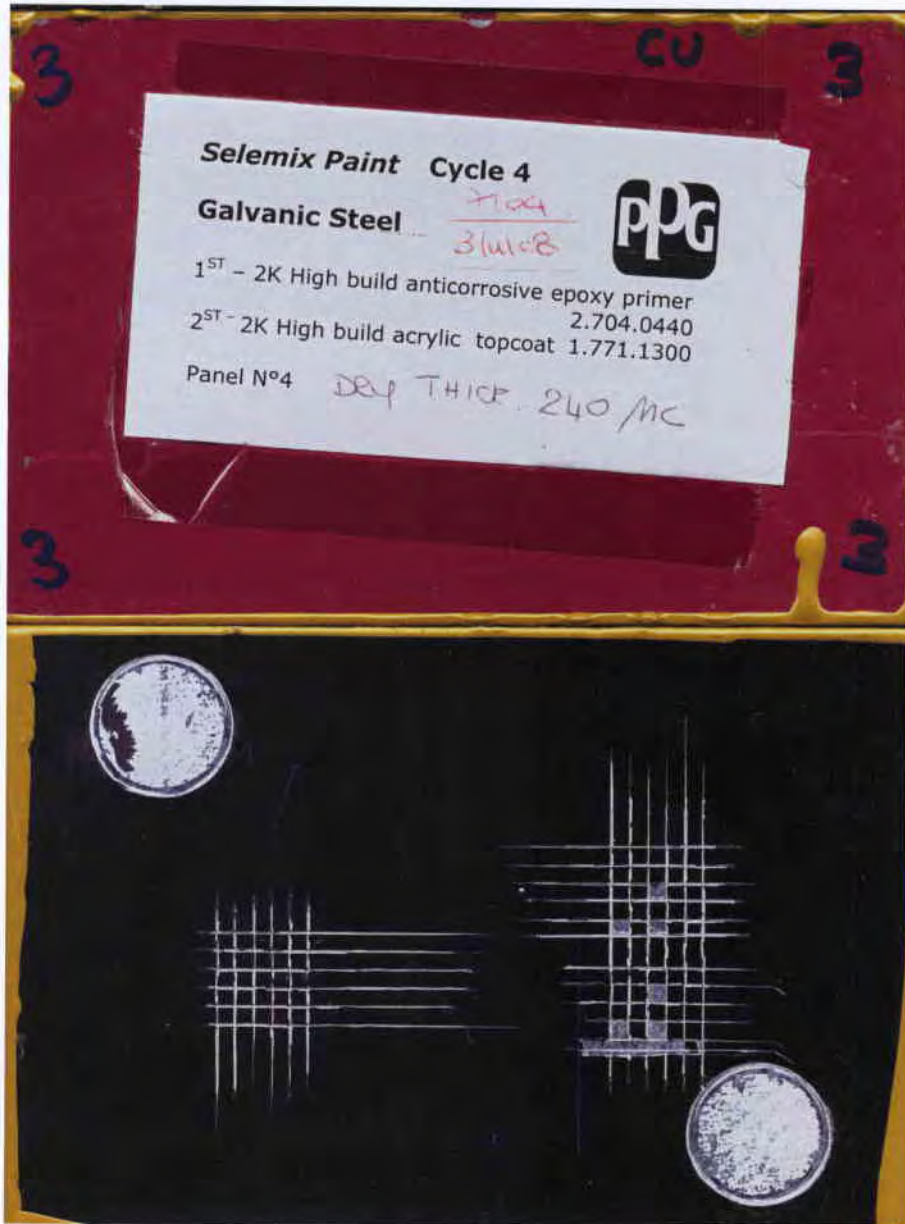


Fig.1 – Original samples

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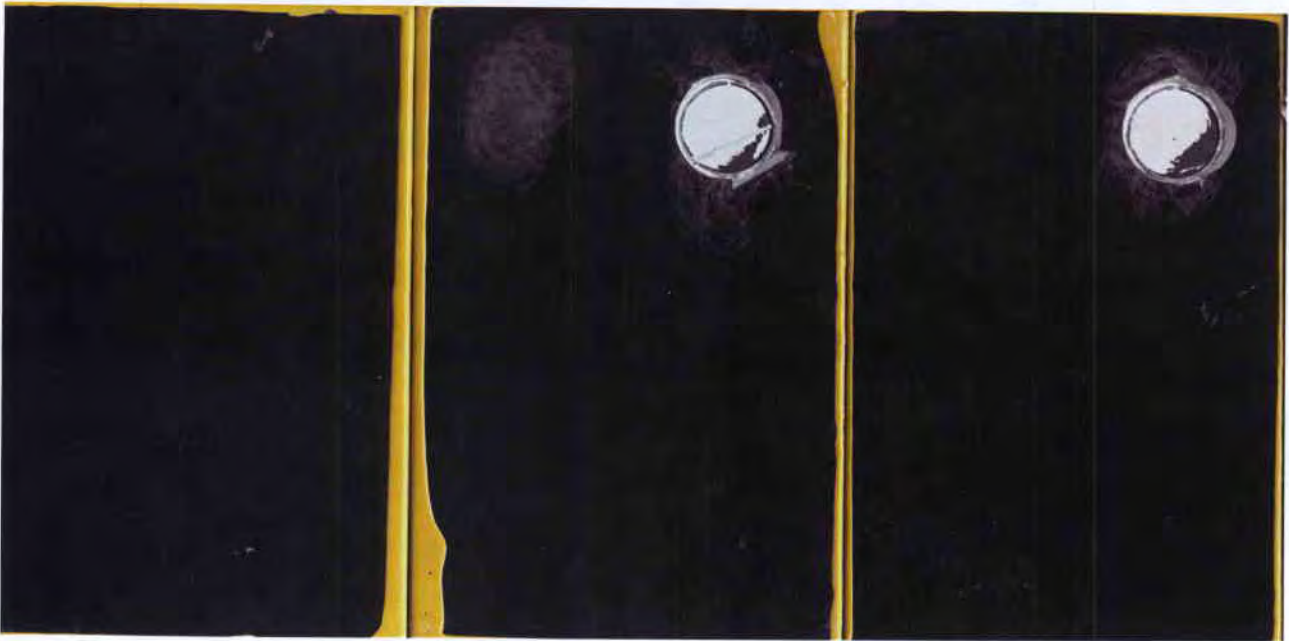


Fig. 2 – Assessment of samples before and after natural salt fog



Fig. 3 - Evaluation of samples after water condensation test

