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

Features
- 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

Applications
HexWeb® 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.

HexWeb® CR-PAA outperforms standard AMS-C-7438 core in salt spray and crack propagation tests.

Type Designation
Hexcel HexWeb® Aluminum Flex-Core™ materials are designated as follows:

CR-PAA™ – 5052/F40 – 2.1*
CR III – 5052/F40 – 4.1*

Where:
CR-PAA™ – phosphoric acid anodized coating
CR III – CR III coating
5052 – aluminum alloy used
F40 – nominal cell count of open cells in 12 inches measured in the W direction
2.1 or 4.1 – is the nominal density in pounds per cubic foot

* If blank, cell walls are not vented; otherwise designated as v for vented cell walls. Vented cell walls require custom processing. Contact Customer Service for details and availability.

Coatings
HexWeb® Aluminum Flex-Core® is available with two types of corrosion-resistant coating. These coating are CR III and phosphoric acid anodized (CR-PAA™). CR III is an organo-metallic polymer coating that offer 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

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

<table>
<thead>
<tr>
<th>Product</th>
<th>L</th>
<th>W</th>
<th>T max</th>
<th>T min</th>
</tr>
</thead>
<tbody>
<tr>
<td>5052/F40</td>
<td>36&quot; +2&quot;</td>
<td>96&quot; +4&quot;</td>
<td>4.00</td>
<td>0.250</td>
</tr>
<tr>
<td></td>
<td>- 0'</td>
<td>- 0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5056/F40</td>
<td>36&quot; +2&quot;</td>
<td>96&quot; +4&quot;</td>
<td>4.00</td>
<td>0.250</td>
</tr>
<tr>
<td></td>
<td>- 0'</td>
<td>- 0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5052/F80</td>
<td>36&quot; +2&quot;</td>
<td>48&quot; +4&quot;</td>
<td>4.00</td>
<td>0.250</td>
</tr>
<tr>
<td></td>
<td>- 0'</td>
<td>- 0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5056/F80</td>
<td>36&quot; +2&quot;</td>
<td>48&quot; +4&quot;</td>
<td>4.00</td>
<td>0.250</td>
</tr>
<tr>
<td></td>
<td>- 0'</td>
<td>- 0&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F = Flex-Core

All Flex-Core is cut to T and is not available in HOBE Form.

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.

Specifications

Density: Standard tolerance is ±10% from the nominal density shown in Table 1.

Thickness: Standard tolerance is as follows:

Cut T: inches    Tolerance: inches
0.250 – 3.999 in.    ±0.005
4.000 – over        ±0.062
Availability
Flex-Core® material will be shipped as follow:

SHIPPING TERMS: FCA Hexcel, Casa Grande, AZ, USA (Incoterms 2010)
MATERIAL TITLE TRANSFER: Hexcel, Casa Grande, AZ, USA

Lead times will vary with the particular core type selected.
The information in this Data Sheet is subject to change without notice.
Contact your nearest Hexcel Sales Office for delivery information.

Table I: HexWeb® Aluminum Flex-Core® Mechanical Properties

Typical values (typ) are presented below, as well as minimum average (min) for a product type.

<table>
<thead>
<tr>
<th>Material/Cell Count – Gauge</th>
<th>Nominal Density pcf</th>
<th>Compressive Strength</th>
<th>Crush Strength psi</th>
<th>Beam Shear Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>typ typ min typ</td>
<td>Bare</td>
<td>Stabilized</td>
<td>typ typ min</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strength psi</td>
<td>Strength psi</td>
<td>Modulus ksi</td>
</tr>
<tr>
<td>F40 – .0013</td>
<td>2.1</td>
<td>200</td>
<td>126</td>
<td>225</td>
</tr>
<tr>
<td>F40 – .0019</td>
<td>3.1</td>
<td>360</td>
<td>238</td>
<td>395</td>
</tr>
<tr>
<td>F40 – .0025</td>
<td>4.1</td>
<td>525</td>
<td>378</td>
<td>560</td>
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<tr>
<td>F40 – .0037</td>
<td>5.7</td>
<td>935</td>
<td>630</td>
<td>1050</td>
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<tr>
<td>F80 – .0013</td>
<td>4.3</td>
<td>524</td>
<td>402</td>
<td>542</td>
</tr>
<tr>
<td>F80 – .0019</td>
<td>6.5</td>
<td>1200</td>
<td>700</td>
<td>1300</td>
</tr>
<tr>
<td>F80 – .0025</td>
<td>8.0</td>
<td>1800</td>
<td>1100</td>
<td>1750</td>
</tr>
<tr>
<td>F80 – .0037</td>
<td>12.0</td>
<td>2700</td>
<td>2300</td>
<td>2600</td>
</tr>
<tr>
<td>F40 – .0014</td>
<td>2.1</td>
<td>240</td>
<td>150</td>
<td>260</td>
</tr>
<tr>
<td>F40 – .0020</td>
<td>3.1</td>
<td>460</td>
<td>284</td>
<td>465</td>
</tr>
<tr>
<td>F40 – .0025</td>
<td>4.1</td>
<td>680</td>
<td>440</td>
<td>740</td>
</tr>
<tr>
<td>F80 – .0014</td>
<td>4.3</td>
<td>780</td>
<td>475</td>
<td>860</td>
</tr>
<tr>
<td>F80 – .0020</td>
<td>6.5</td>
<td>1400</td>
<td>805</td>
<td>1500</td>
</tr>
<tr>
<td>F80 – .0023</td>
<td>8.0</td>
<td>1800</td>
<td>1210</td>
<td>1950</td>
</tr>
</tbody>
</table>

Note - * Results using Beam Shear

For customers requiring specialized flexcore which can accommodate venting between cells, Hexcel offers “vented” Flex-Core. Vented Flex-Core is a custom processing addition to standard Flex-Core. The venting is a rectangular shaped vent in the free cell wall of the flexcore honeycomb. The standard vented product has a vent spacing of approximately 0.750” in the T direction. Custom configurations may be available an additional charge. Please contact your Hexcel sales associate to determine if your requirements can be achieved with this specialized flexcore honeycomb. All vented Flex-Core is subject to minimum buys for specific thicknesses, expanded slices only, one specification per order.
Table II: Effect of Radius Curvature on Shear Strength

![Graph showing the effect of radius curvature on shear strength.](image)

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

For more information
Hexcel is a leading worldwide supplier of composite materials to aerospace and industrial markets. Our comprehensive range includes:

- HexTow® carbon fibers
- HexForce® reinforcements
- HiMax™ multiaxial reinforcements
- HexPly® prepregs
- HexMC® molding compounds
- HexFlow® RTM resins
- Redux® adhesives
- HexTool® tooling materials
- HexWeb® honeycombs
- Acousti-Cap® sound attenuating honeycomb
- Engineered core
- Engineered products

For US quotes, orders and product information call toll-free 1-888-611-4038. For other worldwide sales office telephone numbers and a full address list, please go to:

http://www.hexcel.com/contact/salesoffice

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