

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 PUR extra topcoat code 1.775.1200

STAZIONE SPERIMENTALE PER LE INDUSTRIE  
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31/03/2009



**GENERAL INFORMATION**SAMPLE 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 ( $\mu\text{m}$ )
<b>1<sup>st</sup> Coat</b>	2.704.0440	grey	2K High build anticorrosive epoxy primer	170
<b>2<sup>rd</sup> Coat</b>	1.775.1200	black	2K PUR extra topcoat	80

**Total NDFT ( $\mu\text{m}$ )****250**

**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 ( $\mu\text{m}$ )	Mean value ( $\mu\text{m}$ )	Min ( $\mu\text{m}$ )	Max ( $\mu\text{m}$ )	DFT < 1.2 NDTF
1	1	192	200	192	212	COMPLY
	2	203				
	3	199				
	4	192				
	5	212				
2	1	212	206	196	216	COMPLY
	2	216				
	3	198				
	4	196				
	5	210				
3	1	199	222	199	242	COMPLY
	2	240				
	3	210				
	4	242				
	5	220				
4	1	192	188	174	197	COMPLY
	2	197				
	3	174				
	4	194				
	5	183				
5	1	217	218	205	234	COMPLY
	2	205				
	3	234				
	4	221				
	5	214				
6	1	186	192	186	200	COMPLY
	2	190				
	3	200				
	4	196				
	5	189				
7	1	198	205	198	219	COMPLY
	2	204				
	3	200				
	4	204				
	5	219				
8	1	237	231	212	244	COMPLY
	2	244				
	3	226				
	4	212				
	5	234				
9	1	196	221	196	240	COMPLY
	2	205				
	3	234				
	4	240				
	5	231				
10	1	229	227	214	233	COMPLY
	2	233				
	3	214				
	4	228				
	5	230				

**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 % H<sub>2</sub>SO<sub>4</sub> 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 H<sub>2</sub>SO<sub>4</sub> 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	6.1	70% A/B – 30% C
Adhesion after neutral salt fog	7.3	60% C – 40% A/B
Adhesion after water condensation test	10.6	10% A/B – 90% 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**

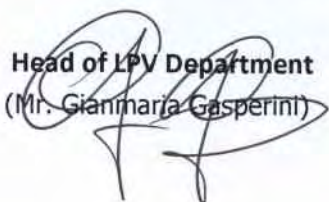
TEST REGIME	TEST	METHOD	REQUIREMENT	LABORATORY PERFORMANCE ASSESSMENT
1	THICKNESS	ISO 2808	DFT < 1.2 NDTF	<b>COMPLY</b>
1	ADESION BEFORE EXPOSURE	ISO 4624	> 5.0 MPa	<b>COMPLY</b>

**ASSESSMENT OF CORROSION CATEGORY**

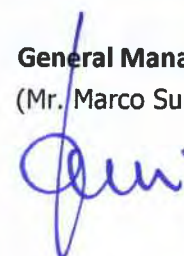
TEST REGIME	TEST	METHOD	CORROSION CATEGORY TARGET	LABORATORY PERFORMANCE ASSESSMENT
1	NEUTRAL SALT SPRAY	ISO 9227	C5-I High C5-M High	<b>COMPLY</b>
1	EVALUATION AFTER SALT FOG	ISO 4628 -2/5	C5-I High C5-M High	<b>COMPLY</b>
1	ADESION AFTER SALT FOG	ISO 4624	C5-I High C5-M High	<b>COMPLY</b>
1	WATER CONDENSATION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

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)



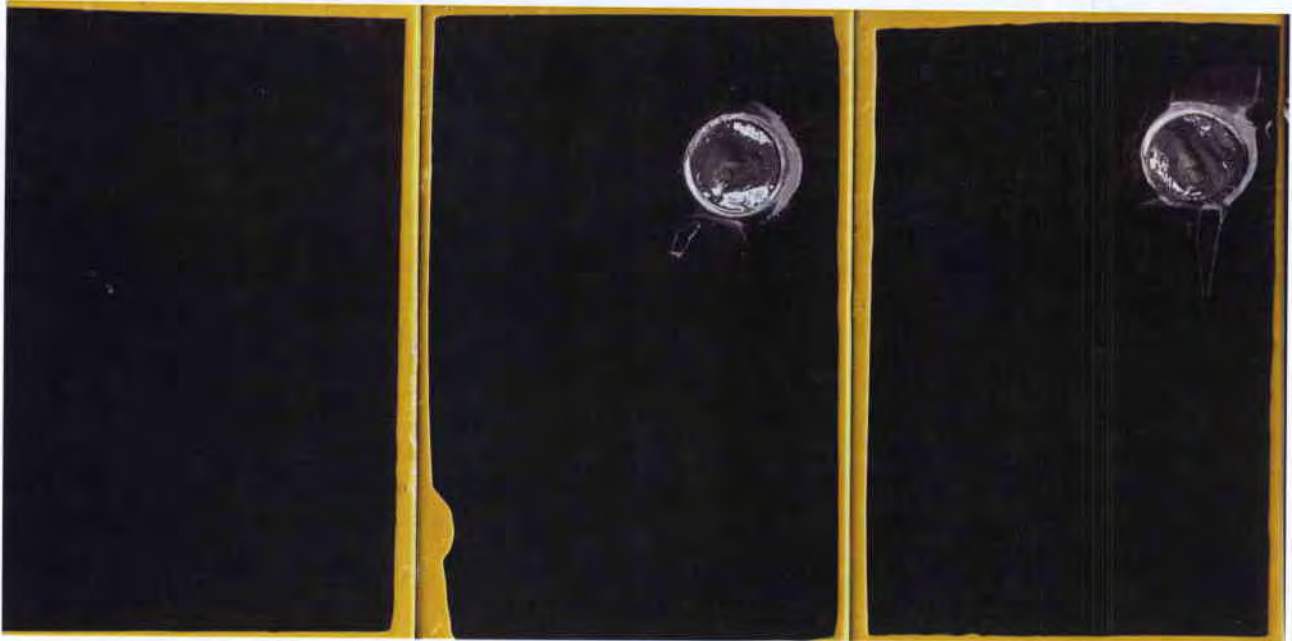


## ANNEX 1 - DIGITAL PHOTOS



Fig.1 - Original samples





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



**Fig. 3 - Evaluation of samples after water condensation test**

