

DuFLEX™ panels are specifically designed to reduce construction time and to optimise structural weight in high performance composite structures. Time-consuming laminating, coring and vacuum bagging steps normally required to fabricate high performance composites are avoided, and material waste, labour and tooling costs are greatly reduced.

DuFLEX™ panels are 2400mm x 1200mm with multiaxial E-fibreglass or carbon fibre skins, laminated with a high performance epoxy resin. Fibre orientation and ply schedules are based on design or engineering specifications to best meet weight targets, stress and impact loads, and other design parameters.

The laminates are finished with peel ply to protect the laminate from contamination and to reduce

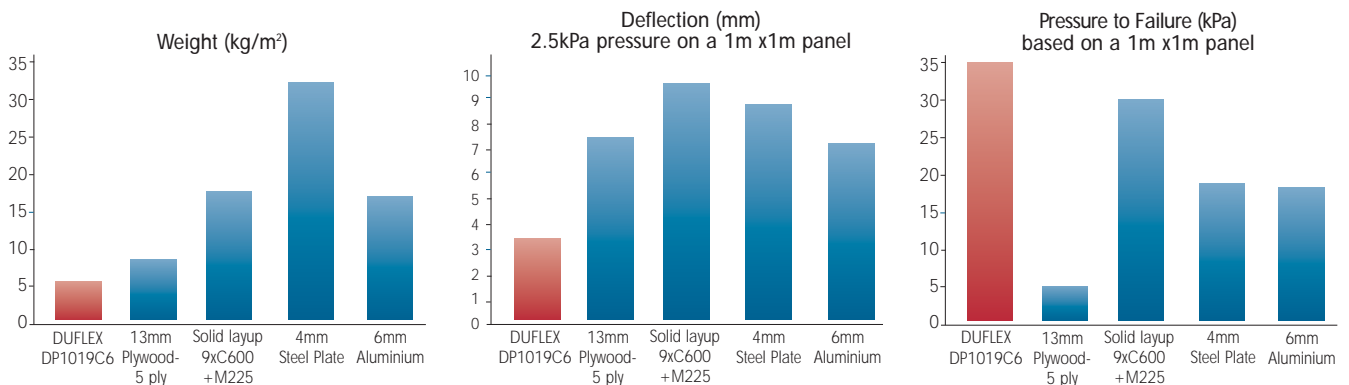
preparation of the surface prior to secondary bonding or laminating.

End grain balsa has an extremely high strength-to-weight ratio, excellent mechanical properties, good thermal and sound insulation properties, high impact and fatigue resistance and good moisture resistance.

Typical applications include hull shells, decks, super-structures, bulkheads, frames and stringers in one-off construction, prototypes and running plugs. Non marine applications include, rail floors, wall, doors, roof and interior partitions, automotive floors and truck bodies, and architectural long span roofing and partitions.

TYPICAL LAMINATE PROPERTIES			
Laminate thickness 0.53mm per 600gm		Fibre Fraction 62-64% weight fraction	
	Test Method	Biaxial - Warp (0°)	Biaxial - Fill 90°
Tensile Strength	ASTM D3039	371.9 MPa	327.6 MPa
Tensile Modulus	ASTM D3039	21.27 GPa	18.22 GPa
Compressive Strength	ASTM C-273	293.8 MPa	255.5 MPa
Compressive Modulus	ASTM C-273	21.27 GPa	18.22 GPa

MATERIAL COMPARISONS	Weight (kg/m <sup>2</sup> )	Deflection (mm)	Pressure to Failure(kPa)
DUFLEX Balsa - DP1019C6	5.1	3.4	35
13mm Plywood- 5ply	8.1	7.4	5
Solid Layup 9x C600+M225	16.9	9.5	30
4mm Steel Plate	31.4	8.6	19
6mm Aluminium	16.2	7.1	18



**RIGID END-GRAIN SHEET PROPERTIES**

Nominal Density	(ASTM C-271)	150 kg/m <sup>3</sup>	9.4 lb/ft <sup>3</sup>
Tensile Strength perpendicular to the plane	(ASTM C-297)	13.0 MPa	1886 psi
Tensile Modulus perpendicular to the plane	(ASTM C-297)	3.52 GPa	510 ksi
Compressive Strength perpendicular to the plane	(ASTM C-365)	12.67 MPa	1837ksi
Compressive Modulus perpendicular to the plane	(ASTM C-365)	3.92 GPa	568 ksi
Shear Strength	(ASTM C-273)	2.94 MPa	427 psi
Shear Modulus	(ASTM C-273)	159 MPa	22.8 ksi
Thermal Conductivity @ 24°C(75°F)	(ASTM C-177)	0.066 W/m.°K	0.453 Btu.in/hr.ft <sup>2</sup> .°F
Linear Coefficient of Thermal Expansion	-Tangential	18.9 x 10 <sup>-6</sup> m/m/°C	10.5 x 10 <sup>-6</sup> in/in/°F
	-Radial	12.6 x 10 <sup>-6</sup> m/m/°C	7.0 x 10 <sup>-6</sup> in/in/°F
	-Longitudinal	3.06 x 10 <sup>-6</sup> m/m/°C	1.7 x 10 <sup>-6</sup> in/in/°F

**JOINING & BONDING**

To offset the individual size of the panel, DuFLEX can be supplied with both long edges pre-machined to facilitate joining. The Z-Joint is structurally effective and achieves a smooth and fair surface profile. A high density epoxy adhesive is specified for joining DuFLEX Z-joints. Contact ATL Composites for suitable adhesives.

Manual joining of the panels is also possible, Contact ATL Composites for specific details.

**CUTTING**

Diamond-coated fiberglass tooling is recommended for best tool life. The best edge finish is achieved with circular saws running aluminium cutting blades, however blade life is greatly reduced.

**KITS**

ATL Composites offers in-house CAD and CNC cutting services, and can produce pre-fabricated DuFLEX kits from electronic design files.

**STANDARD STOCK DuFLEX WITH BALTEK® BALSA CORE 150 kg/m<sup>3</sup>**

Order Code*	Description	Core Thickness	Nominal Weight kg/m <sup>2</sup>
DP1010C6	1 x 600gm biaxial E-glass on either side	10 mm	3.8
DP1013C6	1 x 600gm biaxial E-glass on either side	13 mm	4.2
DP1016C6	1 x 600gm biaxial E-glass on either side	16 mm	4.7
DP1019C6	1 x 600gm biaxial E-glass on either side	19 mm	5.1
DP1025C6	1 x 600gm biaxial E-glass on either side	25 mm	6.0
DP2010C6	2 x 600gm biaxial E-glass on either side	10 mm	6.0
DP2013C6	2 x 600gm biaxial E-glass on either side	13 mm	6.5
DP2016C6	2 x 600gm biaxial E-glass on either side	16 mm	6.9
DP2019C6	2 x 600gm biaxial E-glass on either side	19 mm	7.2
DP2025C6	2 x 600gm biaxial E-glass on either side	25 mm	8.3

\* Example - order code for a 13mm panel with 1 layer of 600 gm biaxial is DP1013C6 - Alternative skin laminates available on request  
Sheet size - 1200mm x 2400mm

**STORAGE**

DuFLEX™ panels should be stored flat, out of direct sunlight, and kept dry and clean. Panels supplied with fibreglass skins have peel-ply on the surface, which should be left in place as long as possible, to protect them from surface contamination.

All timber used in the manufacture of DuFLEX™ Composite Panels is plantation grown. ATL Composites reserves the right to alter specifications without prior notice. Weight may vary due to variations in core density.

NOTE Our products are intended for sale to industrial and commercial customers. We request that customers inspect and test our products before use and satisfy themselves as to contents and suitability. Nothing herein shall constitute a warranty, express or implied, including any warranty or merchantability or fitness, nor is protection from law or patent to be inferred. All patent rights are reserved. The exclusive remedy for all proven claims is replacement of our materials and in no event shall we be liable for special or consequential damages. 22/10/09

