



HexWeb® A1 and A10

High strength aramid honeycomb

Product Data

Description

Non-metallic honeycombs are manufactured from high temperature resistant aramid paper formed into a honeycomb structure, and coated with a phenolic resin.

The combination of aramid paper and phenolic resin gives types A1 and A10 their superior strength, toughness and chemical resistance.

The honeycomb cell shape is normally hexagonal for optimum mechanical properties. It can also be over-expanded to produce a rectangular cell shape and provide improved drapeability for the production of curved parts.

Key Features

- High mechanical strength at low densities.
- Outstanding resistance to corrosive attack by chemicals.
- Excellent resistance to impact damage and moisture.
- Fire retardant and self extinguishing.
- Low smoke and toxic gas emission.
- Highly resistant to fungal growth.
- Good dielectric properties, transparent to radio and radar waves.
- Easily cut and machined to shape and can be heat formed.
- Low thermal conductivity.
- Compatible with most lightweight reinforced composite materials, providing a good bonding surface for Redux® adhesives and self adhesive prepreg systems.
- Easy single curvature forming of over-expanded honeycomb.

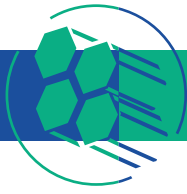
Typical applications

Aerospace: Helicopter blades, fairings, interior panels, flooring, control surfaces, flaps, engine nacelles.

HexWeb A1 honeycomb is qualified to all major aerospace specifications.

Industrial: Marine and ground transportation, interior panels, flooring, bulkheads, hatches.
Racing boat shells.
High performance car chassis and body panels.
Precision optical equipment.
Desiccant and filtration systems.
Radar reflectors, covers and emitters.

HexWeb A10 honeycomb is recommended for all industrial applications.



HexWeb® A1 and A10

Typical Mechanical Properties

Honeycomb Designation	Stabilised Compression		Plate Shear			
	Strength (MPa)	Modulus (MPa)	Strength "L" Direction (MPa)	Modulus "L" Direction (MPa)	Strength "W" Direction (MPa)	Modulus "W" Direction (MPa)
A1-23-19	0.60	38	0.50	16	0.25	11
A1-24-6	0.70	41	0.50	20	0.26	14
A1-29-3	0.90	60	0.50	25	0.35	17
A1-32-5*	1.20	75	0.70	29	0.40	19
A1-32-6	1.20	75	0.70	29	0.38	19
A1-32-13	1.00	75	0.75	30	0.35	19
A1-48-3*	2.40	138	1.25	40	0.73	25
A1-48-5*	2.40	140	1.20	40	0.70	25
A1-50-6	3.00	144	1.25	44	0.72	28
A1-64-3*	3.90	190	2.00	63	1.00	35
A1-64-5*	3.90	190	1.80	60	1.00	35
A1-64-6	5.00	190	1.55	55	0.86	33
A1-64-13	4.50	190	1.75	55	0.82	32
A1-72-3	5.10	225	2.00	65	1.05	36
A1-72-5	5.10	225	2.00	65	1.05	36
A1-80-3*	5.30	250	2.25	72	1.20	40
A1-96-3	7.70	400	2.60	85	1.50	50
A1-96-5	7.70	400	2.60	85	1.50	50
A1-123-3	11.50	500	3.00	100	1.80	60
A1-128-3	12.50	538	3.20	110	1.85	64
A1-139-3	14.00	580	3.40	113	1.88	67
A1-144-3	15.00	600	3.50	115	1.90	69
A1-29-5 OX	1.00	50	0.40	14	0.40	21
A1-48-5 OX*	2.90	120	0.80	20	0.85	35
A1-48-6 OX	2.90	120	0.80	20	0.85	35
A1-56-6 OX	4.60	140	1.20	29	1.25	45

*Highlighted products are also available as A10 honeycomb.

Typical A10 performance levels are similar to A1 but may be subject to slightly lower minima due to a less stringent manufacturing specification.

Material Properties

Chemical Resistance

HexWeb A1 and A10 show excellent resistance to chemical attack, with strength reductions of less than 10% following immersion in engine oil, hydraulic oil, aircraft fuels and distilled water.

Dielectric Constant

At 9375 MHz, the dielectric constant for non-metallic honeycomb is 1.08 ± 0.05 and the loss tangent 0.005 maximum.

Fire Properties

HexWeb A1 is rated as self extinguishing and has low heat generation, smoke density and toxic gas emissions when tested to FAR 25.853 and ATS 1000.

Forming

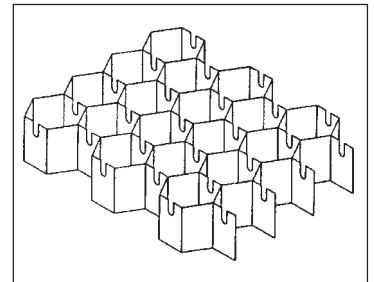
The use of over-expanded (OX) honeycomb is recommended for components with single curvature surfaces. All aramid honeycombs can be formed by heating to approximately 210°C and cooling while held in the required shape, this eliminates the tendency to spring back to its flat form.

Slotting

Slotted honeycomb is available, which allows cells to be vented under vacuum and any moisture to escape.

Bonding

The cell walls of aramid honeycomb are impermeable and only non-volatile adhesives should be used to prevent build up of volatiles during cure (Redux® film adhesives are recommended). Aramid honeycomb slices absorb a small amount of atmospheric moisture and drying the core before bonding is recommended for maximum performance.



Material Form

Aramid honeycomb is supplied in flat sheets. The length and width dimensions are determined by the block size, and the slice thickness "T" is cut to customer order - see diagram below:

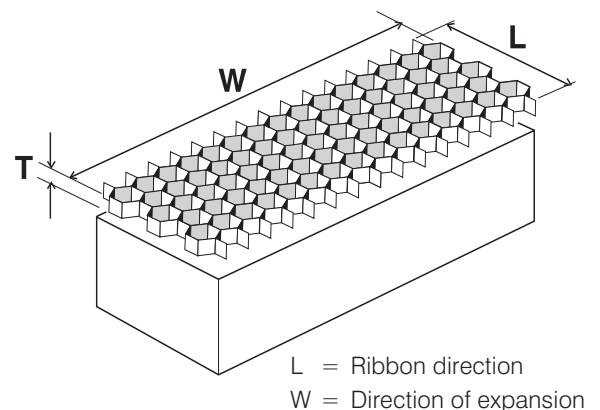
Typical dimensions and tolerances:

	Length (mm)		Width (mm)
Hexagonal cell:	1250	x	2500
	1220	x	2440
Over-expanded cell:	915	x	2440
Standard tolerance:	+50/-0		+75/-0

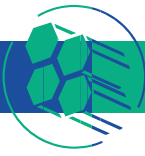
Thicknesses are available between 3mm and 560mm to customer order.

Slice thickness	Tolerance
3mm to 50mm	$\pm 0.125\text{mm}$
50mm to 100mm	$\pm 0.25\text{mm}$
100mm+	$\pm 3.2\text{mm}$

Density $\pm 10\%$ of nominal



Other dimensions and tolerance may be available subject to minimum order limitations or stock availability. Please refer to Hexcel Composites for any non standard requirement.



HexWeb® A1 and A10 Product Data

Ordering

To specify the material you require, the material type and dimensions must be defined, e.g.

Material type:	HexWeb		A1-48-5 OX			
	A1	-	48	-	5	OX
	type		density (kg/m ³)		cell size (mm)	rectangular cell shape (over-expanded)
Dimensions:	1220	x	2440	x	12.7	
	L or ribbon dimension		W or direction of expansion		Customer specified thickness	

HexWeb A1 honeycomb is qualified to most major aerospace specifications.

Requirements for specification must be defined on the order.

HexWeb A1 and A10 honeycombs are equivalent to HRH10 and HRH78 supplied from our U.S. and Belgium facilities.

Handling and Safety Precautions

The usual precautions when handling fine fibrous materials should be observed. The use of clean disposable inert gloves provides protection for the operator and avoids contamination of material and components.

Product safety data sheets have been prepared for all Hexcel products and are available to company Safety Officers on request.

Important

All information is believed to be accurate but is given without acceptance of liability. Users should make their own assessment of the suitability of any product for the purposes required. All sales are made subject to our standard terms of sale which include limitations on liability and other important terms.

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For More Information

Hexcel is a leading worldwide supplier of composite materials to aerospace and other demanding industries. Our comprehensive product range includes:

- Carbon Fibre
- RTM Materials
- Honeycomb Cores
- Continuous Fibre Reinforced Thermoplastics
- Carbon, glass, aramid and hybrid prepregs
- Reinforcement Fabrics
- Structural Film Adhesives
- Honeycomb Sandwich Panels
- Special Process Honeycombs

For US quotes, orders and product information call toll-free 1-800-688-7734

For other worldwide sales office telephone numbers and a full address list please go to:

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