



Tectyl 3335 SAE J-2334 Cyclic Corrosion Study

Scope:

Tectyl 3335 is a low VOC water based corrosion preventive coating for truck underbodies. This report will discuss the corrosion protection performance of Tectyl 3335 over I-Beams and 5x7x0.25 inch panels. The panels and I-Beams will be run through SAE J-400 Gravelometer, scribed, or un-breached. The panels and I-Beams will then be tested using the SAE J-2334 specification, but replacing the salt solution with magnesium chloride as outlined in the Frito Lay National Fleet Protocol Specification (see attached).

Application:

The customer provided 3 steel I-Beams and 3 steel panels coated with 2-4 mils Tectyl 3335. All 6 substrates were sprayed to a dry film thickness of 10 mils. The substrates were allowed to dry at room temperature for 7 days before starting the SAE J-2334 Cycle testing.

Procedure:

SAE J-2334 cyclic testing ran on a 5 cycle per week schedule. Panels were placed in a 50°C with 100% humidity cabinet for 6 hours, panels were then immersed in a salt bath for 15 minutes (Salt Solution – 1.0% NaCl, 3.0% CaCl₂, 0.5% KCl, 2.5% MgCl₂, and 93% DI H₂O). Lastly, the panels were placed in a 60°C 50% humidity cabinet for 17 hours and 45 minutes. This constituted one cycle. On the weekends and holidays, the panels were left in the 60°C, 50% humidity cabinet. J-2334 testing was run for 80 cycles.

Results:

The SAE-J400 rating system runs from a low of 1 to a high of 10. Automotive OEM generally considers a rating of 5 or better a pass.

SAE-J400 Gravelometer Results			
Part	Total Impacts	Impacts to Metal	SAE J400 Rating
Gravelometer Panel	75	4	8
Gravelometer I-Beam	35	3	8

SAE J-2334 Rating System

The SAE-J-2334 rating system requires a total metal loss after the test finishes. As the blank steel panel and I-Beam weights were not given, a replacement rating criteria was generated and used to compare the samples.

After every 10 cycles the samples were rated on a scale of a low of 1 to a high of 5 in three categories: face rust, peeling, and other defects. The three scores were then tallied to give an overall rating. The range of scores is 3 for poor up to 15 for excellent. The tables below describe the rating criteria and give the overall rating of the samples after every 10 cycles. Detailed descriptions of the condition of the samples after every 10 cycles are listed below as well.

Overall Rating			
Rating	Face Corrosion	Peeling	Other Defects
5	0-5% Face Corrosion	No Peeling	Less Than 20% Corrosion on Scribe or Impacts
4	5-20% Face Corrosion	Slight Peeling Around Edges	20-40% Corrosion Around Scribe or Impacts
3	20-40% Face Corrosion	Heavy Peeling Around Edges, or Slight Peeling on Edges and Around Scribe/Impacts	40-60% Corrosion on Scribe/Impacts
2	40-70% Face Corrosion	Heavy to Complete Peeling Around Edges, Peeling from Scribe/Impacts	60-80% Corrosion on Scribe/Impacts
1	70-100% Face Corrosion	Complete Peeling Around Edges	Complete Peeling From Scribe/Impacts, Up to 80-100% Corrosion on Scribe/Impacts

	10 Cycles	20 Cycles	30 Cycles	40 Cycles	50 Cycles	60 Cycles	70 Cycles	80 Cycles
Panel (Un-Breached)	15	15	15	15	12	12	9	9
Panel (Gravel)	15	12	12	11	10	10	8	7
Panel (Scribe)	12	11	11	11	9	9	7	6
I-Beam (Un-Breached)	15	15	15	11	12	12	10	9
I-Beam (Gravel)	15	13	12	11	10	10	8	7
I-Beam (Scribe)	13	11	11	11	10	10	8	7

Tectyl 3335, SAE J-2334 Test Run to 60 Cycles				
	10 Cycles	20 Cycles	30 Cycles	40 Cycles
Panel (Un-breached)	No corrosion observed	No corrosion observed	2% Corrosion on edges	5% Corrosion on edges 3-5% Face rust
Panel (SAE Gravel)	Light corrosion on 20% of impacts No corrosion creep from impacts	Corrosion on 75% of impacts Slight corrosion creep from impacts	Corrosion on 75% of impacts Slight corrosion creep from impacts	Corrosion on 100% of Impacts Slight Corrosion Creep on 40% of Impacts
Panel (Scribed)	Light corrosion on 80% of scribe No corrosion creep from scribe	Light corrosion on 100% of scribe No corrosion creep from scribe	Corrosion on 100% of scribe Slight corrosion creep from scribe	Corrosion on 100% of scribe Slight corrosion creep from Scribe 2% Face rust
I-Beam (Un-breached)	No corrosion observed	No corrosion observed	5% corrosion on edges	Slight corrosion on edges 3-5% Face Rust
I-Beam (SAE Gravel)	Light corrosion on 20% of Impacts No corrosion creep from impacts	Light corrosion on 50% of impacts Slight corrosion creep from 10% of impacts	Corrosion on 60% of impacts Slight corrosion creep from 15% of impacts	Corrosion on 80% of impacts Slight corrosion creep on 20% of impacts
I-Beam (Scribed)	Light corrosion on 50% of scribe No corrosion creep from scribe	Light corrosion on 90% of scribe No corrosion creep from scribe	Corrosion on 100% of scribe Slight corrosion creep from scribe	Corrosion on 100% of scribe Slight corrosion creep from scribe

	50 Cycles	60 Cycles	70 Cycles	80 Cycles
Panel (Un-breached)	10-15% Corrosion on edges 5% Face rust Minor peeling observed around edges	15-18% Corrosion on edges 8% Face rust Minor peeling observed around edges	65% Corrosion on edges 25% Face rust Increased peeling on edges Peeling beginning on face	80% Corrosion on edges 45% Face rust Major peeling on edges and face
Panel (SAE Gravel)	Corrosion on 100% of impacts Slight corrosion creep on 75% of impacts Minor peeling observed around edges	Corrosion on 100% of impacts Slight corrosion creep on 100% of impacts 3% Face rust Minor peeling observed around edges	Corrosion on 100% of impacts Peeling on 25% of impacts 20% Face rust Increased peeling on edges	Corrosion on 100% of impacts 35% Face Rust Peeling on 45% of impacts Major peeling on edges
Panel (Scribed)	Heavy corrosion on 100% of scribe Slight corrosion creep from scribe 5% Face rust Minor peeling observed around edges	Heavy corrosion on 100% of scribe Corrosion creep from scribe 8% Face rust Minor peeling observed around edges	Heavy corrosion on 100% of scribe Peeling around 5% of scribe 25% Face rust Increased peeling on edges	Heavy corrosion on 100% of scribe 45% Face Rust Peeling on 15% of scribe Major peeling on edges
I-Beam (Un-breached)	Slight corrosion on edges 5-8% Face rust Minor peeling observed around edges	8% Corrosion on edges 8-10% Face rust Minor peeling observed around edges	25% Corrosion on edges 12% Face rust Minor peeling on edges	35% Corrosion on edges 18% Face rust Increased peeling on edges
I-Beam (SAE Gravel)	Corrosion on 100% of impacts Slight corrosion creep on 50% of impacts Minor peeling observed around edges	Corrosion on 100% of impacts Slight corrosion creep on 90% of impacts Minor peeling observed around edges	Corrosion on 100% of impacts Peeling on 30% of impacts Increased peeling on edges	Corrosion on 100% of impacts Peeling on 65% of impacts Major peeling on edges
I-Beam (Scribed)	Heavy corrosion on 100% of Scribe Slight corrosion creep from scribe Minor peeling observed around edges	Heavy corrosion on 100% of scribe Corrosion creep from scribe 3% Face rust Minor peeling observed around edges	Heavy corrosion on 100% of scribe Peeling on 5% of scribe 15% Face rust Increased peeling on edges	Heavy corrosion on 100% of scribe 20% Face rust Peeling on 10% of scribe No further peeling on edges

Conclusion:

After 80 SAE-J2334 cycles the steel samples coated with Tectyl 3335 appear to be in serviceable condition with minimal to no metal loss.

The un-breached samples are in the best state with a rating of 9.

The scribed and gravelometer samples coated with Tectyl 3335 have minimal under cutting creep corrosion at the scribe or at the gravelometer impacts. The scribed and gravelometer samples appear to retain equal corrosion protection with ratings of 6-7. There does not seem to be any difference in the corrosion protection of Tectyl 3335 when coated over the large panels compared to being coated over I-beams.

Attached to the end of this report is a photo of an uncoated I-Beam that was exposed to 80 cycles of SAE-J2334. As a result of comparing the Tectyl 3335 coated I-Beams and panels to the uncoated I-Beam, Dauber Chemical would consider the Tectyl 3335 coated substrates a pass.



80 SAE-J2334 Cycles

Tectyl 3335



Gravelometer
10 mils DFT

80 SAE-J2334 Cycles
Tectyl 3335



Gravelometer
10 mils DFT

80 SAE-J2334 Cycles

Tectyl 3335



Scribed
10 mils DFT

80 SAE-J2334 Cycles Tectyl 3335



Scribed
10 mils DFT

80 SAE-J2334 Cycles

Tectyl 3335



Un-Breached
10 mils DFT

80 SAE-J2334 Cycles Tectyl 3335



Un-Breached
10 mils DFT