

# The Doorway™

A Publication of The Gill Corporation

High-Performance Composite Products Since 1945 • [www.thegillcorp.com](http://www.thegillcorp.com)

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## ***HONEYCOMB LIGHTWEIGHT HIGH-PERFORMANCE MATERIALS***

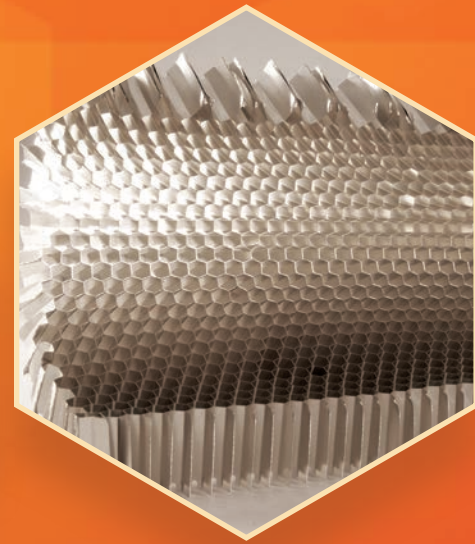


ANTIMICROBIAL TREATED

**1950**  
Balsa Core



**1956**  
Aluminum  
Honeycomb



Honeycomb core has provided the highest strength-to-weight ratio of *any* structural material for decades. The Gill Corporation pioneered the use of balsa wood as a natural, lightweight, high-strength core in the 1950s. We introduced metallic honeycomb cores using very high-strength, lightweight aluminum foil in the mid 1950s.

With over 50 years' structural core experience, The Gill Corporation is a leading manufacturer offering a diverse product portfolio with expansive value-add capabilities. Our Meta-Aramid honeycomb cores were introduced in the 1980s, followed by Para-Aramid honeycomb cores in the 2000s and Fiberglass honeycomb cores in the 2010s.

Today, our honeycomb cores have been qualified by virtually every manufacturer of aircraft and aerospace vehicles, and are designed into numerous ground, rail, marine, and specialty industrial applications.

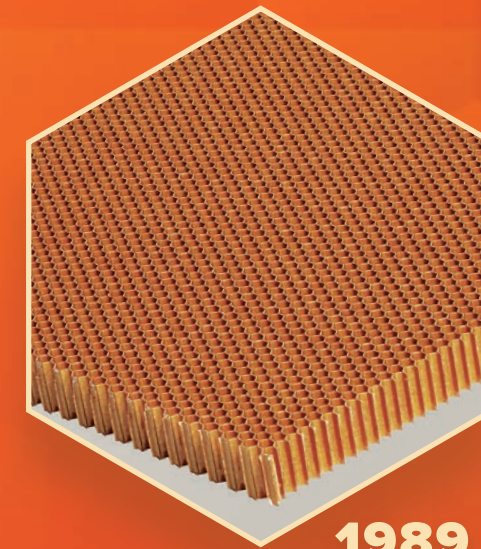
We offer standardized core materials and highly customized core products based upon our proprietary resin formulations, node bond adhesives and advanced production processes.

Honeycomb can be produced in a wide range of cell sizes, geometries and densities to achieve optimal weight, strength and performance requirements. Honeycomb is available in block and slice formats, as well as machined core details, bonded and sandwich structures, finished parts and assemblies.

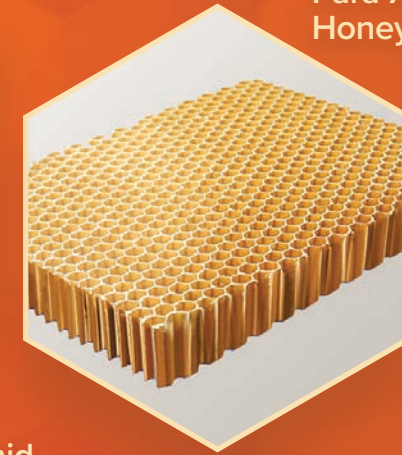
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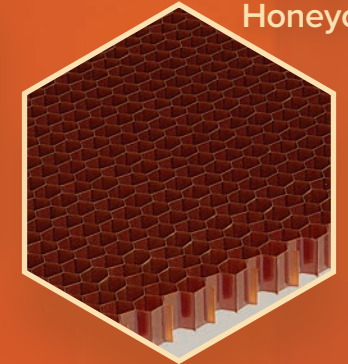
**STACKING**



**1989**  
Meta-Aramid  
Honeycomb



**2004**  
Para-Aramid  
Honeycomb



**2014**  
Fiberglass  
Honeycomb

**Metallic honeycomb** provides light weight, high strength solutions with corrosion resistance for exterior aircraft applications such as slats, spoilers, flaps, engine nacelle and thrust reverser structures, interior structures and monuments, floor panels, and non-aerospace applications including collision and energy absorption, flooring and interiors of train and subway cars, specialty transportation casks, building materials, as well as high performance racing yachts. Metallic honeycomb is prominently used in space applications for rocket boosters, nose cones, heat shields, solar and satellite structures.

**Non-metallic honeycomb** provides light weight, high strength performance for exterior and interior aircraft applications. A passenger in an airliner is essentially encapsulated by parts made from non-metallic honeycomb including engine nacelle components, spoilers, flap track fairings, wing to body fairings, floors, sidewalls, overhead bins, lavatories, galleys, doors and more. Non-metallic honeycomb has become a key performance enabler of advanced lightweight manned and unmanned aircraft and vehicles.

**3, 5, AND 6-AXIS  
CNC MACHINING**



Metallic



Non-Metallic



**SLICING**

## NON-METALLIC CORES

### GILLCORE® HD

#### HIGH PERFORMANCE NON-METALLIC HONEYCOMB

Meta-Aramid fiber reinforced honeycomb is coated with heat resistant phenolic resin to solve most structural design challenges in composite aerostructures when non-metallic honeycomb is preferred.

### GILLCORE® HK

#### HIGHEST PERFORMANCE NON-METALLIC HONEYCOMB

Para-Aramid fiber reinforced honeycomb is coated with heat resistant phenolic resin. It's 25% lighter than meta-aramid with enhanced performance characteristics including strength, stiffness and fatigue. Gillcore HK® offers exceptional performance/weight ratio for all applications.

### GILLCORE® HF

#### HIGH PERFORMANCE NON-METALLIC FIBERGLASS HONEYCOMB

Honeycomb with fiberglass substrate coated with heat resistant phenolic resin for moisture resistance and suitable for applications requiring a high degree of forming.

### GILLCORE® HA

#### COMMERCIAL GRADE NON-METALLIC HONEYCOMB

Offers an economical alternative for marine, rail, transportation, and recreational applications.



Aircraft ceiling, floors, sidewalls, stowage bins, lavatories, galleys and more.

## METALLIC CORES

### DURA-CORE®

#### HIGH PERFORMANCE ALUMINUM HONEYCOMB

Provides aerospace and commercial markets with a high degree of flexibility to solve lightweight structural design challenges. Prior to bonding, the foil is cleaned and treated using a proprietary chemical conversion coating. The resulting honeycomb exhibits excellent corrosion resistance in hostile environments, especially salt fog. Cores are produced in a broad range of cell sizes and densities, assuring the optimal product for your application.

### PAA-CORE®

#### THE ULTIMATE ALUMINUM HONEYCOMB

Phosphoric Acid Anodized (PAA) foil treatment process yields unsurpassed corrosion resistance with excellent bonding properties and allows for the bonding of carbon skins without the risk of galvanic corrosion. One of its distinctions is a high strength to weight ratio. Proven over the years to provide critical bond durability between core and skins that is critical to long part life, and for this, PAA-CORE® has no equal.



Energy absorber.

## METALLIC SPECIALTY CORES

### HIGRID®

#### HIGH-STRENGTH CORRUGATE ALUMINUM HONEYCOMB

HIGRID® excels as a high-impact energy absorber. It offers an ideal solution for fastener inserts and edge reinforcements in honeycomb structures. It is produced by bonding together corrugated sheets of aluminum foil that have much higher densities than are possible with conventional expanded honeycomb.

### TRUSSGRID®

#### 3D ALUMINUM HONEYCOMB

TRUSSGRID® 3D honeycomb is dimensionally stable, naturally vented, rigid core material made of cross-laminated aluminum foil corrugations. With considerable compressive strength in all three dimensions, TRUSSGRID® offers a unique performance in special types of sandwich construction and as a high-impact absorber.

### ALPHEX®

#### COMMERCIAL GRADE ALUMINUM HONEYCOMB

Lightweight structural core that offers excellent strength and corrosion resistance to meet a wide variety of applications. An advanced protection system is applied to the aluminum foil prior to processing honeycomb, extending its service life in hot, wet and corrosive environments. It solves most of the structural design challenges in railways interiors, marine, construction and many other fields.

### SHAPEGRID®

#### CUSTOM-CONTOURED HONEYCOMB

SHAPEGRID® can be customized to meet tight radial requirements, while maintaining normal cell axis alignment to meet your design requirements.



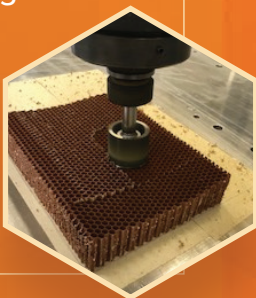
### HONEYCOMB MATERIALS ARE AVAILABLE IN MANY FORMS:

- ◆ Block
- ◆ Sliced
- ◆ Machined
- ◆ Unexpanded
- ◆ Bonded Structures
- ◆ Composite core sandwich panels



### VALUE ADDED HONEYCOMB SERVICES INCLUDES:

- ◆ Trimming
- ◆ Chamfering
- ◆ Potting
- ◆ Thermal forming to contour
- ◆ Septum and splice bonding
- ◆ Film adhesive stabilization
- ◆ Details, bonded assemblies and core kits
- ◆ 3, 5 and 6-axis CNC machining capabilities



Ask us about our environmentally friendly, Non-Metallic honeycomb production process we call "Kerfless". First, we eliminated the solvent-based phenolic resins with an aqueous-based resins. Second, honeycomb sheets are produced to the required thicknesses without slicing core blocks on a saw thereby eliminating dust. Then we recover material waste from the saw blade kerf to yield more slices of honeycomb core. Our green process can utilize alternate resins that further expand our capabilities.

Offered in a wide range of types, classes, grades, densities for commercial, aerospace, defense, industrial, transportation and non-aerospace applications. The reference charts below list the primary specifications that we are qualified to. Please contact us for updates and for us to qualify to your specifications.

GILLCORE® HD META-ARAMID HONEYCOMB CUSTOMER QUALIFICATIONS CHART (NOMEX®)

Gillcore® HD Meta-aramid honeycomb processes fully meet the requirements of SAE Aerospace Materials Standard AMS 3711. Our honeycomb can be manufactured to various configurations, with cell sizes ranging from 1/8” to 3/8” and densities from 1.5 PCF up to 9 PCF, and other custom configurations as requested.

Original Equipment Manufacturer	Specification	Product
Aermacchi	MMS8011	HD533
Aim Aviation	AIM-M-1002-1	HD132
Aim Aviation	AMS13	HD132
Airbus	ABS5035A4	HD132
Airbus	ABS5035A6	HD142
Airbus	ABS5035C3	HD163
Airbus	ABS5035C6	HD193
Airbus	ABS5035C5	HD183L
Alenia Aermacchi	MMS8011	HD111, HD132, HD142, HD163, HD183, HD193, HD332, HD332O
AVIC	AMMS3502	HD1061, HD132, HD142, HD1032, HD163, HD183, HD193
BAE Systems Control	SM628155	HD343, HD132, HD142, HD193, HD322, HD332, HD412, HD153, HD183
Bell Helicopter	299-947-103	HD153, HD183, HD3033, HD312, HD332, HD111, HD132, HD142, HD193, HD163, HD343, HD332O, HD422, HD312O, HD365, HD412, HD432, HD412OX, HD422OX, HD432OX, HD322
Boeing	BMS8-124	HD322, HD332, HD412, HD153, HD183, HD312O, HD343, HD132, HD142, HD193, HD332O, HD111
Boeing	D210-12012-1	HD132, HD153, HD142
Bombardier	SMS35	HD132, HD533
Britax Heath Tecna	HMS-B3-001	HD193, HD183, HD312O, HD111, HD132, HD332O
C & D Zodiac	CDM020-01	HD186
Cessna	CMNP083	HD132, HD111, HD163
COMAC	CMS-CP-402	HD343, HD132, HD142, HD332O, HD332
De Havilland	DHMS1.26	HD153, HD183, HD322, HD332, HD111, HD132, HD142, HD163, HD332O, HD312O
Delta	DFPMS-0002	HD132, HD193, HD332O
Driessen	SMS015	HD332
Driessen	SMS015-1	HD132
Embraer	MEP15-010	HD163
FACC AG	FMS1030	HD153, HD2092, HD322, HD193, HD132, HD111, HD1062
Israel Aircraft	MS080020E	HD322, HD332, HD412, HD153, HD183, HD343, HD132, HD142, HD193
Jamco	MSJ-2011	HD132, HD332O
KAI	88MS0010	HD111, HD132, HD142, HD193, HD343, HD153, HD183, HD322, HD332, HD412
Lockheed	LMA-MD013	HD111, HD132C, HD142C, HD153C, HD163, HD183, HD332, HD343
Lockheed	LCM28-1041	HD111, HD132, HD142, HD153, HD183, HD193, HD332, HD343
Lockheed	G28001	HD132, HD142, HD153, HD163, HD183, HD322, HD332
Lockheed-Georgia	STM28-105	HD322, HD332, HD412, HD432, HD445, HD111, HD132, HD142, HD343, HD422
McDonnell Douglas	DMS1974	HD3035, HD434, HD445, HD412, HD432, HD3024, HD345, HD365, HD322, HD332, HD3013, HD153, HD183, HD1012, HD422, HD343, HD111, H132, HD142, HD193
Nordam	NMD-MS3031	HD132
Northrop Grumman	GC101D11	HD183
Northrop Grumman	GC101D20	HD433
Northrop Grumman	GC101D19	HD153
Northrop Grumman	GC101D02	HD132
Northrop Grumman	GC101D08	HD163
Orlite	2274-14-00	HD132
Orlite	2274-15-00	HD132
Raytheon Aircraft	BS23732	HD153, HD183, HD322, HD332, HD345, HD365, HD412, HD432, HD445, HD512, HD522, HD532, HD111 HD132, HD142, HD163, HD193, HD343, HD422

For the full Specification Chart that includes Types, Classes, Grades, and Cell Size-Densities, please visit: [www.thegillcorp.com/qualifications](http://www.thegillcorp.com/qualifications)

GILLCORE® HK PARA-ARAMID HONEYCOMB CUSTOMER QUALIFICATIONS CHART (KEVLAR®)

Original Equipment Manufacturer	Specification	Product
Airbus	ABS5341A3	HK1061
Airbus	ABS5341A5	HK131
Airbus	ABS5341C5	HK162
Airbus	ABS5341C8	HK262
Airbus	ABS5341C1	HK2032
ATK	MS-201	HK1033
Aurora	ASM 1028	HK1061, HK1033
Bell Helicopter	299-947-386	HK321, HK131, HK132, HK1033, HK332, HK163
Boeing	BMS 8-124	HK1061, HK131, HK162, HK141, HK3061O
Boeing - Phil-PA	D210-12012-1	HK1033, HK131, HK162
Lockheed	SPTMDL17	HK131C, HK1033C, HK163C
Lockheed	LMA-MD017	HK1032i, HK162i, HK132i
Northrop Grumman	ACS-MRS-5301	HK131, HK132, HK163, HK1033, HK1032i
Northrop Grumman	ACS-MRS-5911	HK1061
Orbital ATK	MP-MS-201-03	HK2061C
Sikorsky	38023-15015-040	HK1061
Sikorsky	SS9217-001	HK1061
Sikorsky	SS9217-002	HK1033

DURA-CORE® AND PAA-CORE® ALUMINUM HONEYCOMB CUSTOMER QUALIFICATIONS CHART

Original Equipment Manufacturer	Specification	Product
Airbus	AIMS 11-02-002	Dura-Core® Aluminum Honeycomb - 5052 Alloy
Airbus Helicopters	ECS2449-A	Dura-Core® or PAA Aluminum Honeycomb - 5056 Alloy
Airbus Helicopters	ECS2447-A	Dura-Core® or PAA Aluminum Honeycomb - 5056 Alloy
Airbus Helicopters	ECS2451-A	Dura-Core® or PAA Aluminum Honeycomb - 5056 Alloy
Airbus Helicopters	ECS2450-A	Dura-Core® or PAA Aluminum Honeycomb - 5056 Alloy
Airbus Helicopters	ECS2448-A	Dura-Core® or PAA Aluminum Honeycomb - 5056 Alloy
Bell Textron	299-947-059	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Boeing	BMS4-4	Dura-Core® or PAA Aluminum Honeycomb - 5052 Alloy
Boeing	BMS4-25	PAA Aluminum Honeycomb - 5056 Alloy
Boeing ST. Louis	MMS 710, 714, 728	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
COMAC	CMS-CP-401	PAA Aluminum Honeycomb - 5052 Alloy
Decrane/Pats	PS-028	Dura-Core® Aluminum Honeycomb - 5052 Alloy
General Dynamics	P190	Dura-Core® Aluminum Honeycomb - 5052 Alloy
Goodrich	RMS 026	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Hispano Suiza	BLGG 500601	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Hispano Suiza	BLGG 500801	PAA Aluminum Honeycomb - 5052 Alloy
Leonardo	MMS 8010	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Lockheed	FMS 3010	Dura-Core® Aluminum Honeycomb - 5052 Alloy
Lockheed	STM Y1071	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Northrop Grumman	GC 100B, GC100F	Dura-Core® Aluminum Honeycomb - 5052 Alloy
Northrop Grumman	NAI-1171	Dura-Core® Aluminum Honeycomb - 5052 Alloy
MRAS	STMM-Y100	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Raytheon	BS 25017	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
SAAB	STD 124230	PAA Aluminum Honeycomb - 5056 Alloy
SAE	AMS 4348, AMS 4349	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
SAE	AMS-C-7438	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Safran	HMRC 3001D	PAA Aluminum Honeycomb - 5056 Alloy
Safran	HMRC3005	PAA Aluminum Honeycomb - 5052 Alloy
Safran	HMRC3007	Dura-Core® Aluminum Honeycomb - 5052 Alloy
Shorts Brothers	SMS 58	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Shorts Brothers	SMS 78	Dura-Core® or PAA Aluminum Honeycomb - 5052 or 5056 Alloy
Sonaca	SMS1003	PAA Aluminum Honeycomb - 5052 Alloy
Sonaca	SMS1005	Dura-Core® Aluminum Honeycomb - 5056 Alloy
Thales Alenia Space	10903820-5, 11014180-1	Dura-Core® or PAA Aluminum Honeycomb 5056 Alloy

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# Quotables

"Be nice to your kids. They'll choose your nursing home."  
- UNKNOWN

"Everyone is gifted. Some just never open the box."  
- STEVEN SNYDER

"Facts do not cease to exist because they are ignored."  
- ALDOUS HUXLEY, AUTHOR

"More people would benefit from their mistakes if they weren't so busy denying them."  
- UNKNOWN

"Never mistake activity for achievement."  
- JOHN WOODEN, UCLA COACH

"A supervisor's job is to, every day, make their product at a higher quality and a lower cost."  
- STEPHEN GILL

"If you were arrested for being a manager, could they collect enough evidence to convict you?"  
- DR. TERRY PAULSON, CONSULTANT

"It's never too late to be what you might have been."  
- GEORGE ELIOT, AUTHOR

Too many people stop to think and never start again.  
- UNKNOWN

"The fear of loss is twice the motivator as the desire for gain."  
- DEAN MINUTO, VISTAGE SPEAKER

"Resentment is like taking poison and waiting for the other person to die."  
- MALACHY MCCORT, AUTHOR

"The first rule of leadership is that everything is your fault."  
- UNKNOWN

"The first purpose of a brochure is to tell our side of what we are doing."  
- DAVID KRITZER, CONSULTANT



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