

# Water-based Resin Application for Metal Protective Coatings

## 水性树脂在金属防护涂料的应用

Technical Marketing, AP

William Chen, 陈伟林

Jan. 2018



We create chemistry

- **Metal protective coatings technology**
- **Test method for metal protective coatings**
- **Product offerings & introduction**
  - 1K acrylic
  - 2K PU
- **Open discussion**

- **Metal protective coatings technology**
- Test method for metal protective coatings
- Product offerings & introduction
  - 1K acrylic
  - 2K PU
- Open discussion

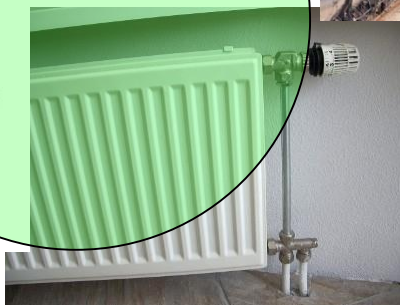
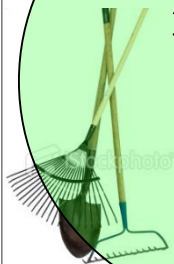
# 金属防护涂料的分类

## 普通工业防护涂料

## 海洋工业防护涂料



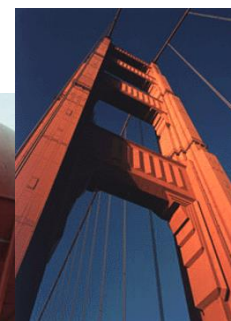
轻度防护



中度防护



重度防护

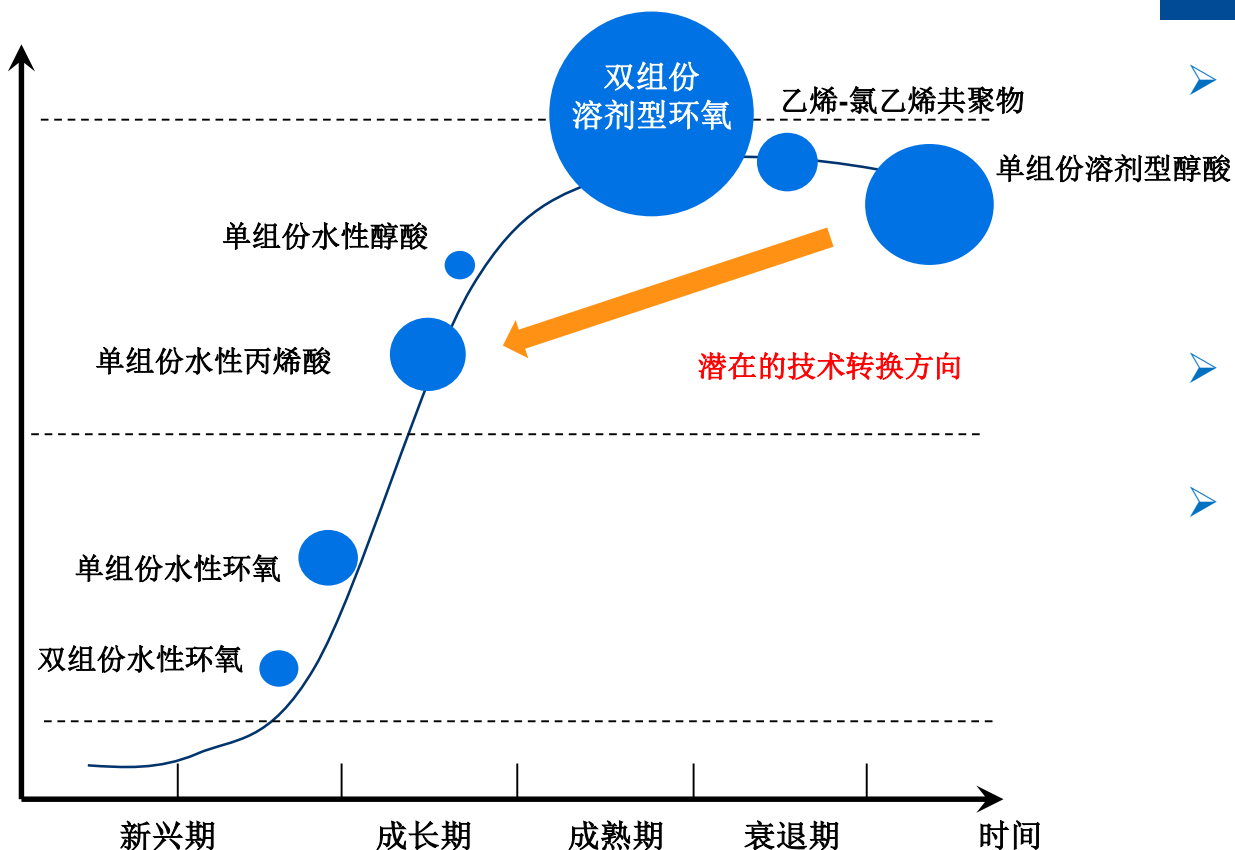


|                 | 轻度防护<br>Institutional coatings                                                                                                               | 中度防护<br>Infrastructure coatings                                                                                                                 | 重度防护<br>Heavy industrial                                                                                                                             |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 防护功能等级          | C1- C2                                                                                                                                       | C3- C4                                                                                                                                          | C5- C6                                                                                                                                               |
| 主要底材            | 钢材，铝材，<br>镀锌板                                                                                                                                | 钢材，铝材，<br>镀锌板<br>，铜，混凝土                                                                                                                         | 钢材，铝材，<br>镀锌板                                                                                                                                        |
| 防护涂料技术的<br>化学类型 | <ul style="list-style-type: none"> <li>■ 醇酸树脂</li> <li>■ 醇酸杂化, 如：醇酸-丙烯酸混拼</li> <li>■ 丙烯酸树脂</li> <li>■ 聚酯粉末涂料</li> <li>■ 单组份的烘烤体系*</li> </ul> | <ul style="list-style-type: none"> <li>■ 醇酸及其杂化树脂</li> <li>■ 丙烯酸树脂</li> <li>■ 双组份环氧体系（底漆）</li> <li>■ 双组份聚氨酯体系（面漆）</li> <li>■ 单组份烘烤体系</li> </ul> | <ul style="list-style-type: none"> <li>■ 双组份环氧体系</li> <li>■ 双组份聚氨酯体系</li> <li>■ 环氧富锌底漆，无机富锌底漆，聚硅氧烷面漆</li> <li>■ 乙烯-氯乙烯共聚物</li> <li>■ 氯化橡胶</li> </ul> |

# 金属防护涂料的生命周期

防护技术的发展

气泡大小代表相对的市场容量



## 关键信息说明

- 防护技术的化学类型多样；生命周期长；溶剂型体系占据大部分的市场份额；水性体系目前仅在欧洲/北美地区新兴发展
- 重度防护涂料市场主要还是由溶剂型体系所占据
- 溶剂型体系向水性体系的技术转换主要存在于轻度/中度防护涂料 (C1- C3)

# 应用于防护涂料的水性树脂技术比较

## 防护功能等级

重度防护应用  
(heavy industrial)

中度防护应用  
(infrastructure coatings)

轻度防护应用  
(institutional coatings)

- 已获得市场认可的防护技术
- 不适用于户外使用
- 在中国市场发展迅速

水性双组份环氧

高光/良好的流平性  
慢干/漆膜偏软

单组份环  
氧及杂化

良好的防腐功能，施工方便

水性醇酸

其他 (聚氨酯分散体，  
杂化体系，双组份聚氨酯)

柔韧性/硬度/高光/耐候性良好

丙烯酸

快干/抗粘连性/硬度/ 耐候性良好

市场价格

备注：  
来源于巴斯夫内部数据

# 巴斯夫提供的防护技术-新兴类型

## 水性技术

| 体系     | 技术类型     | 巴斯夫产品牌号前缀                              |
|--------|----------|----------------------------------------|
| 单组份丙烯酸 | 丙烯酸分散体   | Joncryl® PRO / Acronal® PRO            |
| 双组份聚氨酯 | 含羟基的分散体  | Joncryl® OH/ Luhydran®/<br>Basonol® AC |
|        | 水性的聚异氰酸酯 | Basonat® HW                            |

## 高固体份

| 体系        | 技术类型      | 巴斯夫产品牌号前缀              |
|-----------|-----------|------------------------|
| 高固含双组份聚氨酯 | 含羟基的丙烯酸树脂 | Joncryl®/ Basonol® HPE |
|           | 聚异氰酸酯     | Basonat® HI            |

## 无溶剂型

| 体系        | 技术类型             | 巴斯夫产品牌号前缀                      |
|-----------|------------------|--------------------------------|
| 无溶剂双组份聚氨酯 | 生物基的聚酯/聚醚多元醇     | Solvermol®                     |
|           | 聚异氰酸酯, HDI / MDI | Basonat® HI / Lupranate® M 20S |

# 水性防护涂料增长的驱动力

**TREND:** Ongoing substitution of solvent based anticorrosion coatings with waterborne coatings 发展趋势：溶剂型→水性

- More stringent environmental standards

环保

- VOC Regulations

法规

- Safety (low flammability)

安全

- Health (exposure to VOCs)

健康

- New technology advances

新技术

- Nanotechnology

纳米技术

- Hybrid materials

杂化技术

- Know-how on structure properties relationship

涂层结构关系

**Waterborne systems: Acrylic dispersions, Alkyd Resins, Polyurethanes, 2K Epoxy ...**

水性防护涂料系统：丙烯酸，醇酸，聚氨酯，双组分环氧

# 丙烯酸分散体 对金属防护等级达到较高水平

## ADVANTAGES

- Health, Safety and Environment (HSE), due to very low organic solvent content 健康安全 环保
- Fast drying & recoating times 快干重涂 时间短
- Low odor 低气味
- Good corrosion protection 防腐蚀好
- Good hardness development & chemical resistance 硬度发展快, 耐化
- Acrylics have good UV-resistance 户外耐候

优点

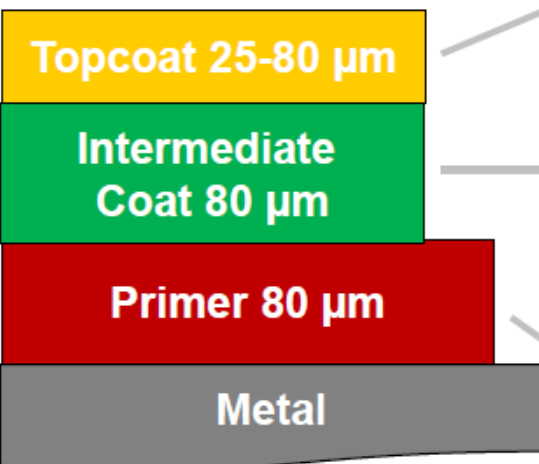
## DISADVANTAGES

缺点

- Not appropriate for underwater use 不适水下应用
- Complex film formation process 成膜过程复杂
- Limitations regarding climate conditions at application (high RH and low T) 施工气候限制
- Require excellent surface preparation 需表面预处理
- Require additives to lower surface tension 需助剂降张力
- Freezing below 0°C 零下会冻结

# 主要的涂层体系

## Multilayer



**Aesthetics (color, texture, gloss) + weatherability + additional barrier**

色彩效果（颜色，纹理，光泽），耐候，附加的防护

**Enhance barrier to moisture and aggressive chemicals + build film thickness & unit topcoat & primer**

对湿气和强化化学物质的加强防护，厚度建立，连接底漆和面漆

**Active Corrosion Protection (barrier against oxygen, water & ions) + Adhesion to metal surface + provide surface for adhesion**

对金属防护的关键层（氧气，水，离子），对金属底材的附着力，和中涂面涂的连接

## Direct to metal (DTM)



**High gloss, chemical & UV resistance. No anticorrosive pigments**

高光，耐化学品，耐UV，无防腐颜料

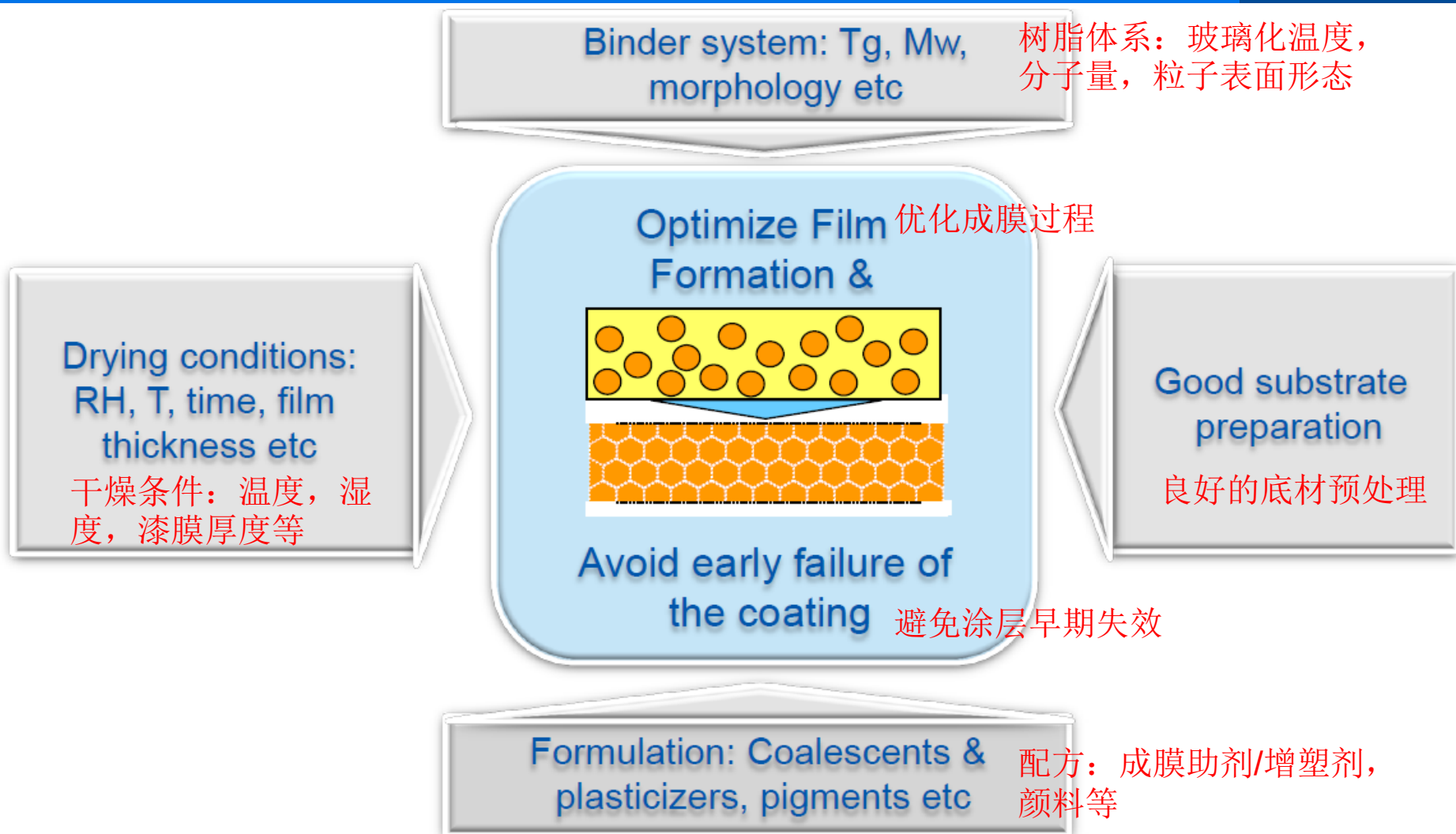
**More application steps & higher corrosion protection**

更多的施工涂层  
更高的防护能力  
C3-C4

更少的施工涂层  
更低的防护能力  
C1-C2

**Less application steps & lower corrosion protection**

# 影响防腐性能的关键因素



- Metal protective coatings technology
- **Test method for metal protective coatings**
- Product offerings & introduction
  - 1K acrylic
  - 2K PU
- Open discussion

# 水性金属防护涂料的测试方法

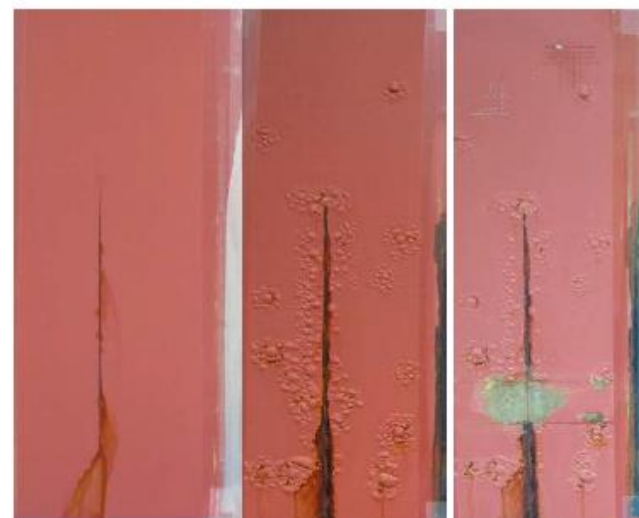
## ■ Accelerated Tests: 加速测试(耐盐雾, 耐水, 循环测试)

- Salt spray test ASTM B 117-02 / DIN 50 021
- Humidity test ASTM D 2247-02 / DIN 50 017
- Cyclic test (humidity - dry - salt spray ; e.g. Prohesion ASTM G 85-02 A5)

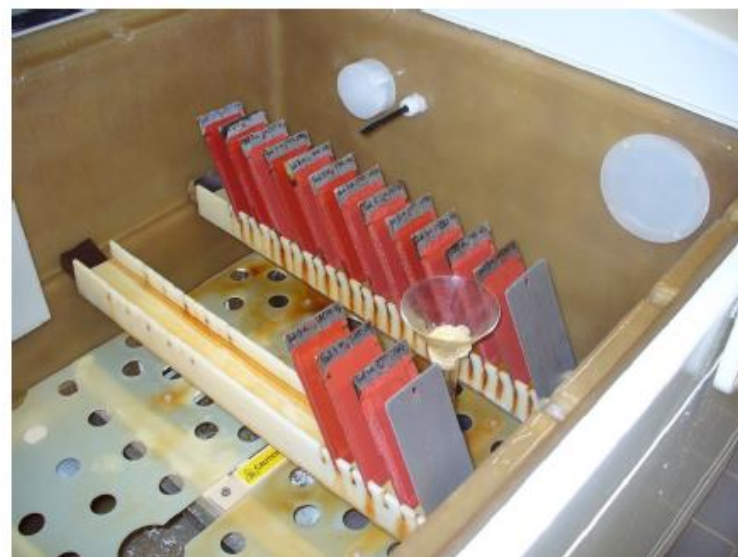
## ■ Outdoor Exposure 户外曝晒测试

## ■ Determination: 判断方法

- Degree of blistering ASTM D 714-02 / ISO 4628-2  
起泡等级
- Average measurement of failure at the scribe ASTM D 1654-92/ DIN 53 167 划痕失效
- Degree of rusting ASTM D 610-01 / ISO 4628-3  
生锈等级



- Corrosion resistance (using Q-Fog test cabinet) 耐腐蚀测试(Q-Fog测试仓)
  - Salt spray according to ASTM B 117 / ISO 7253
    - 5% NaCl solution, continuous sprayed at 35°C 耐盐雾  
- 5%盐水, 35°C, 不断喷水
  - Prohesion test (Cyclic corrosion test)
    - 1 hour salt fog at 25°C (0.05% NaCl + 0.35% ammonium sulfate)
    - 1 hour dry off at 35°C 干湿交替混合盐雾测试(循环测试)  
- 1小时耐盐雾+1小时干燥



# 早期耐水性

- to simulate resistance to rain after a very short drying period
  - coating is applied onto metal
  - dry at 23°C / 50% RH for 2 hours
  - water immersion for 24 hours

模拟短时间干燥后的耐雨水腐蚀

- 测试金属接触的涂层
- 干燥条件：23°C，50%相对湿度，2小时
- 浸水24小时



# 相对湿度对早期耐水性的影响



相对湿度增大产生起泡，水点的漆膜失效，原因可能是成膜助剂的过早挥发

Blister formation on the high RH panel

Water spotting on the high RH panel

**RH may lead to poor performance Due to premature evaporation of coalescent**

## ■ Water resistance

- humidity resistance according to ISO 6270 (using Cleveland test cabinet)
  - 100% RH at 40°C at test side
- adhesion is done before, direct after and after recovery

防潮测试(使用克利夫兰测试仓)

- 潮气测试表面: 100%相对湿度, 40°C

通过附着力测试来判断:

潮气测试前, 刚完成测试之后, 完成测试经过恢复



## ■ Rapid deformation

- Impact resistance
  - Forward
  - Reverse
- Conical mandrell

快速形变

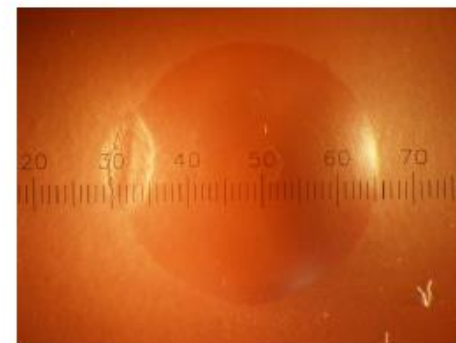
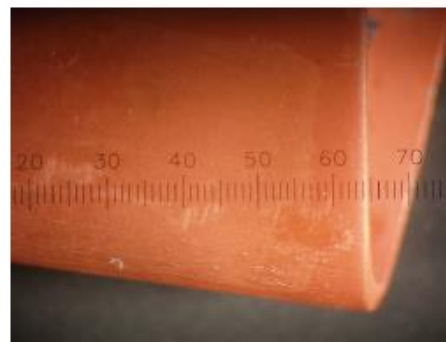
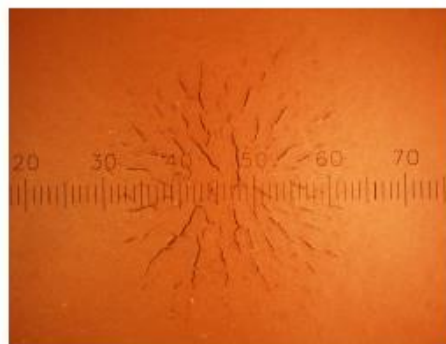
- 抗冲击
  - 正冲
  - 反冲
- 锥形锤冲击

## ■ Slow deformation

- Erichsen cupping test

慢速形变

- 杯突测试



# 抗粘连性/耐堆叠性

## ■ Per industry variations possible in

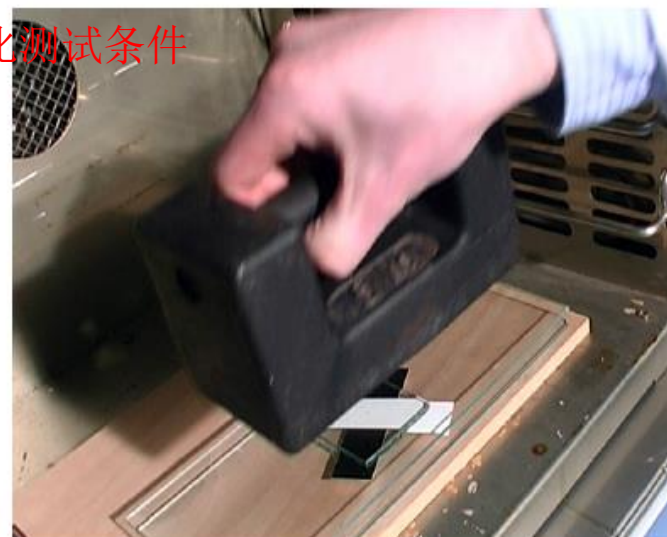
- wet film thickness
- drying time
- block pressure
- block time
- block temperatures

## ■ Metal

- 100 microns wet film, 5' flash off, 30' at 60°C
- Block at 2 kg / cm<sup>2</sup> for 1 hour at 50°C

根据不同要求变化测试条件

- 湿膜厚度
- 干燥时间
- 测试压力
- 测试时间长短
- 测试温度



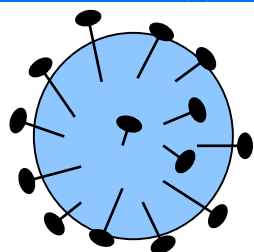
对于金属底材

- 湿膜厚度100微米，闪干5分钟，60°C干燥30分钟
- 测试压强 2kg/cm<sup>2</sup>，1小时，50°C

- Metal protective coatings technology
- Test method for metal protective coatings
- **Product offerings & introduction**
  - 1K acrylic
  - 2K PU
- Open discussion

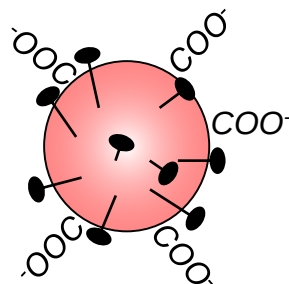
# BASF core technologies for dispersions

## 巴斯夫分散体的核心技术类型



Conventional  
传统分散体(乳液)

- Classical surfactants • 传统表面活性剂
- Vinyl monomers (styrene – (meth)acrylates)
  - 乙烯基单体(苯乙烯-丙烯酸)

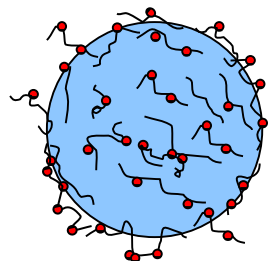


Colloidal/  
Alkali soluble

溶胶/碱溶胀型分散体

- Conventional dispersion with high carboxylic acid content and lower Mw
- neutralization of COOH gives clear solution

- 传统乳液引入羧基，降低分子量
- 羧基被中和后得到透明溶液

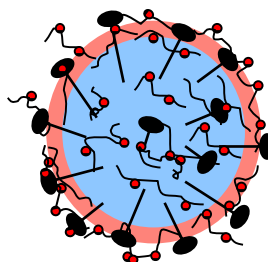


RC

流变控制型分散体

- Seed polymer prepared by SGO process,
- Seed polymer dissolved in alkaline solution
- 2<sup>nd</sup> stage polymerization

- SGO种子，低聚物
- 种子溶解在碱性溶液中
- 进行第二步聚合



RC(D)

新型RC

- First stage polymerization of colloidal phase,
- 2<sup>nd</sup> stage polymerization of core

- 第一步聚合：溶胶
- 第二步聚合：成核

# BASF Offerings - Acrylic Dispersion for Metal Protection

| Class | Product           | Technology                      | Performance & Application                                                                                                                                                                               |
|-------|-------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C1-C2 | Joncryl® PRO 1532 | RC Acrylic                      | Excellent adhesion, early water res, humidity res, durability (anti-corrosion primer, topcoat)                                                                                                          |
|       | Joncryl® PRO 1532 |                                 | High Tg, hardness development, humidity res (anti-corrosion primer, topcoat)                                                                                                                            |
|       | Joncryl® PRO 1555 |                                 | Drying, excellent adhesion, early water res, excellent block res (anti-corrosion primer, topcoat)                                                                                                       |
| C2-C3 | Acronal® PRO 800  | Styrene Acrylic                 | APEO free, balanced hardness & flexibility, excellent early water res, not easy to whiten for a long-term dipping into water, excellent hot block res, excellent durability (topcoat)                   |
|       | Acronal® PRO 763  | Silane Modified Styrene Acrylic | Good adhesion, excellent anti-corrosion, cost effective (anti-corrosion primer)                                                                                                                         |
|       | Acronal® PRO 761  | Self-crosslinking Acrylic       | APEO free, good adhesion good compatibility with anti-corrosive pigment (anti-corrosion primer)                                                                                                         |
|       | Acronal® PRO 8977 |                                 | APEO free, excellent block res, high pigment loading (anti-corrosion primer, topcoat, DTM)                                                                                                              |
|       | Joncryl® PRO 8139 |                                 | Excellent anti-corrosion, low coalescent demand, high hardness & fast hardness development, excellent early water res, outstanding hot block res, good dry/wet adhesion, good durability (topcoat, DTM) |
|       | Joncryl® PRO 1522 | RC Acrylic                      | Excellent anti-corrosion for DTM, high gloss, durability, good compatibility with anti-corrosive pigment (topcoat, DTM)                                                                                 |
|       | Joncryl® PRO 1524 | Non-surfactant Acrylic          | APEO free, low VOC (<100 g/l), very good anti-corrosion, outstanding water & humidity res, high gloss, excellent dry/wet adhesion, good hardness & UV durability (topcoat, DTM)                         |
| C4    | Acronal® PRO 780  | Modified Acrylic                | APEO & Zinc free, excellent anti-corrosion(>80 microns), excellent barrier to humidity, good adhesion, early rain res, high pigment loading (anti-corrosion primer, topcoat, DTM)                       |

# 通用经济型水性丙烯酸分散体

## Acronal® PRO 763



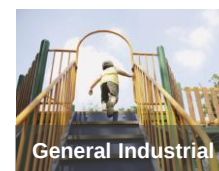
### Performance highlights

- **Cost-effective** 经济高效
- Good adhesion on steel 钢材的良好附着
- Universal use: can be applied as primer or DTM 通用于底漆和DTM
- Shear stable; can be used in the grinding step 剪切稳定, 可研磨
- APEO-free 不含APEO

### Usage

- Light to medium duty ( $\leq 240$  h SST) applications (C2 – C3) 中轻防护
- Steel constructions, steel parts, manholes, tanks, gas tanks, etc. 钢构, 钢部件, 沙井, 储罐等
- High volume, low price applications 适合使用量大, 低价的应用

### Exemplary applications



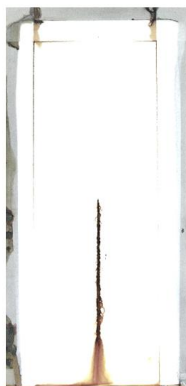
### Availability

Samples & commercial quantities available

216 hours

288 hours

360 hours



White primer: Salt Spray Test Results on Cold Rolled Steel. 7 days drying at room temperature (80 – 100 microns dry) 白底在冷轧钢板的耐盐雾(室温干燥7天的80-100微米干膜)

### Key technical data

- Silane-modified styrene-acrylic dispersion 硅烷改性苯丙
- Solids by weight: 固含  $\sim 50\%$
- Viscosity: 粘度 100 - 250 mPa·s (25 °C)
- pH: pH值 7-8
- MFT:  $\sim 28^{\circ}\text{C}$  最低成膜温度

# 加强耐腐蚀性的水性丙烯酸分散体

## Acronal® PRO 780



### Performance highlights

- Enhanced corrosion protection 加强耐腐蚀性
- Suitable for light and medium duty primer topcoat applications 适合中轻防护底漆和面漆
- Good adhesion on steel 良好的钢材附着力
- Excellent application properties (airless, dip) 施工性非常好(无气喷涂, 浸涂)
- Good barrier and inhibiting properties 良好的阻隔性
- APEO- and zinc-free 不含APEO和锌

### Usage

- Medium duty ( $\leq 360$  h SST) applications (C3)
- Steel parts and constructions 中度防护
- Exterior tanks 适合钢构, 钢部件, 户外储罐

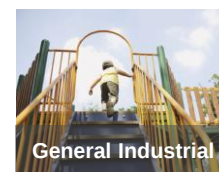
### Exemplary applications



Metal protection



ACE



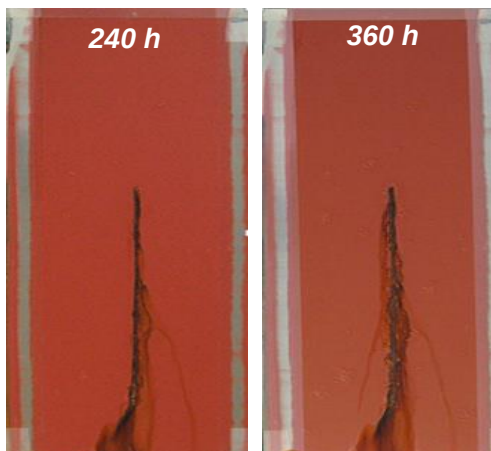
General Industrial

### Key technical data

- Core shell styrene-acrylic dispersion 核壳结构苯丙
- Solids by weight: 固含  $\sim 50\%$
- Viscosity: 粘度  $\sim 190$  mPa·s (25 °C)
- pH: pH值 8-9
- MFT: 最低成膜温度  $\sim 22^\circ\text{C}$
- Density: 密度  $1,09$  g/cm<sup>3</sup>

### Availability

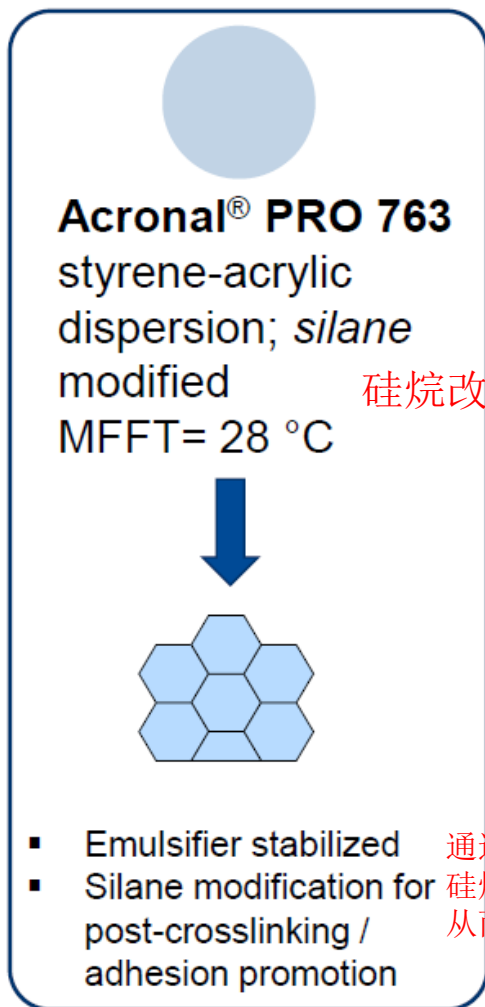
Samples & commercial quantities available



Red primer: Salt Spray Test Results on Cold Rolled Steel. (80 dry film thickness) 红底在冷轧钢板的耐盐雾(80微米干膜)

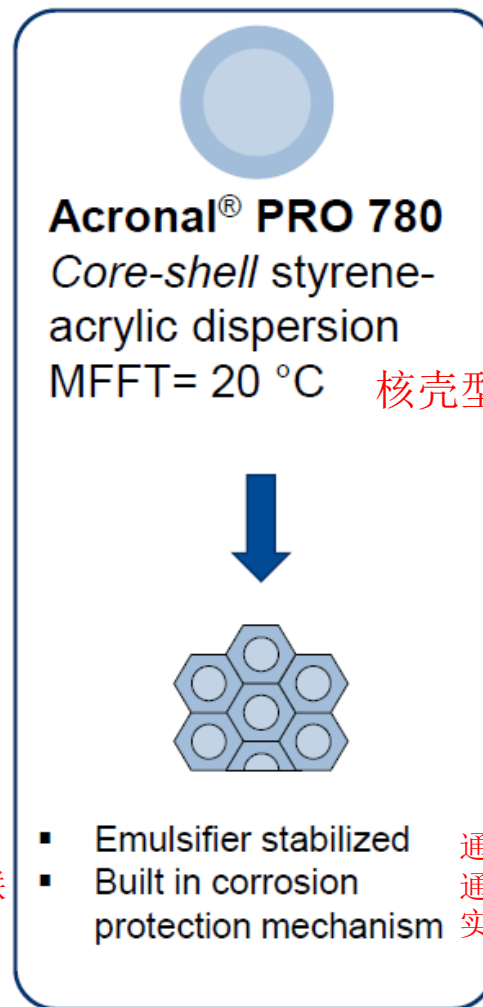
# 水性单组份丙烯酸

## Acronal® PRO 763 & 780



硅烷改性苯丙

通过乳化剂稳定  
硅烷改性增强后期交联  
从而改善附着力



核壳型苯丙乳液

通过乳化剂稳定  
通过内在的防腐机理  
实现金属防护

# Acronal® PRO 780 - Red anticorrosive formulation (27185-3)

**Disperse for 30 min. in high speed dispenser or bead mill:**

|                   |               |     |       |       |
|-------------------|---------------|-----|-------|-------|
| Acronal® PRO 780  | emulsion      | 乳液  | 150,0 | parts |
| FoamStar® SI 2210 | defoamer      | 消泡剂 | 2,5   | parts |
| Surfynol® 104 E   | wetting agent | 润湿剂 | 3,7   | parts |

**Pre-mix: 预分散**

|                |                  |     |      |       |
|----------------|------------------|-----|------|-------|
| water          |                  |     | 69,3 | parts |
| Lutensit® A-EP | dispersing agent | 分散剂 | 1,0  | parts |
| Ammonia 25 %   |                  | 氨水  | 2,6  | parts |

**Pre-mix: 预分散**

|                           |                        |      |       |       |
|---------------------------|------------------------|------|-------|-------|
| Phenoxy propanol          | coalescing solvent     | 成膜助剂 | 7,2   | parts |
| Mineral spirit 180-220 °C | coalescing solvent     |      | 7,2   | parts |
| Bayferrox® 130M           | red oxide pigment      | 铁红   | 113,3 | parts |
| Luzenac® 20M2             | talc extender          | 滑石粉  | 47,1  | parts |
| Heucophos® ZMP            | anti-corrosive pigment | 防腐颜料 | 109,8 | parts |
| Lithopone™ L (30 % ZnS)   | extender               | 填料   | 170,4 | parts |

配漆，边搅边加

**Let-down, add while stirring:**

|                                            |                        |       |       |       |
|--------------------------------------------|------------------------|-------|-------|-------|
| Acronal® PRO 780                           | emulsion               | 乳液    | 266,6 | parts |
| FoamStar® SI 2210                          | defoamer               | 消泡剂   | 2,4   | parts |
| CHE Coat® Ci LNF A4*<br>(1 : 1 with water) | organic rust inhibitor | 有机防锈剂 | 10,8  | parts |

**Pre-mix: 预分散**

|                  |                    |       |        |       |
|------------------|--------------------|-------|--------|-------|
| Rheovis® PU 1280 | PU thickener       | PU增稠剂 | 1,8    | parts |
| Butyl glycol     | coalescing solvent |       | 1,8    | parts |
|                  |                    | 成膜助剂  |        |       |
| water            |                    |       | 5,3    | parts |
| ammonia 25 %     |                    | 氨水    | 27,2   | parts |
|                  |                    |       | 1000,0 | parts |

**Physical constants**

|                  |        |                                    |
|------------------|--------|------------------------------------|
|                  | 物理特性   |                                    |
| PVC              | 颜料体积浓度 | 35 %                               |
| solids by weight | 固含量    | 66 %                               |
| pH               | pH值    | 9.6                                |
| viscosity        | 粘度     | Brookfield, 23 °C (73 °F) / 60 rpm |
| VOC              |        | ca. 85 g/l                         |

®: registered trademark of the respective company

# Acronal® PRO 780 - Influence of film thickness on corrosion after 480 hours SST

480h

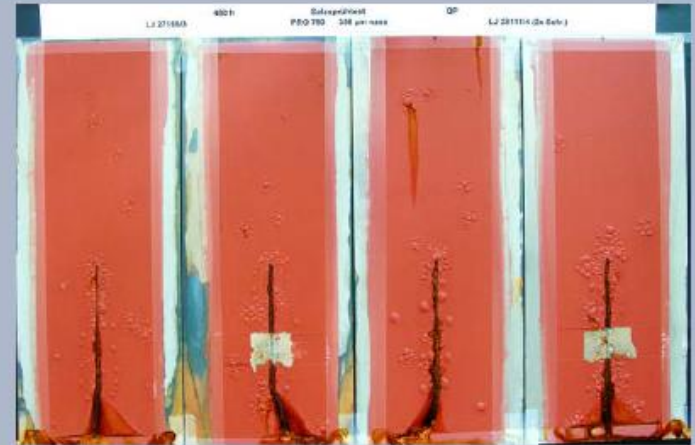
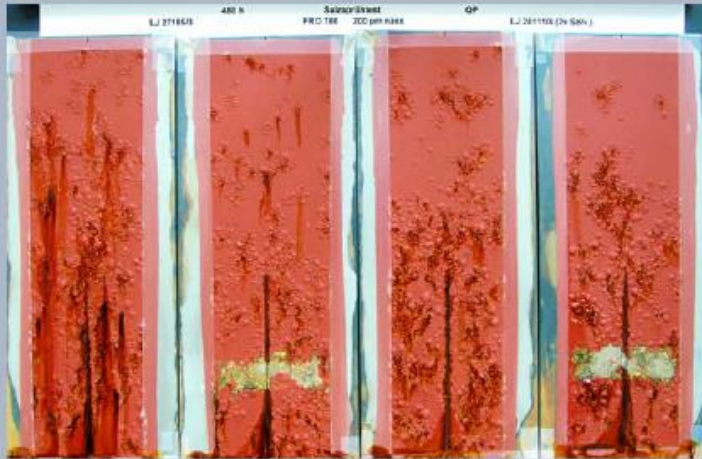
DFT = 65 microns

DFT = 110 microns

Acronal®  
PRO 780

LJ27185-3  
Red Primer

Salt Spray  
480 hours



CRS

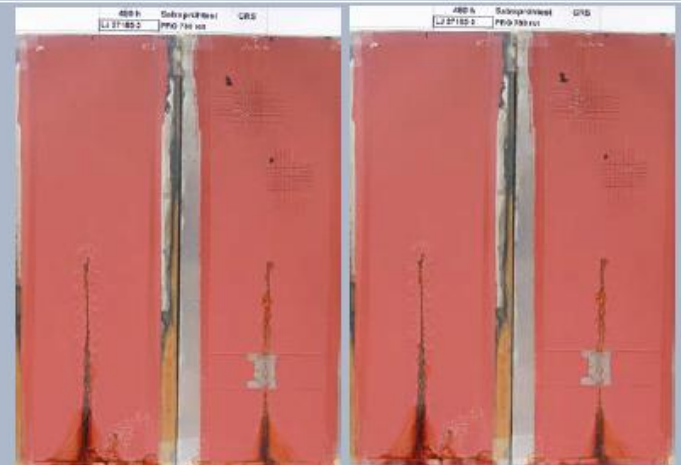
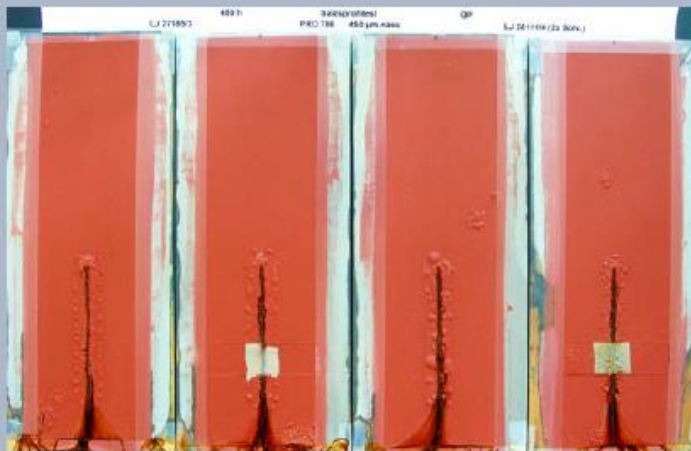
DFT = 140 microns

DFT = 200 microns

Acronal®  
PRO 780

LJ27185-3  
Red Primer

Salt Spray  
480 hours



# Acronal® PRO 780 - White anticorrosive formulation (27185-4)

**Disperse for 30 min. in high speed dispenser or bead mill:**

|                   |               |     |       |       |
|-------------------|---------------|-----|-------|-------|
| Acronal® PRO 780  | emulsion      | 乳液  | 150,0 | parts |
| FoamStar® SI 2210 | defoamer      | 消泡剂 | 2,5   | parts |
| Surfynol® 104 E   | wetting agent | 润湿剂 | 3,7   | parts |

**Pre-mix: 预分散**

|                |                  |     |      |       |
|----------------|------------------|-----|------|-------|
| water          |                  |     | 69,3 | parts |
| Lutensit® A-EP | dispersing agent | 分散剂 | 1,0  | parts |
| Ammonia 25 %   |                  | 氨水  | 2,6  | parts |

**Pre-mix: 预分散**

|                           |                    |      |     |       |
|---------------------------|--------------------|------|-----|-------|
| Phenoxy propanol          | coalescing solvent | 成膜助剂 | 7,2 | parts |
| Mineral spirit 180-220 °C | coalescing solvent |      | 7,2 | parts |

|                         |                        |      |       |       |
|-------------------------|------------------------|------|-------|-------|
| Kronos® 2190            | white pigment          | 钛白   | 113,3 | parts |
| Luzenac® 20M2           | talc extender          | 滑石粉  | 47,1  | parts |
| Heucophos® ZMP          | anti-corrosive pigment | 防腐颜料 | 109,8 | parts |
| Lithopone™ L (30 % ZnS) | extender               | 填料   | 170,4 | parts |

**配漆，边搅边加**

**Let-down, add while stirring:**

|                                         |                        |       |       |       |
|-----------------------------------------|------------------------|-------|-------|-------|
| Acronal® PRO 780                        | emulsion               | 乳液    | 266,6 | parts |
| FoamStar® SI 2210                       | defoamer               | 消泡剂   | 2,4   | parts |
| CHE Coat® Ci LNF A4* (1 : 1 with water) | organic rust inhibitor | 有机防锈剂 | 10,8  | parts |

**Pre-mix: 预分散**

|                  |                    |       |        |       |
|------------------|--------------------|-------|--------|-------|
| Rheovis® PU 1280 | PU thickener       | PU增稠剂 | 1,8    | parts |
| Butyl glycol     | coalescing solvent |       | 1,8    | parts |
|                  |                    | 成膜助剂  |        |       |
| water            |                    |       | 5,3    | parts |
| ammonia 25 %     |                    | 氨水    | 27,2   | parts |
|                  |                    |       | 1000,0 | parts |

**Physical constants**

|                  |                                    |            |
|------------------|------------------------------------|------------|
| PVC              | 物理特性                               |            |
| solids by weight | 颜料体积浓度                             | 35 %       |
|                  | 固含量                                | 66 %       |
| pH               | pH值                                | 9.6        |
| viscosity        | Brookfield, 23 °C (73 °F) / 60 rpm | 1000 mPa.s |
| VOC              | 粘度                                 | ca. 85 g/l |

®: registered trademark of the respective company

# Acronal® PRO 780 - Influence of film thickness on corrosion after 480 hours SST

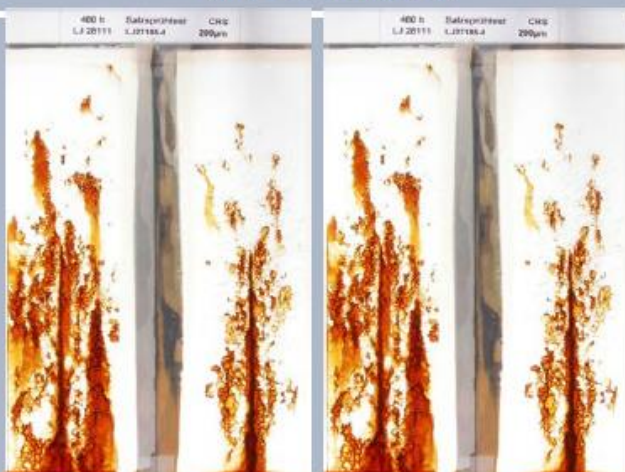
480h

DFT = 50 - 60 microns

DFT = 80 - 110 microns

Acronal®  
PRO 780  
LJ27185-4  
White  
Primer

Salt Spray  
480 hours

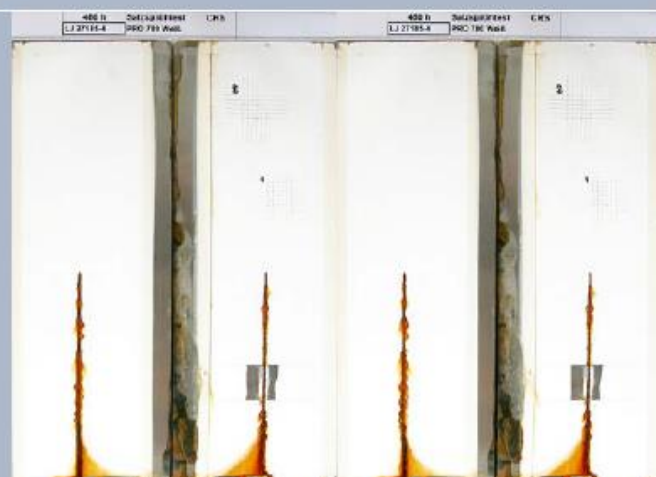
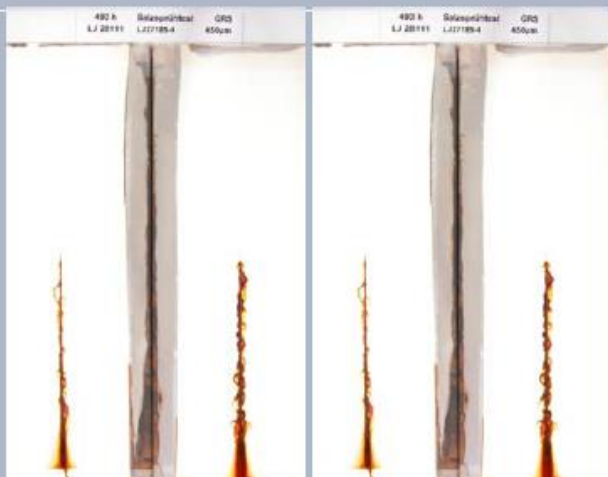


DFT = 140 - 160 microns

DFT = 180 - 200 microns

Acronal®  
PRO 780  
LJ27185-4  
White  
Primer

Salt Spray  
480 hours



# Acronal® PRO 763 - White anticorrosive formulation (29238-10)

## Add while stirring 边搅边加

|                   |          |     |       |       |
|-------------------|----------|-----|-------|-------|
| Acronal® PRO 763  | function | 乳液  | 40,00 | parts |
| FoamStar® SI 2210 | defoamer | 消泡剂 | 0,22  | parts |

## Pre-mix: 预分散

|                |                  |      |      |       |
|----------------|------------------|------|------|-------|
| water          |                  |      | 0,50 | parts |
| Lutensit® A-EP | dispersing agent | 分散剂  | 0,06 | parts |
| DMEA           |                  | pH调节 | 0,08 | parts |

|               |                    |      |      |       |
|---------------|--------------------|------|------|-------|
| Solvenon® PnB | coalescing solvent |      | 1,12 | parts |
| Butyl glycol  | coalescing solvent | 成膜助剂 | 1,12 | parts |

|                |                        |      |       |       |
|----------------|------------------------|------|-------|-------|
| Kronos® 2190   | White pigment          | 钛白   | 8,00  | parts |
| Heucophos® ZMP | Anti-corrosive pigment | 防腐颜料 | 11,10 | parts |
| Luzenac® 20M2  | Talc                   | 滑石粉  | 5,55  | parts |
| Barite EWO     | Barium sulfate         | 硫酸钡  | 3,85  | parts |

## Let-down 配漆, 边搅边加

|                                      |                        |       |       |       |
|--------------------------------------|------------------------|-------|-------|-------|
| Acronal® PRO 763                     | function               | 乳液    | 26,90 | parts |
| FoamStar® SI 2210                    | defoamer               | 消泡剂   | 0,19  | parts |
| CHE Coat® Ci LNF A4 (1:1 with water) | Organic rust inhibitor | 有机防锈剂 | 0,37  | parts |

## Add mix of 预分散

|                       |              |       |        |       |
|-----------------------|--------------|-------|--------|-------|
| Rheovis® PU 1280      | PU thickener | PU增稠剂 | 0,15   | parts |
| Butyl glycol          |              | 成膜助剂  | 0,15   | parts |
| water                 |              |       | 0,50   | parts |
| Ammonia 25%, bis pH 9 |              | 氨水    | 0,10   | parts |
|                       |              |       | 100,00 | parts |

## Physical constants

|                  |        |                                    |
|------------------|--------|------------------------------------|
|                  | 物理特性   |                                    |
| PVC              | 颜料体积浓度 | 20 %                               |
| solids by weight | 重量固含   | 64 %                               |
| solids by volume | 体积固含   | 69 %                               |
| pH               | pH值    | 9,0                                |
| viscosity        | 粘度     | Brookfield 25 °C (77 °F) 1800 mPas |
|                  |        | 60RPM spindle 63                   |
| VOC              |        | 41 g/l                             |

## Properties

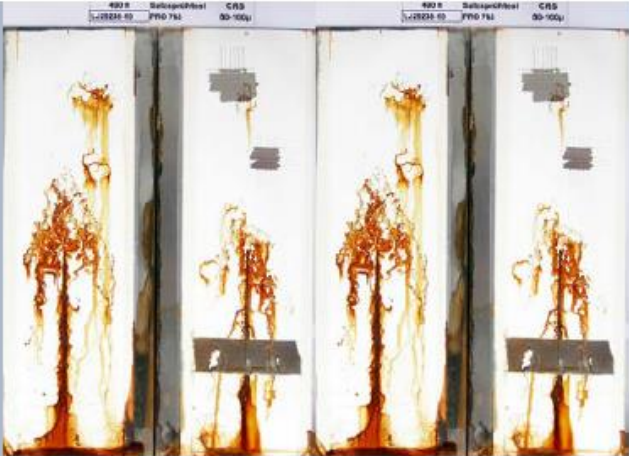
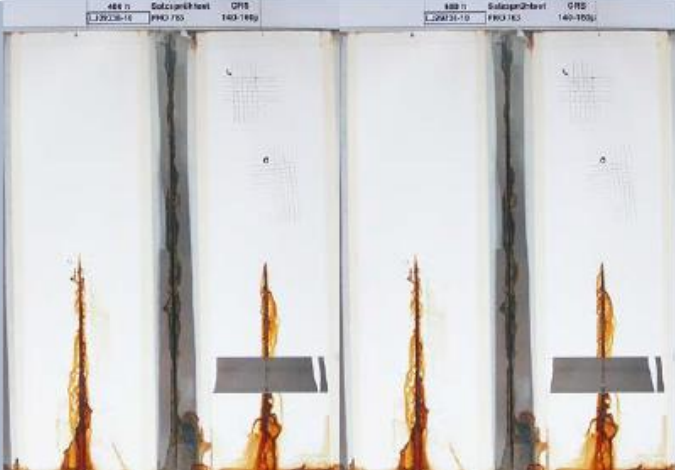
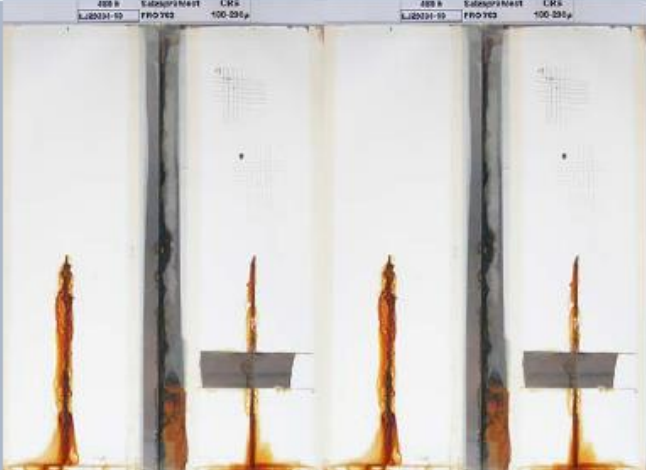
|                |                            |           |
|----------------|----------------------------|-----------|
| application    | 施工方式                       | draw down |
| König Hardness | K氏硬度                       | 29 osc.   |
|                | 1 week at room temperature |           |

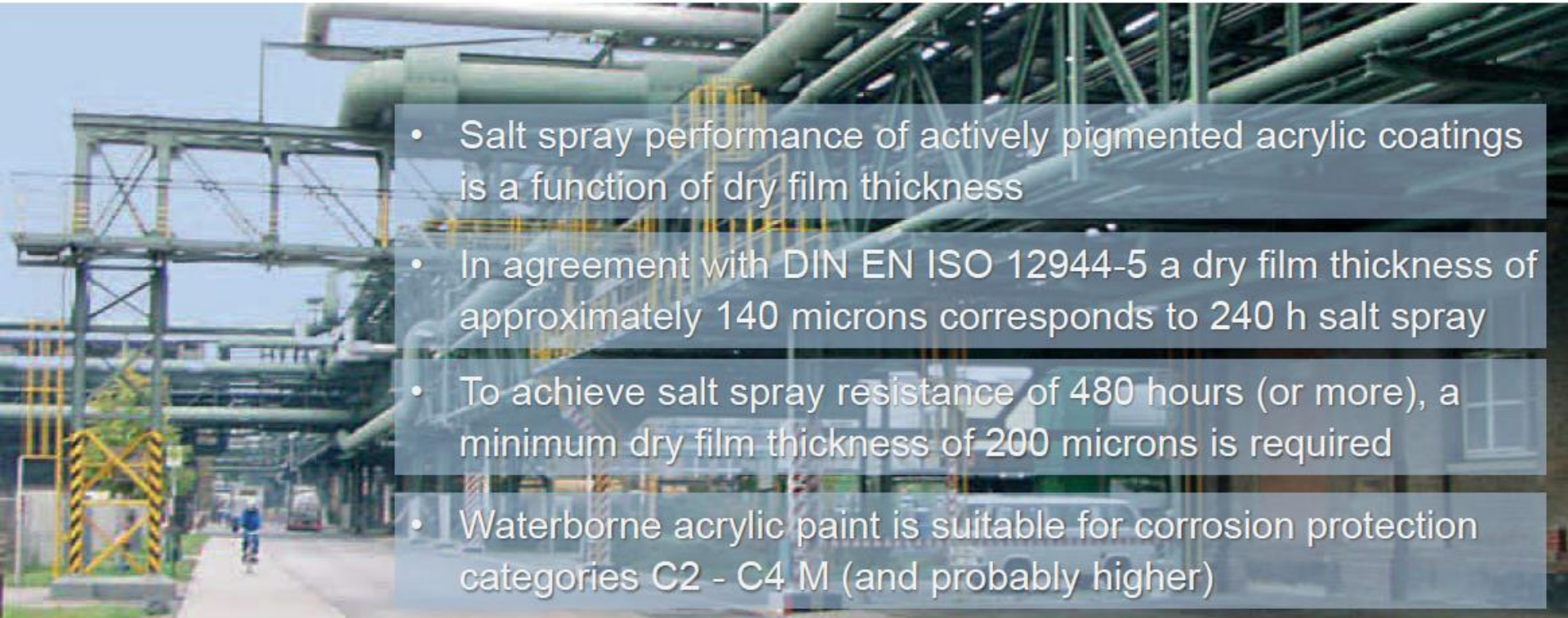
®: registered trademark of the respective company

**Note: addition of Heucorin® RZ to grind significantly improves adhesion on galvanized steel**

添加**Heucorin® RZ**加强研磨后, 能改善在镀锌钢板的附着力

# Acronal® PRO 763 - Influence of film thickness on corrosion after 480 hours SST

| 480h                                                                                    | DFT = 65 microns                                                                   | DFT = 80 - 110 microns                                                               |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Acronal®<br>PRO 763<br><br>LJ29238/10<br>White<br>Primer<br><br>Salt Spray<br>480 hours |                                                                                    |   |
|                                                                                         | DFT = 140 - 160 microns                                                            | DFT = 180 - 200 microns                                                              |
| Acronal®<br>PRO 763<br><br>LJ29238/10<br>White<br>Primer<br><br>Salt Spray<br>480 hours |  |  |

- 
- Salt spray performance of actively pigmented acrylic coatings is a function of dry film thickness
  - In agreement with DIN EN ISO 12944-5 a dry film thickness of approximately 140 microns corresponds to 240 h salt spray
  - To achieve salt spray resistance of 480 hours (or more), a minimum dry film thickness of 200 microns is required
  - Waterborne acrylic paint is suitable for corrosion protection categories C2 - C4 M (and probably higher)

经济型单组份丙烯酸色漆，达到**C2-C4**等级，需增加厚度提升耐盐雾  
耐盐雾 240小时 → 干膜厚度 约**140微米**干膜厚度  
480小时 至少**200微米**

# 用于单涂层金属防护的水性丙烯酸分散体 Joncryl® PRO 1522



## Performance highlights

- Good corrosion protection at low dry film thickness 低干膜厚度下的良好耐腐蚀
- High gloss (>80 at 60°) 高光 低VOC
- Low VOC (<150 g/l) 单涂层领域应用
- Outperforming commercial DTM paints
- Good early water resistance 早期耐水性好
- Good exterior durability 户外耐候性好
- Suitable for brush, roller, spray and dip application 适合刷涂, 辊涂, 喷涂和浸涂

Joncryl® 1522

White DTM alkylid

White DTM acrylic



White DTM Salt Spray Test Results after > 200 h on Cold Rolled Steel. (40 µm dry film thickness)

白色单涂层在冷轧钢板的耐盐雾大于200小时(40微米干膜)

## Usage

- Light duty metal protection (e.g. gas tanks) (C2) 中轻防护
- Steel components for ACE equipment 农业机械的钢部件
- Interior steel pipes 室内钢管
- Underbody coatings 背面涂层
- Touch-up of metal parts 彩色金属件

## Exemplary applications



## Key technical data

- styrene-acrylic dispersion with non-migrating emulsifier 含不迁移乳化剂的苯丙
- Solids by weight: 固含 ~ 45%
- Viscosity: 粘度 ~ 400 mPa·s (25 °C)
- pH: pH值 ~ 9
- MFT: 最低成膜温度 ~ 26°C
- Density: 密度 1,06 g/cm<sup>3</sup>

## Availability

Samples available.  
Commercial quantities

# Joncryl® PRO 1522

## 早期耐水性 ( 浸泡 )

ASTM D-714

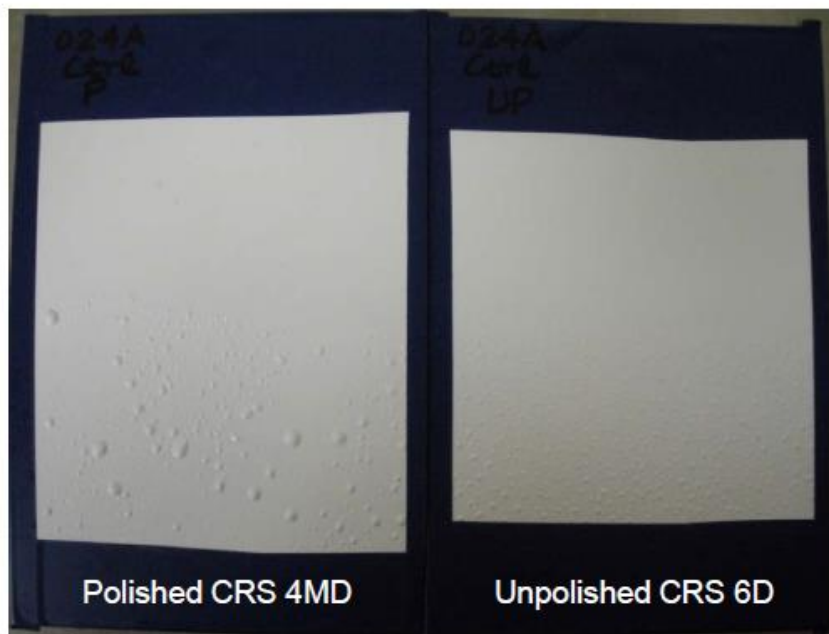


Overnight immersion test after 4 hours drying time 过夜浸泡测试后干燥4小时

- No rust, no blistering (LJB-027C)
- About 80% gloss retention after recovery

不生锈，不起泡(LJB-027C)

恢复后保光率约80%



打磨过的冷轧钢板

不打磨的冷轧钢板

Formulation SEH-0183D



打磨过的冷轧钢板

不打磨的冷轧钢板

Formulation LJB-027C

# Joncryl® PRO 1522

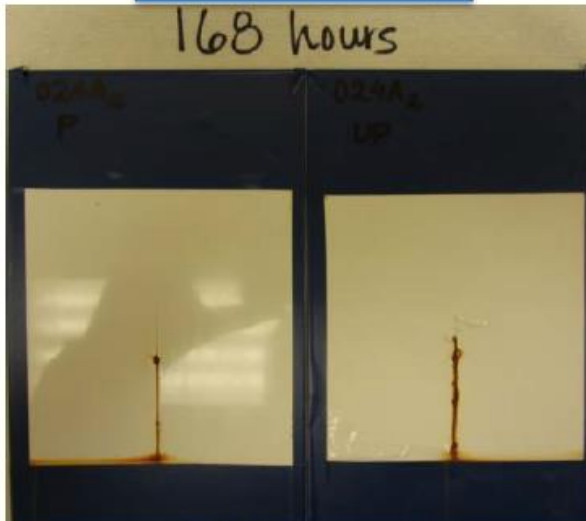
## 耐盐雾测试

ASTM B-117

**BASF**  
We create chemistry

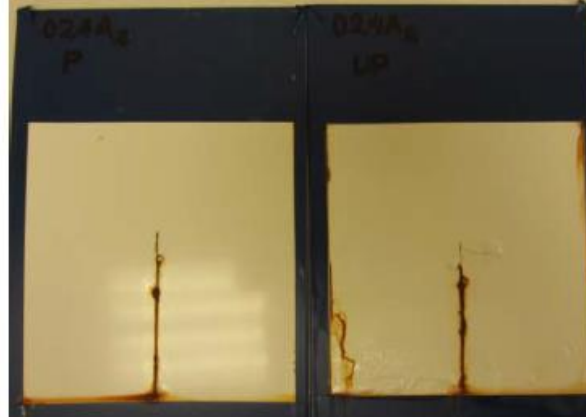
SEH-0183D: 240 g/L

168 hours



168 hours

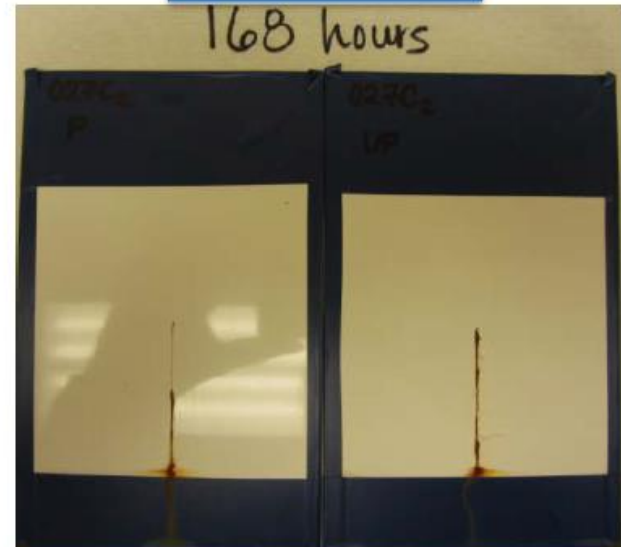
336 hours



336 hours

LJB-027C: 210 g/L

168 hours

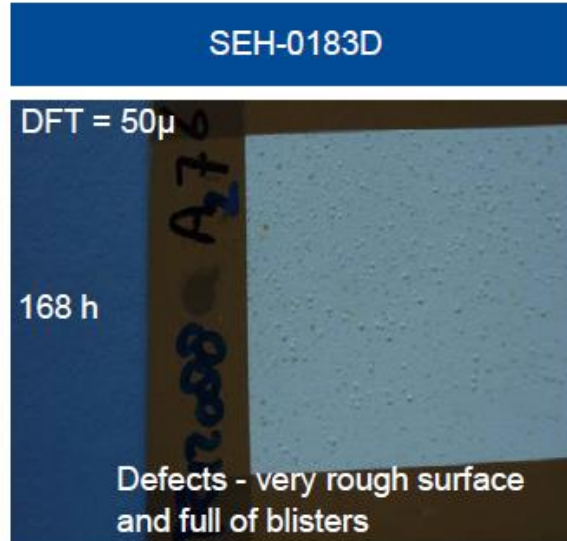


# Joncryl® PRO 1522

## 克里夫兰耐水测试

CRS

冷轧钢板



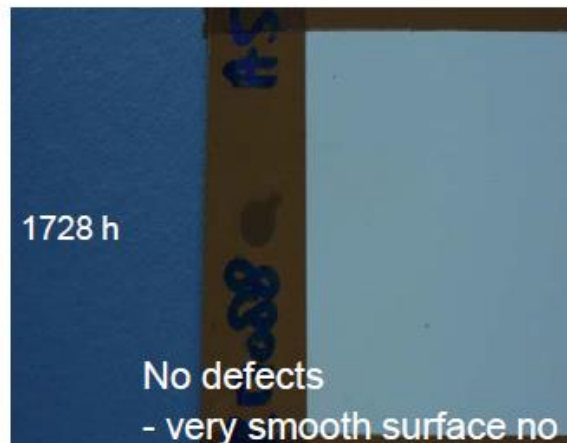
缺陷-漆膜粗糙，满板起泡



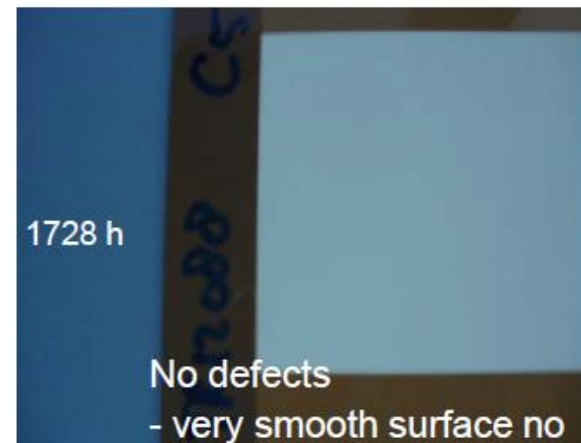
无缺陷-漆膜光滑，无起泡

ALU

铝板



无缺陷-漆膜光滑，无起泡



无缺陷-漆膜光滑，无起泡

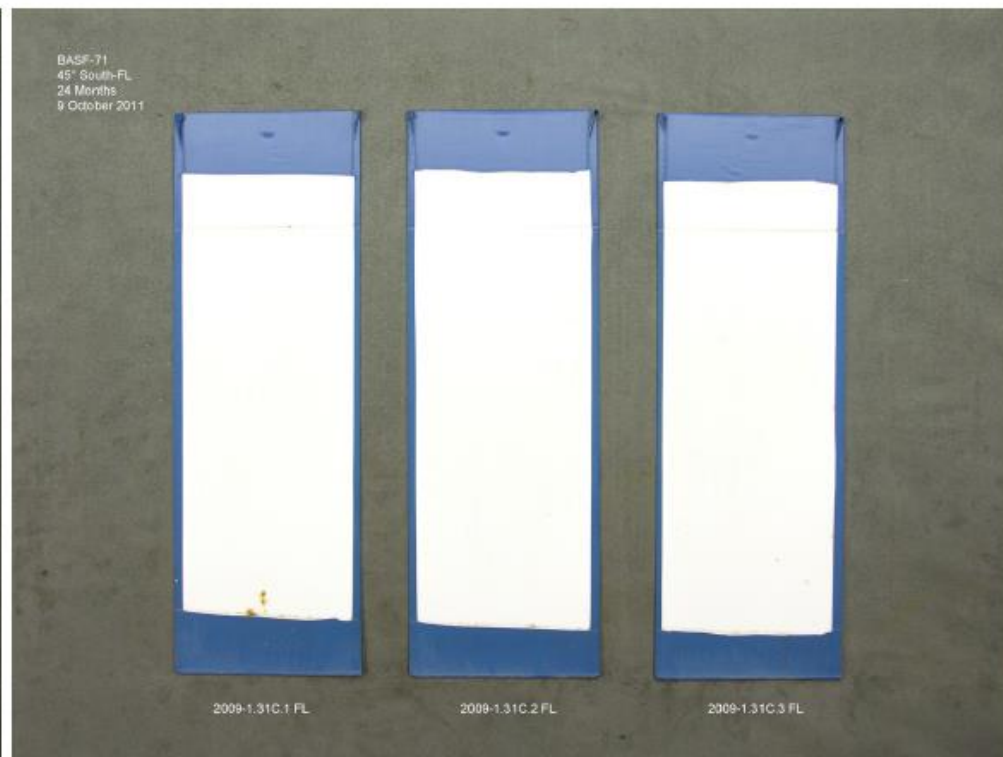
# Joncryn<sup>®</sup> PRO 1522

## 佛罗里达曝晒测试 6个月 & 2年

CRS, clean-polish



VOC (g/L): 240  
Lab book # SEH-0183D



VOC (g/L): 240  
Lab book # SEH-0183D

# 用于单涂层金属防护的水性丙烯酸分散体

## Joncryl® PRO 1524

### Performance highlights

- Good Corrosion Resistance 良好的耐腐蚀
- Low VOC Capable (< 100 g/l) 低VOC
- Excellent Adhesion (wet and dry) 优异的干湿附着力
- Gloss > 80 at 60° 高光
- Excellent UV durability 优异的户外耐UV
- Good Chemical Resistance 良好的耐化性
- APEO Free 不含APEO



White DTM Salt Spray Test Results after > 322 hours on Cold Rolled Steel. (40-50 µm dry film thickness)

白色DTM在冷轧钢板的耐盐雾大于322小时(40-50微米干膜)

### Usage

- Light duty metal protection (e.g. gas tanks) (C2) 中度防护(气体储罐)
- Steel components for ACE equipment 农机钢部件
- Interior steel pipes 室内钢管
- Underbody coatings 背面涂层
- Touch-up of metal parts 彩色的金属件

### Key technical data

- Non-surfactant acrylic dispersion 不含表活的丙烯酸
- Solids by weight: 固含 ~ 43%
- Viscosity: 粘度 ~ 1000 mPa·s (25 °C)
- pH: pH值 ~ 8.3
- MFT: 最低成膜温度 ~ 25°C
- Density: 密度 1,06 g/cm<sup>3</sup>

### Exemplary applications



Metal protection



ACE



General Industrial

### Availability

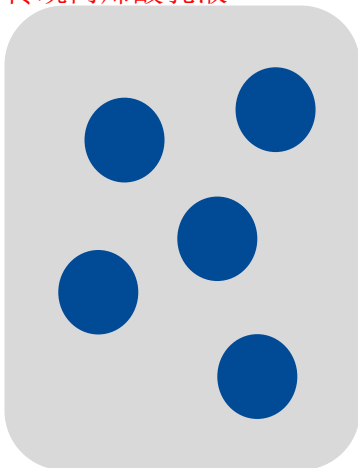
Samples available.  
Commercial quantities

# 新一代丙烯酸分散体技术

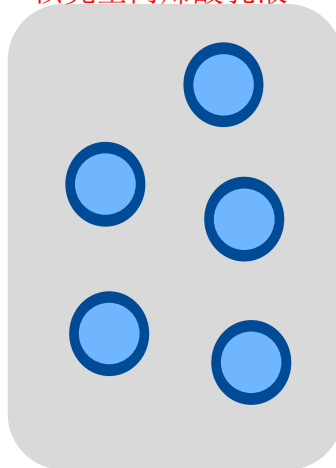
## Joncryl® PRO 1524

| The 1 <sup>st</sup> generation | The 2 <sup>nd</sup> generation | The 3 <sup>rd</sup> generation |
|--------------------------------|--------------------------------|--------------------------------|
| Basic acrylic latex            | Structured acrylic latex,      | Unique, improving wet adhesion |

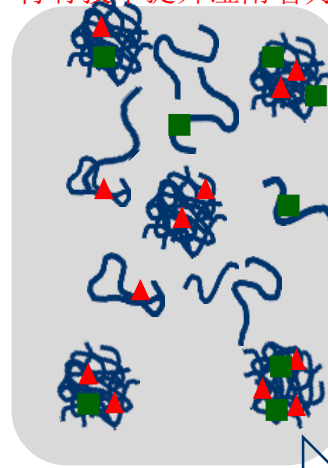
传统丙烯酸乳液



核壳型丙烯酸乳液

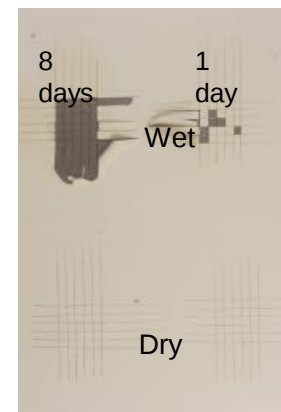


特有技术提升湿附着力

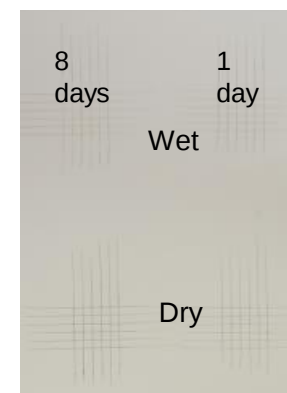


性能差距驱动新技术产生  
*Performance gaps driving new technologies*

### Commercial



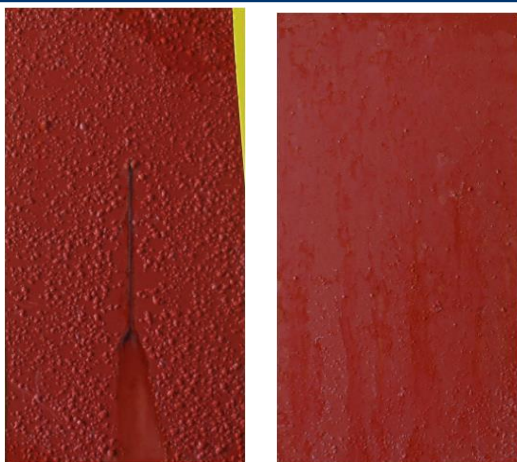
### Joncryl PRO 1524



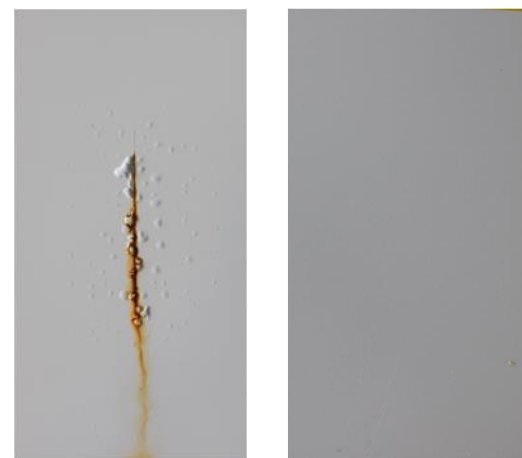
# 金属防护涂料从溶剂型向水性转换的关键挑战

## ■ 单组份丙烯酸分散体取代溶剂型醇酸的技术挑战

耐盐雾测试早期满板起泡



划痕处的耐盐雾测试早期起泡



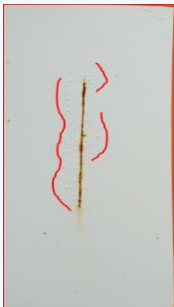
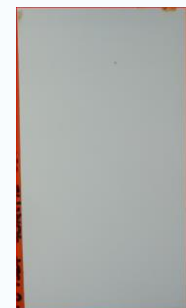
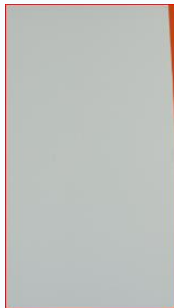
## ■ 如何改善？

- ☐ 使用高防护的核壳分散体
- ☐ 配方优化
- ☐ 更厚的漆膜
- ☐ 调整干燥条件...

- ☐ 通过分散体改善湿膜附着力
- ☐ 针对个别底材机动调整配方
  - 附着力促进剂
  - 活性防腐颜料

# 单涂层水性丙烯酸分散体的耐盐雾结果比较

- 相比于其他丙烯酸分散体，Joncryl® PRO 1524表现出**优异的抗早期起泡性** (短期的耐盐雾测试)

| 48小时耐盐雾测试   | Joncryl® PRO 1522                                                                   | Joncryl® PRO 1524                                                                   | Benchmark 1                                                                          | Benchmark 2                                                                           | Benchmark 3                                                                           | Benchmark 4                                                                           |
|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 干膜厚度35~40微米 |   |   |   |   |   |   |
|             |  |  |  |  |  |  |

# 不同底材的结果比较

## - 不同来源的冷轧钢

- 在不同的底材上，Joncryl® PRO 1524 表现出**更好的耐盐雾**测试结果，尤其是在带刮痕处理的板面上

在Q-Panel R-36上

| 干膜40微米       | 带划痕处理   | 不带划痕处理   |
|--------------|---------|----------|
| Joncryl 1522 | < 48 小时 | > 145 小时 |
| Joncryl 1524 | 145 小时  | > 145 小时 |

在本地的冷轧钢上

| 干膜40微米       | 带划痕处理  | 不带划痕处理   |
|--------------|--------|----------|
| Joncryl 1522 | 200 小时 | > 300 小时 |
| Joncryl 1524 | 200 小时 | > 300 小时 |

# Joncryl® PRO 1524 丙烯酸分散体

## - 推荐配方

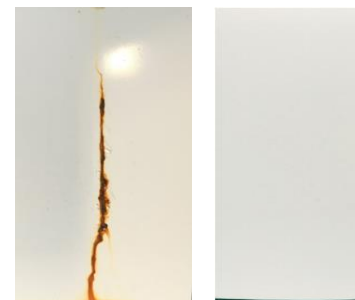
### □ Joncryl PRO 1524 高光白色单涂层/面漆配方

配方号: CFT- MD-02, Aug. 2016 更新

| 原材料                                  | 用量            | 功能    | 供应商     |
|--------------------------------------|---------------|-------|---------|
| 逐步添加以下原料, 然后高速分散30分钟得到研磨浆料           |               |       |         |
| DI Water                             | 6.0           |       |         |
| Dispex® Ultra PX4575                 | 0.3           | 分散剂   | BASF    |
| Hydropalat® WE 3322                  | 0.1           | 底材润湿剂 | BASF    |
| FoamStar® SI 2250                    | 0.1           | 消泡剂   | BASF    |
| Kronos® 2190                         | 14.0          | 钛白粉   | KRONOS  |
| NH3H2O-28%                           | 0.1           | pH调节剂 | Local   |
| 配漆                                   |               |       |         |
| Joncryl® PRO 1524                    | 71.0          | 分散体   | BASF    |
| 在搅拌分散体时添加以上研磨浆料, 预分散水和成膜助剂, 然后逐步添加原料 |               |       |         |
| DI Water                             | 3.36          |       |         |
| Ethylene glycol monobutyl ether      | 4.0           | 成膜助剂  | Local   |
| Hydropalat® WE 3322                  | 0.5           | 底材润湿剂 | BASF    |
| FoamStar® SI 2250                    | 0.1           | 消泡剂   | BASF    |
| Rheovis® PU 1191(50%)                | 0.14          | 流变控制剂 | BASF    |
| ASCOTRAN-H10                         | 0.3           | 防闪锈助剂 | Ascotec |
| <b>Total</b>                         | <b>100.00</b> |       |         |

| 性能项目        | 结果   |
|-------------|------|
| 细度/ 微米      | < 20 |
| 粘度/ KU      | 90   |
| 颜料体积浓度/ %   | 11   |
| 重量固含/ %     | 45.2 |
| pH值         | 8.4  |
| 光泽度@60°, GU | 84   |

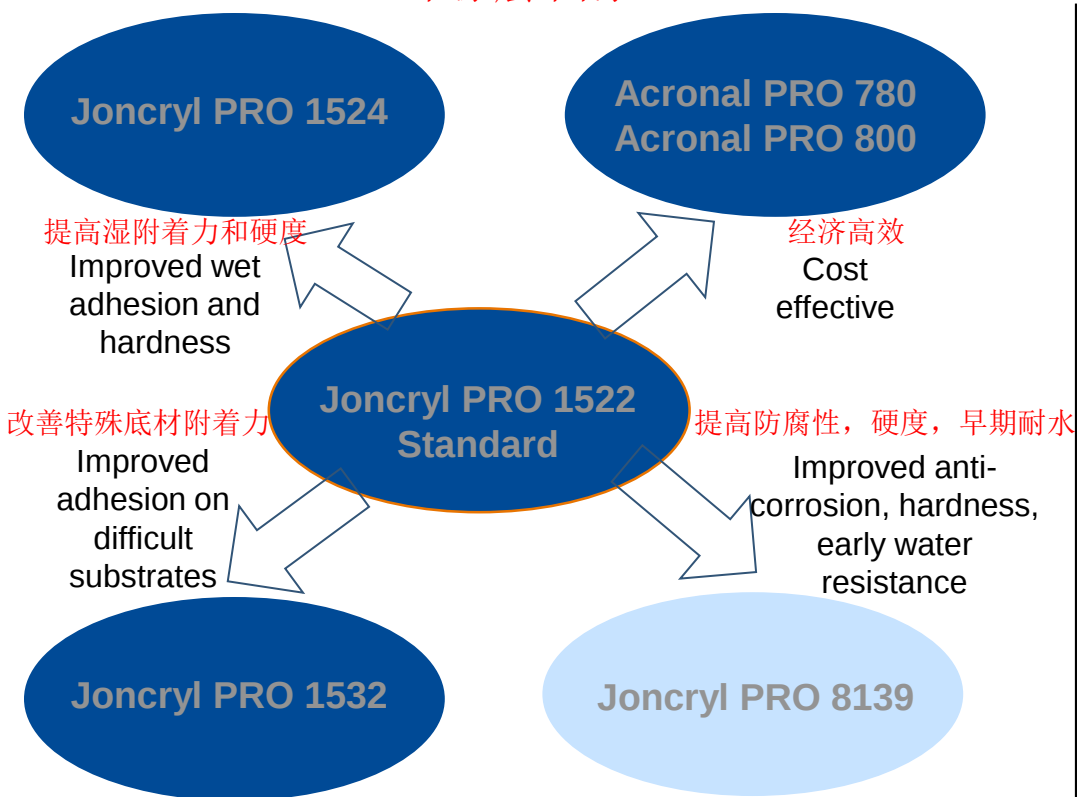
### □ 耐盐雾测试215小时后 依据ASTM B-117, 干膜厚度40~50微米



# 用于金属防护涂料的水性丙烯酸分散体

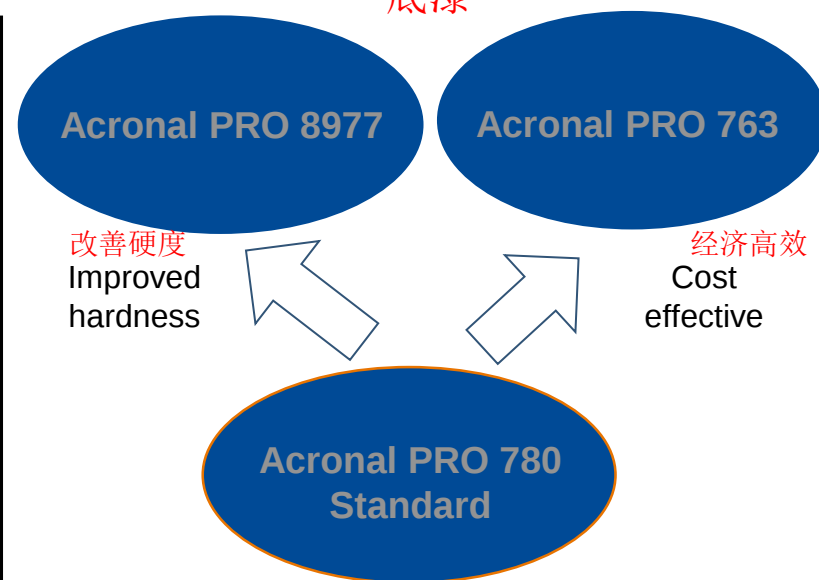
## DTM / Topcoat

单涂层/面漆



## Primer

底漆



# 单组分水性金属防护涂料的产品推荐

## Multilayer

Topcoat 25-80 µm

Intermediate  
Coat 80 µm

Primer 80 µm

Metal

❖ C3-C4

- ✓ Joncryl PRO 1522
- ✓ Joncryl PRO 1524
- ✓ Joncryl PRO 1532
- ✓ Joncryl PRO 8139
- ✓ Acronal PRO 780
- ✓ Acronal PRO 800

**More application  
steps & higher  
corrosion protection**

- ✓ Acronal PRO 780
- ✓ Acronal PRO 763
- ✓ Joncryl PRO 8977

## Direct to metal (DTM)

DTM Coating (25 – 40 µm)

Metal

❖ C1-C2

- ✓ Joncryl PRO 1522
- ✓ Joncryl PRO 1524
- ✓ Joncryl PRO 8139

**Less application  
steps & lower  
corrosion protection**

# BASF Offerings - WB 2K for Metal Protection

| Class | Product              | Technology                            | Performance & Application                                                                                                                                                                                                                   |
|-------|----------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C3-C4 | Luhydran® S 938 ap   | Conventional acrylic, OH functional   | APEO free, universal resistant to hydrolysis, good anti-corrosion, high chemical res, high hardness, good block resistance, and good water & solvent resistance. (WB 2KPU primer, topcoat)                                                  |
|       | Joncryn® OH 8311     | RC acrylic, OH functional             | APEO free, excellent adhesion, high water & chemical res.(WB 2KPU topcoat)                                                                                                                                                                  |
|       | Joncryn® OH 8312     | Conventional acrylic, OH functional   | APEO free, low coalescent demand, good adhesion, excellent outdoor durability. (WB 2KPU topcoat)                                                                                                                                            |
|       | Joncryn® OH 8314     | Non-surfactant acrylic, OH functional | Crosslinkable with water-dispersible polyisocyanate, pot life with end indication via viscosity increase, low VOC capability, excellent anti-corrosion, excellent chemical res, good hardness development, good adhesion. (WB 2KPU topcoat) |
|       | Basonat® HW 1180 PC  | HDI based isocyanates                 | 80% solid, water-emulsifiable polyfunctional isocyanates, easy mixing (WB 2KPU)                                                                                                                                                             |
|       | Basonat® HW 2100     | HDI based isocyanates                 | 100% solid, emulsifier-modified polyisocyanate, easy emulsification into water, excellent light fastness, good chemical res. (WB 2KPU)                                                                                                      |
|       | Basonat® HW 3280 MBA | HDI & IPDI based isocyanates          | 80% solid hydrophilic polyisocyanate, fast hardness development, easy emulsifiable, good compatibility with dispersion, fast drying and high end hardness, longer pot-life compared to pure HDI types. (WB 2KPU)                            |

new

# 双组分能显示活化期终点的羟丙分散体 Joncryl® OH 8314

**BASF**  
We create chemistry

## Performance highlights

- Pot-life with end indication via viscosity increase 通过粘度增加显示活化期终点
- Low VOC capability 低VOC
- Excellent anti-corrosion 优异的耐腐蚀性
- Good adhesion 良好的附着力
- Good hardness development 良好的硬度发展
- Excellent chemical resistance

优异的耐化性

## Usage

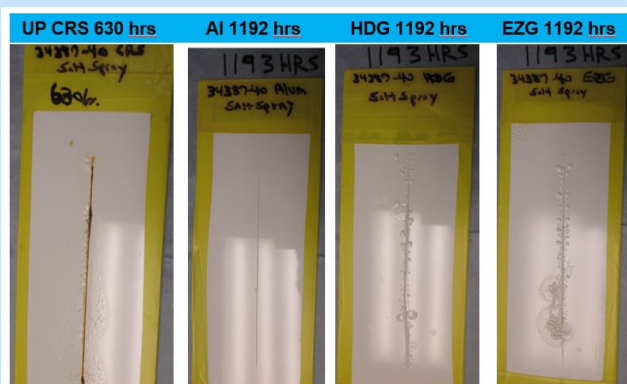
- Interior/exterior industrial and Institutional maintenance
- Interior/exterior general industrial metal
- Direct-to-metal protective 户内/户外工业防护和维护翻新  
户内/户外通用的金属防护
- Automotive interior 单涂层保护  
汽车内饰件

## Exemplary applications



## Key technical data

- Non-surfactant acrylic dispersion 不含表活的丙烯酸
- Solids by weight: 固含 ~ 44%
- Viscosity: 粘度 100~800 mPa·s (25 °C)
- pH: pH值 ~ 8.3
- MFT: 最低成膜温度 40~45°C
- Hydroxyl number 羟值 70 mg KOH /g
- Density 密度 1,06 g/cm<sup>3</sup>



White DTM Salt Spray Test Results on Different Substrates. (40-50 µm dry film thickness)

白色DTM在不同底材的耐盐雾测试(40-50微米干膜)

## Availability

Samples available.  
Commercial quantities

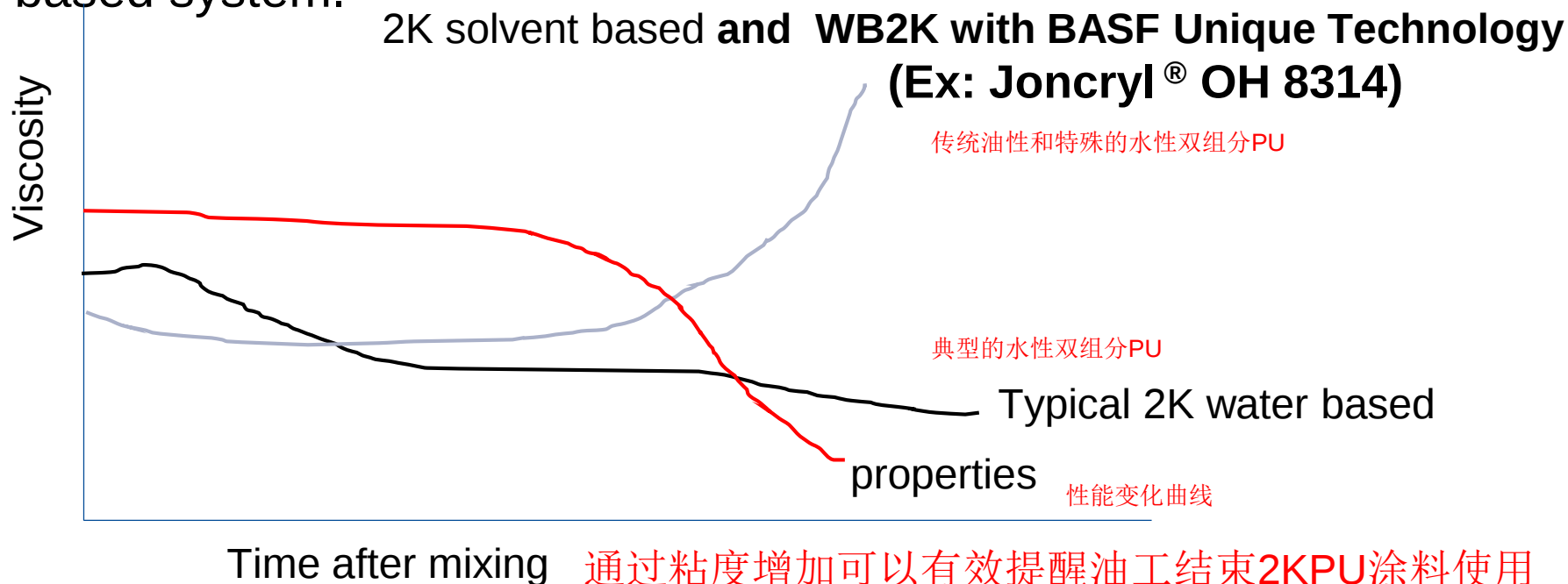
new

# BASF独有的新技术

活化期的标识: 性能Vs 时间

**BASF**  
We create chemistry

- Typical WB2K systems show no increase in viscosity. Reactions happen in the dispersed phase. Our system behaves like a solvent based system.



A viscosity increase is an easy indicator for the user to stop using the coating

# Joncryl® OH 8314 + Basonat® HW 1000

## 用于白色单涂层

### Joncryl OH 8314 FORMULA for WB2K High Gloss White DTM (34387-86)

高光水性双组分PU

| Materials                                                                       | Pounds        | Gallons       |
|---------------------------------------------------------------------------------|---------------|---------------|
| <b>PART A</b>                                                                   |               |               |
| <b>GRIND – combine under agitation</b>                                          |               |               |
| DI Water                                                                        | 25.56         | 3.07          |
| Foamstar® ST 2446 消泡剂                                                           | 2.12          | 0.26          |
| Disperbyk <sup>1</sup> 190 分散剂                                                  | 12.47         | 1.41          |
| Ti-Pure <sup>2</sup> R-706 钛白                                                   | 124.75        | 3.75          |
| <b>High shear disperse for 10 minutes at 2500 RPM (Hegman &gt;7). Then add:</b> |               |               |
| DI Water                                                                        | 25.56         | 3.07          |
| pH调节                                                                            |               |               |
| <b>LET DOWN – combine with agitation at 1500 RPM</b>                            |               |               |
| Joncryl® OH 8314 乳液                                                             | 500.93        | 56.87         |
| Hydropalat® WE 3650 润湿剂                                                         | 6.74          | 0.83          |
| <b>Preblend the next two materials (25% solution), then add:</b>                |               |               |
| Rheovis® PU 1191 流变助剂                                                           | 1.69          | 0.20          |
| DI Water                                                                        | 5.06          | 0.61          |
| <b>High shear disperse for 10 minutes. Then add:</b>                            |               |               |
| DI Water                                                                        | 99.19         | 11.90         |
| <b>PART B – Mix until dissolved</b>                                             |               |               |
| Basonat® HW 1000 固化剂                                                            | 100.91        | 10.34         |
| Propylene glycol monomethyl ether acetate                                       | 48.51         | 5.99          |
| Diethylene glycol monoethyl ether acetate 成膜助剂                                  | 16.15         | 1.91          |
| <b>Total</b>                                                                    | <b>969.62</b> | <b>100.00</b> |

#### Mixing Instructions:

#### PART A / PART B

82.9 g./17.1 g. (by weight)

► Charge PART A and add PART B under agitation

► Mix with lift blade for 5 minutes at 1000 RPM

<sup>1</sup>Registered trademark of BYK Additives.

<sup>2</sup>Trademark of The Chemours Company TT, LLC.

# Joncryl® OH 8314 + Basonat® HW 1000

## 用于白色单涂层

| Formulation Attributes      |                           |
|-----------------------------|---------------------------|
| <b>PART A</b>               |                           |
| Solids                      | 44.7% by wt, 37.1% by vol |
| Viscosity (Stormer)         | 55 KU                     |
| pH                          | ~8.0                      |
| <b>PART A + PART B</b>      |                           |
| Solids                      | 47.3% by wt, 40.7 by vol  |
| Viscosity (Brookfield)      | ~530 cps                  |
| PVC                         | 9.2%                      |
| VOC (calculated)            | <167 g/l                  |
| NCO:OH Ratio                | 1.5                       |
| pH                          | ~8.0                      |
| <b>Pot Life (20 – 22°C)</b> | <b>120 minutes</b>        |

# BASF Novel Polyol Dispersion

*White DTM performance\**

| Property                              | Test                             | Result               |
|---------------------------------------|----------------------------------|----------------------|
| Gloss 光泽                              | 60°                              | 86                   |
| Solvent resistance 耐溶剂                | MEK double rubs                  | > 180                |
| Adhesion dry UP CRS 冷轧钢干附着力           | ASTM D3359 (B)                   | 5B                   |
| Adhesion Al, HDG, EZG 铝材/热浸镀锌/ 电镀锌附着力 | ASTM D3359 (B)                   | 4-5B                 |
| Adhesion wet UP CRS 冷轧钢湿附着力           | X-scribe, 1 hr water spot test   | 4A                   |
| Hardness K氏硬度                         | König (pendulum - swings)        | 65                   |
| Hardness 铅笔硬度                         | Pencil                           | F-H                  |
| Flexibility 柔韧性                       | 1/8" Mandrel                     | 0"                   |
| Salt Spray 耐盐雾                        | ASTM B117                        | > 250 hrs            |
| Weathering (no UVA/HALS) 耐候性          | ASTM D4587 (QUV A 340 @1000 hrs) | >90% gloss retention |
| Pot Life (20 – 22°C) 活化期              | Time to double visc              | 2 hrs                |

\*Panels aged at 50° C for 24 hours prior to testing to approximate ~7 days ambient cure

# 不同底材上的附着力

*ASTM D3359, Methods A and B*

冷轧钢 铝材 电镀锌

热浸镀锌 采石瓦

水泥

枫木

樱桃木

红橡

塑料

| Substrate             | UP<br>CRS | ALUM<br>6061 | EZG<br>Galv. | Bondrite<br>1000 | HDG<br>Galv. | Quarry<br>Tile | Concrete | Maple | Cherry | Red<br>Oak | VCT |
|-----------------------|-----------|--------------|--------------|------------------|--------------|----------------|----------|-------|--------|------------|-----|
| 7 Day dry<br>Adhesion | 5A        | 3A           | 4A           | 4A               | 4A           | 5A             | 5A       | 5A    | 5A     | 5B         | 5B  |

Method A = X-scribe, Method B = Cross hatch  
5 = no removal, 0 = complete removal of coating

*Bonderite is a registered trademark of Henkel Corporation.*

# 耐化性

Spot Tests (1 hour) per ASTM D1308

| Chemical                               | 24 hours               | 7 days |
|----------------------------------------|------------------------|--------|
| Water                                  | 10                     | 10     |
| Ethanol, 100% <span>100%乙醇</span>      | 9 – slight penetration | 10     |
| Gasoline <span>汽油</span>               | 10                     | 10     |
| Mineral Spirits <span>矿物油</span>       | 10                     | 10     |
| Muratic Acid (37% HCl) <span>盐酸</span> | 10                     | 10     |
| NaOH, 10% <span>10%氢氧化钠溶液</span>       | 10                     | 10     |
| Formula 409®                           | 10                     | 10     |

10 = no damage, 1 = complete removal of coating

Formula 409® is a registered trademark of The Clorox Company.

# QUV (A 340) 500-2000 Hours

51 = system A  
(No UVA/Hals)

| System                        | 51     |         |          | 51     |         |          | 51     |         |          | 51     |         |          |
|-------------------------------|--------|---------|----------|--------|---------|----------|--------|---------|----------|--------|---------|----------|
| Hours                         | 500    |         |          | 1000   |         |          | 1500   |         |          | 2000   |         |          |
| Time after activation<br>活化时间 | 0 min. | 60 min. | 120 min. | 0 min. | 60 min. | 120 min. | 0 min. | 60 min. | 120 min. | 0 min. | 60 min. | 120 min. |
| % gloss retention<br>保光率      | 100    | 99.0    | 98.9     | 95.9   | 91.2    | 88.9     | 88.0   | 84.8    | 84.4     | 78.5   | 73.2    | 74.9     |
| Delta E<br>黄变指数               | 0.89   | 1.02    | 0.99     | 1.62   | 1.75    | 1.62     | 2.0    | 2.2     | 1.9      | 2.04   | 2.2     | 2.06     |

# 干湿交替耐盐雾测试 (ASTM G 85-02)

## ASTM 评分级数

| Substrate       | UP CRS           | Alum                | EZG Galv.  | Bondrite B1000   | HDG Galv        |
|-----------------|------------------|---------------------|------------|------------------|-----------------|
| Filmbuild - CRS | 2.0-2.1          | 2.0-2.1             | 2.0-2.1    | 2.0-2.1          | 2.0-2.1         |
| 255 hours       | 4.30 mm          | 0.50 mm             | 4.00 mm    | 4.30 mm          | 5.80 mm         |
| ASTM Rating     | 5                | 9                   | 5          | 5                | 4               |
| Comments        | Ok               | a little gloss loss | gloss loss | Ok               | slt. gloss loss |
| 399 hours       | N/A              | N/A                 | 16 mm      | N/A              | 20 mm           |
| ASTM Rating     | N/A              | N/A                 | 0          | N/A              | 0               |
| Comments        | N/A              | N/A                 | pull       | N/A              | pull            |
| 539 hours       | 9.2 mm           | 1.5 mm              |            | 8.3 mm           |                 |
| ASTM Rating     | 6                | 8                   |            | 6                |                 |
| Comments        | no face blisters | no face blisters    |            | no face blisters |                 |
| 539 hours       | 9.2 mm           | 1.5 mm              |            | 8.3 mm           |                 |
| ASTM Rating     | 6                | 8                   |            | 6                |                 |
| Comments        | no face blisters | no face blisters    |            | no face blisters |                 |
| 632 hours       | 9.5 mm           | 1.5 mm              |            | 11.3 mm          |                 |
| ASTM Rating     | 3                | 7                   |            | 2                |                 |
| Comments        | no face blisters | no face blisters    |            | no face blisters |                 |
| 870 hours       | 13.3 mm          | 2.7 mm              |            | 15.7mm           |                 |
| ASTM Rating     | 1                | 6                   |            | 1                |                 |
| Comments        | no face blisters | no face blisters    |            | no face blisters |                 |
| 1032 hours      | 17.3 mm          | 3.0 mm              |            | 18.7 mm          |                 |
| ASTM Rating     | 0                | 6                   |            | 0                |                 |
| Comments        | PULL             | no face blisters    |            | PULL             |                 |
| 1195 hours      |                  | 7.0 mm              |            |                  |                 |
| ASTM Rating     |                  | 4                   |            |                  |                 |
| Comments        |                  | no face blisters    |            |                  |                 |
| hours           |                  |                     |            |                  |                 |
| ASTM Rating     |                  |                     |            |                  |                 |
| Comments        |                  | no face blisters    |            |                  |                 |

# 干湿交替耐盐雾测试

UP CRS 1032 hrs

EZG 399 hrs

HDG 399 hrs

B1000 1032 hrs



# 耐盐雾测试(ASTM B 117)

## ASTM 评分等级

| Substrate       | UP CRS           | Alum                | EZG Galv.                   | Bondrite B1000   | HDG Galv         |
|-----------------|------------------|---------------------|-----------------------------|------------------|------------------|
| Filmbuild - CRS | 2.0-2.1          | 2.0-2.1             | 2.0-2.1                     | 2.0-2.1          | 2.0-2.1          |
| 259 hours       | 10.75 mm         | 0.50 mm             | 1.40 mm                     | 7.70 mm          | 1.50 mm          |
| ASTM Rating     | 2                | 9                   | 7                           | 3                | 7                |
| Comments        | Ok               | a little gloss loss | gloss loss                  | Ok               | slt. gloss loss  |
| 541 hours       | 15.8 mm          | 0.5 mm              | 5.8 mm                      | 12.3 mm          | 7.50             |
| ASTM Rating     | 1                | 9                   | 4                           | 2                | 3                |
| Comments        | no face blisters | no face blisters    | gloss loss/no face blisters | no face blisters | no face blisters |
| 630 hours       | 16.30 mm         | 0.5 mm              | 7.0 mm                      | 14.5 mm          | 8.10 mm          |
| ASTM Rating     | 0                | 9                   | 4                           | 2                | 3                |
| Comments        | PULL             | no face blisters    | gloss loss/no face blisters | no face blisters | no face blisters |
| 867 hours       |                  | 0.5 mm              | 8.7 mm                      | 16.2 mm          | 8.8 mm           |
| ASTM Rating     | 0                | 9                   | 3                           | 0                | 3                |
| Comments        |                  | no face blisters    | gloss loss/no face blisters | PULL             | no face blisters |
| 1032 hours      |                  | 0.5 mm              | 10.2 mm                     |                  | 9.4 mm           |
| ASTM Rating     |                  | 9                   | 2                           |                  | 3                |
| Comments        |                  | no face blisters    | gloss loss/no face blisters |                  | no face blisters |
| 1193 hours      |                  | 1.0 mm              | 15.2 mm                     |                  | 9.5 mm           |
| ASTM Rating     |                  | 8                   | 1                           |                  | 3                |
| Comments        |                  | no face blisters    | gloss loss/no face blisters |                  | no face blisters |
| hours           |                  |                     |                             |                  |                  |
| ASTM Rating     |                  |                     |                             |                  |                  |
| Comments        |                  |                     |                             |                  |                  |

# 耐盐雾测试

UP CRS 630 hrs



Al 1192 hrs



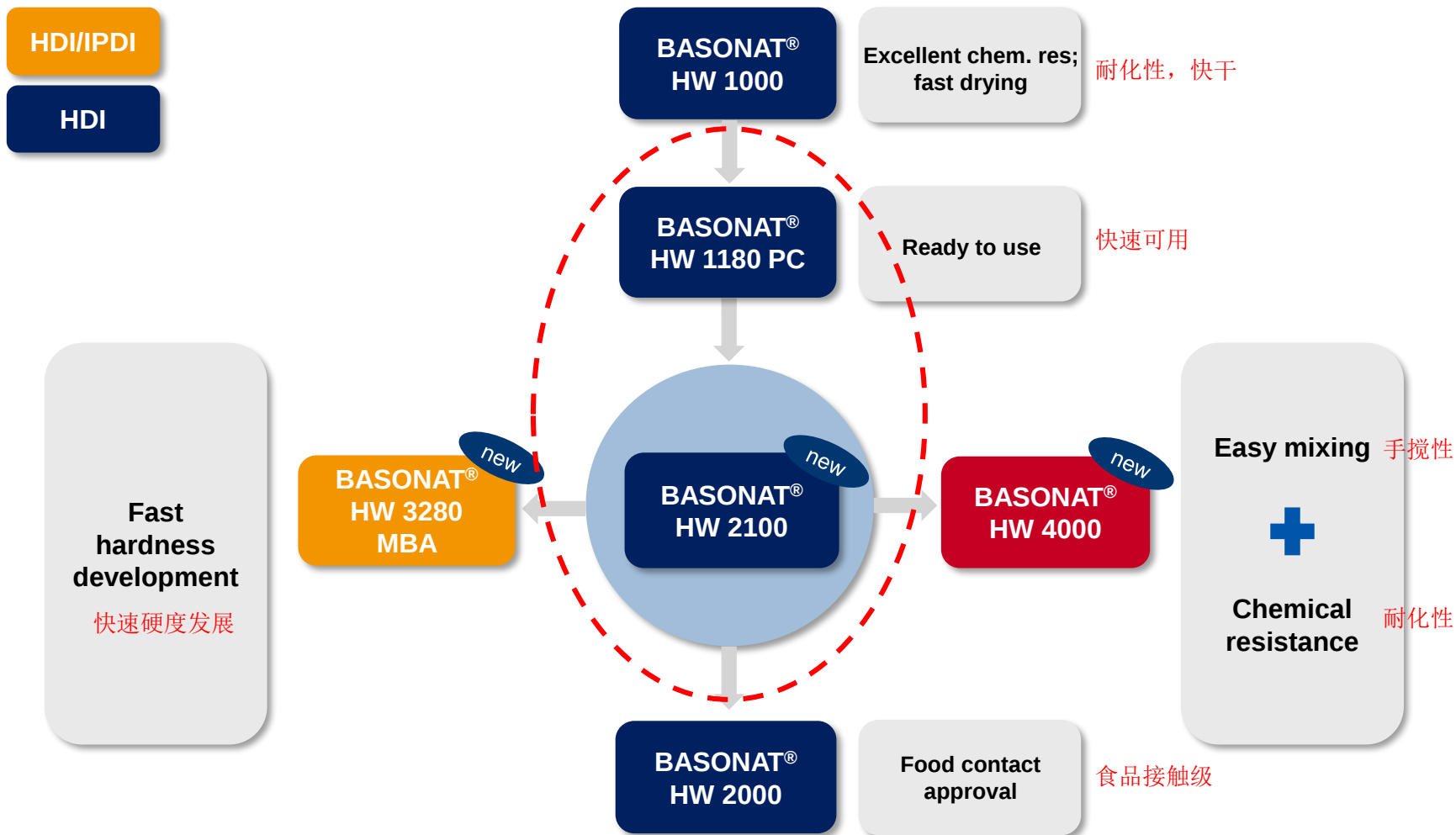
HDG 1192 hrs



EZG 1192 hrs



# BASONAT® HW 2KPU 固化剂



# 通用亲水性PU固化剂

## Basonat® HW 2100



### Performance highlights

- Hydrophilic modified HDI trimer for high quality water-borne 2K PU systems
- Balanced miscibility / chemical resistance profile
- Compatible with OH-functional dispersions & standard acrylic and polyurethane dispersions

亲水改性三聚体用于高要求的水性2KPU

有效平衡混溶性和耐化性

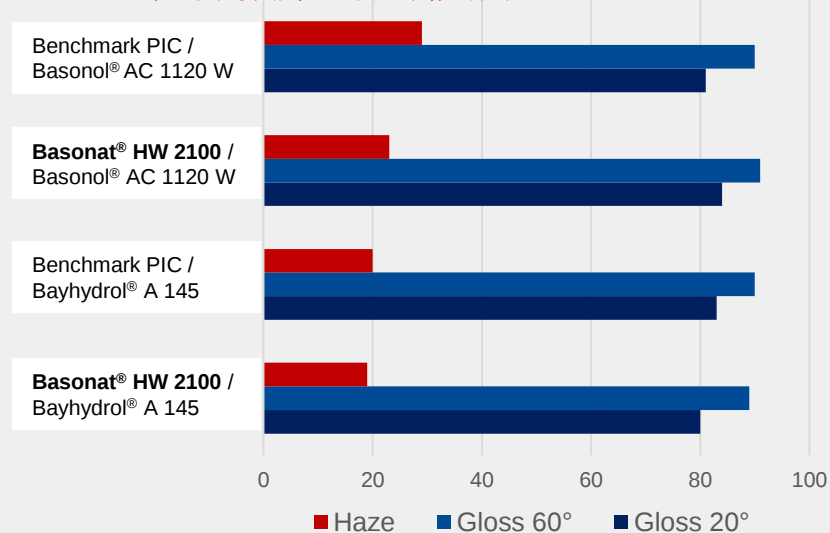
与普通的丙烯酸/聚氨酯/羟丙分散体相容性好

### Key technical data

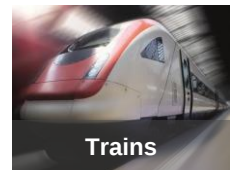
- NCO content: ~ 17.5 %
- Viscosity: ~ 2,800 mPa·s
- Solids content: 100 %

### Gloss / Haze (after 7 days at room temperature) – White high gloss pigmented coating

光泽和雾影值 – 白色高光体系



### Exemplary applications



### Availability

Samples & commercial quantities available

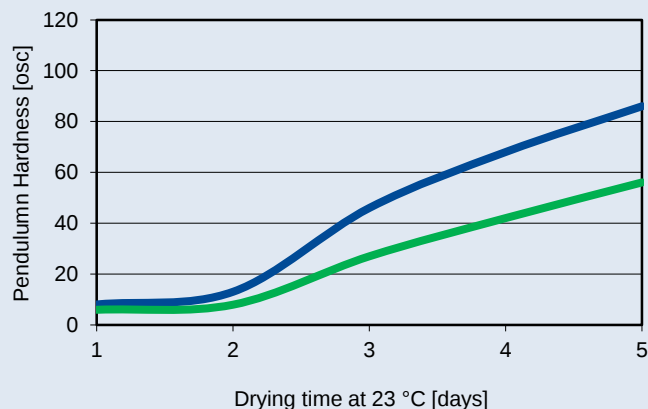
# 硬度快速发展亲水性2KPU固化剂

## Basonat® HW 3280 MBA

### Performance highlights

- Fast hardness development
- High end hardness 快速硬度发展  
最终硬度高
- Fast drying 快干
- Easy emulsifiable with binder – similar to HDI trimer-based market standards 和树脂一起易乳化  
类似标准的HDI三聚体

### Hardness development

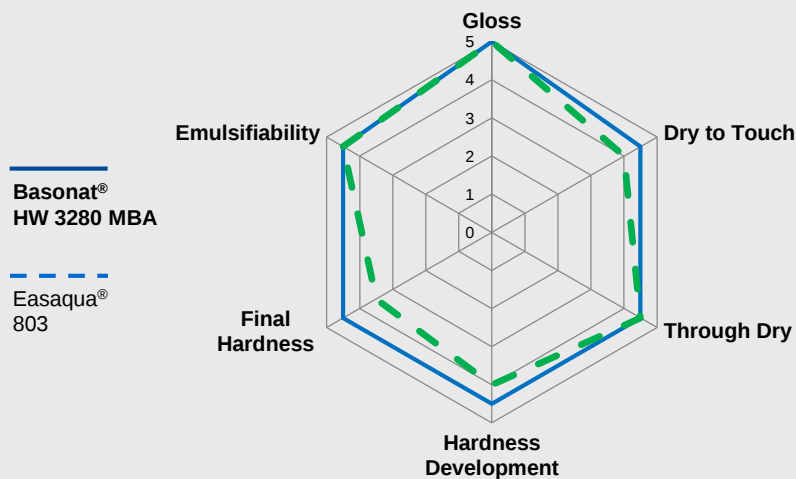


### Key technical data

#### Basonat® HW 3280 MBA

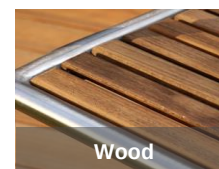
|                 |                                      |
|-----------------|--------------------------------------|
| Ionic character | Non-ionic<br>(broader compatibility) |
| NCO content     | 12 %                                 |
| Solids content  | 80 %<br>(in 3-methoxybutyl acetate)  |
| Viscosity       | ~ 1,000 mPa·s                        |

### Overall performance comparison



Bayhydrol® A 145 used as binder Evaluation: 5-best, 0-worst

### Exemplary applications



### Availability

Samples available

Launch: Q3/2017

- Metal protective coatings technology
- Test method for metal protective coatings
- Product offerings & introduction
  - 1K acrylic
  - 2K PU
- **Open discussion**



**BASF**  
We create chemistry





We create chemistry