HexWeb® CR III

Corrosion Resistant Specification Grade Aluminum Honeycomb

Product Data

Description

5052 and 5056 expanded aerospace grade aluminum honeycomb materials are available in a wide selection of cell sizes and foil gauges. The HexWeb® CR III coating has been developed to offer superior protection for aluminum honeycomb exposed to corrosive environments. The HexWeb® CR III system offers a clear protective film that interacts with the aluminum surface forming a stable, tightly adherent bond. The coating is primarily an organo-metallic polymer type that differs from the normal conversion-type corrosion protective coatings.

Features

- Aerospace structural grade honeycomb
- Excellent corrosion resistance
- Highest strength and rigidity to weight ratio as a sandwich core
- Maintain corrosion protection at elevated temperatures
- Available in 5052 and 5056 alloys

Applications

Aluminum HexWeb® CR III Specification Grade honeycomb materials are predominantly used in sandwich structures to meet design requirements for highly engineered structural components. As a structural core material, it finds applications in all types of aerospace vehicles and supporting equipment where sandwich structure offers rigid panels of minimum weight, aerodynamic smooth surfaces, and high fatigue resistance. The same structural properties are also used for commercial applications such as tools, snow and water skis, bulkheads, and floors. Other nonstructural uses are directional air/fluid flow control, RF shielding, and energy absorption.

Type Designation

HexWeb® CR III aluminum honeycomb is designated as follows:

Material – Cell size – Alloy – Density

Example: **CR-III – 3/16 – 5052 – 3.1N**

Where

CR III – designates corrosion resistant honeycomb

3/16 – is the cell size in inches

5052 – is the alloy of the aluminum

N – indicates the cell walls are not perforated.

P – indicates cell walls are perforated, and is available on special order

3.1 – is the nominal density in pounds per cubic foot

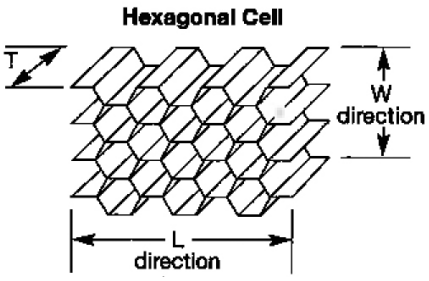
5052 and 5056 are supplied in the H-39 temper

Dimensional Nomenclature

T = Thickness, or cell depth

L = Ribbon direction, or longitudinal direction

W = Transverse direction, or direction perpendicular to the ribbon



Availability

Lead time varies with the honeycomb type. Please contact a Hexcel Sales Office or Hexcel Customer Service for price and delivery information.

Specifications

HexWeb® CR III expanded aluminum honeycomb materials meet the requirements of Military Specification MIL-C7438 where applicable.

Standard Dimensions

HexWeb® CR III 5052 and 5056 aluminum honeycomb is available in the following standard size:

On special orders Hexcel has the capability of manufacturing HexWeb® CR III honeycomb panels in the L dimensions up to 60 inches maximum, W dimensions up to 150 inches maximum, and T dimensions up to 34 inches maximum, subject to limitations on some products. Larger sizes may be produced by splicing. Contact the nearest Hexcel Sales Office for additional information.

Expanded Sheets		
L	W	Nominal Sq.Ft.
48 in. + 3 in. - 0 in.	96 in. + 4 in. - 0 in.	32.00

Dimensional Tolerances

Tolerances on cut thickness for standard size and smaller sheets are as follows:

Sheet Thickness	Standard Tolerances
0.250 in. to 3.999 in.	± 0.005 in.
4.000 in. and over	± 0.062 in.

Contact your nearest Hexcel Sales Office with regard to specific dimensional tolerances.

Density Tolerance

The nominal densities of the 5052 and 5056 expanded aluminum honeycomb products are shown in Table 1 and II. The standard density tolerance from the normal density is ± 10%.

Custom Processing

Aluminum honeycomb can be provided machined or formed ready for bonding. Hexcel has complete facilities for the manufacture of honeycomb core parts and core assembles. Capabilities include all types of adhesive edge splicing, machining of simple or compound taper elements with plane or compound curved surfaces, machining of relief areas, chamfering, drilling, plan form contouring, curvature forming, and similar operations.

Special Products

In addition to the HexWeb® CR III hexagonal core honeycomb, Hexcel makes 5052 and 5056 aluminum honeycomb in several other specialized cell configurations and products; e.g., Flex-Core® (Data Sheet 2700), exceptional formable core material; Corrugated and Reinforced Corrugated Core (Data Sheet 2400), and higher density cores with superior compressive and crush strengths.

Contact your nearest Hexcel Sales Office for information on these specialized products and on specific processing requirements.

Mechanical Properties

Mechanical properties of HexWeb® CR III 5052 and 5056 alloy honeycomb are shown in Table I and II, respectively. A major advantage of the HexWeb® CR III organo-metallic polymer coating over typical coatings is that HexWeb® CR III is much more resistant to salt spray exposure combined with a prior elevated temperature exposure. Shear strength retention after 350°F heat aging for up to 500 hours and 30-day salt spray exposure is approximately 88% of room temperature properties with no salt spray exposure; weight loss is considerably less than the maximum permissible per MIL-C-7438 for corrosion resistant aluminum honeycomb.

Table I: HexWeb® CR III 5052 Hexagonal Aluminum Honeycomb

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

Cell Size	Nominal Density pcf	Compressive Strength					Crush Strength psi	Plate Shear					
		Bare		Stabilized				L Direction			W Direction		
		Strength psi		Strength psi		Modules ksi		Strength psi		Modulus ksi	Strength psi		Modulus ksi
		typ	min	typ	min	typ	typ	typ	min	typ	typ	min	typ
1/8	3.1	285	200	300	215	75	130	210	155	45.0	130	90	22.0
1/8	4.5	550	375	570	405	150	260	340	285	70.0	220	168	31.0
1/8	6.1	980	650	1020	680	240	450	560	455	98.0	340	272	41.0
1/8	8.1	1500	1000	1560	1100	350	750	800	670	135.0	470	400	54.0
1/8	10.0	2100p	1575p	2250p	1685p	–	–	980p	735p	175.0p	550p	415p	65.0p
1/8	12.0	2700	2100	2900	2200	900	–	1940l	1250l	–	1430l	1000l	–
5/32	2.6	220	150	240	160	55	90	165	120	37.0	100	70	19.0
5/32	3.8	395	285	410	300	110	185	270	215	56.0	165	125	26.4
5/32	5.3	690	490	720	535	195	340	420	370	84.0	270	215	36.0
5/32	6.9	1080	770	1130	800	285	575	590	540	114.0	375	328	46.4
5/32	8.4	1530	1070	1160	1180	370	800	760	690	140.0	475	420	56.0
3/16	2.0	160	90	175	100	34	60	120	80	27.0	70	46	14.3
3/16	3.1	290	200	335	215	75	130	210	155	45.0	125	90	22.0
3/16	4.4	520	360	550	385	145	250	330	280	68.0	215	160	30.0
3/16	5.7	820	560	860	600	220	390	460	410	90.0	300	244	38.5
3/16	6.9	1120	770	1175	800	285	575	590	540	114.0	375	328	46.4
3/16	8.1	1600	1000	1720	1100	350	750	725	670	135.0	480	400	54.0
1/4	1.6	90	60	100	70	20	40	85	60	21.0	50	32	11.0
1/4	2.3	190	120	210	130	45	75	140	100	32.0	85	57	16.2
1/4	3.4	340	240	370	250	90	150	230	180	50.0	140	105	24.0
1/4	4.3	500	350	540	370	140	230	320	265	66.0	200	155	29.8
1/4	5.2	690	500	760	510	190	335	410	360	82.0	265	200	35.4
1/4	6.0	990	630	1100	660	235	430	530	445	96.0	340	265	40.5
3/8	1.0	50	20	55	20	10	25	45	32	12.0	30	20	7.0
3/8	1.6	90	60	95	70	20	40	85	60	21.0	50	32	11.0
3/8	2.3	190	120	200	130	45	75	135	100	32.0	80	57	16.2
3/8	3.0	285	190	310	200	70	120	200	145	43.0	125	85	21.2
3/8	3.7	370	270	410	285	105	180	250	200	55.0	160	115	26.0
3/8	4.2	520	335	560	355	135	220	310	255	65.0	200	150	29.0

Test data obtained at 0.625 inch thickness.
p = preliminary
x = predicted values
l = beam shear for 12.0 pcf products.
maximum block size 48 in. x 60 in., maximum thickness = 1.00 in.

Other cell sizes, densities, and dimensions are available on special request. Please contact your nearest Hexcel Sales Office for additional information. One block minimum buy may apply.

Table II: HexWeb® CR III 5056 Hexagonal Aluminum Honeycomb

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

Cell Size	Nominal Density pcf	Compressive Strength					Crush Strength psi	Plate Shear					
		Bare		Stabilized				L Direction			W Direction		
		Strength psi		Strength psi		Modules ksi		Strength psi		Modulus ksi	Strength psi		Modulus ksi
	typ	typ	min	typ	min	typ	typ	typ	min	typ	typ	min	typ
1/8	3.1	320	250	350	260	97	170	250	200	45.0	155	110	20.0
1/8	4.5	6300	475	690	500	185	320	440	350	70.0	255	205	28.0
1/8	6.1	1120	780	1200	825	295	535	690	525	102.0	400	305	38.0
1/8	8.1	1750	1200	1900	1300	435	810	945	740	143.0	560	440	51.0
5/32	2.6	250	180	265	185	70	120	200	152	37.0	115	80	17.0
5/32	3.8	450	360	500	375	140	235	335	272	57.0	195	155	24.0
5/32	5.3	820	615	865	650	240	420	550	435	85.0	325	250	33.0
5/32	6.9	1220	920	1340	1000	350	650	760	610	118.0	430	360	43.0
3/16	2.0	190	110	200	120	45	75	140	105	27.0	85	50	13.0
3/16	3.1	380	250	410	260	97	170	265	200	45.0	150	110	20.0
3/16	4.4	620	460	670	490	180	310	425	340	68.0	245	198	27.0
3/16	5.7	920	685	1000	735	270	480	565	480	94.0	330	280	36.0
1/4	1.6	100	75	110	80	30	50	90	78	20.0	60	38	10.5
1/4	2.3	240	145	265	155	58	100	180	130	32.0	100	62	15.0
1/4	3.4	400	300	480	315	115	200	290	230	50.0	175	130	22.0
1/4	4.3	580	440	620	465	172	300	400	325	67.0	230	190	27.0
1/4	5.2	790	600	820	645	230	410	490	425	84.0	300	245	32.0
3/8	1.0	55	25	60	35	15	35	55	45	15.0	35	25	6.8
3/8	1.6	100	75	110	80	30	50	90	78	20.0	60	38	10.5
3/8	2.3	215	155	225	155	58	100	170	130	32.0	95	62	15.0
3/8	3.0	320	240	340	260	92	160	245	190	43.0	145	100	19.0

Test data obtained at 0.625 inch thickness.

Other cell sizes, densities, and dimensions are available on special request. Please contact your nearest Hexcel Sales Office for additional information. One block minimum buy may apply.

Important

Hexcel Corporation believes, in good faith, that the technical data and other information provided herein is materially accurate as of the date this document is prepared. Hexcel reserves the right to modify such information at any time. The performance values in this data sheet are considered representative but do not and should not constitute specification minima. The only obligations of Hexcel, including warranties, if any, will be set forth in a contract signed by Hexcel or in Hexcel's then current standard Terms and Conditions of Sale as set forth on the back of Hexcel's Order Acknowledgement.

For more information

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

- Carbon Fiber
- Reinforced Fabrics
- Carbon, Glass, Aramid and Hybrid Prepregs
- RTM Materials
- Engineered Core
- HexTOOL® composite tooling material
- Structural Film Adhesives
- Honeycomb Cores

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 click here: http://www.hexcel.com/contact/salesoffices.

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