



Waterborne Solutions for Protective Applications

防腐应用的水性涂料解决方案

A large, symmetrical graphic of a water splash, rendered in a vibrant blue color, serves as a background for the central text. The splash is composed of numerous droplets and streams, creating a dynamic, tree-like shape that frames the text.

氰特研讨会
- 迈向水性技术
Towards
Waterborne
Technologies

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标准和要求
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总结



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Protective & Marine Coatings 防腐及船舶涂料

Marine coatings 船舶涂料

- Bulk carrier, naval vessel, cruise, yacht, etc.
货轮，舰艇，游艇等
- Coastal & offshore platforms
& oil rigs
海上平台及油塔
- Jetties, ports & cranes
港口、码头、港机等
- Cargo containers 集装箱



Protective coatings 防腐涂料

- Civil infrastructures: airport, bridge, stadium, etc
基础建筑：如机场、桥梁、体育馆等
- Chemical plants 化工厂
- Storage tanks and pipelines 储罐和管道
- Railway 轨道交通
- Agricultural and construction equipment 农业及工程机械
- Fossil fuel & nuclear & wind power plants, etc. 火电、风电及核电站等

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Standard for Steel Structures-ISO12944

钢结构标准-ISO12944

Corrosive Categories 腐蚀等级	Durability* 耐久性	Typical DFT/μm 典型膜厚	Salt Spray/h 耐盐雾性	Humidity Resistance/h 耐湿热性
ISO 12944-2		ISO 19840	ISO 7253	ISO 6270
C2 Low	Low 低	80	-----	48
	Medium 中	120	-----	48
	High 高	160	-----	120
C3 Medium	Low 低	120	120	48
	Medium 中	160	240	120
	High 高	200	480	240
C4 High	Low 低	160	240	120
	Medium 中	200	480	240
	High 高	240(含Zn) 280(不含Zn)	720	480
C5 - I** C5 - M** Very high	Low 低	200	480	240
	Medium 中	280	720	480
	High 高	320	1440	720

* Low – 2~5yrs; Medium – 5~15yrs; High – over 15yrs

** I – industrial environment; M – marine environment

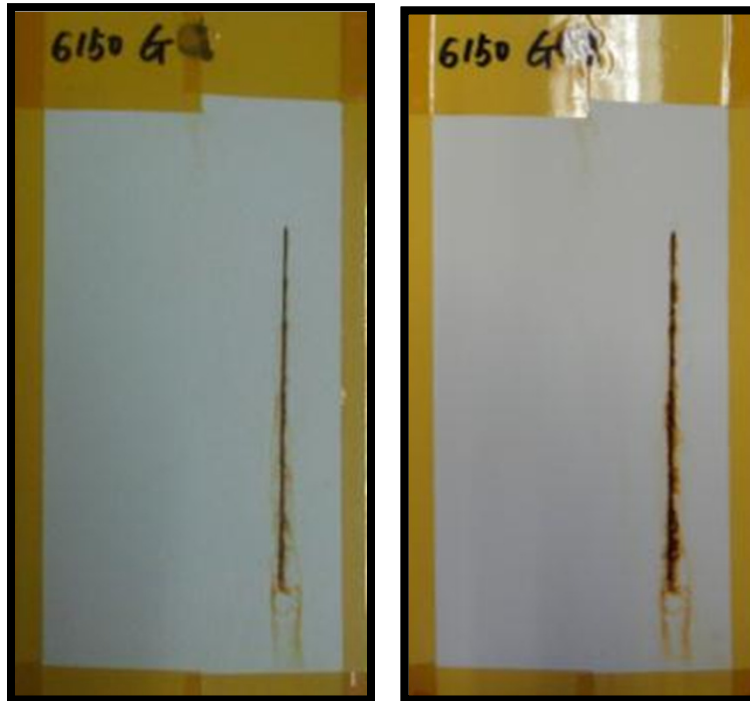
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Waterborne Solutions for 1K Primer

单组分底漆的水性解决方案

1K Alkyd: RESYDROL™ AY 6150w/45WA

单组分醇酸: RESYDROL™ AY 6150w/45WA



100h 200h
Salt Spray Resistance 耐盐雾性能

P/B 颜基比=1.5

DFT干膜厚: ~50 um

Substrate 底材: Q-Panel R-36

Special features 典型特点:

Core-shell Structure:

Core-alkyd; Shell-acrylic

核壳结构: 核-醇酸; 壳-丙烯酸

No external emulsifier added

无外加乳化剂

Low particle size <140nm

粒径低 <140nm

High shear stability, good pigment wetting

高剪切稳定, 良好的颜料润湿性

Good freeze thaw stability

良好的冻融稳定性

Good water and humidity resistance

良好的耐水和耐湿热性

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Waterborne Solutions for 1K Primer

单组分底漆的水性解决方案

1K Epoxy: DUROXYN™ VEF 2406w/45WA

单组分环氧: **DUROXYN™ VEF 2406w/45WA**



200h



380h



500h

P/B 颜基比 = 1.5
DFT 干膜厚: ~50um;
Substrate 底材: Q-Panel R-36

Special features:

典型特点:

Cationic dispersion

阳离子分散体

High molecular weight

高分子量

Low PH value, 4~6

低PH值, 4~6

Fast drying

快干

Good hardness development

良好的硬度发展

Good corrosion resistance

防腐性好

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Waterborne Solutions for 2K Primer

双组分底漆的水性解决方案

Recommended combination 推荐配套

BECKOPOX™ EP

385w/56WA

Type-1 epoxy dispersion,

1型环氧分散体

Flexibilized 柔韧

BECKOPOX™ EP

386w/52WA

Type-1 epoxy dispersion

1型环氧分散体

Flexibilized, shear stable

柔韧，剪切稳定

+

BECKOPOX™ EH 613w/80WA

Aliphatic polyamine adduct 脂肪胺加成物

High reactivity 高反应活性

=

Good anticorrosion performance 防腐性好

High performance/cost 性价比高

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Waterborne Solutions for 2K Primer

双组分底漆的水性解决方案

Recommended combination 推荐配套

BECKOPOX EP 386w/52WA

Type-1 epoxy dispersion 1型环氧分散体

Flexibilized, shear stable 柔韧, 剪切稳定

+

BECKOPOX VEH 2188w/55WA

Aliphatic polyamine adduct 脂肪族胺加成物

Hydrophobic, free of volatile basic amines

疏水, 不含游离胺

=

Excellent anticorrosion performance 防腐性优异

without anticorrosive pigments 不含防腐颜料

high P/B=2.5 possible 高颜基比可能

Good adhesion for some special substrates

对于一些难附着的基材上,如不锈钢,附着力好

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Waterborne Solutions for 2K Primer

双组分底漆的水性解决方案

Recommended combination 推荐配套

BECKOPOX EP 2384w/57WA

Type-1 epoxy dispersion 1型环氧分散体
Zero VOC, shear stable 0 VOC, 剪切稳定

+

BECKOPOX VEH 2188w/55WA

Aliphatic polyamine adduct 脂肪胺加成物
Hydrophobic, free of volatile basic amines
疏水, 不含游离胺

=

Good anticorrosion performance 防腐性好
Low VOC 低VOC

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Waterborne Solutions for 2K Primer

双组分底漆的水性解决方案

Recommended combination 推荐配套

BECKOPOX EP 2390w/75MP

Type-1 epoxy emulsifiable,
Flexibilized

1型环氧，可乳化，柔韧

BECKOPOX EP 2391w/70MP

Type-1 epoxy,
Hydrophobic, fast dry

1型环氧，疏水，快干

+

BECKOPOX EH 613w/80WA

Aliphatic polyamine adduct
Lower cost

脂肪胺加成物，低价

BECKOPOX EH 2849w/80WA

Aliphatic polyamine adduct
Better pigment wetting

脂肪胺加成物，颜料润湿性好

=

2K epoxy zinc rich primer

双组分环氧富锌漆

Good storage stability 储存稳定性好

Excellent anticorrosion performance 防腐性好

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Waterborne Solutions for 2K Primer

双组分底漆的水性解决方案



Salt Spray
耐盐雾 1000h

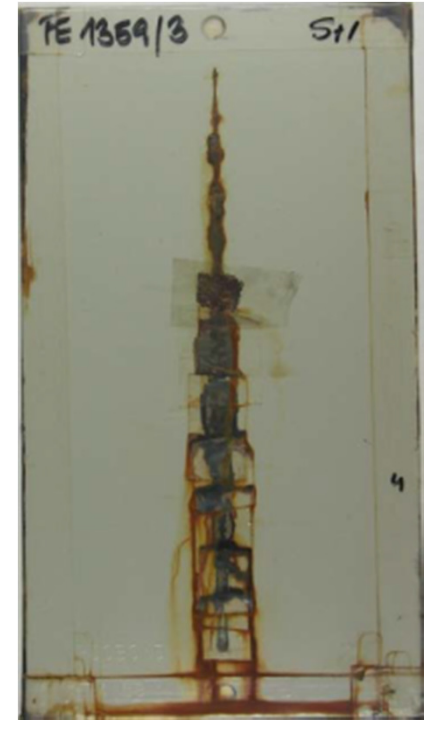


Humidity
耐湿热1000h

BECKOPOX EP386w/52WA-EH613w/80WA
Substrate底材: Gardobond OC钢板;
DFT干膜厚: ~50 μm



Left: **BECKOPOX EP2384w/57WA-EH2188w/55WA**



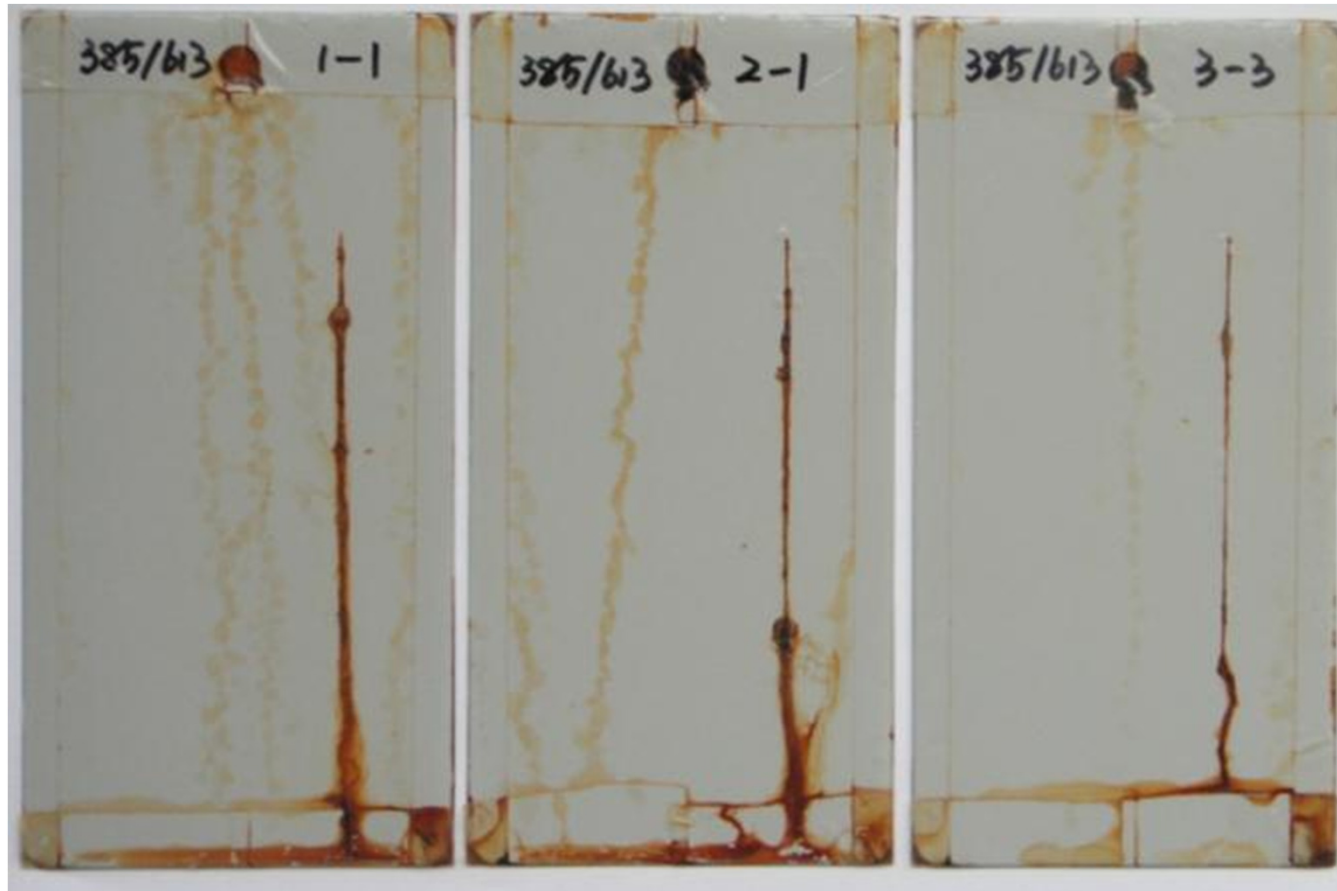
Right: **BECKOPOX EP384w/53WA-EH2188w/55WA**

Salt Spray Resistance 耐盐雾性
Substrate底材: steel钢板;
DFT干膜厚: ~60 μm

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Waterborne Solutions for 2K Primer

双组分底漆的水性解决方案



Salt Spray Resistance 耐盐雾性 820h

BECKOPOX EP385w/56WA-EH613w/80WA

Substrate底材: Q-Panel, R-36;

DFT干膜厚: ~60 μm

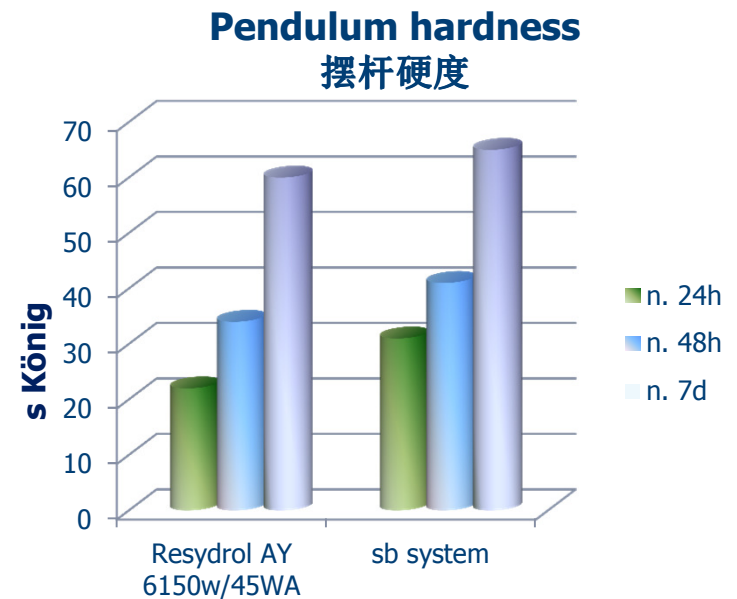
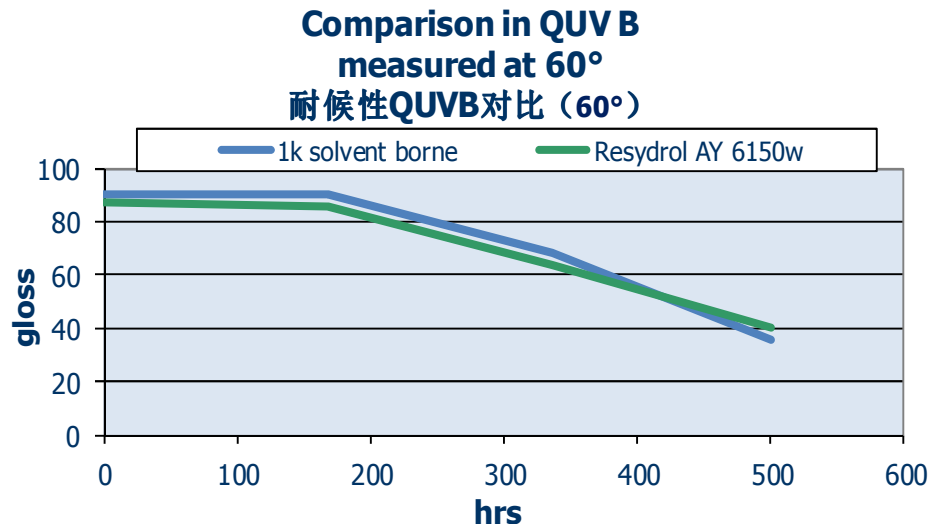
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Waterborne Solutions for 1K Topcoat

单组分面漆的水性解决方案

Products	Resin type	Typical features
RESYDROL™ AY 6150 w/45WA	alkyd	High gloss, good humidity resistance
DAOTAN™ TW 1252 w/42WA	PUD	High gloss, good chemical resistance
VIACRYL™ VSC 6279 w/40WA	acrylic	Good outdoor durability, fast drying

RESYDROL AY 6150w/45WA



Excellent alternative to traditional solventborne alkyd
良好的传统溶剂型醇酸替代物

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Waterborne Solutions for 2K Topcoat

双组分面漆的水性解决方案

White topcoats based on MACRYNAL + hydrophilic HDI-Trimer (NCO/OH=1,4)

白色面漆，基于MACRYNAL和亲水HDI三聚体（NCO/OH=1,4）

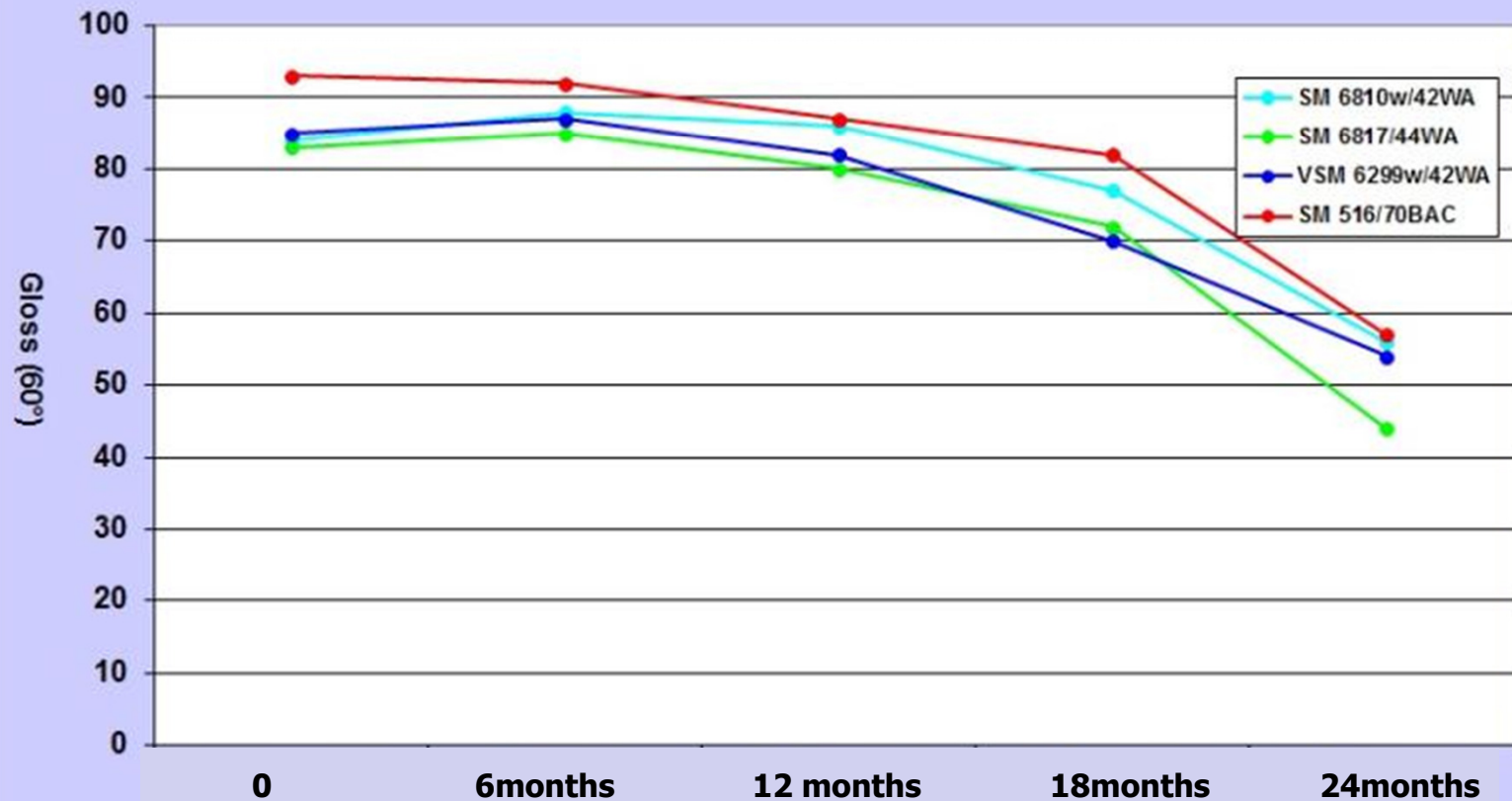
MACRYNAL™	SM 6817w /44WA	VSM2521w /42WAB	VSM 6299w /42WA	SM 6810w /42WA
OH-number (solid resin)	3,0%	4.2%	4,1%	4,1%
Pendulum hardness (RT after 24h/7d)	26" / 37"	54" / 62"	44" / 50"	36" / 78"
Pendulum hardness (45min 60° C + 24h/7d)	58" / 71"	117" / 121"	92" / 94"	65" / 106"
BFFT	~ 69µm	47µm	~ 65µm	87µm
Tack-free time	3 h	4 h	6 h	8 h
Acetone resist. (7d)	< 30s	1 min	30s	1 min
Xylene resist. (7d)	5 min	> 10 min	9 min	> 10 min
VOC	175 g/l	190 g/l	190 g/l	185 g/l

Waterborne Solutions for 2K Topcoat

双组分面漆的水性解决方案

Gloss retention of white pigmented topcoats 白色面漆的光泽

WB vs. SB (Florida exposure) 水性与溶剂型涂料对比（佛罗里达曝晒）



Waterborne Solutions for 2K Topcoat

双组分面漆的水性解决方案

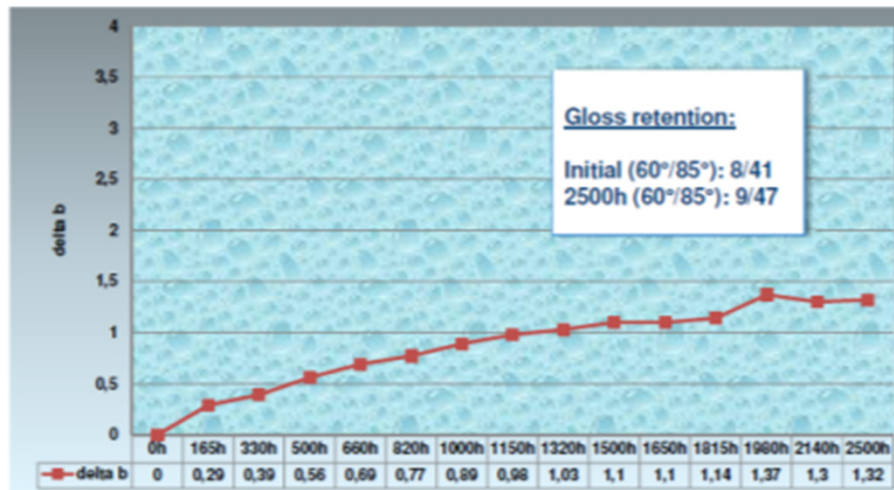
2K Matt PU: MACRYNAL SM 6826W/43WA

双组分亚光聚氨酯: MACRYNAL SM 6826W/43WA

Typical Features 典型特点

- ✓ Shear stable 剪切稳定
- ✓ Mat film appearance 亚光涂膜
- ✓ High film build 高膜厚
- ✓ Excellent weather resistance 耐候性好
- ✓ Very good resistance to chemicals and solvents 耐化和耐溶剂性好

Artificial weathering (QUV-B, 313nm):



WB 136/1 applied on stoving filler F 2205/11

P/B=0.8; NCO/OH=1.4; White
颜基比0.8; NCO/OH=1.4; 白色

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Waterborne Solutions for Monocoat

单涂层的水性解决方案

1K Alkyd单组分醇酸: RESYDROL AY 6150w/45WA

Good balance between corrosion resistance and gloss

较好的平衡了防腐性和光泽



Gardobond OC



Gardobond 6800



Q-Panel R 46



Sandblasted steel



Salt Spray
耐盐雾 200h



Humidity Resistance
耐湿热200h

Salt Spray Test 耐盐雾: 320h;
Gloss (60°)光泽: 70
DFT 干膜厚: ~70 um

Substrate: Q-Panel, R-36
Gloss (60°)光泽: ~80
DFT干膜厚: 70~80 um

1K acrylic and 2K PU for monocoats are being evaluated now
用于单涂层的单组分丙烯酸和双组分PU正在评估中

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Waterborne Solutions for Paint Systems

配套体系的水性解决方案

Paint system: 2K epoxy primer + 1K topcoat

防腐配套: 双组分环氧底漆/单组分面漆



Topcoat: VIACRYL VSC 6279 w/40WA

RESYDROL AY 6150 w/45WA

DAOTAN TW 1252 w/42WA

Salt Spray Test 耐盐雾: 1000h;

Substrate底材: Q-Panel, R-36

Primer底漆: BECKOPOX EP386w/52WA-VEH2188w/55WA

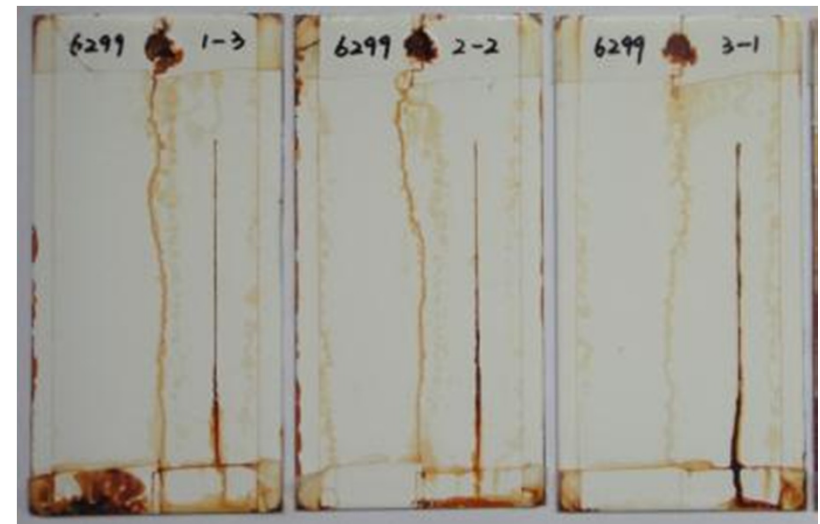
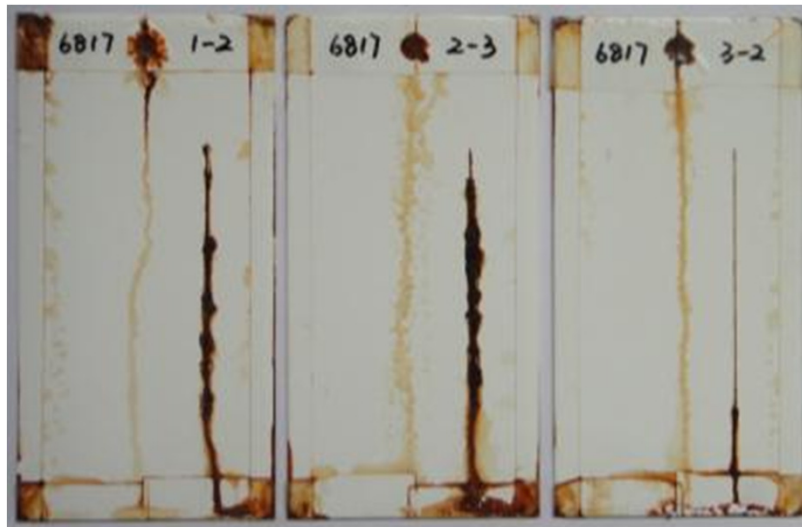
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Waterborne Solutions for Paint Systems

配套体系的水性解决方案

Paint system: 2K epoxy primer + 2K PU topcoat

防腐配套: 双组分环氧底漆 / 双组分聚氨酯面漆



MACRYNAL VSM6817w/44WA面漆

MACRYNAL VSM6299w/42WA面漆

Salt spray resistance 耐盐雾, 820h

Substrate底材: Q-Panel, R-36

DFT干膜厚度: primer底漆 50~60um + topcoat面漆40~50um

Primer 底漆: BECKOPOX EP385w/56WA-BECKOPOX EH613w/80WA

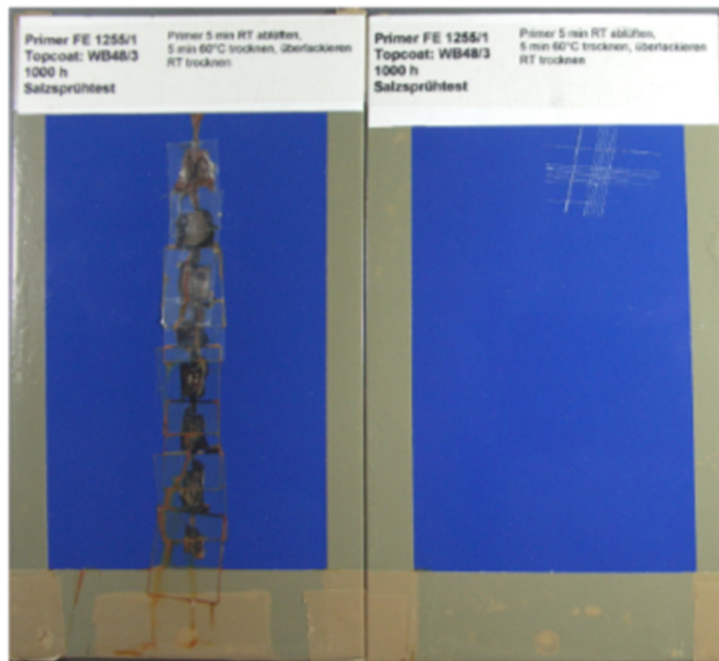
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Waterborne Solutions for Paint Systems

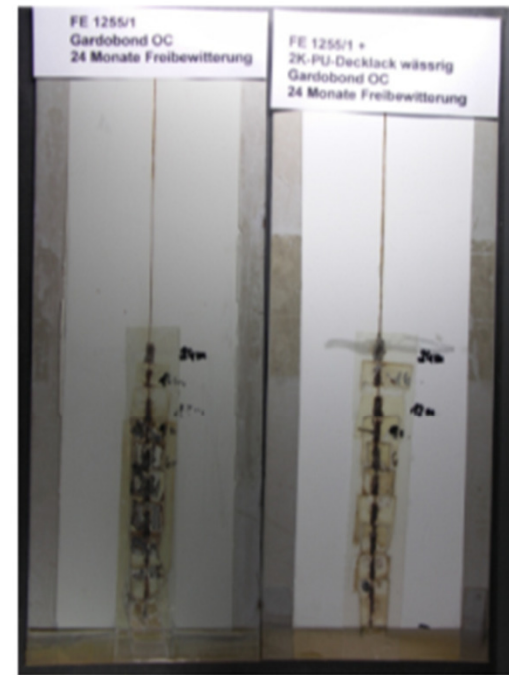
配套体系的水性解决方案

Paint system: 2K epoxy primer + 2K PU topcoat

防腐配套: 双组分环氧底漆/双组分聚氨酯面漆



Salt Spray resistance 耐盐雾, 1000h
BECKOPOX EP386w/52WA-BECKOPOX
VEH2188w/55WA底漆+
MACRYNAL VSM6810w/42WA面漆



Outdoor durability 室外曝晒, 2yrs
BECKOPOX EP386w/52WA-BECKOPOX
VEH2188w/55WA底漆+
MACRYNAL VSM6299w/42WA面漆

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Waterborne Solutions for Paint Systems

配套体系的水性解决方案

**Heavy duty paint system: 2K epoxy (zinc rich) primer
+ 2K epoxy mid-coat + 2K PU topcoat**

重防腐配套：环氧(富锌)底漆/环氧中间漆/聚氨酯面漆



Salt spray resistance
耐盐雾，2000h
DFT干膜厚度：~50um
BECKOPOX EP2390w/75MP-
VEH2849w/80WA



Salt spray resistance
耐盐雾，2500h
DFT干膜厚度：~200um
Layers层数：3



Adhesion test
BECKOPOX EP2391w/70MP-
VEH2849w/80WA+EP2384w/56WA-
VEH2188w/55WA+ MACRYNAL VSM6299w/42WA



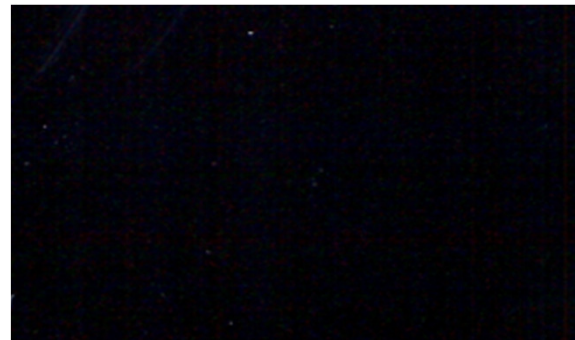
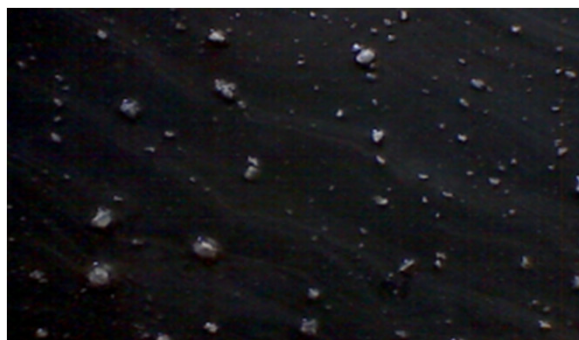
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Additive - Dispersant ADDITOL™ VXW 6208/60

助剂 - 分散剂 ADDITOL™ VXW 6208/60

Special features

- ❖ High molecular weight nonionic dispersant 高分子量非离子型分散剂
- ❖ Good wetting and dispersing performance for carbon black & organic pigments 对碳黑和有机颜料润湿分散性能出色
- ❖ Already used as standard dispersant in 2K WB epoxy zinc rich primer 已经成为双组分水性环氧富锌底漆中的标准分散剂
- ❖ No water incorporation, could be used in waterborne as well as solventborne coatings 不含水，水性和溶剂型体系皆可用



Dispersant selection tips for 2K WB epoxy

水性环氧分散剂选择提示

Ionic dispersants would destruct epoxy resins via activating oxirane ring, resulting in loss of performance of the final paint

离子型分散剂会促进环氧开环，从而影响涂料性能

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Additives - Dispersant ADDITOL VXW 6208

助剂 - 分散剂 ADDITOL VXW 6208

2K WB EPOXY
双组分水性环氧



Standard Dispersant ADDITOL VXW 6208

Salt spray resistance
耐盐雾 1176h
Substrate底材: Gardobond OC
DFT干膜厚: 85μm

1K WB ALKYD
单组分水性醇酸



Standard Dispersant ADDITOL VXW 6208

Salt spray resistance
耐盐雾 336h
Substrate底材: Gardobond OC
DFT干膜厚: 45μm

Additives for WB Protective Coatings

水性防腐涂料用助剂

Dispersant/wetting agent 润湿分散剂

ADDITOL VXW 6394 High Mw waterborne dispersant for Titanium dioxide and inorganic pigments

高分子量分散剂，分散钛白粉和无机盐填料

Defoamer 消泡剂

ADDITOL VXW 4973 Highly effective universal waterborne defoamer based on mineral oil

高效通用的矿物油基消泡剂

ADDITOL VXW 6393 Defoamer based on mineral spirits, stronger than VXW4973

矿物油基消泡剂，较VXW4973强

Flow & leveling 流动&流平剂

ADDITOL VXL 6503N Leveling and substrate wetting agent based on a polyether modified polysiloxane

聚醚改性有机硅流平和基材润湿剂

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Additives for WB Protective Coatings

水性防腐涂料用助剂

- **Thickener 增稠剂**
- **ADDITOL VXW6360** Polyurethane thickener for high shear viscosity 聚氨酯增稠剂，提供高剪切粘度
- **ADDITOL VXW6388** Polyurethane thickener for mid shear viscosity 聚氨酯增稠剂，提供中剪切粘度
- **Drier 催干剂**
- **ADDITOL VXW 6206** Combination drier, NPEO free
- 综合催干剂，不含NPEO
- **ADDITOL VXW 4940N** Combination drier, NPEO free
- 综合催干剂,不含NPEO
- **ADDITOL VXW 6533** Combination drier, cobalt free
- 综合催干剂，不含钴

Summary – WB Recommended Solutions

总结-氟特水性涂料推荐方案

Requirement 要求	Primer 底漆	Topcoat 面漆
Low 低 monocoat	RESYDROL AY 6150w/45WA, 1K	
Low 低	RESYDROL AY 6150w/45WA, 1K	RESYDROL AY 6150w/45WA, 1K
Low 低	DUROXYN VEF 2406w/45WA, 1K	RESYDROL AY 6150w/45WA, 1K
Medium 中	BECKOPOX EP385w/56WA+ BECKOPOX EH613w/80WA, 2K	VIACRY VSC 6279 w/40WA, 1K
High 1 高	BECKOPOX EP386w/52WA+ BECKOPOX EH613w/80WA, 2K	MACRYNAL SM 6817w/44WA, 2K
High 2 高	BECKOPOX EP386w/52WA+ BECKOPOX VEH613w/80WA, 2K	MACRYNAL SM6299w/42WA, 2K
Very high 很高	<u>Zinc rich primer:</u> BECKOPOX EP2391w/70MP+ BECKOPOX VEH2849w/80WA, 2K <u>Primer:</u> BECKOPOX EP386w/52WA+ BECKOPOX VEH2188w/55WA, 2K	MACRYNAL SM6810w/42WA, 2K

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