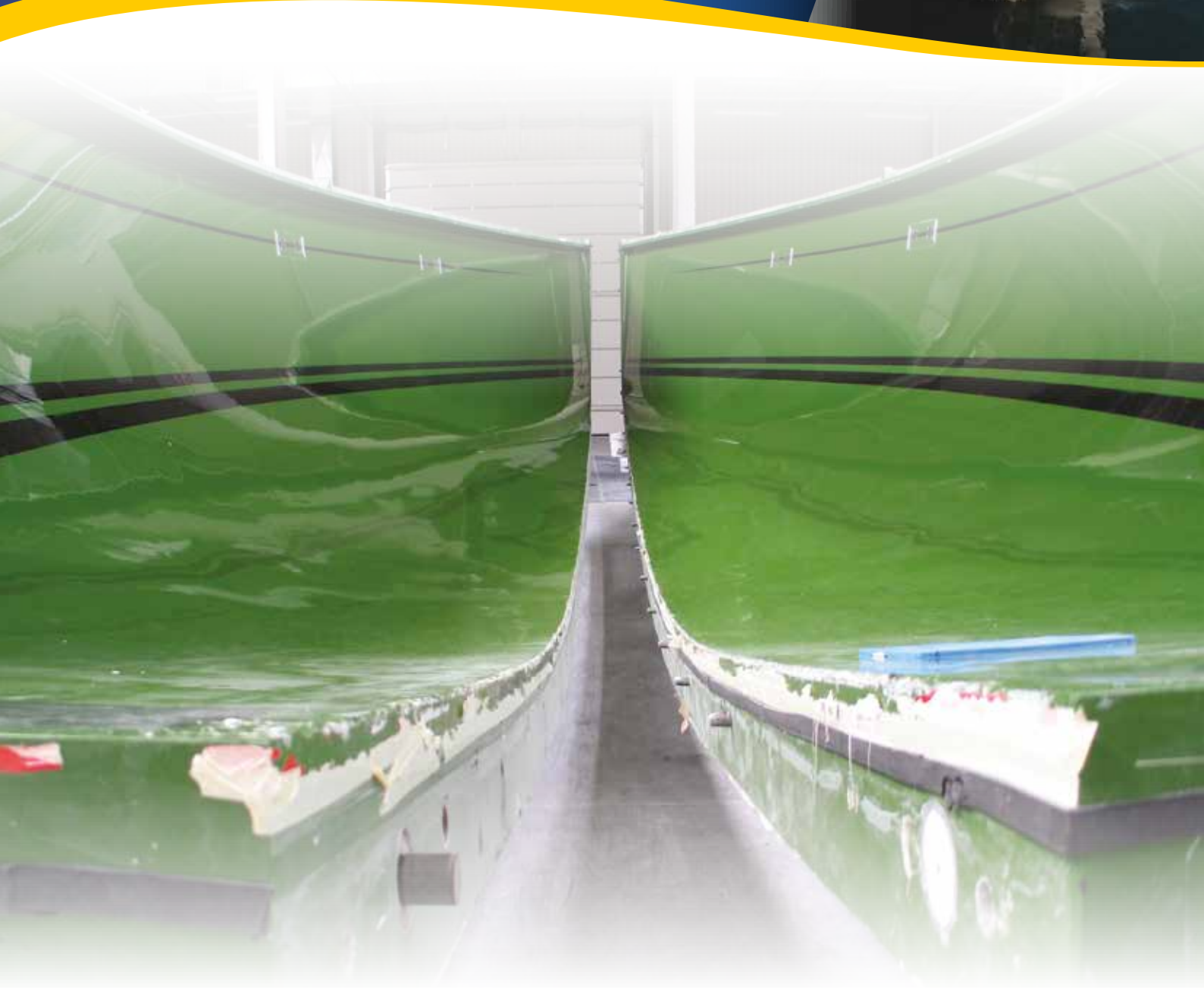




Making a **positive** difference

High Performance Matched Tooling Systems





Scott Bader History

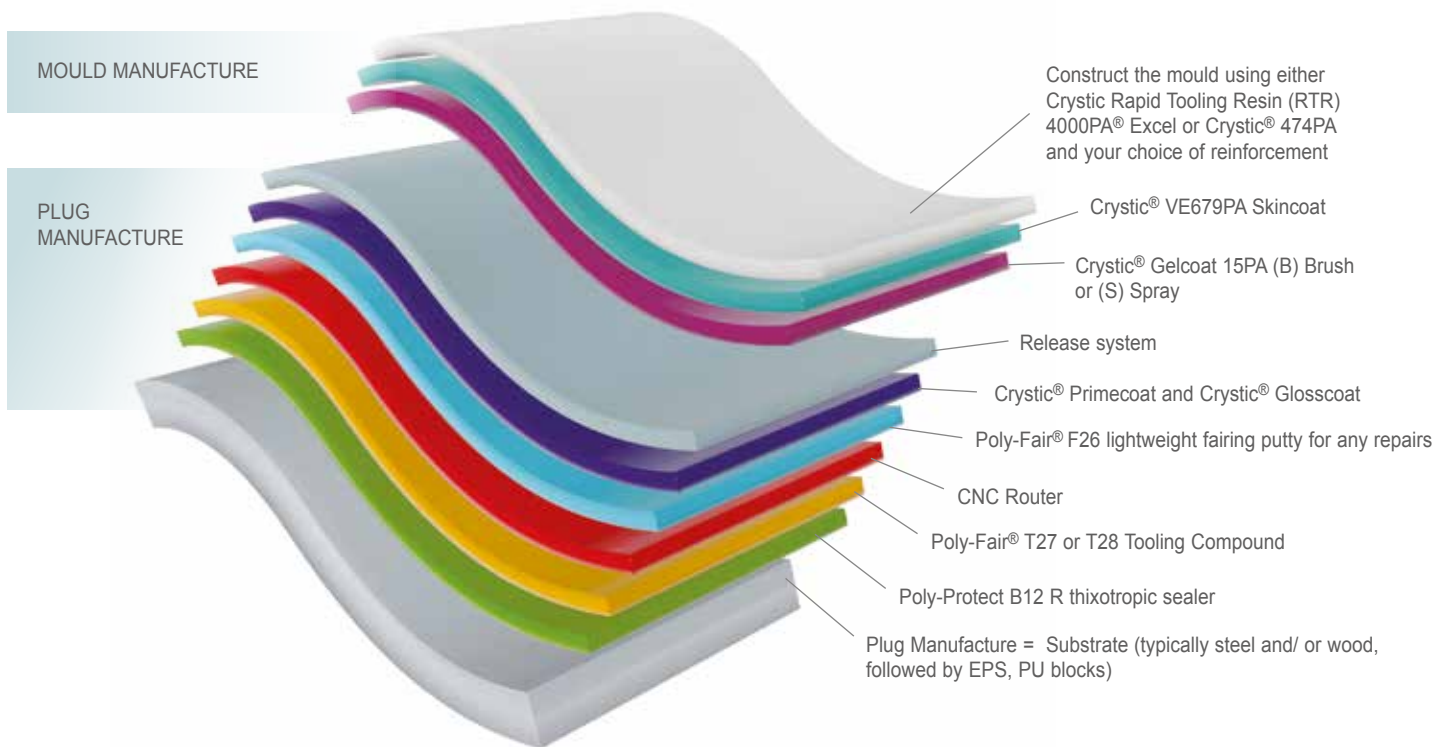
Scott Bader Company Ltd was founded in 1920 by Ernest Bader. In 1940 the company relocated from London to Wollaston in Northamptonshire. After one year in the new premises Scott Bader successfully produced the first room temperature cure polyester resin and a few years later, in 1949, developed the first air drying polyesters.

In 1954 the first marine polyester resin was developed to make a GRP hull for Halmatic's Perpetua, the first GRP boat in the world and then in 1965 the first marine class gelcoat was developed.

By 1980, an extensive range of Crystic® products had been developed, which are now sold to key composite market globally and include: marine, transport, building, chemical containment and piping.

Today Scott Bader is proud to offer a range of products that allow complete composite tooling and mould production from start to finish.

Overview Diagram



Sealing Compound for Polystyrene Foam Surfaces

Scott Bader- ATC now offers Poly-Protect B12 as part of its Tooling range. Poly-Protect B12 is a MEKP catalysed, brushable, lightly thixotropic sealer designed to coat expanded and extruded polystyrene foams. This sealer acts as a chemical bridge and barrier between the polystyrene foam and either a laminate or machinable polyester-based tooling paste such as Poly-Fair T27/T28, as well as traditional plug materials.

POLY-PROTECT B12 R TYPICAL PROPERTIES

Colour	Light Green
Density - (g/cm ³)	1.00
Density (lb/gln)	8.33
Consistency	Liquid
Viscosity (RVF3, 2RPM)	14,000 CPS
Thix Index	2
Hardness 1/8" (24hours)	80 Shore D
Catalysation	Luperox DDM-9
Catalyst Level at 75°F (24°C)	2%
Gel Time (100grams mass)	15 Minutes

POLY-FAIR®

Tooling Compounds for CNC Machining

Scott Bader – ATC now has the innovative Poly-Fair T27 and T28 Tooling Compounds as part of its range. Successfully used for over 16 years, these are modified polyester-based sprayable and extrudable tooling pastes used for CNC Moulds, patterns, plugs and direct moulds (LPMs – Limited Production Moulds).

It is a viable alternative to the epoxy and urethane tooling pastes offering the flexibility, ease of use and efficiency of polyester chemistry processed with standard, off-the-shelf RAM-type dispensing equipment.

This original approach results in a tough and durable mould surface. It is well suited for both moulds, plugs and for the production LPMs. Poly-Fair T27 and T28 tools are vacuum-tight and are suitable for infusion. LPMs are a viable and economical alternative for conventional tooling.



KEY BENEFITS

- The unique combination of elongation and toughness means Poly-Fair T27 and T28 can be used with the high exotherm low-shrink tooling resins, such as Crystic RTR 4000PA Excel, in production of female moulds.
- The easy to use application technique allows for the construction of larger structures longer than 7 metres
- Can be applied to a variety of substrates after the steel or wood base, including; EPS, PU or Foam sprayed in situ and Polyester resin and Chopped Strand Mat.
- The toughness achieves a lower modulus and therefore a non brittle material allowing large tools with very low risk of cracking
- Suitable for marine, transportation, architectural, aerospace, defence and wind energy applications
- Highly thixotropic, demonstrating zero sag on vertical surfaces
- Easy to repair – T27 and T28 bond to themselves and to Poly-Fair F26, a repairing compound
- 12 month shelf life
- 'Wood-like shavings' when used with a 5 axis CNC cutter
- These products produce no dust when machined, a common irritant with other chemistries or even other polyester based machinable compounds

TYPICAL PROPERTIES

	T27	T28
Colour	Pink	Beige / Tan
Density (g/cc)	1.07	0.78
Density (lb/gln)	8.9	6.45
Viscosity, cps (Brookfield HAS)	206,000	300,000
Shrinkage	-	<1%
Catalyst, Luperox DDM9	1.8%	2%
Gel Time, 24°C	18 Minutes	40 Minutes
Peak Exotherm °C*	132°C	110°C

*100 gram mass at 75 Minutes

Application

Poly-Fair T27 and Poly-Fair are applied with standard and economically priced dispensing equipment used widely in the composites industry. Manufacturers are: Magnum-Venus-Plastech (www.mvpind.com); GS Mfg. (www.gsmfg.com); and Glascraft (www.glascraft.com).

TYPICAL T27 SPRAY APPLICATION		
Coat # 1	2 – 2.5 mm	0.080 – 0.100"
Coat # 2	2.5 – 3 mm	0.100 – 0.120"
Coat # 3	3 – 4 mm	0.120 – 0.150"
Coat # 4	4 – 5 mm	0.150 – 0.200"

Typical Extrusion Application

Poly-Fair T28 is pumped from a RAM-type polyester “putty” machine equipped with a high volume gun feeding a clear reinforced vinyl hose. The hose itself or various cow-bell/duck bill type attachments can be used depending on the complexity of the part. Applied thicknesses are between 5/8” (16mm) and 1” (25mm).

Catalysts for T27 and T28

Correct catalyst selection is important for the two different compounds and different temperature, humidity and various curing criteria. Typical catalysts are:

- Arkema Luperox DDM-9 – Recommended catalyst (should not exceed 1.8% by Volume)
- Syrgis Norox MEKP-9 and MEKP-9H
- Syrgis Superox 702
- Norpol Peroxide # 1
- Syrgis Andonox KP-9
- Akzo Cadoc D50-a

Please contact us for more technical guidance and other catalysts.

Process Guide for Poly-Fair T27

A comprehensive Process Guide for Poly-Fair T27 which covers the various tool construction steps from designing the sub-structure to obtaining to the desired surface is available upon request.

Direct Moulds

The concept of direct tooling has become possible with the tough and durable surface achievable with Poly-Fair T27 and Poly-Fair T28. Key to this process is a strong steel-framed substructure as shown in the picture below. A hardtop for a 80’ Hattaras motoryacht is being demoulded. It is not uncommon for this direct tool to be used for 12+ pulls.



A flybridge for an 80’ motor yacht being demoulded



Hatteras 80’ motor yacht with a direct moulded flybridge

Customer Testimonial

Over 15 years of successfully producing tools - pattern, plugs and direct moulds - at DLBA Robotics, Hampton, VA.

“We have used Poly-Fair T27 ever since its inception in the late 90s. We have evaluated many other products, but Poly-Fair has been our first choice for our high quality pattern, plugs and direct tools. We can rely on a consistent quality, and have created many satisfied customers”.

Doug Blount, President, DLBA Robotics.

PLUG MANUFACTURE

Crystic Primecoat & Glosscoat 'Plug preparation & finishing' High Build Polyester coating material

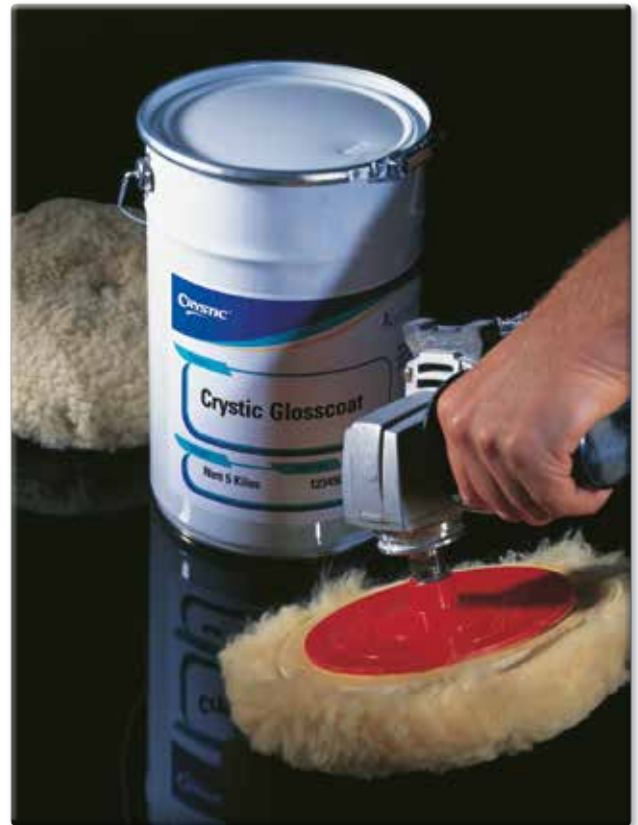
Crystic Primecoat allows the rapid surfacing of patterns constructed of wood, MDF, GRP or Poly-Fair products. It can be applied wet-on-wet up to a thickness of 1.5mm in one operation without sagging or drainage from vertical surfaces. It is designed for spray application but can be applied by brush. The material has a quick hardening rate and can be easily sanded to a smooth finish, which can in turn be polished to achieve high levels of gloss. If a superior level of gloss is required it can be surfaced with Crystic Glosscoat.

Crystic Glosscoat Polyester coating for use with Primecoat

Crystic Glosscoat is designed to be applied over prepared Crystic Primecoat to give a glossier and more durable surface.

KEY BENEFITS TO CRYSTIC PRIMECOAT AND GLOSSCOAT

- Can be sprayed via a gravity feed gun
- Excellent build up without sag on vertical surfaces
- Fast curing and easily sanded
- Polishes to a super smooth, gloss finish
- Ideal for all standard pattern / plug making materials
- Can be blended with low density fillers



MOULD MANUFACTURE

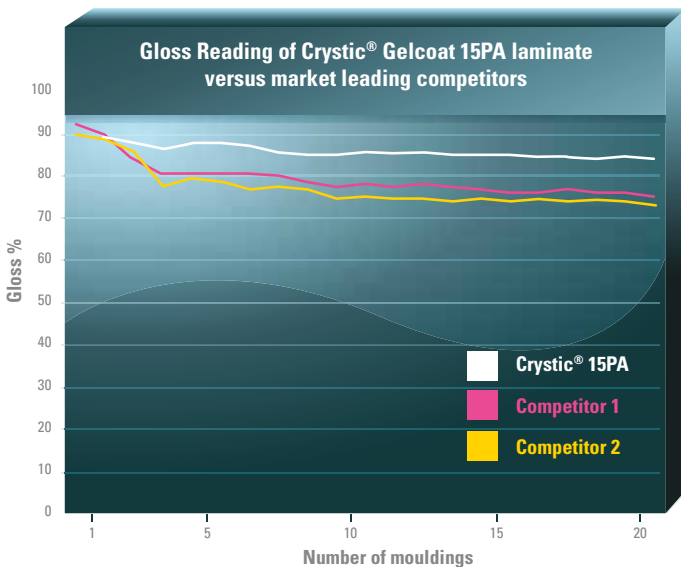
MOULD MANUFACTURE

- Crystic Gelcoat 15PA (B) Brush or (S) Spray
- Crystic VE679PA Skincoat and lightweight reinforcement
- Construct the mould with either Crystic RTR 4000PA Excel or Crystic 474PA and your choice of reinforcement



Crystic Gelcoat 15PA (B) & (S)

Crystic Gelcoat 15PA, both brush and spray, represent the highest quality in tooling gelcoat manufacture. A superior vinylester resin technology offers a premium finish with exceptional resistance to chemical attack and extremely long life cycles and multiple pulls.



“ Very easy to spray with, covers nicely and no sagging. The degassing is perfect and no pinholes were found even after sanding the surface of the gel coat. But where it really out performs the competition is in achieving excellent resistance to print-through when vacuum bagging a 2 x 2 twill carbon fabric of 200 gm⁻² with epoxy resin. ”

Alejandro Castro,
Resinas Castro, S.L.

TYPICAL PROPERTIES FOR CRYSTIC 15PA S & B

When tested in accordance with the appropriate BS or BS EN ISO method

		15PA (S)	15PA (B)
Viscosity at 25°C		Thixotropic	Thixotropic
Volatile Content	%	40	30
Geltime at 25°C (using 2% Butanox M50)	Minutes	7	11
Stability in dark at 20°C	Months	3	3

MOULD MANUFACTURE

Crystic Skincoat VE679PA

An easy to use Vinyl ester / DCPD skincoat which significantly reduces the occurrence of fibre print through. Crystic VE679PA greatly enhances surface finish on mouldings.

TYPICAL LIQUID PROPERTIES		
Appearance		Red/Brown
Viscosity at 25°C 4500 sec ⁻¹	Poise	2.3
Viscosity at 25°C 37.35 sec ⁻¹	Poise	3.5
Specific Gravity @ 25°C	-	1.065
Stability at 25°C	Months	3
Geltime at 25°C using 2% Butanox LPT	Minutes	18
Geltime at 25°C using 2% Butanox M50	Minutes	23

FULLY CURED RESIN			
		*Post Cure	**Post Cure
Barcol Hardness (GYZJ 934 – 1)		23	25
Deflection Temperature Under Load † (1.80 MPa)	°C	60	94
Water Absorbtion 24hrs at 23°C	mg	10	15
Tensile Strength	MPa	60	52
Tensile Modulus	GPa	2.7	3.0
Elongation at Break	%	4.3	2.1
Specific Gravity at 25°C	-	1.161	1.158

*Curing Schedule – 24hrs at 20°C, 16hrs at 40°C

** Curing Schedule – 24hrs at 20°C, 3hrs at 80°C

† Curing Schedule – 24hrs at 20°C, 5hrs at 80°C, 3hrs at 120°C

RTR 4000PA Excel

Crystic RTR 4000PA Excel is a new, improved rapid tooling resin which incorporates better handling, lower viscosity, improved shrinkage control and ease of use. For the manufacture of high quality, low profile mould making applications.

LIQUID PROPERTIES		
Viscosity at 25°C (ICI Cone and Plate)	Poise	5
Specific Gravity at 25°C	-	1.35
Volatile Content	%	29
Geltime at 25°C (1% Butanox M-50) **	Minutes	40
Stability (at less than 20°C in original container)	Months	3

TYPICAL MECHANICAL PROPERTIES		
HDT**	°C	63
Tensile Strength*	MPa	114
Tensile Modulus*	GPa	8.1
Elongation at break*	%	2.0

*Glass Content 28%, laminate made with 3 layers of 450gsm CSM; 16hrs at 40°C post cure

**Property of the cast resin, 16hrs at 40°C post cure

For information on part manufacture please refer to the appropriate Scott Bader product guides

Scott Bader Group Companies

HEAD OFFICE

Scott Bader Company Limited

Wollaston
England
Tel: +44 1933 663100
Fax: +44 1933 666139
email: enquiries@scottbader.com

Scott Bader France

Amiens
France
Tel: +33 3 22 66 27 89
Fax: +33 3 22 66 27 80
email: info_distribution@scottbader.fr

Scott Bader Spain

Barcelona
Spain
Tel: +34 93 553 1162
Fax: +34 93 553 1163
email: diazs@scottbader.es

Scott Bader Germany

Weiden
Germany
Tel: +49 961 401 84474
Fax: +49 961 401 84476
email: composites@scottbader.de

Scott Bader Ireland

Dublin
Ireland
Tel: +353 1801 5656
Fax: +353 1801 5657
email: composites@scottbader.ie

Scott Bader Scandinavia AB

Falkenberg
Sweden
Tel: +46 346 10100
Fax: +46 346 59226
email: composites@scottbader.se

Scott Bader Eastern Europe s.r.o

Mimoň II
Czech Republic
Tel: +420 (0) 487 863 880
Fax: +420 (0) 485 111 254
email: miro@sbee.cz

Scott Bader Croatia

Zagreb
Croatia
Tel: +385 1 240 6440
Fax: +385 1 240 4573
email: info@scottbader.hr

Scott Bader North America

Stow, OH
USA
Tel: +1 330 920 4410
Fax: +1 330 920 4415
email: info@scottbader-na.com

Scott Bader South Africa

Hammarsdale
South Africa
Tel: +27 31 736 8500
Fax: +27 31 736 8511
email: composites@scottbader.co.za

Scott Bader Middle East Limited

Dubai
United Arab Emirates
Tel: +971 481 50222
Fax: +971 488 35319
email: info@scottbader.ae

Abahsain Scott Bader FZ CO

Jebel Ali
United Arab Emirates
Tel: +971 481 50 222
email: info@scottbader.ae

Scott Bader Asia Pacific

Shanghai
China
Tel: +86 (21) 5298 7778
Fax: +86 (21) 5298 8889
email: info@scottbader.cn

Satyen Scott Bader Pvt. Ltd

Mumbai
India
Tel: +91 22 4220 1555
Fax: +91 22 2491 1262
email: info@satyenpolymers.com

NovaScott Especialidades Químicas Ltda

Civit II, Serra, ES 29165-973
Brazil
Tel: +55 27 3298-1100
email: info@novascott.com.br



 SCOTT BADER

www.scottbader.com

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For more information on Scott Bader products, visit our website

All information correct at time of printing.

MATCHED TOOLING SYSTEM 9/16 ISSUE 2

