

Executive Summary

Phase III Report

Draft

12-16-05

Code Key

Codes	Published VOC	Grouping	
Group 8:	Rust Preventative		
RP1 (p)	345 g/L	> 100g/L	H
RP1 (t)	390 g/L	> 100g/L	H
RP2 (p)	340 g/L	> 100g/L	H
RP2 (t)	370 g/L	> 100g/L	H
RP3 (p)	58 g/L	≤ 100g/L	L
RP3 (t)	<50 g/L	≤ 100g/L	L
RP4 (p)	0 g/L	≤ 100g/L	L
RP4 (t)	0 g/L	≤ 100g/L	L
Group 9:	Industrial Maintenance		
IM2 (p)	163 g/L	> 100g/L	H
IM2 (i)	235 g/L	> 100g/L	H
IM2 (t)	<250 g/L	> 100g/L	H
IM3 (p)	0 g/L	≤ 100g/L	L
IM3 (i)	40 g/L	≤ 100g/L	L
IM3 (t)	66 g/L	≤ 100g/L	L
IM4 (p)	0 g/L	≤ 100g/L	L
IM4 (i)	0 g/L	≤ 100g/L	L
IM4 (t)	0 g/L	≤ 100g/L	L

Products Listing by Category

	Published VOC	Grouping	
Group 8:	Rust Preventative		
RP1 (p)	345 g/L	> 100g/L	H
RP1 (t)	390 g/L	> 100g/L	H
RP2 (p)	340 g/L	> 100g/L	H
RP2 (t)	370 g/L	> 100g/L	H
RP3 (p)	58 g/L	≤ 100g/L	L
RP3 (t)	<50 g/L	≤ 100g/L	L
RP4 (p)	0 g/L	≤ 100g/L	L
RP4 (t)	0 g/L	≤ 100g/L	L
Group 9:	Industrial Maintenance		
IM2 (p)	163 g/L	> 100g/L	H
IM2 (i)	235 g/L	> 100g/L	H
IM2 (t)	<250 g/L	> 100g/L	H
IM3 (p)	0 g/L	≤ 100g/L	L
IM3 (i)	40 g/L	≤ 100g/L	L
IM3 (t)	66 g/L	≤ 100g/L	L
IM4 (p)	0 g/L	≤ 100g/L	L
IM4 (i)	0 g/L	≤ 100g/L	L
IM4 (t)	0 g/L	≤ 100g/L	L

Number of Products Tested by Published VOC Range

Category	Products >100g/L	Products ≤100g/L
Rust Preventative	4	4

Industrial Maintenance	3	6
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Number of Systems in each VOC range

Category	Systems >100g/L	Systems ≤100g/L
Rust Preventative	2	2
Industrial Maintenance	1	2

Tests for General Properties Summary

Percent Nonvolatile Summary*

	Published VOC	Grouping		Percent Nonvolatile
				Experimental
Group 8:	Rust Preventatives			
RP1 (p)	345 g/L	> 100g/L	H	75.61
RP1 (t)	390 g/L	> 100g/L	H	68.52
RP2 (p)	340 g/L	> 100g/L	H	76.11
RP2 (t)	370 g/L	> 100g/L	H	64.32
RP3 (p)	58 g/L	≤ 100g/L	L	51.21
RP3 (t)	<50 g/L	≤ 100g/L	L	26.92
RP4 (p)	0 g/L	≤ 100g/L	L	56.08
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)
Group9:	Industrial Maintenance			
IM2 (p)	163 g/L	> 100g/L	H	77.37
IM2 (i)	235 g/L	> 100g/L	H	82.97
IM2 (t)	<250 g/L	> 100g/L	H	79.16
IM3 (p)	0 g/L	≤ 100g/L	L	79.83
IM3 (i)	40 g/L	≤ 100g/L	L	91.73
IM3 (t)	66 g/L	≤ 100g/L	L	62.85
IM4 (p)	0 g/L	≤ 100g/L	L	81.15
IM4 (i)	0 g/L	≤ 100g/L	L	98.37
IM4 (t)	0 g/L	≤ 100g/L	L	57.79

*Average Values

Stormer and Cone and Plate Viscosities Summary*

	Grouping	Stormer (KU)		Cone and Plate (P)	
		Average	Temp. (°C)	Average	Temp (°C)
Group 8:	Rust Preventatives				
RP1 (p)	H	86	25	4.412	25
RP1 (t)	H	91	25	4.921	25
RP2 (p)	H	86	25	2.946	25
RP2 (t)	H	87	25	4.154	25
RP3 (p)	L	104	25	0.464	25
RP3 (t)	L	82	25	N/A**	25
RP4 (p)	L	117	25	1.429	25
RP4 (t)	L	Same as RP4 (p)		Same as RP4 (p)	

Group 9:	Industrial Maintenance				
IM2 (p)	H	81	25	N/A***	25
IM2 (i)	H	107	25	14.350	25
IM2 (t)	H	117	25	17.183	25
IM3 (p)	L	122	25	N/A***	25
IM3 (i)	L	108	25	20.5165	25
IM3 (t)	L	120	25	1.851	25
IM4 (p)	L	74	25	N/A***	25
IM4 (i)	L	107	25	23.550	25
IM4 (t)	L	98	25	0.664	25

*Average Values

** N/A: readings were below range

***N/A: Coatings are slightly textured, readings cannot be obtained

Spindle = , Shear Rate = 12000s⁻¹

Mechanical Dry Time Summary*

	Grouping	Set-Touch	Tack-Free	Dry-Hard	Dry-Through
Group 8:	Rust Preventatives				
RP1 (p)	H	2	208	277	314
RP1 (t)	H	15	163	231	>450
RP2 (p)	H	29	105	157	296
RP2 (t)	H	46	179	213	>450
RP3 (p)	L	5	8	N/A**	N/A**
RP3 (t)	L	6	9	N/A**	N/A**
RP4 (p)	L	9	17	22	N/A**
RP4 (t)	L	Same as RP4 (p)			
Group 9:	Industrial Maintenance				
IM2 (p)	H	3	5	8	>450
IM2 (i)	H	2	209	319	>450
IM2 (t)	H	16	155	315	>450
IM3 (p)	L	2	9	14	>450
IM3 (i)	L	230	>450	-----	-----
IM3 (t)	L	22	200	276	>450
IM4 (p)	L	5	9	11	>450
IM4 (i)	L	238	>450	-----	-----
IM4 (t)	L	34	180	329	381

*Average values; times in minutes; stylus diameter = 1mm; speed = 6 hours

**The note "N/A" indicates that there was no discernable markings for this point because the coating finished drying before marks for this dry time could be obtained

Ambient Dry Time Summary*

	Grouping	Set-Touch	Dust-Free	Tack-Free	Dry-Hard	Dry-Through
Group 8:	Rust Preventatives					
RP1 (p)	H	59	85	193	892	1158
RP1 (t)	H	169	990	1075	1152	1809

RP2 (p)	H	117	152	197	244	635
RP2 (t)	H	119	707	1034	3797	3897
RP3 (p)	L	20	30	35	56	80
RP3 (t)	L	30	38	41	1021	1051
RP4 (p)	L	32	38	65	116	184
RP4 (t)	L	Same as RP4 (p)				
Group 9:	Industrial Maintenance					
IM2 (p)	H	19	22	25	34	40
IM2 (i)	H	98	138	219	836	926
IM2 (t)	H	22	77	824	841	884
IM3 (p)	L	18	23	26	31	51
IM3 (i)	L	664	724	751	1394	1434
IM3 (t)	L	187	250	660	1219	1244
IM4 (p)	L	22	25	28	29	43
IM4 (i)	L	671	748	803	1374	1419
IM4 (t)	L	169	244	600	1206	1228

*Times are in minutes, and are the average of two samples

Gloss Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	Rust Preventative						
RP1 (p)	H	1.7	0.1	6.6	0.2	6.6	0.2
RP1 (t)	H	70.6	0.8	86.9	0.2	98.5	1.0
RP2 (p)	H	2.0	0.1	10.0	0.2	11.4	0.1
RP2 (t)	H	80.8	0.6	89.9	0.2	100.6	0.7
RP3 (p)	L	1.8	0.1	9.2	0.2	26.6	0.2
RP3 (t)	L	67.8	2.1	84.5	1.3	99.0	0.9
RP4 (p)	L	14.2	0.3	47.8	0.4	73.8	2.0
RP4 (t)	L	Same as RP4 (p)					
Group 9:	Industrial Maintenance						
IM2 (p)	H	0.4	0.1	1.4	0.2	8.7	0.4
IM2 (i)	H	6.4	0.4	44.0	0.7	88.3	0.8
IM2 (t)	H	50.2	1.3	81.6	0.4	97.6	0.4
IM3 (p)**	L	0.3	0.1	0.7	0.1	1.1	0.1
IM3 (i)	L	96.0	0.7	98.6	0.6	101.8	1.1
IM3 (t)	L	47.8	1.9	84.2	1.7	82.4	2.2
IM4 (p)	L	0.3	0.1	1.0	0.1	3.1	0.1
IM4 (i)	L	98.6	0.4	99.3	0.4	101.1	0.7
IM4 (t)	L	69.3	1.2	86.0	1.3	99.3	1.5

*Average values

**This coating did not adhere to the sealed portion of the chart, so gloss readings were taken over the unsealed portion

Hide Summary – Contrast Ratio*

	Grouping	3 mil #1	3 mil #2	2 mil #1	2 mil #2
Group 8:	Rust Preventatives				
RP1 (p)	H	0.97	0.97	0.95	0.95
RP1 (t)	H	0.98	0.97	0.97	0.97
RP2 (p)	H	0.96	0.96	0.93	0.93
RP2 (t)	H	0.97	0.97	0.95	0.95
RP3 (p)	L	0.97	0.97	0.95	0.95
RP3 (t)	L	N/A – Clear Coating			
RP4 (p)	L	0.99	0.99	0.97	0.96
RP4 (t)	L	Same as RP4 (p)			
Group 9:	Industrial Maintenance				
IM2 (p)	H	1.06	0.99	1.05	0.97
IM2 (i)	H	0.05	0.05	0.04	0.04
IM2 (t)	H	0.99	0.99	0.99	0.98
IM3 (p)	L	N/A – No Adhesion to Sealed Portion of Chart			
IM3 (i)	L	1.00	1.00	0.99	0.99
IM3 (t)	L	0.99	0.99	0.98	0.97
IM4 (p)	L	0.98	0.99	0.99	1.01
IM4 (i)	L	0.93	0.94	0.87	0.90

IM4 (t)	L	0.97	0.97	0.95	0.96
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*Average values

Tests for Rust Preventative Coatings Summary

Taber Abrasion Summary*

	Grouping	I, Wear Index	L, Weight Loss, mg
Group 8:	Rust Preventative		
RP1 (p/t)	H	87.92	35.17
RP2 (p/t)	H	74.67	29.87
RP3 (p/t)	L	36.75	14.70
RP4 (p/t)	L	64.17	25.67

*Average Values

Impact Resistance Summary*

	Grouping	Last Pass	First Fail
Group 8:	Rust Preventative		
RP1 (p/t)	H	40	50
RP2 (p/t)	H	97	107
RP3 (p/t)	L	100	110
RP4 (p/t)	L	40	50

*Average Values

Adhesion on Steel Summary*

		PATTI		Battelle	
	Grouping	Adhesion (psi)	Failure Mechanism	Adhesion (psi)	Failure Mechanism
Group 8:	Rust Preventative				
RP1 (p/t)	H	1121.0	Co-90%, Ad – 10%	3383.1	Co-95%, Ad – 5%
RP2 (p/t)	H	746.8	Co-77%, Ad – 23%	2759.7	Co – 90%, Ad – 10%
RP3 (p/t)	L	733.2	Co-32%, Ad-68%	3370.9	Co – 38%, Ad – 62%
RP4 (p/t)	L	661.8	Co-23%, Ad-77%	2255.8**	100% Adhesion

*Average Values; ‘Co’ = Cohesive Failure, ‘Ad’ = Adhesion Failure

**This number is the average of two samples because the third puck experienced epoxy failure and was not pulled

Flow/Level Summary*

	Published VOC	Grouping		Flow/Level
Group 8:	Rust Preventatives			
RP1 (p)	345 g/L	> 100g/L	H	1
RP1 (t)	390 g/L	> 100g/L	H	5
RP2 (p)	340 g/L	> 100g/L	H	5
RP2 (t)	370 g/L	> 100g/L	H	9
RP3 (p)	58 g/L	≤ 100g/L	L	5
RP3 (t)	<50 g/L	≤ 100g/L	L	4
RP4 (p)	0 g/L	≤ 100g/L	L	1

RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)
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*Average Values

Prohesion – Gloss – 0 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	Rust Preventative						
RP1 (p/t)	H	33.3	5.6	75.7	5.7	70.6	4.4
RP2 (p/t)	H	48.0	3.9	82.1	1.7	83.5	1.9
RP3 (p/t)	L	21.3	1.7	63.2	1.4	66.8	1.3
RP4 (p/t)	L	9.5	1.0	40.9	2.3	56.2	3.8

*Average Values

Prohesion – Gloss – 1 Cycle Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	Rust Preventative						
RP1 (p/t)	H	3.0	0.5	32.4	1.9	64.8	2.5
RP2 (p/t)	H	3.3	0.4	23.5	2.8	63.5	1.7
RP3 (p/t)	L	2.2	0.2	14.2	0.6	32.8	2.7
RP4 (p/t)	L	7.0	0.7	33.5	1.3	49.9	2.6

*Average Values

Prohesion – Gloss – 2 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	Rust Preventative						
RP1 (p/t)	H	1.2	0.1	10.0	0.6	46.3	1.4
RP2 (p/t)	H	1.1	0.1	5.2	0.6	41.8	1.5
RP3 (p/t)	L	1.4	0.1	4.6	0.4	23.1	1.7
RP4 (p/t)	L	6.4	1.4	33.2	3.5	45.9	4.3

*Average Values

Flash Rusting Summary

Conical Mandrel Flexibility Summary*

	Grouping	Pass/Fail	Failure Distance**	Adhesion Pass/Fail (after pass)***
Group 8:	Rust Preventative			
RP1 (p/t)	H	Fail	5 1/16	-----
RP2 (p/t)	H	Fail	9/16	-----
RP3 (p/t)	L	Pass	-----	Pass
RP4 (p/t)	L	Pass	-----	Pass

*Average Values

**Failure distance is reported in inches and is extent of failure from narrow end of cone

***If the coating passed, the narrow end of the flexed coating was scored to check for adhesion failure

Tests for Industrial Maintenance Coatings Summary

Taber Abrasion Summary

	Grouping	I, Wear Index	L, Weight Loss, mg
Group 8:	Rust Preventative		
IM2 (p/i/t)	H	76.00	30.40
IM3 (p/i/t)	L	38.35	15.34
IM4 (p/i/t)	L	65.00	26.00

Impact Resistance*

	Grouping	Last Pass	First Fail
Group 9:	Industrial Maintenance		
IM2 (p/i/t)	H	30	40
IM3 (p/i/t)	L	73	83
IM4 (p/i/t)	L	10	20

*Average Values; 4 pound weight used

Conical Mandrel Flexibility Summary*

	Grouping	Pass/Fail	Failure Distance**	Adhesion Pass/Fail (after pass)***
Group 9:	Industrial Maintenance			
IM2 (p/i/t)	H	Fail	4 19/32	-----
IM3 (p/i/t)	L	Fail	6****	-----
IM4 (p/i/t)	L	Fail	6****	-----

*Average Values

**Failure distance is reported in inches and is extent of failure from narrow end of cone

***If the coating passed, the narrow end of the flexed coating was scored to check for adhesion failure

****The panels are 6 inches long, so a failure of 6 inches indicates that the coating failed the entire length of the panel

Adhesion on Metal Summary*

		PATTI		Battelle	
	Grouping	Adhesion (psi)	Failure Mechanism	Adhesion (psi)	Failure Mechanism
Group 8:	Industrial Maintenance				
IM2 (p/i/t)	H	2160.7	Co – 30%, Ad – 70%	3918.2	Co – 2%, Ad – 98%
IM3 (p/i/t)	L	2051.8	Co-2%, Ad-98%	3662.9	Co – 4%, Ad – 96%
IM4 (p/i/t)	L	2296.7	Co-3%, Ad – 97%	3531.1	Co – 3%, Ad – 97%

*Average Values

QUV – Gloss – 0 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	28.3	4.9	67.3	3.1	62.8	4.2
IM3 (p/i/t)	L	57.8	9.7	74.8	6.5	73.8	6.1
IM4 (p/i/t)	L	66.1	3.1	85.2	1.4	82.1	2.6

*Average Values

QUV – Gloss – 200 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	25.2	3.3	64.5	5.0	64.1	3.5
IM3 (p/i/t)	L	48.4	3.5	80.6	4.2	74.1	3.7
IM4 (p/i/t)	L	48.4	2.9	79.7	1.1	85.6	1.7

*Average Values

QUV – Gloss – 400 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	19.7	3.5	60.6	3.6	65.8	2.3
IM3 (p/i/t)	L	38.2	6.6	77.6	4.7	82.2	3.5
IM4 (p/i/t)	L	21.0	1.7	66.0	1.0	82.8	2.5

*Average Values

QUV – Gloss – 600 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	6.1	1.1	42.3	3.5	61.6	2.8
IM3 (p/i/t)	L	31.8	3.3	75.4	3.9	76.6	1.8
IM4 (p/i/t)	L	7.7	0.3	49.3	1.9	82.0	2.7

*Average Values

QUV – Gloss 800 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	1.9	0.1	24.1	1.7	63.7	1.4
IM3 (p/i/t)	L	31.9	2.6	67.9	2.5	78.1	3.7
IM4 (p/i/t)	L	3.6	0.2	34.1	0.7	78.6	1.8

*Average Values

QUV – Gloss 1000 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	1.5	0.1	13.3	1.2	58.8	2.1
IM3 (p/i/t)	L	25.4	5.3	67.2	4.5	74.0	3.7
IM4 (p/i/t)	L	3.0	0.2	22.9	1.5	76.9	2.7

*Average Values

QUV – Color, ΔE Summary*

	Grouping	ΔE, 200 Hours	ΔE, 400 Hours	ΔE, 600 Hours	ΔE, 800 Hours	ΔE, 1000 Hours

Group 9: Industrial Maintenance						
IM2 (p/i/t)	H	1.24	1.66	2.16	2.41	2.64
IM3 (p/i/t)	L	3.28	2.44	2.25	2.00	1.85
IM4 (p/i/t)	L	2.97	2.35	2.04	1.94	2.22

*Average Values

MEK Rubs Summary*

	Grouping	Gloss Loss
Group 9:	Industrial Maintenance	
IM2 (p/i/t)	H	After 15 Cycles
IM3 (p/i/t)	L	Gloss Loss
IM4 (p/i/t)	L	Trace Gloss Loss

*Average Values

Prohesion – Gloss – 0 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	29.3	3.8	70.0	3.1	69.2	1.7
IM3 (p/i/t)	L	48.2	3.3	83.2	2.3	77.3	2.0
IM4 (p/i/t)	L	60.9	3.4	84.9	1.2	79.6	2.1

*Average Values

Prohesion – Gloss – 1 Cycle Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	27.0	3.9	62.4	5.9	60.1	3.9
IM3 (p/i/t)	L	32.6	4.1	64.9	1.8	67.4	3.4
IM4 (p/i/t)	L	39.8	2.3	71.0	1.1	72.1	3.5

*Average Values

Prohesion – Gloss – 2 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	17.7	3.3	55.0	2.6	59.1	3.1
IM3 (p/i/t)	L	23.7	1.9	60.1	1.6	66.4	2.3
IM4 (p/i/t)	L	14.0	1.3	52.6	1.5	68.8	2.0

*Average Values

Prohesion – Gloss – 3 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	5.8	1.1	36.7	3.2	56.6	3.0
IM3 (p/i/t)	L	15.8	2.6	50.2	2.7	60.1	1.2
IM4 (p/i/t)	L	4.3	0.2	36.8	1.9	67.3	1.5

*Average Values

Prohesion – Color ΔE Summary*

	Grouping	ΔE, After 1 Cycle	ΔE, After 2 Cycles	ΔE, After 3 Cycles
Group 9:	Industrial Maintenance			
IM2 (p/i/t)	H	0.83	1.85	2.64
IM3 (p/i/t)	L	3.18	2.93	1.85
IM4 (p/i/t)	L	2.99	3.25	2.22

*Average Values

Task 1 - Testing Protocol

Tests for General Properties of all paints

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar Type
Percent Solids	ASTM D2369-04	3	N/A	N/A
Stormer Viscosity	ASTM D562-01	2	N/A	N/A
Cone and Plate Viscosity	ASTM D4287-00	2	N/A	N/A
Dry Time - Mechanical	ASTM D5895-03	2	Glass	3mil Cube Applicator
Dry Time	ASTM D1640-03	2	Glass	3mil/Bird bar
Gloss	ASTM D523-89	2	Leneta Card 1-B	3mil/Bird bar
Hide	Spectrophotometer	4	Leneta Card 1-B	3mil/Bird bar 2mil/Bird bar

Tests for Rust Preventative Coatings

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar type
Taber Abrasion	ASTM D4060	3	Steel Taber Panel	Coated by weight
Impact Resistance	ASTM D2794	3	Steel	Coated by weight
Adhesion on Steel (unprimed)	Batelle Torque Method	3	Steel	Coated by weight
Flow & Leveling	ASTM D4062	3	Leneta Card 1-B	
Prohesion	ASTM G85 Annex A5	3	Steel	Coated by weight
Flash Rusting	Our Protocol	3	Steel	Coated by weight
Flexibility	ASTM D522 Rev A	3	Cold Rolled Steel Q-panels	Coated by weight

Tests for Industrial Maintenance Coatings

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar type
Taber Abrasion	ASTM D4060	3	Steel Taber panel	Coated by weight
Impact Resistance	ASTM D522 Rev A	3	Steel	Coated by weight
Adhesion on Steel (unprimed)	Batelle Torque Method	3	Steel	Coated by weight
QUV	ASTM D4587	3	Steel	Coated by weight
MEK Rubs	ASTM D4752	3	Steel	Coated by weight
Prohesion	ASTM G85 Annex A5	3	Steel	Co`ated by weight

Performance of Testing

Tests for General Properties of All Paints

Percent Solids – ASTM D2369 is used.

Stormer Viscosity – ASTM D562, method B, is used and provides a digital readout in KU.

Cone & Plate Viscosity – ASTM D4287 is used with the Brookfield CAP2000 model viscometer, using a number 3 spindle and a shear rate of 1200s^{-1} .

Dry Time – Mechanical Recorder – ASTM D5895 is used to determine dry time with a mechanical straight line drying time recorder.

Dry-Time – ASTM D1640 is used to determine dry time at room temperature.

Gloss – ASTM D523 is used with a BYK-Gardner micro-TRI-gloss meter calibrated just prior to use.

Hide – For dry hide and gloss, a three-mil Bird bar was used to apply paint to two black and white Leneta charts. Also, for hide, a two-mil Bird bar was used to apply paint to two black and white Leneta charts. The color was measured using a Minolta CM-2002 spectrophotometer and the CIE XYZ value for Y was recorded. The Y values over the white section and the black section were used to calculate dry hide. Due to Beer's and Lambert's Law, hide increases as film thickness increases. Hide also increases as concentration of hiding pigments increases.

Tests for Rust Preventative Coatings

Taber Abrasion – ASTM D4060 is used. The samples are run for 400 cycles and weight loss is determined.

Impact Resistance – ASTM D2794 is used. A 4 pound weight is used, and the last value at which the coating passes and the first value at which the coating fails are recorded.

Adhesion on Steel – Batelle torque method is used as well as the PATTI adhesion test with an F-8.

Flow & Leveling – ASTM D4062 is used. This is an old ASTM method that is analogous to the New York Society for Paint Technology "Official Digest" No. 44 Vol. 32, No. 430, p. 1435. The NYPC Level Blade is used.

Prohesion – ASTM G85 Annex A5 is used. The coated panels are scored and exposed to UV/Condensation cycling (4 hour intervals) for one week and salt-fog for one week (a two week cycle) for a total of three cycles.

Flash Rusting – Our protocol is used. The panels are coated and placed in a chamber with humidity in excess of 90% for two hours and then are dried in ambient conditions and color measurements are taken.

Flexibility – ASTM D522 Rev A is used with a conical mandrel. Failure is measured as the distance the coating cracks from the narrow end of the conical mandrel. In addition, if a coating passes the flexibility test, it is scored to see if there are any underlying adhesion problems.

Tests for Industrial Maintenance Coatings

Taber Abrasion – ASTM D4060 is used. The samples are run for 400 cycles and weight loss is determined.

Flexibility – ASTM D522 Rev A is used with a conical mandrel. Failure is measured as the distance the coating cracks from the narrow end of the conical mandrel. In addition, if a coating passes the flexibility test, it is scored to see if there are any underlying adhesion problems.

Adhesion on metal – Batelle torque method is used as well as the PATTI adhesion test with an F-8.

QUV – ASTM D4587 is used. The aluminum panels are subjected to UV and condensation cycles alternating every four hours. Every 200 hours total time, the panels are evaluated for gloss and color change and are rotated according to the standard used. The total time used is 1000 hours.

MEK Rubs – ASTM D4752 is used.

Prohesion – ASTM G85 Annex A5 is used. The coated panels are scored and exposed to UV/Condensation cycling (4 hour intervals) for one week and salt-fog for one week (a two week cycle) for a total of three cycles.

Test Results

Tests for General Properties of All Paints

Percent Solids

	Pub. VOC	Grouping	3 Replicates Each							
Group 8:	Rust Preventative			W1	W2	SA	V (%vol)	AVG V	N (%NV)	AVG N
RP1 (p)	345 g/L	> 100g/L	H	1.5371	1.9287	0.5176	24.34	24.39	75.66	75.61
	Replicate 2			1.4958	1.9082	0.5458	24.44	-----	75.56	-----
	Replicate 3			1.5295	1.9008	0.4911	24.39	-----	75.61	-----
RP1 (t)	390 g/L	> 100g/L	H	1.5682	1.8858	0.4639	31.54	31.48	68.46	68.52
	Replicate 2			1.514	1.8498	0.491	31.61	-----	68.39	-----
	Replicate 3			1.5709	1.9438	0.5427	31.29	-----	68.71	-----
RP2 (p)	340 g/L	> 100g/L	H	1.5616	1.9788	0.548	23.87	23.89	76.13	76.11
	Replicate 2			1.5466	1.9609	0.5444	23.90	-----	76.10	-----
	Replicate 3			1.5438	1.9402	0.521	23.92	-----	76.08	-----
RP2 (t)	370 g/L	> 100g/L	H	1.5659	1.9307	0.5667	35.63	35.68	64.37	64.32
	Replicate 2			1.5546	1.8637	0.4805	35.67	-----	64.33	-----
	Replicate 3			1.5641	1.939	0.5833	35.73	-----	64.27	-----
RP3 (p)	58 g/L	≤ 100g/L	L	1.5744	1.842	0.5229	48.82	48.79	51.18	51.21
	Replicate 2			1.5671	1.8317	0.5158	48.70	-----	51.30	-----
	Replicate 3			1.5719	1.8524	0.5482	48.83	-----	51.17	-----
RP3 (t)	<50 g/L	≤ 100g/L	L	1.5606	1.6991	0.5145	73.08	73.08	26.92	26.92
	Replicate 2			1.5704	1.7055	0.5021	73.09	-----	26.91	-----
	Replicate 3			1.5707	1.7064	0.5038	73.06	-----	26.94	-----
RP4 (p)	0 g/L	≤ 100g/L	L	1.5773	1.9353	0.6383	43.91	43.92	56.09	56.08
	Replicate 2			1.5702	1.8437	0.4876	43.91	-----	56.09	-----
	Replicate 3			1.5667	1.8748	0.5495	43.93	-----	56.07	-----
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (t)						
Group 9:	Industrial Maintenance			-----	-----	-----	-----	-----	-----	-----
IM2 (p)	163 g/L	> 100g/L	H	1.5861	2.0056	0.542	22.60	22.63	77.40	77.37
	Replicate 2			1.5893	2.0177	0.5538	22.64	-----	77.36	-----
	Replicate 3			1.5616	1.9589	0.5136	22.64	-----	77.36	-----
IM2 (i)	235 g/L	> 100g/L	H	1.5595	2.0787	0.6255	16.99	17.03	83.01	82.97
	Replicate 2			1.5397	1.9164	0.4541	17.04	-----	82.96	-----
	Replicate 3			1.5717	2.0551	0.5827	17.04	-----	82.96	-----
IM2 (t)	<250 g/L	> 100g/L	H	1.571	2.0218	0.5705	20.98	20.84	79.02	79.16
	Replicate 2			1.5456	1.9105	0.4618	20.98	-----	79.02	-----
	Replicate 3			1.5447	1.9869	0.5567	20.57	-----	79.43	-----
IM3 (p)	0 g/L	≤ 100g/L	L	1.5447	2.0312	0.6088	20.09	20.17	79.91	79.83
	Replicate 2			1.5376	1.9509	0.5172	20.09	-----	79.91	-----
	Replicate 3			1.5575	1.9232	0.459	20.33	-----	79.67	-----
IM3 (i)	40 g/L	≤ 100g/L	L	1.583	2.1595	0.6266	8.00	8.27	92.00	91.73
	Replicate 2			1.5225	2.0341	0.5586	8.41	-----	91.59	-----
	Replicate 3			1.5472	2.0229	0.5193	8.40	-----	91.60	-----
IM3 (t)	66 g/L	≤ 100g/L	L	1.5528	1.8802	0.5212	37.18	37.15	62.82	62.85
	Replicate 2			1.5318	1.8647	0.5295	37.13	-----	62.87	-----
	Replicate 3			1.565	1.885	0.509	37.13	-----	62.87	-----
IM4 (p)	0 g/L	≤ 100g/L	L	1.534	1.9015	0.4527	18.82	18.85	81.18	81.15
	Replicate 2			1.5672	1.9912	0.5234	18.99	-----	81.01	-----
	Replicate 3			1.5602	2.0713	0.6289	18.73	-----	81.27	-----
IM4 (i)	0 g/L	≤ 100g/L	L	1.5587	2.084	0.5335	1.54	1.63	98.46	98.37
	Replicate 2			1.5601	2.0482	0.4962	1.63	-----	98.37	-----

Replicate 3				1.5467	2.0921	0.555	1.73	-----	98.27	-----
IM4 (t)	0 g/L	≤ 100g/L	L	1.5191	1.8201	0.5208	42.20	42.21	57.80	57.79
Replicate 2				1.5154	1.8288	0.5426	42.24	-----	57.76	-----
Replicate 3				1.5545	1.8597	0.5278	42.18	-----	57.82	-----

Stormer Viscosity and Cone and Plate Viscosity

Dry Time – Mechanical Recorder

Dry-Time – Ambient

Gloss

Group 8:	Pub. VOC	Grouping		Gloss (5 readings per replicate)					
				20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
RP1 (p)	345 g/L	> 100g/L	H	1.7	0.1	6.6	0.2	6.5	0.1
Replicate 2				1.7	0.1	6.6	0.2	6.6	0.2
Average				1.7	0.1	6.6	0.2	6.6	0.2
RP1 (t)	390 g/L	> 100g/L	H	71.2	0.6	86.8	0.2	97.8	0.8
Replicate 2				69.9	1	87	0.2	99.1	1.2
Average				70.6	0.8	86.9	0.2	98.5	1.0
RP2 (p)	340 g/L	> 100g/L	H	2	0.1	9.9	0.2	11.4	0.1
Replicate 2				2	0.1	10	0.2	11.3	0.1
Average				2.0	0.1	10.0	0.2	11.4	0.1
RP2 (t)	370 g/L	> 100g/L	H	81.1	0.6	90	0.2	100.1	0.6
Replicate 2				80.5	0.6	89.8	0.2	101	0.8
Average				80.8	0.6	89.9	0.2	100.6	0.7
RP3 (p)	58 g/L	≤ 100g/L	L	1.8	0.1	9.2	0.2	26.8	0.1
Replicate 2				1.8	0.1	9.2	0.1	26.4	0.2
Average				1.8	0.1	9.2	0.2	26.6	0.2
RP3 (t)	<50 g/L	≤ 100g/L	L	67.3	1.8	84.0	1.4	98.5	1.2
Replicate 2				68.3	2.4	84.9	1.2	99.5	0.6
Average				67.8	2.1	84.5	1.3	99.0	0.9
RP4 (p)	0 g/L	≤ 100g/L	L	14.4	0.2	48.3	0.4	73.6	1.4
Replicate 2				14.0	0.4	47.3	0.4	74.0	2.6
Average				14.2	0.3	47.8	0.4	73.8	2.0
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)					
Group 9:	Industrial Maintenance			-----	-----	-----	-----	-----	-----
IM2 (p)	163 g/L	> 100g/L	H	0.3	0.1	1.3	0.2	7.2	0.6
Replicate 2				0.4	0.1	1.5	0.1	10.1	0.2
Average				0.4	0.1	1.4	0.2	8.7	0.4
IM2 (i)	235 g/L	> 100g/L	H	6.4	0.1	43.8	0.4	86.3	0.8
Replicate 2				6.4	0.6	44.1	1.0	90.3	0.8
Average				6.4	0.4	44.0	0.7	88.3	0.8
IM2 (t)	<250 g/L	> 100g/L	H	50.8	1.6	82.0	0.2	97.5	0.2
Replicate 2				49.5	1.0	81.1	0.6	97.6	0.6
Average				50.2	1.3	81.6	0.4	97.6	0.4
IM3 (p)	0 g/L	≤ 100g/L	L	0.3	0.1	0.7	0.1	1.2	0.1
Replicate 2				0.2	0.1	0.7	0.1	1.0	0.1

Average				0.3	0.1	0.7	0.1	1.1	0.1
IM3 (i)	40 g/L	≤ 100g/L	L	95.6	1.0	98.7	0.4	101.3	1.6
Replicate 2				96.3	0.4	98.4	0.8	102.2	0.6
Average				96.0	0.7	98.6	0.6	101.8	1.1
IM3 (t)	66 g/L	≤ 100g/L	L	47.7	1.0	85.6	0.4	88.6	1.6
Replicate 2				47.8	2.8	82.7	3.0	76.2	2.8
Average				47.8	1.9	84.2	1.7	82.4	2.2
IM4 (p)	0 g/L	≤ 100g/L	L	0.3	0.1	1.0	0.1	3.1	0.1
Replicate 2				0.3	0.1	1.0	0.1	3.1	0.1
Average				0.3	0.1	1.0	0.1	3.1	0.1
IM4 (i)	0 g/L	≤ 100g/L	L	97.6	0.6	98.9	0.2	101.8	1.0
Replicate 2				99.6	0.2	99.7	0.6	100.4	0.4
Average				98.6	0.4	99.3	0.4	101.1	0.7
IM4 (t)	0 g/L	≤ 100g/L	L	69.1	1.6	86.5	0.6	99.7	2.0
Replicate 2				69.4	0.8	85.5	2.0	98.9	1.0
Average				69.3	1.2	86.0	1.3	99.3	1.5

Hide

	VOC	Grouping		3mi I- 1			3mil - 2			2mil - 1			2mil - 2		
Group 8:	Rust Preventative			Y (Black)	Y (White)	Cont. Rat.	Y (Black)	Y (White)	Cont. Rat.	Y (Black)	Y (White)	Cont. Rat.	Y (Black)	Y (White)	Cont. Rat.
RP1 (p)	345 g/L	> 100g/L	H	81.95	84.50	0.97	81.82	84.49	0.97	80.58	84.71	0.95	80.43	84.69	0.95
	Reading 2			82.00	84.54	0.97	81.99	84.52	0.97	80.96	84.65	0.96	80.63	84.71	0.95
	Reading 3			82.06	84.61	0.97	81.97	84.51	0.97	80.63	84.66	0.95	80.95	84.65	0.96
	Average			82.00	84.55	0.97	81.93	84.51	0.97	80.72	84.67	0.95	80.67	84.68	0.95
RP1 (t)	390 g/L	> 100g/L	H	81.79	82.68	0.99	81.84	83.87	0.98	81.98	84.19	0.97	81.92	84.15	0.97
	Reading 2			81.29	83.34	0.98	81.75	84.81	0.96	81.86	84.26	0.97	81.87	84.07	0.97
	Reading 3			80.72	83.13	0.97	82.29	85.29	0.96	81.77	84.53	0.97	81.84	84.32	0.97
	Average			81.27	83.05	0.98	81.96	84.66	0.97	81.87	84.33	0.97	81.88	84.18	0.97
RP2 (p)	340 g/L	> 100g/L	H	76.18	79.68	0.96	76.49	79.69	0.96	74.42	80.13	0.93	73.83	80.14	0.92
	Reading 2			76.14	79.64	0.96	76.18	79.58	0.96	74.07	80.02	0.93	74.14	79.95	0.93
	Reading 3			76.43	79.68	0.96	76.58	79.70	0.96	74.18	80.06	0.93	74.37	80.17	0.93
	Average			76.25	79.67	0.96	76.42	79.66	0.96	74.22	80.07	0.93	74.11	80.09	0.93
RP2 (t)	370 g/L	> 100g/L	H	80.97	83.75	0.97	80.98	83.68	0.97	80.51	84.98	0.95	79.99	84.77	0.94
	Reading 2			80.74	83.60	0.97	81.02	83.66	0.97	80.54	85.03	0.95	80.72	84.86	0.95
	Reading 3			80.92	83.62	0.97	81.41	83.87	0.97	80.64	85.04	0.95	80.38	84.93	0.95
	Average			80.88	83.66	0.97	81.14	83.74	0.97	80.56	85.02	0.95	80.36	84.85	0.95
RP3 (p)	58 g/L	≤ 100g/L	L	88.60	91.90	0.96	88.63	91.22	0.97	86.38	90.34	0.96	85.74	90.18	0.95
	Reading 2			88.46	91.07	0.97	88.32	91.12	0.97	86.41	90.50	0.95	85.90	90.40	0.95
	Reading 3			88.47	91.00	0.97	88.69	91.22	0.97	86.14	90.46	0.95	86.12	90.19	0.95
	Average			88.51	91.32	0.97	88.55	91.19	0.97	86.31	90.43	0.95	85.92	90.26	0.95
RP3 (t)	<50 g/L	≤ 100g/L	L	N/A - Clear Coating											
RP4 (p)	0 g/L	≤ 100g/L	L	86.25	86.86	0.99	86.58	86.70	1.00	84.38	86.54	0.98	83.60	86.05	0.97
	Reading 2			86.26	87.65	0.98	86.39	86.91	0.99	84.36	86.49	0.98	83.65	86.17	0.97
	Reading 3			85.89	87.39	0.98	86.02	87.30	0.99	83.97	86.47	0.97	83.56	88.54	0.94
	Average			86.13	87.30	0.99	86.33	86.97	0.99	84.24	86.50	0.97	83.60	86.92	0.96
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)											
				3mi I- 1			3mil - 2			2mil - 1			2mil - 2		
Group 9:	Industrial Maint.			Y (Black)	Y (White)	Cont. Rat.	Y (Black)	Y (White)	Cont. Rat.	Y (Black)	Y (White)	Cont. Rat.	Y (Black)	Y (White)	Cont. Rat.
IM2 (p)	163 g/L	> 100g/L	H	23.00	21.41	1.07	25.34	25.27	1.00	23.34	22.27	1.05	25.19	25.96	0.97
	Reading 2			23.96	22.91	1.05	25.33	25.01	1.01	24.21	23.28	1.04	25.43	26.08	0.98
	Reading 3			23.95	22.87	1.05	25.30	26.10	0.97	23.98	22.77	1.05	25.34	26.20	0.97
	Average			23.64	22.40	1.06	25.32	25.46	0.99	23.84	22.77	1.05	25.32	26.08	0.97
IM2 (i)	235 g/L	> 100g/L	H	3.32	66.14	0.05	3.37	66.59	0.05	2.99	67.77	0.04	2.81	68.36	0.04
	Reading 2			3.40	66.32	0.05	3.43	66.83	0.05	2.90	67.78	0.04	3.00	68.28	0.04

Reading 3				3.41	66.19	0.05	3.30	66.91	0.05	2.98	67.44	0.04	2.93	68.66	0.04
Average				3.38	66.22	0.05	3.37	66.78	0.05	2.96	67.66	0.04	2.91	68.43	0.04
IM2 (t)	<250 g/L	> 100g/L	H	80.18	80.58	1.00	80.35	80.89	0.99	79.56	80.53	0.99	79.40	80.80	0.98
Reading 2				80.36	80.73	1.00	79.93	80.77	0.99	79.40	80.24	0.99	79.21	80.68	0.98
Reading 3				80.54	81.17	0.99	79.81	81.22	0.98	79.94	80.42	0.99	79.47	80.93	0.98
Average				80.36	80.83	0.99	80.03	80.96	0.99	79.63	80.40	0.99	79.36	80.80	0.98
IM3 (p)	0 g/L	≤ 100g/L	L	N/A - No Adhesion to Sealed Portion											
IM3 (i)	40 g/L	≤ 100g/L	L	52.46	52.56	1.00	52.45	52.62	1.00	52.06	52.78	0.99	51.94	52.58	0.99
Reading 2				52.45	52.57	1.00	52.43	52.62	1.00	52.02	52.78	0.99	51.98	52.49	0.99
Reading 3				52.47	52.65	1.00	52.47	52.60	1.00	52.00	52.74	0.99	52.08	52.55	0.99
Average				52.46	52.59	1.00	52.45	52.61	1.00	52.03	52.77	0.99	52.00	52.54	0.99
IM3 (t)	66 g/L	≤ 100g/L	L	83.39	83.98	0.99	83.22	83.94	0.99	81.60	83.63	0.98	81.97	83.66	0.98
Reading 2				83.36	83.83	0.99	82.71	83.86	0.99	81.19	83.65	0.97	80.95	83.69	0.97
Reading 3				82.90	83.87	0.99	82.98	84.08	0.99	81.79	83.55	0.98	80.43	83.69	0.96
Average				83.22	83.89	0.99	82.97	83.96	0.99	81.53	83.61	0.98	81.12	83.68	0.97
IM4 (p)	0 g/L	≤ 100g/L	L	24.25	24.90	0.97	23.99	24.04	1.00	24.63	24.63	1.00	24.50	24.23	1.01
Reading 2				24.24	24.53	0.99	23.91	24.37	0.98	24.63	25.16	0.98	24.46	24.10	1.01
Reading 3				24.18	24.71	0.98	24.16	24.57	0.98	24.31	24.35	1.00	24.41	24.62	0.99
Average				24.22	24.71	0.98	24.02	24.33	0.99	24.52	24.71	0.99	24.46	24.32	1.01
IM4 (i)	0 g/L	≤ 100g/L	L	66.49	70.97	0.94	66.42	71.05	0.93	62.42	71.68	0.87	64.15	71.67	0.90
Reading 2				66.02	71.01	0.93	66.38	71.08	0.93	63.04	71.81	0.88	64.78	71.63	0.90
Reading 3				66.18	70.98	0.93	66.66	71.02	0.94	62.79	71.88	0.87	63.92	71.64	0.89
Average				66.23	70.99	0.93	66.49	71.05	0.94	62.75	71.79	0.87	64.28	71.65	0.90
IM4 (t)	0 g/L	≤ 100g/L	L	85.86	88.44	0.97	85.82	88.23	0.97	83.34	87.40	0.95	83.26	87.03	0.96
Reading 2				85.76	88.56	0.97	85.42	88.34	0.97	83.34	87.41	0.95	83.25	87.37	0.95
Reading 3				85.81	88.40	0.97	85.53	87.95	0.97	83.52	87.28	0.96	83.25	86.81	0.96
Average				85.81	88.47	0.97	85.59	88.17	0.97	83.40	87.36	0.95	83.25	87.07	0.96

Tests for Rust Preventative Coatings

Taber Abrasion

		Grouping							
Group 8:	Rust Preventative		W1	W1,mg	W2	W2,mg	# Cycles	I(wear index)	L(weight loss),mg
RP1 (p/t)	> 100g/L	H	69.5001	69500.1000	69.4735	69473.5000	400	66.50	26.60
	Replicate 2		69.8702	69870.2000	69.8320	69832.0000	400	95.50	38.20
	Replicate 3		69.8042	69804.2000	69.7635	69763.5000	400	101.75	40.70
	Average							87.92	35.17
RP2 (p/t)	> 100g/L	H	69.2225	69222.5000	69.2009	69200.9000	400	54.00	21.60
	Replicate 2		69.9350	69935.0000	69.8991	69899.1000	400	89.75	35.90
	Replicate 3		70.3952	70395.2000	70.3631	70363.1000	400	80.25	32.10
	Average							74.67	29.87
RP3 (p/t)	≤ 100g/L	L	69.5657	69565.7000	69.5557	69555.7000	400	25.00	10.00
	Replicate 2		69.3965	69396.5000	69.3844	69384.4000	400	30.25	12.10
	Replicate 3		69.8660	69866.0000	69.8440	69844.0000	400	55.00	22.00
	Average							36.75	14.70
RP4 (p/t)	≤ 100g/L	L	70.5716	70571.6000	70.5551	70555.1000	400	41.25	16.50
	Replicate 2		70.7334	70733.4000	70.6913	70691.3000	400	105.25	42.10
	Replicate 3		70.5638	70563.8000	70.5454	70545.4000	400	46.00	18.40
	Average							64.17	25.67

Impact Resistance

Group 8:	Rust Preventative		Last Pass	First Fail
RP1 (p/t)	> 100g/L	H	40	50
	Replicate 2		40	50
	Replicate 3		40	50
	Average		40	50
RP2 (p/t)	> 100g/L	H	120	130
	Replicate 2		110	120
	Replicate 3		60	70
	Average		97	107
RP3 (p/t)	≤ 100g/L	L	60	70
	Replicate 2		110	120
	Replicate 3		130	140
	Average		100	110
RP4 (p/t)	≤ 100g/L	L	30	40
	Replicate 2		60	70
	Replicate 3		30	40
	Average		40	50

Adhesion on Steel

			Patti			Battelle		
Group 8:	Rust Preventative		Adhesion (psig)	Adhesion (psi)	Failure Mech.	Adhesion (in-lb)	Adhesion (psi)	Failure Mech.
RP1 (p/t)	> 100g/L	H	51.2	1039.4	Co-95%, Ad-5%	86.9	3540.624526	Co-90%, Ad - 10%
	Replicate 2		58	1182.2	Co-85%, Ad-15%	77.3	3149.485338	Co-96%, Ad - 4%
	Replicate 3		56	1141.4	Co-90%, Ad-10%	84.9	3459.137195	Co-98%, Ad - 2%

Average			55.1	1121.0		83.0	3383.1	
RP2 (p/t)	> 100g/L	H	17.1	345.5	Co-75%, Ad-25%	59.8	2436.471193	Co-95%, Ad - 5%
Replicate 2			48.8	998.5	Co-75%, Ad-25%	58.1	2367.206962	Co-90%, Ad - 10%
Replicate 3			43.6	896.5	Co-80%, Ad-20%	85.3	3475.434661	Co-85%, Ad - 15%
Average			36.5	746.8		67.7	2759.7	
RP3 (p/t)	≤ 100g/L	L	28.6	590.4	Co-10%, Ad-90%	79.4	3235.047035	Co-15%, Ad - 85%
Replicate 2			42.8	876.1	Co-45%, Ad-55%	78.6	3202.452103	Co-50%, Ad - 50%
Replicate 3			35.5	733.2	Co-40%, Ad-60%	90.2	3675.078622	Co-50%, Ad - 50%
Average			35.6	733.2		82.7	3370.9	
RP4 (p/t)	≤ 100g/L	L	33.1	672.0	Co-30%, Ad-70%	54.5	2220.529766	Ad - 100%
Replicate 2			31.8	651.6	Co-15%, Ad-85%	47	1914.952275	Ad - 100%
Replicate 3			-----	-----	-----	64.6	2632.040787	Ad - 100%
Average			32.5	661.8		55.4	2255.8	

Flow & Leveling

	Pub. VOC	Grouping		Flow/Level			
Group 8:	Rust Preventative			1	2	3	Avg
RP1 (p)	345 g/L	> 100g/L	H	1	1	1	1
RP1 (t)	390 g/L	> 100g/L	H	4	5	5	5
RP2 (p)	340 g/L	> 100g/L	H	5	5	5	5
RP2 (t)	370 g/L	> 100g/L	H	9	9	9	9
RP3 (p)	58 g/L	≤ 100g/L	L	5	5	5	5
RP3 (t)	<50 g/L	≤ 100g/L	L	4	4	4	4
RP4 (p)	0 g/L	≤ 100g/L	L	1	1	1	1
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)			

Prohesion – Gloss – 0 Cycles

Grouping			Gloss (5 readings per replicate) - Prohesion 0 Cycles					
Group 8:	Rust Preventative		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
RP1 (p/t)	> 100g/L	H	32.6	4.6	76.3	2.8	71.1	1.2
Replicate 2			32.5	6.8	75.5	8.2	65.0	6.4
Replicate 3			34.7	5.4	75.2	6.0	75.8	5.6
Average			33.3	5.6	75.7	5.7	70.6	4.4
RP2 (p/t)	> 100g/L	H	58.9	3.2	85.7	2.2	83.7	2.0
Replicate 2			54.1	6.0	86.0	1.0	91.3	0.8
Replicate 3			30.9	2.4	74.6	1.8	75.6	2.8
Average			48.0	3.9	82.1	1.7	83.5	1.9
RP3 (p/t)	≤ 100g/L	L	20.6	1.8	61.8	1.0	66.3	1.4
Replicate 2			22.0	1.8	65.4	1.2	68.4	1.4
Replicate 3			21.2	1.6	62.3	2.0	65.8	1.2
Average			21.3	1.7	63.2	1.4	66.8	1.3
RP4 (p/t)	≤ 100g/L	L	10.9	1.0	45.1	1.0	59.7	2.0
Replicate 2			7.7	1.4	36.8	4.0	52.5	6.0
Replicate 3			9.8	0.6	40.7	2.0	56.3	3.4

Average	9.5	1.0	40.9	2.3	56.2	3.8
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Prohesion – Gloss – 1 Cycle

Grouping			Gloss (5 readings per replicate) - Prohesion 1 Cycle					
Group 8:	Rust Preventative		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
RP1 (p/t)	> 100g/L	H	0.9	0.1	20.1	2.0	62.0	0.6
Replicate 2			6.3	1.2	46.4	2.8	64.8	3.2
Replicate 3			1.9	0.2	30.7	1.0	67.5	3.6
Average			3.0	0.5	32.4	1.9	64.8	2.5
RP2 (p/t)	> 100g/L	H	5.8	0.6	35.3	5.0	74.6	1.6
Replicate 2			3.2	0.4	28.3	2.6	75.7	0.2
Replicate 3			0.9	0.1	7.0	0.8	40.2	3.4
Average			3.3	0.4	23.5	2.8	63.5	1.7
RP3 (p/t)	≤ 100g/L	L	2.3	0.2	15.5	0.6	30.0	3.2
Replicate 2			2.6	0.2	17.0	0.2	34.0	2.4
Replicate 3			1.6	0.1	10.1	1.0	34.5	2.4
Average			2.2	0.2	14.2	0.6	32.8	2.7
RP4 (p/t)	≤ 100g/L	L	9.0	0.8	35.6	0.2	52.6	2.2
Replicate 2			6.6	1.0	36.0	2.4	52.7	4.8
Replicate 3			5.4	0.2	29.0	1.4	44.3	0.8
Average			7.0	0.7	33.5	1.3	49.9	2.6

Prohesion – Gloss – 2 Cycles

Grouping			Gloss (5 readings per replicate) - Prohesion 2 Cycles					
Group 8:	Rust Preventative		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
RP1 (p/t)	> 100g/L	H	1.3	0.1	13.6	1.0	47.7	1.4
Replicate 2			1.2	0.1	9.0	0.6	44.3	1.2
Replicate 3			1.2	0.1	7.5	0.2	46.8	1.6
Average			1.2	0.1	10.0	0.6	46.3	1.4
RP2 (p/t)	> 100g/L	H	1.2	0.1	9.3	1.6	50.4	2.2
Replicate 2			1.1	0.1	4.0	0.2	49.7	1.0
Replicate 3			1.0	0.2	2.3	0.1	25.2	1.4
Average			1.1	0.1	5.2	0.6	41.8	1.5
RP3 (p/t)	≤ 100g/L	L	1.3	0.1	4.3	0.2	19.1	1.0
Replicate 2			1.3	0.1	4.0	0.8	20.7	2.4
Replicate 3			1.5	0.1	5.6	0.2	29.5	1.6
Average			1.4	0.1	4.6	0.4	23.1	1.7
RP4 (p/t)	≤ 100g/L	L	7.0	1.4	35.2	3.2	50.6	2.6
Replicate 2			7.3	1.4	35.0	3.6	47.0	3.6
Replicate 3			4.8	1.4	29.4	3.6	40.0	6.6
Average			6.4	1.4	33.2	3.5	45.9	4.3

Flash Rusting

Flexibility

Group 8:	Rust Preventative	Pass/Fail	Failure Dist. (in)	Adhesion Pass/Fail
RP1 (p/t)	> 100g/L	H	Fail	4 3/4

Replicate 2			Fail	5 3/16	-----
Replicate 3			Fail	5 1/4	-----
Average			Fail	5 1/16	-----
RP2 (p/t)	> 100g/L	H	Fail	6/8	-----
Replicate 2			Fail	3/8	-----
Replicate 3			Fail	5/8	-----
Average			Fail	9/16	-----
RP3 (p/t)	≤ 100g/L	L	Pass	-----	Pass
Replicate 2			Pass	-----	Pass
Replicate 3			Pass	-----	Pass
Average			Pass	-----	Pass
RP4 (p/t)	≤ 100g/L	L	Pass	-----	Pass
Replicate 2			Pass	-----	Pass
Replicate 3			Pass	-----	Pass
Average			Pass	-----	Pass

Tests for Industrial Maintenance Coatings

Taber Abrasion

Impact Resistance

Group 9:	Industrial Maint.	Last Pass	First Fail
IM2 (p/i/t)	> 100g/L H	30	40
Replicate 2		20	30
Replicate 3		40	50
Average		30	40
IM3 (p/i/t)	≤ 100g/L L	80	90
Replicate 2		70	80
Replicate 3		70	80
Average		73	83
IM4 (p/i/t)	≤ 100g/L L	10	20
Replicate 2		10	20
Replicate 3		10	20
Average		10	20

Flexibility

Group 9:	Industrial Maintenance	Pass/Fail	Failure Dist. (in)	Adhesion Pass/Fail
IM2 (p/i/t)	> 100g/L H	Fail	5	-----
Replicate 2		Fail	4 1/8	-----
Replicate 3		Fail	4 5/8	-----
Average		Fail	4 19/32	-----
IM3 (p/i/t)	≤ 100g/L L	Fail	6	-----
Replicate 2		Fail	6	-----
Replicate 3		Fail	6	-----
Average		Fail	6	-----
IM4 (p/i/t)	≤ 100g/L L	Fail	6	-----
Replicate 2		Fail	6	-----
Replicate 3		Fail	6	-----
Average		Fail	6	-----

Adhesion on Metal

			Patti			Battelle		
Group 9:	Industrial Maint		Adhesion (psig)	Adhesion (psi)	Failure Mech.	Adhesion (in-lb)	Adhesion (psi)	Failure Mech.
IM2 (p/i/t)	> 100g/L	H	59.8	2446.4	PAd-95%, Pco-5%	109	4441.1	Ad - 98%
Replicate 2			56.1	2283.1	PCo-70,PAd-30,IAAd-5	80.9	3296.2	Ad - 98%
Replicate 3			42.6	1752.5	PAd-85, PCo-15%	98.6	4017.3	Ad - 98%
Average			52.8	2160.7		96.2	3918.2	
IM3 (p/i/t)	≤ 100g/L	L	80.6	3303.5	PCo-92,PAd-3,IAAd-5	95.8	3903.2	Ad - 90%
Replicate 2			41.5	1711.7	PAd-98,IAAd-2	93.5	3809.5	Ad - 99%
Replicate 3			28.4	1140.3	PCo-1,PAd-99	80.4	3275.8	Ad - 98%
Average			50.2	2051.8		89.9	3662.9	
IM4 (p/i/t)	≤ 100g/L	L	52.3	2119.8	PCo-4,PAd-96	89.9	3662.9	Ad - 100%
Replicate 2			62.5	2568.8	PCo-2,PAd-98	99.5	4054.0	Ad - 90%, EAd-10%
Replicate 3			53.9	2201.5	PCo-2,PAd-98	70.6	2876.5	Ad - 100%
Average			56.2	2296.7		86.7	3531.1	

QUV - Gloss – 0 Hours

Grouping			Gloss (5 readings per replicate) - QUV 0 Hours					
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	27.7	4.0	66.8	3.4	64.3	3.8
Replicate 2			37.7	6.2	76.0	1.4	65.7	5.2
Replicate 3			19.5	4.4	59.2	4.6	58.5	3.6
Average			28.3	4.9	67.3	3.1	62.8	4.2
IM3 (p/i/t)	≤ 100g/L	L	60.3	12.6	78.1	8.0	68.7	8.8
Replicate 2			53.4	10.6	78.0	7.2	74.6	3.6
Replicate 3			59.8	6.0	68.2	4.4	78.1	5.8
Average			57.8	9.7	74.8	6.5	73.8	6.1
IM4 (p/i/t)	≤ 100g/L	L	64.6	3.4	85.1	2.4	83.3	3.0
Replicate 2			63.5	3.4	85.1	1.4	81.8	2.6
Replicate 3			70.3	2.6	85.3	0.4	81.2	2.2
Average			66.1	3.1	85.2	1.4	82.1	2.6

QUV – Gloss – 200 Hours

Grouping			Gloss (5 readings per replicate) - QUV 200 Hours					
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	26.0	2.6	64.2	4.6	63.6	3.2
Replicate 2			27.8	5.8	69.8	3.4	62.9	4.2
Replicate 3			21.8	1.6	59.6	7.0	65.8	3.0
Average			25.2	3.3	64.5	5.0	64.1	3.5
IM3 (p/i/t)	≤ 100g/L	L	42.7	4.8	81.6	3.4	66.1	6.4
Replicate 2			50.0	2.8	80.6	6.8	69.0	2.4
Replicate 3			52.6	3.0	79.6	2.4	87.2	2.4
Average			48.4	3.5	80.6	4.2	74.1	3.7
IM4 (p/i/t)	≤ 100g/L	L	43.2	2.0	78.2	1.4	85.1	2.8
Replicate 2			50.2	3.4	79.9	1.0	88.9	2.2
Replicate 3			51.8	3.4	81.1	1.0	82.7	0.2
Average			48.4	2.9	79.7	1.1	85.6	1.7

QUV – Gloss – 400 Hours

Grouping			Gloss (5 readings per replicate) - QUV 400 Hours					
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	16.0	3.4	63.0	2.0	67.2	1.6
	Replicate 2		29.7	3.8	69.1	5.4	68.3	2.4
	Replicate 3		13.5	3.2	49.8	3.4	62.0	2.8
	Average		19.7	3.5	60.6	3.6	65.8	2.3
IM3 (p/i/t)	≤ 100g/L	L	42.3	8.0	78.1	6.2	76.7	3.4
	Replicate 2		36.9	4.2	76.8	3.6	87.9	5.0
	Replicate 3		35.5	7.6	77.8	4.4	82.1	2.2
	Average		38.2	6.6	77.6	4.7	82.2	3.5
IM4 (p/i/t)	≤ 100g/L	L	11.4	2.2	58.6	2.0	80.9	3.2
	Replicate 2		27.4	0.8	70.7	0.8	84.1	2.4
	Replicate 3		24.3	2.0	68.7	0.1	83.4	1.8
	Average		21.0	1.7	66.0	1.0	82.8	2.5

QUV – Gloss – 600 Hours

Grouping			Gloss (5 readings per replicate) - QUV 600 Hours					
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	3.1	0.8	36.3	2.8	61.6	1.2
	Replicate 2		12.3	2.0	57.0	3.8	62.7	3.4
	Replicate 3		2.9	0.6	33.7	3.8	60.4	3.8
	Average		6.1	1.1	42.3	3.5	61.6	2.8
IM3 (p/i/t)	≤ 100g/L	L	18.9	2.8	74.3	2.0	71.5	2.4
	Replicate 2		34.9	1.2	74.7	4.0	78.6	1.8
	Replicate 3		41.6	6.0	77.2	5.8	79.6	1.2
	Average		31.8	3.3	75.4	3.9	76.6	1.8
IM4 (p/i/t)	≤ 100g/L	L	3.8	0.4	38.4	3.2	78.2	2.4
	Replicate 2		10.1	0.4	55.8	1.4	84.4	2.6
	Replicate 3		9.1	0.2	53.7	1.2	83.3	3.0
	Average		7.7	0.3	49.3	1.9	82.0	2.7

QUV – Gloss – 800 Hours

Grouping			Gloss (5 readings per replicate) - QUV 800 Hours					
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	1.4	0.1	18.4	1.2	64.3	1.2
	Replicate 2		2.9	0.1	39.4	2.4	67.1	1.4
	Replicate 3		1.4	0.1	14.6	1.6	59.6	1.6
	Average		1.9	0.1	24.1	1.7	63.7	1.4
IM3 (p/i/t)	≤ 100g/L	L	33.7	1.0	64.6	2.2	71.7	3.2
	Replicate 2		30.9	2.6	72.4	2.8	84.9	4.2
	Replicate 3		31.1	4.2	66.6	2.6	77.6	3.6
	Average		31.9	2.6	67.9	2.5	78.1	3.7
IM4 (p/i/t)	≤ 100g/L	L	3.0	0.2	24.5	1.2	72.9	2.0
	Replicate 2		4.1	0.2	39.8	0.2	80.5	2.6
	Replicate 3		3.6	0.1	37.9	0.8	82.3	0.8
	Average		3.6	0.2	34.1	0.7	78.6	1.8

QUV – Gloss – 1000 Hours

Group 9:	Grouping		Gloss (5 readings per replicate) - QUV 1000 Hours					
	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	1.5	0.1	13.5	0.6	59.6	0.8
Replicate 2			1.5	0.1	18.1	2.4	62.8	3.0
Replicate 3			1.4	0.1	8.4	0.6	54.1	2.6
Average			1.5	0.1	13.3	1.2	58.8	2.1
IM3 (p/i/t)	≤ 100g/L	L	23.7	6.6	68.8	2.6	70.2	4.6
Replicate 2			26.8	4.6	65.2	6.0	73.1	4.6
Replicate 3			25.8	4.8	67.5	4.8	78.8	2.0
Average			25.4	5.3	67.2	4.5	74.0	3.7
IM4 (p/i/t)	≤ 100g/L	L	2.7	0.2	14.2	2.0	75.3	3.0
Replicate 2			3.1	0.2	28.9	1.6	77.7	3.2
Replicate 3			3.1	0.1	25.7	0.8	77.7	2.0
Average			3.0	0.2	22.9	1.5	76.9	2.7

QUV – Color

			0 Hours			200 Hours				400 Hours				600 Hours			
Group 9:	Industrial Maint.		X	Y	Z	X	Y	Z	ΔE	X	Y	Z	ΔE	X	Y	Z	ΔE
IM2 (p/i/t)	> 100g/L	H	77.39	82.10	85.55	76.30	81.01	82.69	1.35	77.15	82.06	83.10	1.80	78.17	83.11	83.30	2.47
Replicate 2			77.58	83.31	86.60	77.73	82.49	84.48	1.00	77.77	82.58	83.88	1.48	78.40	83.29	84.47	1.56
Replicate 3			77.57	82.26	85.53	76.24	80.96	82.52	1.36	76.90	81.71	82.67	1.71	78.73	83.67	83.76	2.45
Average			77.51	82.56	85.89	76.76	81.49	83.23	1.24	77.27	82.12	83.22	1.66	78.43	83.36	83.84	2.16
IM3 (p/i/t)	≤ 100g/L	L	78.58	83.25	87.04	77.87	82.99	82.65	3.15	77.74	82.73	83.13	2.56	77.74	82.66	83.59	2.15
Replicate 2			78.00	82.67	86.10	76.87	81.99	80.91	3.45	77.28	82.23	82.54	2.35	76.02	80.84	81.35	2.30
Replicate 3			77.15	81.67	85.46	75.32	80.19	79.77	3.25	77.16	82.05	82.71	2.41	76.59	81.42	82.20	2.30
Average			77.91	82.53	86.20	76.69	81.72	81.11	3.28	77.39	82.34	82.79	2.44	76.78	81.64	82.38	2.25
IM4 (p/i/t)	≤ 100g/L	L	79.83	84.61	87.81	80.45	85.71	84.52	3.35	80.30	85.38	85.65	2.23	79.84	84.80	85.52	1.84
Replicate 2			82.79	87.80	90.57	79.68	84.78	84.18	2.71	79.58	84.59	84.42	2.46	80.21	85.22	85.47	2.06
Replicate 3			80.41	85.22	88.51	79.14	84.18	83.61	2.84	77.57	84.49	84.52	2.37	80.38	85.39	85.62	2.22
Average			81.01	85.88	88.96	79.76	84.89	84.10	2.97	79.15	84.82	84.86	2.35	80.14	85.14	85.54	2.04

QUV – Color, Continued

			800 Hours				1000 Hours			
Group 9:	Industrial Maint.		X	Y	Z	ΔE	X	Y	Z	ΔE
IM2 (p/i/t)	> 100g/L	H	79.19	84.11	84.18	2.67	78.33	83.22	83.11	2.69
Replicate 2			79.31	84.21	84.98	1.89	79.99	84.93	85.23	2.32
Replicate 3			78.65	83.49	83.23	2.66	78.62	83.53	82.97	2.90
Average			79.05	83.94	84.13	2.41	78.98	83.89	83.77	2.64
IM3 (p/i/t)	≤ 100g/L	L	77.87	82.75	84.02	1.89	77.81	82.70	83.82	2.00
Replicate 2			77.86	82.77	83.70	1.88	77.31	82.10	83.72	1.36
Replicate 3			77.84	82.74	83.70	2.24	77.36	82.20	83.12	2.20
Average			77.86	82.75	83.81	2.00	77.49	82.33	83.55	1.85
IM4 (p/i/t)	≤ 100g/L	L	80.51	85.49	86.29	1.84	83.19	88.38	88.51	2.84
Replicate 2			80.51	85.49	85.94	1.88	81.12	86.13	86.65	1.71
Replicate 3			81.03	86.04	86.48	2.10	81.29	86.31	86.74	2.12
Average			80.68	85.67	86.24	1.94	81.87	86.94	87.30	2.22

MEK Rubs

		Grouping		
Group 9:	Industrial Maint.		Gloss Loss	
IM2 (p/i/t)	> 100g/L	H	After 15 Cycles	
Replicate 2		After 15 Cycles		
Replicate 3		After 15 Cycles		
Average		After 15 Cycles		
IM3 (p/i/t)	≤ 100g/L	L	Gloss Loss	
Replicate 2		Gloss Loss		
Replicate 3		Gloss Loss		
Average		Gloss Loss		
IM4 (p/i/t)	≤ 100g/L	L	Trace Gloss Loss	
Replicate 2		Trace Gloss Loss		
Replicate 3		Trace Gloss Loss		
Average		Trace Gloss Loss		

Prohesion – Gloss – 0 Cycles

		Grouping		Gloss (5 readings per replicate) - Prohesion 0 Cycles				
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	30.0	3.0	70.9	1.2	71.3	0.8
Replicate 2			31.8	3.4	69.3	3.8	70.9	3.2
Replicate 3			26.0	5.0	69.7	4.4	65.3	1.0
Average			29.3	3.8	70.0	3.1	69.2	1.7
IM3 (p/i/t)	≤ 100g/L	L	39.9	3.0	81.6	3.2	72.0	2.8
Replicate 2			46.2	1.4	82.6	1.4	89.2	2.8
Replicate 3			58.5	5.6	85.3	2.2	70.7	0.4
Average			48.2	3.3	83.2	2.3	77.3	2.0
IM4 (p/i/t)	≤ 100g/L	L	64.5	5.2	86.1	0.4	81.4	3.6
Replicate 2			51.4	0.8	83.7	1.6	85.7	1.6
Replicate 3			66.7	4.2	85.0	1.6	71.7	1.0
Average			60.9	3.4	84.9	1.2	79.6	2.1

Prohesion – Gloss – 1 Cycle

		Grouping		Gloss (5 readings per replicate) - Prohesion 1 Cycle				
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	28.3	3.4	64.4	6.4	63.2	3.8
Replicate 2			26.5	4.6	65.7	5.0	64.6	1.4
Replicate 3			26.2	3.8	57.1	6.4	52.4	6.6
Average			27.0	3.9	62.4	5.9	60.1	3.9
IM3 (p/i/t)	≤ 100g/L	L	29.2	5.0	55.9	0.8	66.2	4.8
Replicate 2			29.5	5.0	67.5	1.0	65.8	2.8
Replicate 3			39.0	2.4	71.4	3.6	70.1	2.6
Average			32.6	4.1	64.9	1.8	67.4	3.4
IM4 (p/i/t)	≤ 100g/L	L	33.3	0.8	67.8	1.2	68.3	5.6
Replicate 2			38.3	4.0	73.5	1.2	80.9	1.4
Replicate 3			47.9	2.2	71.7	0.8	67.0	3.6
Average			39.8	2.3	71.0	1.1	72.1	3.5

Prohesion – Gloss – 2 Cycles

		Grouping		Gloss (5 readings per replicate) - Prohesion 2 Cycles				
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Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	17.7	4.4	57.6	2.8	61.2	3.6
Replicate 2			18.5	1.8	55.8	3.0	61.8	2.6
Replicate 3			16.9	3.6	51.7	2.0	54.4	3.2
Average			17.7	3.3	55.0	2.6	59.1	3.1
IM3 (p/i/t)	≤ 100g/L	L	26.0	2.6	60.4	2.4	61.3	3.2
Replicate 2			29.6	2.0	57.4	1.8	75.6	1.8
Replicate 3			15.6	1.2	62.5	0.6	62.4	1.8
Average			23.7	1.9	60.1	1.6	66.4	2.3
IM4 (p/i/t)	≤ 100g/L	L	12.0	1.4	49.4	1.8	65.5	2.6
Replicate 2			14.0	1.8	55.1	1.4	74.0	2.4
Replicate 3			15.9	0.8	53.4	1.2	66.8	1.0
Average			14.0	1.3	52.6	1.5	68.8	2.0

Prohesion – Gloss – 3 Cycles

Grouping			Gloss (5 readings per replicate) - Prohesion 3 Cycles					
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	5.3	1.2	34.8	4.0	58.0	1.6
Replicate 2			5.9	0.2	38.1	2.6	61.6	2.6
Replicate 3			6.1	2.0	37.1	3.0	50.2	4.8
Average			5.8	1.1	36.7	3.2	56.6	3.0
IM3 (p/i/t)	≤ 100g/L	L	14.9	3.8	48.9	4.0	57.9	1.2
Replicate 2			16.8	2.0	51.4	1.6	68.9	1.4
Replicate 3			15.8	2.0	50.3	2.6	53.4	1.0
Average			15.8	2.6	50.2	2.7	60.1	1.2
IM4 (p/i/t)	≤ 100g/L	L	3.7	0.2	33.5	2.6	67.1	0.6
Replicate 2			4.8	0.2	40.1	1.8	75.9	3.2
Replicate 3			4.5	0.2	36.9	1.2	58.8	0.6
Average			4.3	0.2	36.8	1.9	67.3	1.5

Prohesion - Color