

Product data sheet

Resicoat[®] HMM09QF (Corvel[®] 10-8158) Pipe Internal Coating

Product Description

Resicoat[®] HMM09QF (Corvel[®] 10-8158) is a melt-mixed, 100% solids thermosetting epoxy powder coating designed for coating the internal surface of pipe for use in the secondary recovery of oil. The product displayed no swelling, no softening, no blistering, and no loss of adhesion when the coated substrate was exposed to controlled tests at temperatures of up to 230° F.* When applied to primed metal using Resicoat[®] 596301 primer (Corvel[®] EP-10 1P-0010), Resicoat[®] PI HMM09QF (Corvel[®] 10-8158) provides resistance against H₂S, CO₂, CH₄, salt water and petroleum distillates. This product is suitable for high pressure lines up to 6,500 psi, high temperature brine, water injection, and oil and gas transmission pipelines.

	Typical value	Method
Powder Properties		
Binder system	Epoxy resin	
Specific gravity	1.25 – 1.75	ISO 8130-2
Coverage	130 ft ² /lb/mil	calculated
Gel time at 400 °F (205 °C)	100 – 140 sec.	ANPC-0004 (Flat Plate Stir)
Storage stability	12 months at ≤ 74 °F (23 °C), stored in dry conditions	
Application Data		
Surface preparation	All oil, grease, mill scale, and rust must be removed. A blast profile of 2 – 4 mils (50 – 100 µm) minimum NACE #1 is required.	
Resicoat [®] 596301 primer, dry thickness	0.5 – 1.0 mil (13 – 25 µm)	
Preheating	325 – 400 °F (163 – 204 °C) object temperature	
Post-curing	30 min., 390 – 410 °F (199 – 210 °C) 20 min., 415 – 435 °F (213 – 224°C)	
Recommended film thickness	15 – 25 mils (380 – 635 µm)	
Particle size distribution	< 32 µm = 25 – 45 % < 125 µm = 99 – 100 % > 150 µm = max. 3.0 % > 250 µm = max. 0.2 %	ISO 8130-13 ISO 8130-1 CSA Z245.20-14 12.5 CSA Z245.20-14 12.5
Material Properties		
Color	tan	
Flow	smooth	
Taber abrasion resistance	55 mg weight loss	ASTM D 4060 CS-17, 1000 g, 5000 cycles
Flexibility	at 77 °F (25 ± 3° C) at 50 °F (10 °C) at 41° F (5° C)	5.5° pass 3.75° pass 3.0° pass Aramco 09-SAMSS-091 Aramco 09-SAMSS-091 Aramco 09-SAMSS-091

* This statement is specifically limited to the evaluation conditions specified in the Material Properties Section of this Product Datasheet. This is not a guarantee of actual performance at the operating temperature. This representation is also subject to the Disclaimer contained on Page 3 of this Product Datasheet.

	Typical value	Method	
Material Properties (continued)	Dielectric strength	800 volts/mil	ASTM D 149, in oil
	Abrasion resistance	0.018 g loss	ASTM D 4060 CS-17, 1000g, 1000 cycles
	Impact resistance	1.7 J at 0° C 1.7 J at 20° C	ASTM G14
	Pull off adhesion test (dry)	25 MPa	ASTM D 4541
	Penetration	7.6 % at 185° F (85° C)	ASTM G 17
Autoclave Tests	Resicoat® PI HMM09QF (Corvel® 10-8158) applied over Resicoat® 596301 primer has been evaluated under various autoclave test conditions such as those referenced below:		
	<u>Autoclave #1</u>	Aramco 09-SAMSS-091 laboratory panels	
	Time: 24 hours		
	Temp.: 203° F (95° C)		
	Pressure: 3000 psi	no swelling, no softening, no blistering, no loss of adhesion	
	Discharge: 1 – 3 min.		
	Immersion: 50 % immersed in each phase		
	Gas: 100% N ₂	Pass X Scribe Adhesion	
	Liquid: Treated seawater (ASTM D1141)	1670 – 2038 psi pull off	
	<u>Autoclave #2</u>	Aramco 09-SAMSS-091 laboratory panels	
	Time: 24 hours		
	Temp.: 203° F (95° C)		
	Pressure: 3000 psi	no swelling, no softening, no blistering, no loss of adhesion	
	Discharge: 1 – 3 min.		
	Immersion: 50 % immersed in each phase		
	Gas: 3 % H ₂ S, 3 % CO ₂ , 94% CH ₄	Pass X Scribe Adhesion	
	Liquid: Formation Water Brine: 6.5 % Na, 2.3 % Ca, 3 % Mg, 15 % Cl, 100 ppm SO ₄ , 300 ppm HCO ₃ in DI H ₂ O	528 – 1956 psi pull off	
	<u>Autoclave #3</u>	Aramco 09-SAMSS-091 laboratory panels	
	Time: 24 hours		
	Temp.: 203° F (95° C)		
	Pressure: 3000 psi	no swelling, no softening, no blistering, no loss of adhesion	
	Discharge: 1 – 3 min.		
	Immersion: 50 % immersed in each phase		
	Gas: 100 % CO ₂	Pass X Scribe Adhesion	
	Liquid: Wasia Water: Na = 2500 ppm, Ca = 600 ppm, Mg = 120 ppm, Cl = 4000 ppm, SO ₄ = 1000 ppm, HCO ₃ = 200 ppm, pH = 6.8 – 7.2	2283 – 3181 psi pull off	

**Autoclave Tests
(continued)**

Autoclave #4

Time: 30 days
Temp.: 150° F (65° C)
Pressure: 285 psi
Discharge: 1 – 3 min.
Immersion: 50 % immersed in each phase
Gas: 100 % CO₂
Liquid: Wasia Water: Na = 2500 ppm, Ca = 600 ppm,
Mg = 120 ppm, Cl = 4000 ppm,
SO₄ = 1000 ppm, HCO₃ = 200 ppm,
pH = 6.8 – 7.2

Aramco 09-SAMSS-091
laboratory panels

no swelling, no softening, no
blistering, no loss of adhesion

Pass X Scribe Adhesion
1120 psi pull off gas phase
1900 psi pull off liquid phase

Autoclave #5

Time: 30 days
Temp.: 150° F (65° C)
Pressure: 3000 psi
Discharge: 1 – 3 min.
Immersion: 50 % immersed in each phase
Gas: 100 % CO₂
Liquid: Wasia Water: Na = 2500 ppm, Ca = 600 ppm,
Mg = 120 ppm, Cl = 4000 ppm,
SO₄ = 1000 ppm, HCO₃ = 200 ppm,
pH = 6.8 – 7.2

Aramco 09-SAMSS-091
laboratory panels

no swelling, no softening, no
blistering, no loss of adhesion

Pass X Scribe Adhesion
1560 psi pull off gas phase
1900 psi pull off liquid phase

Autoclave #6

Time: 24 hours
Temp.: 122° F (50° C)
Pressure: covered vented vessel
Liquid: 10 Vol.% HCl

Aramco 09-SAMSS-091
laboratory panels

no swelling, no softening, no
blistering, no loss of adhesion

Pass X Scribe Adhesion
1017 – 1730 psi pull off

Autoclave #7

Time: 14 days
Temp.: 150° F (65° C)
Pressure: 1800 psi
Immersion: 50 % immersed in each phase
Gas: N₂
Liquid: Methanol

no swelling, no softening, no
blistering, no loss of adhesion

Autoclave #8

Time: 24 hours
Temp.: 230° F (110° C)
Pressure: 2071 psi
Immersion: 50 % immersed in each phase
Gas: 8.5 % CO₂, 2 % H₂S, Bal CH₄
Liquid: Chloride = 100000 mg/l, acetate = 500 ppm,
formate = 250 ppm, pH 2.9 at 77° F (25° C)

no swelling, no softening, no
blistering, no loss of adhesion

Autoclave Tests (continued)

Autoclave #9

Time: 24 hours
Temp.: 65 °C (150 °F)
Pressure: 3000 psi
Discharge: 1.5 min.
Immersion: 50 % immersed in each phase
Gas: 5 % H₂S, 8 % CO₂, 77 % CH₄
Liquid: 20 % Diesel, 40 % MEG, 40 % Formation Water

NACE TM0185-06
laboratory panels

glossy, smooth and uniform color finish, no visual defect

Autoclave #10

Time: 7 days
Temp.: 65 °C (150 °F)
Pressure: 3000 psi
Discharge: 1.5 min.
Immersion: 50 % immersed in each phase
Gas: 5 % H₂S, 8 % CO₂, 77 % CH₄
Liquid: 20 % Diesel, 40 % MEG, 40 % Formation Water

NACE TM0185-06
laboratory panels

no blistering, no cracking, no delamination, no visible sign of degradation. Slight color change.

3318 psi pull off gas phase
3568 psi pull off liquid phase

Autoclave #11

Time: 30 days
Temp.: 95 °C (203 °F)
Pressure: 2000 psi
Discharge: Rapid decompression, less than 2 min., after 4 hours of cooling
Immersion: 50 % immersed in each phase
Gas: 0.05 % H₂S, 2 % CO₂, 97.95 % CH₄
Liquid: 100,000 ppm Chloride

PDO SP-2217
Appendix B1

NACE TM0-85

No color change, no swelling, no softening, no blistering, no cracking, no delamination or loss of adhesion in either phase.

4478 psi pull off gas phase
5184 psi pull off liquid phase

Approval

Saudi Aramco: APCS-102B

Date of issue:

July 31, 2017

Authorized by:

GK

Revision no.:

8

Disclaimer: This Product Data Sheet is based on the present state of our knowledge and on current laws. The data referring to Powder Properties, Application Data and Physical Tests is based on lab based samples. Factors such as quality or condition of the substrate may have an effect on the use and application of the product. It remains the responsibility of the user to test thoroughly if the product is applicable for the intended use. The use of the product beyond our recommendation releases us from our responsibility, unless we have recommended the specific use in writing. It is always the responsibility of the user to take all necessary steps to fulfil the demands set out in the local rules and legislation. We are not liable for any application-technological advice. The Product Data Sheet shall be updated from time to time. Please ensure you have the latest version before using the product. All products and Product Data Sheets are subject to our standard terms and conditions of sale (GCS). You can receive the latest copy of GCS via internet or our post address. Brand names mentioned in this Product Data Sheet are trademarks of or are licensed to the AkzoNobel group.