Uniform & Intergranular Corrosion [1]

Uniform corrosion is the destruction of a metal, relatively uniformly over the entire surface. Intergranular corrosion is the destruction of metal at the grain boundaries, usually on a microscopic scale.

Both types of corrosion can result in loss of structural integrity of the affected metal and potential loss of the use of the metal item. In the case of corrosion to aircraft, the loss can result in catastrophic failure.

The Forest Service requires corrosion tests throughout the evaluation period to minimize the risk of corrosion-caused equipment failure in the field.

Proper maintenance and cleaning of the equipment will also help to minimize these potential failures.

Product Performance Data on following pages

1	Standard Test Procedure 5.1, provides instructions for the uniform corrosion test. Standard Test Procedure 5.2, provides instructions for the intergranular corrosion test.

Uniform Corrosion [1] – Water Enhancers

Product [2]	Concentration [3]	2024-T3 Aluminum				4130 Steel				Yellow Brass	Az31B Magnesium			
		Total		Partial		Total		Partial		Partial	Total		Partial	
		70	120	70	120	70	120	70	120	120	70	120	70	120
		mils-per-year												
Barricade II	Concentrate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Mixed – 5.0%	0.1	0.1	0.1	0.1	0.2	0.5	0.8	1.5	0.2	3.5	4.5	2.3	2.5
	Mixed – 3.0%	0.1	0.1	0.1	0.1	0.1	0.2	0.5	1.0	0.1	2.9	3.9	1.8	2.0
	Mixed –1.0%	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.5	0.1	3.3	3.5	2.2	2.2
Thermo-Gel 200L	Concentrate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	9.8	14.1	3.9	5.9
	Mixed – 3.0%	0.1	0.4	0.1	0.3	0.1	0.3	0.8	0.6	0.3	3.6	3.8	2.3	2.0
	Mixed – 1.5%	0.2	0.4	0.1	0.3	0.1	0.2	0.8	0.5	0.3	3.8	2.6	2.7	1.7
	Mixed – 0.5%	0.2	0.4	0.2	0.2	0.1	0.1	0.6	0.2	0.1	1.9	1.5	1.9	1.0
Thermo-Gel 500P	Concentrate	Dry Concentrate - Uniform Corrosion Not Performed [3]												
	Mixed – 1.2%	0.6	1.9	0.3	1.1	0.9	2.3	1.4	2.8	0.4	3.7	7.5	2.3	4.7
	Mixed – 0.5%	0.7	1.3	0.4	0.5	0.6	1.4	1.4	1.3	0.4	4.0	3.9	2.3	2.6
	Mixed – 0.4% [4]	0.6	1.1	0.4	0.3	0.7	1.1	1.6	1.6	0.4	3.3	3.3	2.0	2.1

Notes:

1	Initial Uniform corrosion rates (expressed in mils-per-year) were determined by 90-day weight loss tests. Values shown are the average of all replicates.
2	When there is more than one variation of a product, the most corrosive results are shown.
3	Uniform corrosion tests are performed on wet concentrates and mixed products. Corrosion is not conducted on Dry concentrates.
4	Meets intergranular corrosion requirements for magnesium

Uniform Corrosion [1] – Water Enhancers

Product [2]	Concentration [3]	2024-T3 Aluminum				4130 Steel				Yellow Brass	Az31B Magnesium			
		Total		Partial		Total		Partial		Partial	Total		Partial	
		70	120	70	120	70	120	70	120	120	70	120	70	120
		mils-per-year												
Firewall II	Concentrate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.5	3.8	0.3	2.1
	Mixed – 3.0% [4]	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	2.0	3.7	1.3	2.3
	Mixed – 1.5% [4]	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	1.6	3.1	1.3	1.8
	Mixed – 0.25% [4]	0.2	0.5	0.1	0.2	0.4	1.2	0.3	1.0	0.1	2.0	1.6	1.3	1.1
BioCentral Blazetamer 380	Concentrate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	1.7	4.0	0.7	1.9
	Mixed – 0.65% [4]	0.1	0.3	0.1	0.1	0.2	0.6	0.2	0.4	0.1	0.3	2.0	1.0	1.4
FireIce 561	Concentrate	Dry Concentrate - Uniform Corrosion Not Performed [3]												
	Mixed – 2.1%	0.6	1.1	0.3	0.9	0.6	1.3	1.4	2.5	0.3	5.2	3.1	3.1	1.9
	Mixed – 1.4%	0.4	0.9	0.3	0.4	0.7	1.0	1.3	2.1	0.4	1.8	3.3	2.9	1.8
Phos-Chek Insul-8	Concentrate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
	Mixed – 3.0%	0.5	1.3	0.4	1.0	2.2	1.5	1.4	1.9	0.2	8.6	11.1	3.3	5.4
	Mixed – 1.0%	0.2	0.4	0.3	0.4	0.8	1.4	0.5	1.2	0.1	6.2	5.9	3.7	3.8
	Mixed – 0.37% [4]	0.2	1.0	0.3	0.8	0.5	1.3	0.5	0.9	0.4	3.8	3.1	2.2	1.9
EarthClean TetraKO XL-P	Concentrate	Dry Concentrate - Uniform Corrosion Not Performed [3]												
	Mixed – 1.5%	0.3	0.4	0.3	0.3	0.5	0.8	0.9	1.5	0.2	5.3	4.5	3.0	2.5
	Mixed – 1.0%	0.2	0.4	0.3	0.3	0.4	0.6	0.8	1.2	0.2	4.0	3.5	2.4	2.1
	Mixed – 0.5%	0.2	0.7	0.3	0.3	0.3	0.8	1.2	1.9	0.2	4.1	4.0	2.4	2.6

1	Initial Uniform corrosion rates (expressed in mils-per-year) were determined by 90-day weight loss tests. Values shown are the average of all replicates.
2	When there is more than one variation of a product, the most corrosive results are shown.
3	Uniform corrosion tests are performed on wet concentrates and mixed products. Corrosion is not conducted on Dry concentrates.
4	Meets intergranular corrosion requirements for magnesium.

Uniform Corrosion [1] – Colored Water Enhancers

Product [2]	Concentration [3]	2024-T3 Aluminum				4130 Steel				Yellow Brass	Az31B Magnesium			
		Total		Partial		Total		Partial		Partial	Total		Partial	
		70	120	70	120	70	120	70	120	120	70	120	70	120
		mils-per-year												
Thermo-Gel 200L Blue	AV-B1 – 0.1125% in Water	0.3	0.6	0.3	0.3	1.5	2.0	0.9	1.8	<0.1	0.7	1.0	0.6	0.6
	1.5% TG 200L mixed with 0.1125% AV-B1 in Water	0.1	0.4	0.1	0.2	0.1	0.3	1.0	0.3	0.2	2.4	2.2	1.4	1.4
FireIce 561 Cool Blue	2.0 g Cool Blue / gallon water	0.9	0.4	0.5	0.2	1.6	2.5	1.1	1.9	<0.1	0.5	0.4	0.4	0.4
	0.18 lb/gal FireIce Uncolored mixed with 2.0 g Cool Blue in water	0.4	0.9	0.2	0.7	0.5	0.8	1.4	2.4	0.2	7.0	13.8	2.1	4.4
FireIce HVB-Fx (Colored, 1 Component)	Concentrate	Dry Concentrate - Uniform Corrosion Not Performed [3]												
	Mixed – 2.7%	0.1	0.5	0.1	0.3	0.6	1.0	1.3	2.4	0.1	4.5	3.4	2.7	1.8
	Mixed – 2.2%	0.1	0.5	0.1	0.5	0.7	1.1	1.3	2.4	0.2	5.3	3.0	3.6	1.4
	Mixed – 1.7%	0.2	0.8	0.1	0.5	0.6	1.3	1.5	2.7	0.2	4.4	2.8	3.4	1.6

Notes:

1	Initial Uniform corrosion rates (expressed in mils-per-year) were determined by 90-day weight loss tests. Values shown are the average of all replicates.
2	When there is more than one variation of a product, the most corrosive results are shown.
3	Uniform corrosion tests are performed on wet concentrates and mixed products. Corrosion is not conducted on Dry concentrates.
4	Meets intergranular corrosion requirements for magnesium.