Aluminum Flex-Core®

Formable Aluminum Honeycomb

Product Data

Supplied by

AMBERCOMPOSITES

Description

Aluminum Flex-Core honeycomb utilizes either 5052 or 5056 alloy foil material and is available in two cell sizes and Double-Flex™ Flex-Core has unique cell configurations that eliminate anticlastic behavior and permit small radii of curvature without deformation of the cell walls or loss of mechanical properties.

Features

- The Only Commercially Available Aluminum Honeycomb Core Specifically Designed for Formability
- Retains Mechanical Properties in Sharp Curvatures
- Offers Cost Savings for Curved Panels
- Available in Two Cell Sizes and Double-Flex Configuration

Applications

Aluminum Flex-Core has been developed by Hexcel to allow the designer and fabricator freedom in the utilization of honeycomb for components requiring simple and compound curvatures. Highly contoured sandwich panels such as leading edges and flaps, nacelles, fairings, doors and access covers, and other parabolic, spherical and cylindrical shapes are prime Flex-Core candidates. Duplicate die model and control tooling for aerospace use are also examples of Flex-Core applications.

As with standard aluminum honeycomb, Flex-Core provides controlled crush characteristics without rebound and thus curved energy absorption units become feasible and economical.

Type Designation

Hexcel Aluminum Flex-Core and Double-Flex materials are designated as follows:

CR-PAA™ – 5052/F40 – .0013* – 2.1
CR III® – 5052/DF40 – .0025 – 4.2

Where:

CR-PAA	**–** phosphoric acid anodized coating
CR III	**–** CR III coating
5052	**–** aluminum alloy used
F40 or DF40	**–** nominal cell count of open cells in 12 inches measured in the W direction
.0013 or .0025	**–** nominal foil gauge (inches)
2.1 or 4.2	**–** is the nominal density in pounds per cubic foot

* If blank, cell walls are not slit; otherwise designated as S for slit cell walls.

Coatings

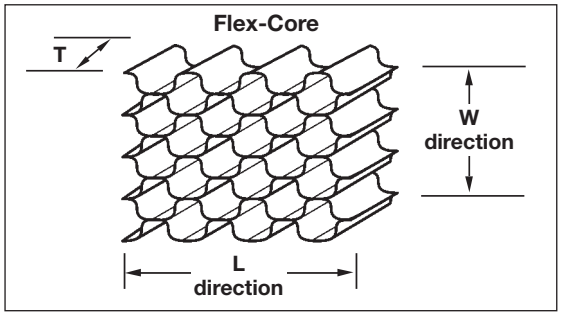
Aluminum Flex-Core is available with two types of corrosion-resistant coating. These coatings are CR III and phosphoric acid anodized (CR-PAA). CR III is an organo-metallic polymer coating that offers protection for aluminum honeycomb exposed to corrosive environments. CR-PAA offers superior protection in extreme salt spray environments.

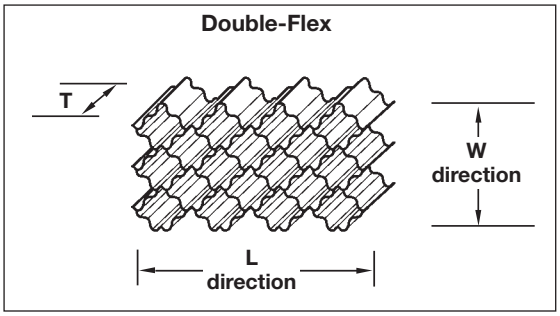
Dimensional Nomenclature

T = Thickness, or cell depth

L = Ribbon direction, or width

W = Expansion direction, or direction perpendicular to the ribbon





Standard Dimensions

Aluminum Flex-Core is available in the following standard sizes and dimensions in inches with the tolerances indicated:

Product	L	W	T max	T min
5052/F40	36^{+2}_{-0}	96^{+4}_{-0}	10.5	0.250
5056/F40	36^{+2}_{-0}	96^{+4}_{-0}	10.5	0.250
5052/F80	36^{+2}_{-0}	48^{+4}_{-0}	10.5	0.250
5056/F80	36^{+2}_{-0}	48^{+4}_{-0}	10.5	0.250

Special L, W, and T dimensions are available on request.

Note: The high-density materials may not be available at the maximum T dimensions due to expansion limitations.

Tolerances

Density: Standard tolerance is ± 10% from the nominal density shown in Table I.

Thickness: Standard tolerance is as follows:

Cut T: inches	Tolerance: inches
0.250 – 3.999	± 0.005
4.000 – over	± 0.062

Availability

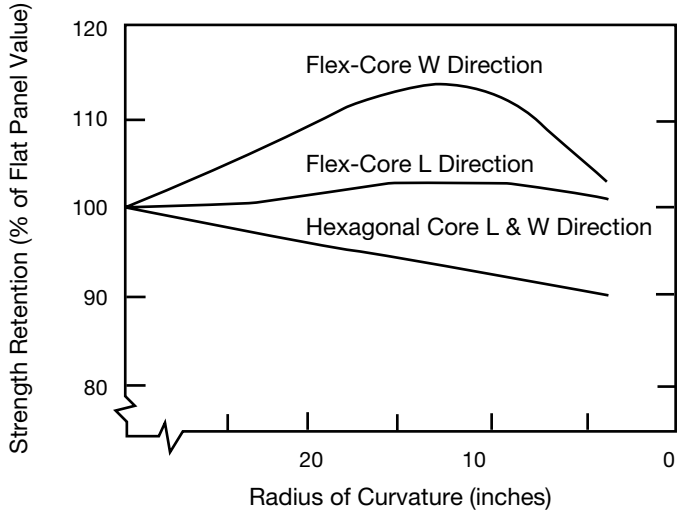
Flex-Core material will be shipped F.O.B. Casa Grande, Arizona. Contact the nearest Hexcel Sales Office or Hexcel Customer Service for price and delivery information.

Table I: Mechanical Properties

Material/ Cell Count – Gauge	Nominal Density pcf	Compressive					Crush Strength psi	Plate Shear					
		Bare		Stabilized				L Direction			W Direction		
		Strength psi		Strength psi		Modulus ksi		Strength psi		Modulus ksi	Strength psi		Modulus ksi
		typ	min	typ	min	typ	typ	typ	min	typ	typ	min	typ
5052/F40 – .0013	2.1	200	126	225	157	65	80	90	63	18.0	50	37	10.0
5052/F40 – .0019	3.1	360	238	395	280	125	165	170	126	32.0	100	75	13.0
5052/F40 – .0025	4.1	525	378	560	420	185	250	260	182	43.0	150	115	17.0
5052/F40 – .0037	5.7	935	630	1050	700	290	380	400	280	68.0	230	170	23.0
5052/F80 – .0013	4.3	542	402	542	455	195	—	300	196	45.0	190	120	20.0
5052/F80 – .0019	6.5	1200	700	1300	735	310	—	540	308	72.0	310	180	24.0
5052/F80 – .0025	8.0	1600	1100	1750	1120	400	—	650	434	98.0	455	260	31.0
5052/DF25 – .0025	2.7	360p	270p	390p	290p	—	145p	185p	135p	27.0p	110p	80p	11.0p
5052/DF25 – .0047	4.8	910p	680p	960p	720p	—	430p	390p	290p	41.0p	240p	180p	20.0p
5052/DF40 – .0025	4.2	760p	600p	850p	680p	—	350p	280p	220p	30.0p	190p	150p	17.0p
5056/F40 – .0014	2.1	240	150	260	182	65	—	105	74	18.0	55	42	10.0
5056/F40 – .0020	3.1	460	284	465	329	125	—	200	150	32.0	120	90	13.0
5056/F40 – .0026	4.1	680	440	740	483	185	—	310	217	45.0	200	132	17.0
5056/F80 – .0014	4.3	780	475	860	518	195	—	375	235	47.0	240	138	20.0
5056/F80 – .0020	6.5	1400	805	1500	910	310	—	645	364	73.0	420	213	24.0
5056/F80 – .0026	8.0	1800	1210	1950	1260	410	—	850	518	100.0	570	307	32.0

p = preliminary value obtained from limited testing.

Table II: Effect of Radius Curvature on Shear Strength



Note: This data was derived from 3.8 pcf Hexagonal Core and 4.3 pcf Flex-Core.

Aluminum Flex-Core® *Product Data*

Supplied by

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