



QUIN
GLOBAL

ADHESIVE INNOVATORS



LAB REPORT

RTM Composite Adhesive Performance

Lab Technician:
Lab Assistant:
Date:

Barry Churchman
Madeline Urquhart
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To the best of our knowledge the information contained in this report is accurate. Data and recommendations are the results of testing and experience, and would highly recommend detailed following for best results. As the information is beyond the control of the supplier, the supplier will not be liable for any injury arising from its issue. Final determination of suitability of the information is the sole responsibility of the designer and/or builder.

TESTING METHOD

Aim: to test and evaluate the compatibility of the TensorGrip TC range and its common competitors, when applied to resins used for composite infusion moulding.

Branch: Quin Global Asia Pacific

Introduction

The purpose of this report is to test the suitability of adhesives for application in the composite industry. This will include the TensorGrip TC42, TensorGrip TC43, TensorGrip TC49, a premium US adhesive and the current global leader.

Test Method

1. Peel Test

- i. Apply light covering of adhesive to fiberglass matting, carbon fiber matting and aluminium base substrate.
- ii. Laminate substrates together after specified tack time has passed.
- iii. Test peel strength after 1 hour of bonding time.

2. Shear Strength Text

- i. Apply adhesive to Beechwood
- ii. Cure for 2 Hours
- iii. Test shear strength (N) in Computer Servo shear strength tester.

3. Resin Dissipation Test

- i. Mix small sample of epoxy, vinyl ester and polyester resin with hardening agent and or catalyst.
- ii. Spray adhesive for 3 seconds into the resin.
- iii. Mix solution and allow to cure.
- iv. Conduct a visual analysis to determine how successfully the adhesive dissipated into the resin.

Specifications

Temperature Conditions	22°C
Substrate/s	Dry Fiberglass and carbon fiber weave
Strength & Peel Testing Machine	Computer Servo Strength Testing Machine

RESULTS

Peel Test

Matting Type	Open Time	TensorGrip TC42	TensorGrip TC43	TensorGrip TC49	US Product	Global Leader
Fiberglass	0.5min	27.31	15.005	21.087	6.326	4.904
	1 min	23.488	8.924	17.702	4.463	3.776
	3 min	6.374	5.542	15.691	3.874	4.119
Carbon Fiber	0.5min	24.811	16.034	28.669	12.75	6.13
	1 min	20.74	13.504	28.979	12.553	7.6
	3 min	6.375	12.798	15.691	7.944	6.552

All results are measured in Newton Metres.

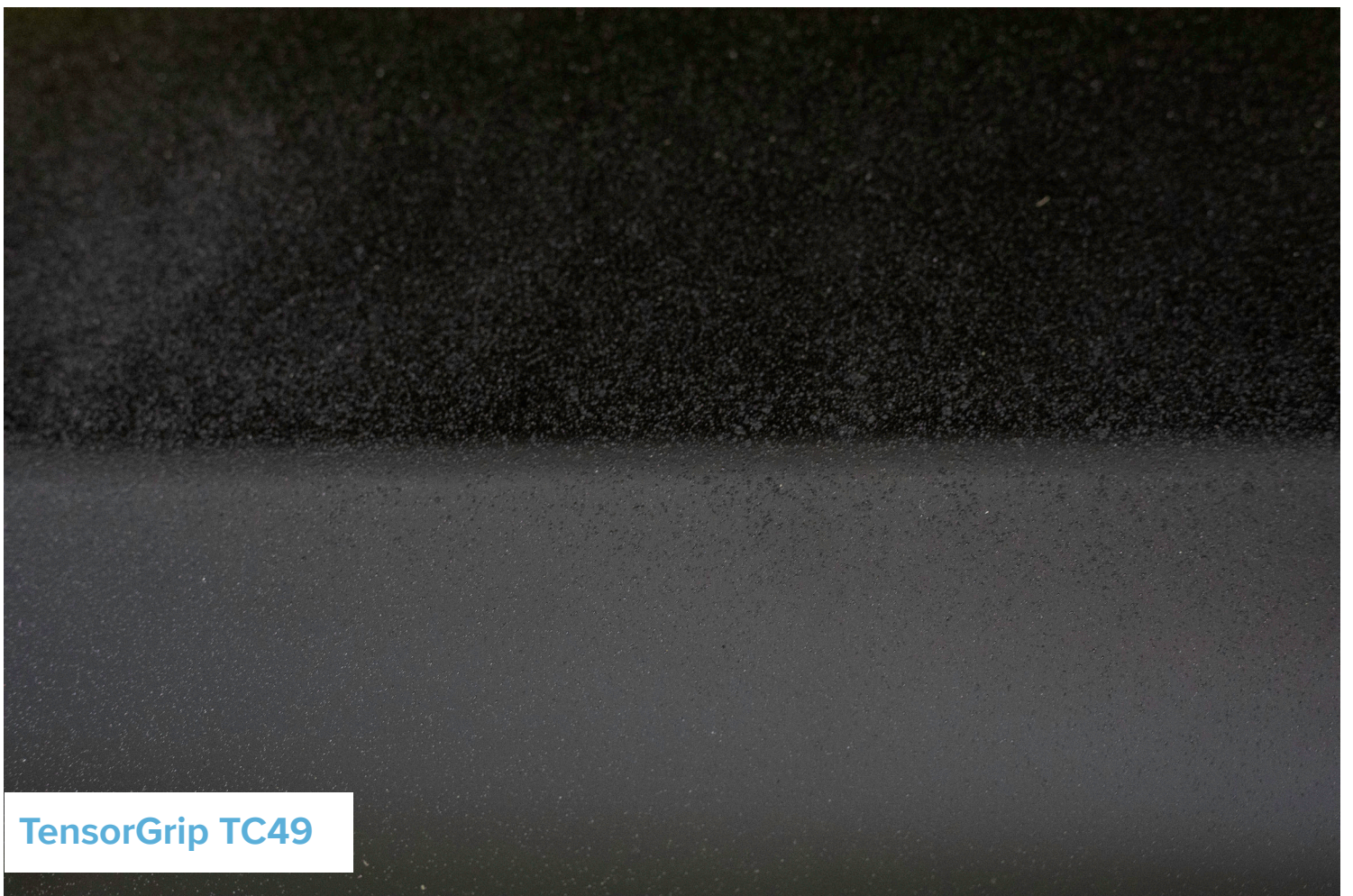
Sheer Test

Product	Result (Newton Metres)
TensorGrip TC42	381.57
TensorGrip TC43	631.0
TensorGrip TC49	430.56
US Product	349.11
Global Leader	345.19

Spray Pattern



TensorGrip TC42



A dark, textured background, possibly a close-up of a material like leather or a fine-grained surface. The texture is uniform across the entire image.

US Product

A dark, textured background, similar to the one above, but with several small, white, irregular specks or particles scattered across the surface, particularly concentrated in the lower-left area.

Global Leader

Epoxy Resin Compatibility

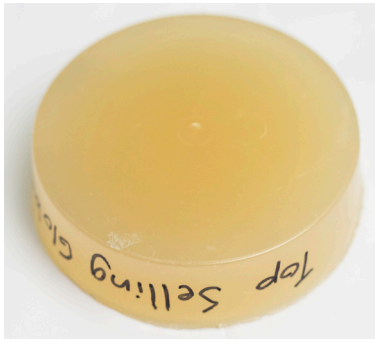


Vinyl Ester Resin Compatibility



Polyester Resin Compatibility





Visual Observances

- TensorGrip TC42 - No Visual Effect
- TensorGrip TC43 - No Visual Effect
- TensorGrip TC49 - No Visual Effect
- US Product - No Visual Effect
- Global Leader - No Visual Effect

Testing Matrix

Test		TensorGrip TC42	TensorGrip TC43	TensorGrip TC49	US Product	Global Leader
Epoxy Resin		✓	✓	✓	✗	✗
Polyester Resin		✓	✓	✓	✓	✓
Vinyl Ester Resin		✓	✓	✓	-	✗
Peel Strength	Fiberglass	19.0n*	9.8n*	18.1n*	4.9n*	12.8n*
	Carbon Fiber	17.3n*	14.1n*	24.4n*	12.1n*	6.7n*
Sheer Strength		381.6n*	631.0n*	430.5n*	349.1n*	345.2n*
Wet Out Risk		None	None	TBC	Risk	Risk
Spray Pattern		Pebble	Web	Mist	Mist	Mist
Overspray		Yes	No	No	No	Yes
Open Time (minutes)		0-20	1-60	0-5	0-20	0-20
Clean Up Residue		No	Yes	No	Yes	Yes
Flow Media		No	Yes	No	No	No
Repositioning		Yes	No	Yes	No	No

* results measured in Newton Metres.

Conclusion

TC42 – Best performer in terms of resin compatibility especially epoxy, Pebble spray is not conducive to a smooth finish and has a bit of over spray. Wet out risk is at a minimum with Diab attesting that the adhesive increases the strength of finished parts. This adhesive is tearing through the wind turbine and marine markets in Europe and India. In terms of failure risk and product integrity it is probably the safest option when not expected to leave a fine mist finish.

TC43 – Stronger bond within the first 0-1 minutes when working with carbon fiber and fiberglass matting. With a strong web-spray this is ideal for larger composite projects using heavy matting. TC43 is soluble in all common resins, isn’t ideal if you need to reposition the matting due to its high tack, has no wetout risk, and can even be used to bond the resin distribution spiral hose to your mold instead of tape.

TC49 – Very strong instant bond and fast tack within the first 3 minutes when working with carbon fiber and fiberglass matting. This product has a strong, fine mist spray pattern making it great for small precise projects, and right through to larger high performance composite components. TC49 is compatible with Polyester, Vinyl Ester and Epoxy resins. When sprayed correctly this mist spray adhesive doesn’t leave residue on the mold after the infusion process. It is also great if you need to reposition the matting within the first 3 minutes.

US Product – Very consistent mist spray pattern with good initial tack and medium strength. Suitable for midweight matting and compatible with polyester resin. No wet out is an issue with a very consistent layer of adhesive. This adhesive may react with epoxy.

Global Leader – A mist spray compatible with polyester resins. Has good tack and a very workable open time. Over sprays a bit and leaves a residue in the mold. Strength is acceptable. Too much of this adhesive may increase the risk of wet out failures in some resins.



63 Hincksman St Queanbeyan NSW 2620
www.quinglobal.com