DUROplastic

Suppliers to the composite Industry

www.DUROplastic.com

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Duroplastic is a well established South African company that was founded in 1986 to supply composite materials to trade and industry. It has since its humble beginnings become a major supplier of a wide range of materials and products in the Sub-Saharan African region which includes thermosets such as polyesters, epoxies, polyurethanes and silicones as the binders. Together with this is a range of fibreglass and other reinforcements. Ancilliaries such as fillers and release agents are also provided by Duroplastic . Duroplastic is also the importer of DIAB (Divinycell) range of Core materials and Sicomin structural Epoxies .

Contents

Plastics and Polymers

Basically there are two types of Plastics: Thermoplastic and Thermosets. Thermoplastics (like PVC, Polystyrene, Nylon or ABS) can be remelted after they have solidified. Thermosets will not melt and will remain in their 3D matrix form. If heated they will eventually just carbonise (burn).

What is a polymer? The most simple definition of a polymer is something made of many units. Think of a polymer as a chain. Each link of the chain is the "mer" or basic unit that is made of carbon, hy -drogen, oxygen, and/or silicon. To make the chain, many links or "mers" are hooked or polymerized together.

Thermosets

Thermosets (or DUROPLASTICS in German), undergo chemical change while they are being formed. They react by polycondensation and cross-linking to form a three-dimensional lattice. This process is called curing and involves a structural change of the molecules that is irreversible. Once a thermoset has achieved its final shape, it cannot be reformed. Examples of thermosets are polyester, epoxies, polyurethanes ,silicones (also phenolic resins, melamines and urea resins). These will be discussed together with a short description of their uses in this Catalogue/booklet.

Polyesters

Polyester resins are the most widely used resin for everyday applications such as marine, swimming pools or canopies. Polyester resins are ideal also for making moulds or doing repairs on boats, roofs or any other job.

Overview

Polyester resins can be used in numerous applications, however described here is an abridged list of products that Duroplastic's supplies to the industry. General purpose resins are normally used for laminating, repairs, swimming pool lining, etc. It is the most widely used product. They come in Ortho and Isophathalic resins. The Ortho is for general use and the Iso resins are for more structural applications.

Gelcoats are a polyester coating that is applied to a mould surface and becomes an integral part of the finished product. Can be coloured to almost any colour. Can be UV stable and maintain a high gloss for a long period of time.

Topcoats are similar to Gelcoats however are applied after the initial laminate of resin and fibreglass is applied. Used to finish swimming pools, boats, etc.

Casting resins are normally either clear or can take fillers. They are made to handle small or large (up to 80kg) casts. Clear casting resins are ideal for small figurines (often cast into silicone moulds) Large casting resins are almost always filled with fillers (see section on fillers). Putties or pastes are often used as adhesives and for bonding cores such as Balsa and foams.

Specialised resins such as infusion, RTM, press moulding etc. can be made to order.

Vinyl Ester Resins are a hybrid polyester/Epoxy resin used for their outstanding chemical resistance and good structural resilience.

Duroplastic supplies Hardners, accelerators, retarders as well as solvents such as Acetone, etc.

Laminating and Casting Resins

Code	Description	Application	Gel Time
P104	G P Resin	Laminating Ortho Resin	18-25min
P300	Iso Resin High HDT	Iso Laminating Resin	18-20min
P222	Thin casting resin	Filler loading casting resin	18-25min
P219	Ultra Clear resin	Clear casting	25 - 35min

Pastes and Putties

Code	Description	Application	Gel Time
P477	Easyshape	Light weight faring polyester compound	6-8 min
P490	Bonding Paste	Ortho Core Bonding Paste	30 min

Flowcoats

Code	Description	Application	Gel Time
F700	Iso Brush On Flowcoat	Pool , External Topcoat Clear	12-15 min
F709	Iso Brush On Flowcoat	Pool Blue External Topcoat / Flowcoat	12-15 min
F710	Iso Brush On Flowcoat	White External Topcoat / Flowcoat White	12-15 min

Gelcoats

Code	Description	Application	Gel Time
G500	Brush On Gelcoat - Clear	Boat hulls	12-18 min
G510	Brush On Gelcoat - White	Marine, Industrial, Swimming Pools	8-12 min
G525	Brush On Gelcoat - Pool Blue	Swimming Pools	8-12 min

Catalyst

Code	Description	Application
CATBTNOX-M50/KG	BUTANOX M50 Catalyst For Resin	Mould making
CATBTNOX-P50/KG	BUTANOX P50 Catalyst For Resin	Mould making

Epoxies

Duroplastic has been supplying different epoxy systems for over a decade. From special adhesives to WEST (Wood epoxy saturation Techniques) to high tech Epoxy systems. With over 27 years experience, Duroplastic can help supply the correct product for your application.
We have recently became the supplier for Sicomin Epoxy Systems in South Africa.

General Epoxy

Code	Description	Application	Gel Time
DP101/368	Epoxy Fast Hardener	100:15 Fast cure	15 - 20 min
DP101/319	Epoxy Medium Cure	100:25 Medium Cure Epoxy	30 - 45 min
DP101/309	Epoxy Slow Cure	100:60 Slower Cure	45 - 65 min

Sicomin Epoxy systems

Code	Description	Application	Gel Time
SR 1280	Sicomin SR 1280	General purpose structural epoxy	see Hardners
SR 1126	Sicomin SR 1126	Fire resistant epoxy laminating system	75 min
SR 8100	Sicomin SR 8100	Resin transfer processes, such as injection or infusion	100 min
SC-SRSURF1	Sicomin SR Surfclear 26	Manufacturing of wind-surf boards and surf boards.	20 min
SR 632	Sicomin SR 632	Wet substrate and underwater application	25 min
PB 250	Sicomin PB 250	Cellular epoxy foam production system	5 min

Sicomin Hardener

Code	Description	Part	Gel Time
SC-SD-4771HR	HRD SD4771 for SR1280 Slow Part B	100:35	240min at 23˚C
SC-SD-4775HR	HRD SD4775 for SR1280 Fast Part B	100:35	350min at 23˚C

Sicomin Epoxy gel times approximations: refer to spec sheets.

Polyurethanes

Polyurethanes also come in a more rigid material, normally defined in terms of the Shore D hardness. They are either solid or foamed. In the instance of the foaming Polyurethanes, these come in various densities that can either be used to cast or for spray application.

We also display our flexible urethanes, however this is explained in a different booklet for Casting and crafting industry

Foaming rigid foams can be used as buoyancy aid, insulation materials, packaging, etc. NB do not use low density foam for buoyancy in boats as can absorb water easily (best to be 60 or greater densities).

Fast Cast

Code	Description	Gel Time
DUROCAST-FC2A	Fast cast for Rapid cure Casting	6-12 min
DUROCAST-FC2B	Fast cast for Rapid cure Casting	6-12 min

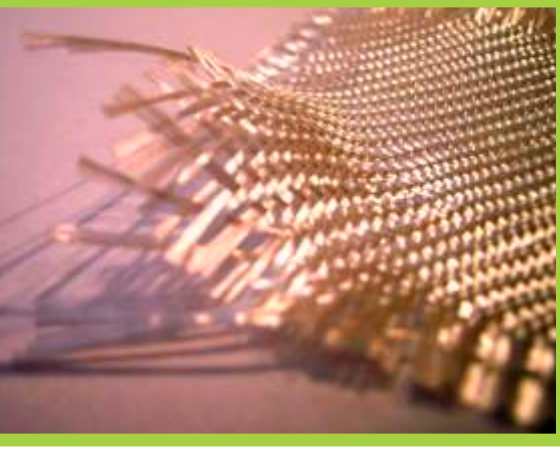
Rigid Foam Polyurethanes

Code	Description	Application	Gel Time
Pour a Foam 35	P/U Foam 35D	Pourable P/U Foam 1:1PBV	2min
Pour a Foam 100	P/U Foam 100	Pourable P/U Foam 1:1PBV	2min
Pour a Foam 200	P/U Foam 200	Pourable P/U Foam 1:1PBV	2min

Easyflex

Code	Description	Gel Time
EFLEX-35A	P/U RUBBER 35 SHORE A	6-8 min
EFLEX60	EASYFLEX 60A P/U RUBBER 4A:2B	6-8 min
EFLEX70	EASYFLEX 70A	6-8 min

Reinforcements



Reinforcements for Composite systems can be any long fibre that has tensile properties superior to that of the resin matrix. The most common is that of Fibreglass, however many others also exist such as Natural fibres (eg Jute, sisal) also Carbon Fibres, Nylons, Kevlars (Aramid) and even metal fibres. Mostly Glassfibres will be discussed

Industrial

Code	Description	Size
FGTISS/M2	Surface Tissues	
FGCMxx/KG	Chop Strand Matts	300 and 450gm/m2
FGWRxx/KG	Woven Rovings (Uni & Bi Direction)	450 and 600 gm/m2
Stitched Fabrics		
FG-Stitched	Wide range of stitched Fabrics	
Cloths		
FGCSPI/xx	Plain weave glass Cloths	140,200,300gm/m2
FGCTWL-xx	Twill weave glass cloths	200 gm/m2
CFC-200PL/M2	Carbon Fibre plain weave	200 gm/m2
CFC-200TWL/M2	Carbon Fibre Twill weave	200 gm/m2

Note +-140gm/m2 = 4 oz, +-200gm/m2 = 6oz, +-300gm/m2 = 10oz cloths

Exotics (Indent o/seas)

Code	Description
CFC-xx	Carbon Tapes
CFC-xx	Carbon Braided cloths

Fillers and Additives

Fillers can be used for numerous applications. Duroplastic stocks a wide range of fillers that are ideal for polyesters, epoxies, vinyl esters and polyurethanes. Fillers can be used to thicken, lighten, make harder, more rigid, more conductive, less conductive, heavier, etc. Here are some fillers that Duroplastic supplies.

For Thermosets

Light Weight Fillers: Capolite Light weight plastic spheres, Glass Bubbles, Fly Ash light weight spheres
Heavier Fillers: Calcium Carbonate, Talc, Silica, Quartz.
Thickeners: Aerosil, Cabosil (fumed Silica)
Pigments: Titanum Dioxide, Iron oxides
Specialised Accicular fillers: Needlite needle fillers, Glass Flakes, Chopped Fibres
Conductive Metal Fillers: Aluminium, Iron filings, Brass, Copper and Bronze

Code	Description
GB23/KG	Glass bubbles light weight fillers
CAPOLITE-250-/KG	Capolite Light weight fillers
AEROSIL	Aerosil thickener powders
KULU-KG	Calcium carbonates
TALC-KG	Talc
TIOXIDE	Titanium Dioxide
Alumina Trihydrate	Alumina Trihydrate
MARBLE-xx	Marble Dust various sizes
Chopped fibres	Chopped fibres 12,25mm
Metal Powders	
COPPER-KG	Copper Powders
BRASS/KG	Brass Powders

Core Materials

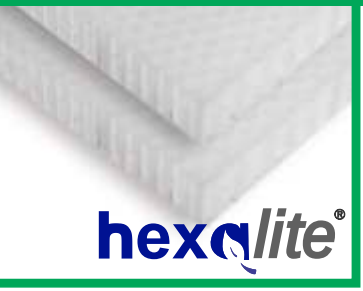
Divinycell has a unique position in the international composite market as a core material in multifunctional sandwich constructions. Divinycell is used in a wide range of applications where there is a need for a strong, lightweight construction material with excellent mechanical characteristic. Divinycell is widely used and found in e.g. wind turbine blades, pleasure craft, ship hulls and truck bodies. Divinycell is available in a range of densities as standard sheets or fabricated to customer specification.
PVC Foams are used because of properties above as well as

- Self extinguishing
- Variable Densities from 40 to 450gm/litre
- Operating temp -200 to 90 Deg C

Divinycell

Code	Description
DVNH80/3	Divinycell H80 3mm PSC (2.175x1.221M)
DVNH80/5	Divinycell H80 5mm PSC (2.175x1.221M)
DVNH80/08	Divinycell H80 8mm
DVNH80/10	Divinycell H80 10mm
DVNH80/12	Divinycell H80 12mm
DVNH80/15	Divinycell H80 15mm
DVNH80/20	Divinycell H80 20mm
DVNH80/25	Divinycell H80 25mm
DVNH80DC/25	Divinycell H80 20mm DOUBLE CUT or GRID CUT
DVNH80DC/25	Divinycell H80 25mm DOUBLE CUT or GRID CUT
DVNIMAT-4	Divinimat Contour PVC Foam 4mm
DVNMX70/XX	Divinycell Matrix Cores - New low density Cores

Divinycell has specialised grooves for infusion in most thicknesses. Also with perforations if reqd.
DIAB has range of fire resistant and deep sea high compression foams.
Divinycell also has high impact resistant foams for high speed power craft.



Hexalite polypropylene honeycomb is fast gaining popularity across many diverse industries as the world looks for new materials to improve performance, reduce weight and lower costs. due to its superior all-round properties at competitive pricing, hexalite polypropylene honeycomb has been widely used in many applications that demand strength-to-weight performance.

Hexalite

Code	Description
HEXPP-8-2-10	Hexacor PP HCOMB 10mm
HEXPP-8-2-13	Hexacor POLYPROP HONEYCOMB 13mm
HEXPP-8-2-20	Hexacor PP HCOMB 20mm
HEXPP-8-2-25	Hexacor PP HCOMB 25mm
HEXPP-8-2-30	Hexacor POLYPROP HONEYCOMB 30mm
HEXPP-8-2-50	Hexacor POLYPROP HONEYCOMB 50mm

Balsa Cores are ideal for structural applications where high rigidity is required without a requirement for low densities. Normally Balsa densities are around 140 - 180gm/litre or kg/m3.
Are most economical core material for most applications.
Although made from wood, the balsa is cut in the end grain, so once laminated becomes virtually water resistant
Not good for high impact applications.

Balsa

Code	Description
BALSA-06	DUROBalsa 6mm
BALSA-10	DUROBalsa 10mm
BALSA-13	DUROBalsa 13mm
BALSA-15	DUROBalsa 15mm
BALSA-20	DUROBalsa 20mm
BALSA-25	DUROBalsa 25mm

We recommend Durobond P490 to bond core materials

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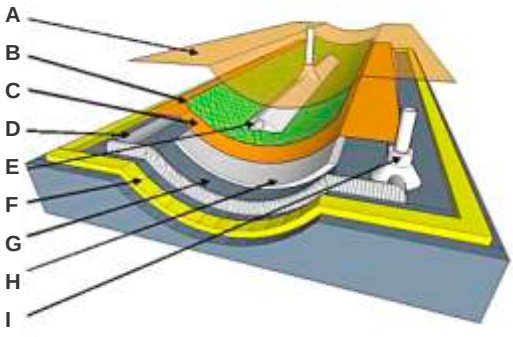
Vacuum Infusion Consumables



A - **Nylon Vacuum film** - 65 micron thickness,

Seal the laminate off and apply even vacuum pressure over the laminate for vacuum infusion or bulk consolidation.

B - **Vacuum Flow Mesh** - 100g/m2, 100x1200mm roll size
- 230g/m2, 50x1200mm roll size

1. Used to allow even amounts of pressure throughout the laminate.
2. To avoid lockout in certain areas of the laminate.
3. Used to increase resin flow through the laminate.

C - **Perforated Film** - 25 micron thickness,
100m rolls in 1500mm wide

1. Use to allow even amounts of pressure through the laminate.

Peel Ply - 85g/m2, with Red Tracer. 100m x 1000mm roll size.

1. Used to create an even finish on the laminate which is ideal for secondary bonding. Due to it's nylon content it can be removed from the laminate after curing.
2. Can also be used to allow even flow of vacuum above the laminate.
3. Or as a resin break medium.

D - **HDPE Spiral Runner,** 12mm

1. Supplies an even amount of vacuum around the perimeter of the mould.
2. Used as a medium of including multiple vacuum or injection points at any desired point over the laminate.
3. Is a resin flow medium used to distribute resin rapidly to specific points on the laminate

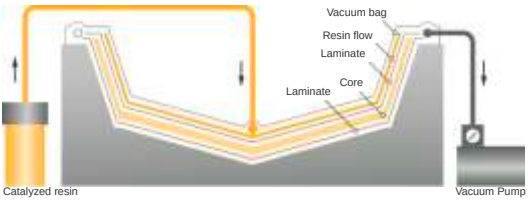
E - **HDPE Vacuum Infusion Pipe,** 9mm and 15mm

1. Extracts air and supply vacuum to the laminate
2. Supplies an even amount of resin to the ejection points of the laminate.

F - **Tacky Tape**, Various 10x2mm and 8x3mm

1. Adhere the nylon vacuum film to the mould / flange
2. Holds in place any piping or fittings over the nylon vacuum bag
3. Seals the leaks in the vacuum bag.

Typical Infusion Schematic



G - Release Agents
Ensure cured part removal off tool

H - Laminate / Part
Dry packed Reinforcement
Cores (or no core)
Dry packed Reinforcement

I - Connectors & Manifolds
Vacuum bag connection for vacuum and resin

Vacuum infusion Consumables

Vacuum Bagging Films and Meshes

Code	Description	Size
VB-NF01	Nylon Vacuum Bag 65mic	X x 2300mm
VB-PF01/M2	Perforated film 25mic	1500mm/m
PPLY-RT80/M2	Peelply Red Tracer, Nylon 66	85G/m^2
VB-FMESH1/M2	Flowmesh 100G/m^2	100x1200mm/m^2
VB-FMESH2/M2	Flowmesh 230G/m^2	50x1200mm/m^2
VACPLAS150/M2	Polythene Vacuum Bag 150mic	120m2 rolls

Vacuum Bagging Tacky Tapes

Code	Description	Size
DBT-123	Tacky Tape	12mm x3mm x 20m
DBT-102	Tacky Tape - Economical	10mm x2mm x 20m
DBT-AS201	Tacky Tape thin with fibre	20mm x1mm x 15m

Pipes , etc

Code	Description	Size
VB-PLASRUN2	HDPE Spiral Runner12mm	
VB-PLASTUBE2	Plastic Infusion Vacuum Pipe	12mm x 9mm/m
VB-PLASTUBE2	Plastic Infusion Resin Pipe	17mm x 12mm/m
	Above pipes fit standard Irrigation fittings	
VB-TLOCK1	Twist Lock Pipe Shutoff device	

Vacuum Infusion Technology Support

For a successful infusion project Duroplastic with over 25 years experience in composites offers expert advice and technology support. Advice on resin runners, infusion points, bagging materials, key vacuum point positioning and project management.

Also available are proven vacuum gauges, vacuum pump designs with manifold and reserve tank and many other unique items that make an infusion project successful from the very first time.

Pattern Making and Finishing

In order to make the pattern makers job as easy as possible, Duroplastics has introduced a new concept in pattern and mould making. Adding onto the very popular Easyshape P476 is now Spray Filler P745 and Glosskote P760. Duroplastic supplies a range of ancillary materials that supplement the tooling industry.

Overview

3D milling Blocks
Duroplastic has the ability to supply syntactic core milling blocks in different densities. Using latest composite and foam board technology, Duroplastic is the only company in South Africa to be able to cast tooling blocks to your unique requirements. Duroplastic has invested in unique plant to be able to offer this service.

Easyshape P476 is a well established Duroplastic product, mix up to 2% MEKP into mix and apply. Cures in about 5 - 8 minutes. Can sand in about 20 minutes.
Note: Easyshape is not a finishing putty, sanding is expected. Use 2pack spot fillers for finishing.

Spray Filler P775 is very easy to sand, light weight spray filler. Ideal for finishing patterns, moulds, GRP and other products. Now also used for finishing Tooling Blocks as well as applying on 3D milling machines as the final coat.

Glosskote P760 is a Polyester finish coat based on a patented airdrying resin formulation. It is ideal for use by itself as a final pattern finishing material or can be used to repair moulds that have star cracks ,etc. Use MEKP 2% for gel time of 12min. Glosskote can be applied to a prepared surface from only 50 microns to 1mm thick. Can be polished up to a high gloss, ready for mould release.

Duroplastic is working on the leading edge of CAD/CAM milling and 3D printing technologies with its own in house 3D tooling and 3D printing machines to prototype its polymer chemistry innovations.

Mould making materials

Production moulds made from glass reinforced plastics are widely used in hand lay up, spray up, cold press and resinject production methods throughout the reinforced plastics industry. They have the advantage of being relatively low cost, easily repaired or modified and simple to manufacture. The disadvantages of these moulds are their short life compared to say matched metal moulds and the strength / flexing limitations in cold press or resin inject moulding.

Mould Making Materials

G520
Specialised tooling gelcoat with good resilience and high barcol hardness.

P300
Specialised key coat resin for first two layers of tissue 300gm Chopped Strand Matt

Mould Matrix
Revolutionary Polyester tooling resin with virtually no shrinkage for extremely accurate moulds and application. Unlike other similar products on the market, requires no special catalysts or accelerators. Already premixed and ready to use. 10mm of mould thickness can be applied at once. Allowing moulds to be made in a day.

Although Mould Matrix is a fantastic product it does create a certain amount of exotherm to work well, so not recommended where the tool/pattern is unstable. Not recommended for making moulds of large moulds like yacht hulls /decks, aircraft wings, etc. Here it is recommended that the P300 is used for such applications or Sicomin 1280 epoxy.

Note the secret to any good mould is good gelcoat, correct application of release agents and good post curing of the mould (where possible).

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