SG5000 Series Temperature Performance

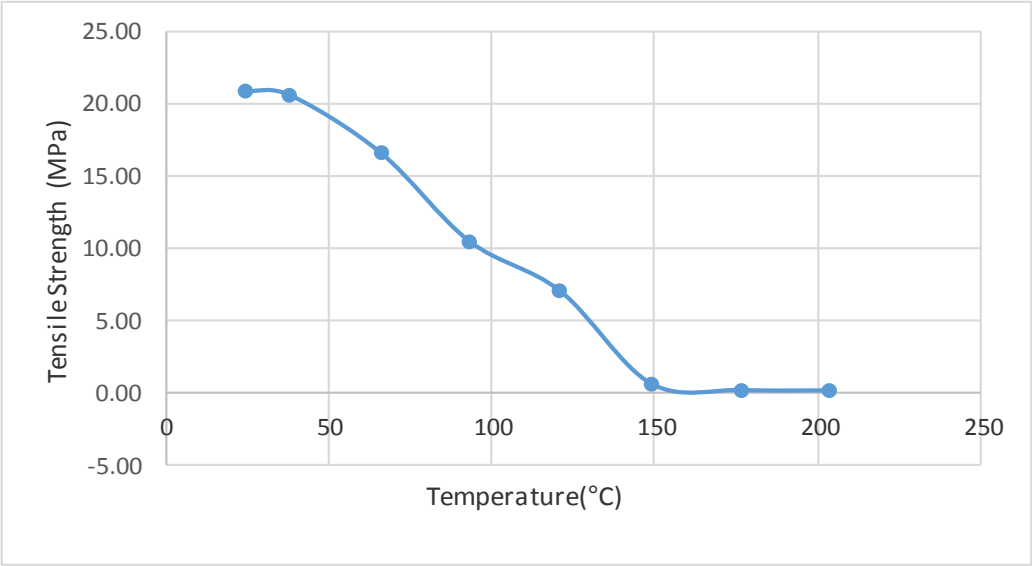
SG5000 Series is a two component, 1:1 ratio methacrylate adhesive designed for the bonding of unprepared metals with minimal surface preparation, as well as engineering plastics and composite materials.

SG5000-03 Shear Strength Performance at Elevated Temperatures

Cold rolled steel lap shear samples were bonded with SG5000-03 as per ASTM D1002 and after 24 hours cure time, were exposed to temperatures up to 204°C for 1 hour then assessed for shear strength at temperature.

Figure 1 and Table 1 provide an outline of the capability of SG5000-03 when exposed to elevated temperatures. At higher temperatures, the strength does decrease and it is crucial that assemblies are properly fixed in place to avoid the joint slipping during the paint bake process.

Figure 1: SG5000-03 Shear Strength versus Temperature



www.scigrip.com

IPS CORPORATION

SCIGRIP Europe
Unit 22, Bentall Business Park, Glover Road,
Washington, Tyne and Wear, NE37 3JD. UK
Tel: +44 0 191 419 6444
Fax: +44 0 191 419 6445
Email: info@scigrip-europe.com
Company Reg No: 7351459

SCIGRIP USA
600 Ellis Road
Durham NC 27703-6015 USA
Tel: +1 919 598 2400
Fax: +1 919 598 2439
Email: info@scigrip-americas.com

SG5000 Series Temperature Performance

Table 1:SG5000-03 Shear Strength versus Temperature Data

Temperature (°C)	Tensile Stress (MPa)	Failure Mode (adhesive/cohesive/substrate)
24	20.86	0/100/0
38	20.58	0/100/0
66	16.56	0/100/0
93	10.46	0/100/0
121	6.99	0/100/0
149	0.55	20/80/0
177	0.11	40/60/0
204	0.08	50/50/0

SG5000-03 Shear Strength Performance after Exposure to Elevated Temperatures

Cold rolled steel lap shear samples were bonded with SG5000-03 as per ASTM D1002 and after 24 hours cure time, were exposed to temperatures up to 204°C for 1 hour then cooled back to room temperature before being assessed for shear stength.

SG5000-03 retains good strength after exposure to temperatures up to 204°C, with the integrity of the bond being unchanged. Full cohesive failure is observed after exposure to temperatures up to 149°C after which the cohesive failure drops to 80% at temperatures up to 204°C.

At higher temperatures, the appearance of the cured adhesive can change in colour, with the adhesive appearing more tanned rather than black. This colour change typically happens due to exposure to higher temperatures during typical painting processes. Whilst there is a colour change, the integrity of the bond remains unchanged.

SCIGRIP Europe
Unit 22, Bentall Business Park, Glover Road,
Washington, Tyne and Wear, NE37 3JD. UK
Tel: +44 0 191 419 6444
Fax: +44 0 191 419 6445
Email: info@scigrip-europe.com
Company Reg No: 7351459

SCIGRIP USA
600 Ellis Road
Durham NC 27703-6015 USA
Tel: +1 919 598 2400
Fax: +1 919 598 2439
Email: info@scigrip-americas.com

SG5000 Series Temperature Performance

Figure 2: SG5000-03 Shear Strength versus Temperature Before and After Exposure

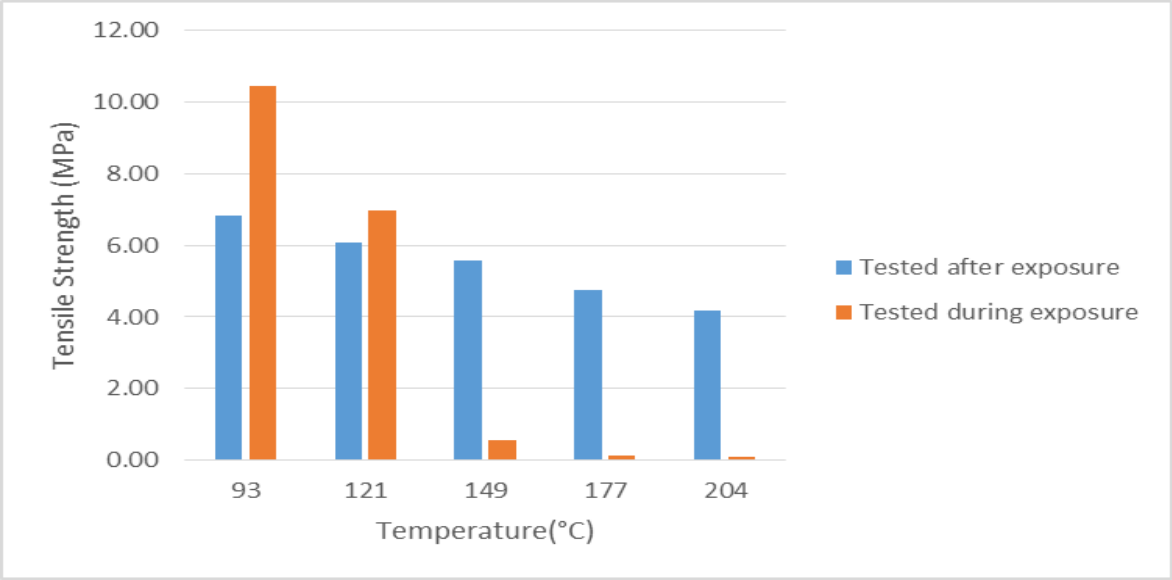


Table 2: SG5000-03 Shear Strength after Exposure to Elevated Temperatures

Temperature (°C)	Tensile Stress (MPa)	Failure Mode (adhesive/cohesive/substrate)
93	6.85	0/100/0
121	6.07	0/100/0
149	5.58	20/80/0
177	4.74	20/80/0
204	4.19	20/80/0

Whilst SG5000-03 was the specific grade tested during this project, SG5000-06, SG5000-13 and SG5000-40 have equivalent performance characteristics with regards to SG5000-03. This is based on a series of side by side tests conducted in our laboratories. The only difference between the products is the rates of polymerisation represented by the working time difference.

SCIGRIP Europe
Unit 22, Bentall Business Park, Glover Road,
Washington, Tyne and Wear, NE37 3JD. UK
Tel: +44 0 191 419 6444
Fax: +44 0 191 419 6445
Email: info@scigrip-europe.com
Company Reg No: 7351459

SCIGRIP USA
600 Ellis Road
Durham NC 27703-6015 USA
Tel: +1 919 598 2400
Fax: +1 919 598 2439
Email: info@scigrip-americas.com