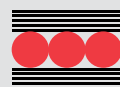




Engineered Honeycomb  
Solutions and Services

# Rail

Honeycomb Core and Panels  
for Rail Vehicle Interiors



PLASCORE®





# Benefits of Honeycomb Panels

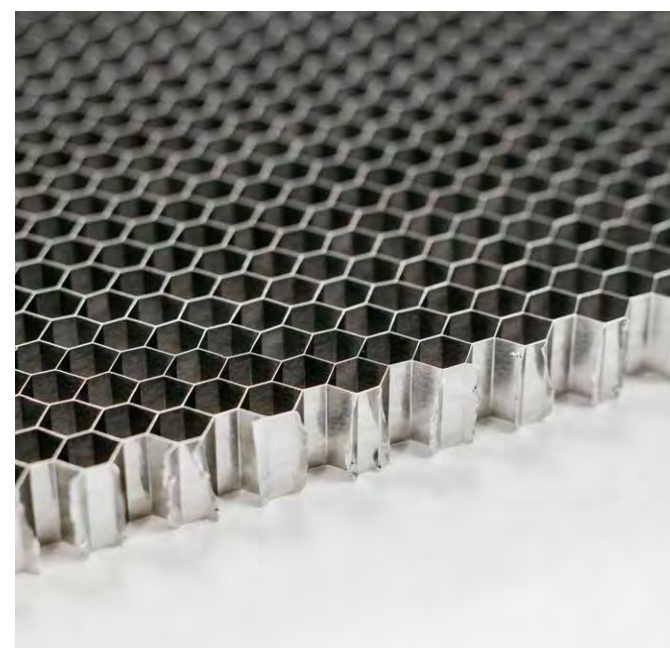
**Lightweight | Strong | Stable | Cost-Effective | Moisture & Corrosion Resistant**

Plascore Honeycomb Panels are a high-strength, lightweight material that provide efficient mechanical performance. Our lightweight panels are an excellent alternative to monolithic materials (e.g., solid aluminum, wood and steel) as well as panels with traditional core materials such as plywood, balsa, and foam.

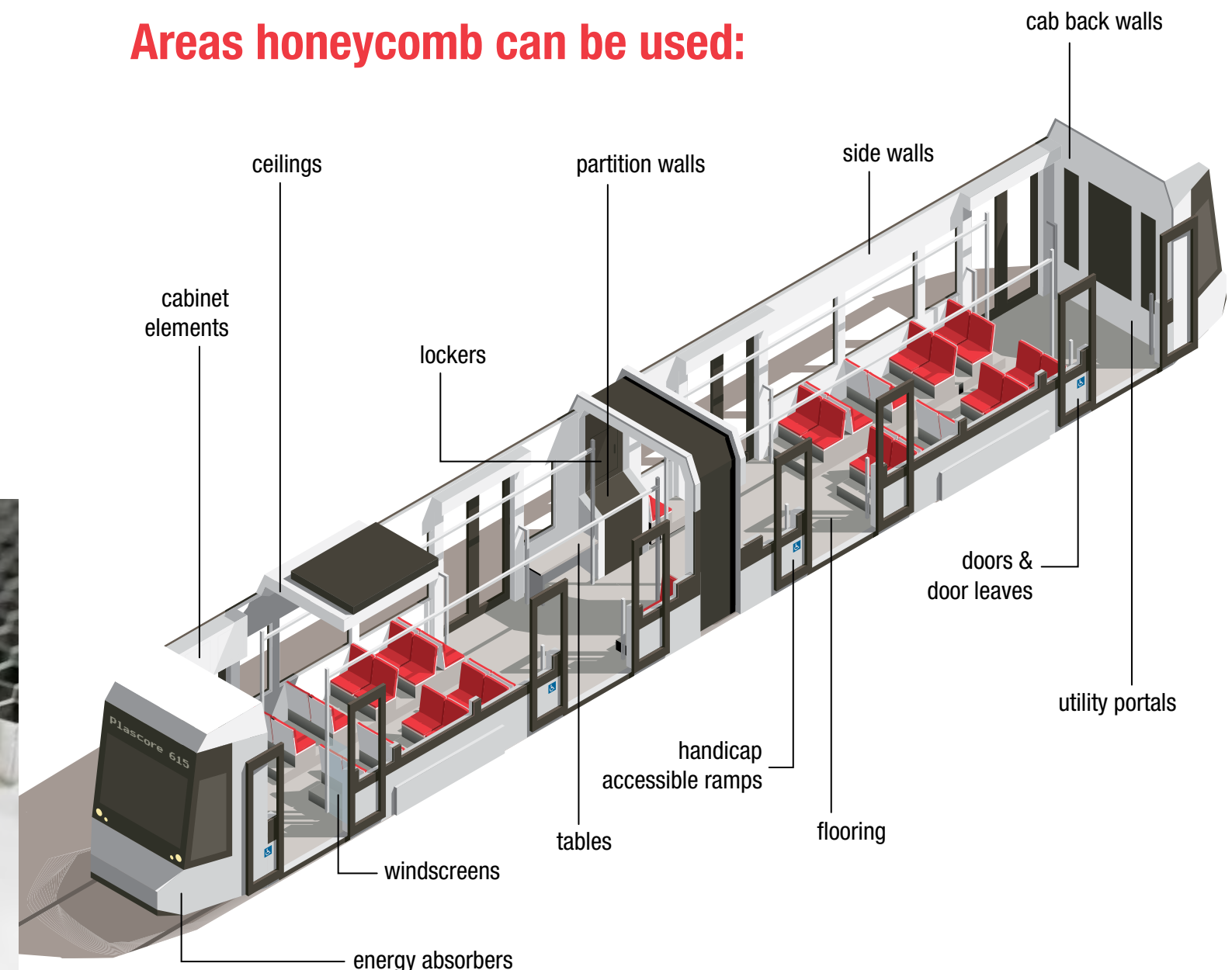
Available in a wide range of sheet sizes and facings, our honeycomb panels are designed for ease of use in many common applications and processes. They can be engineered to meet specific requirements for strength and stiffness. Plascore Honeycomb Panels are used in many situations that require elevated core shear, compression and adhesion performance.



At Plascore we are committed to providing a high-quality product, paired with engineered solutions, for a wide variety of applications. We are a global manufacturer of honeycomb panels, which are a high-strength, lightweight material for use in the Rail Industry. Our engineers can work with your team to manufacture panels that meet your requirements. We are capable of providing basic honeycomb panels as well as finished assemblies that are ready to install upon delivery.



## Areas honeycomb can be used:





# Honeycomb Panel Construction

Based on your project, there are endless options of honeycomb materials, construction, finishes and fabrication to give you a strong, lightweight product. The next few pages gives an idea of our standard options. However, Plascore can customize our product for any need. Please contact your Plascore Sales Representative to ask about other options.

## Material and Finishing Options

### Skin Materials:

- Aluminum
- Stainless Steel
- High Pressure Laminate
- Glass/Epoxy Prepreg
- G10 Fiberglass

### Honeycomb Cores:

- Aluminum (Commercial and Aero/Military Grade)
- Nomex® (Commercial and Aero/Military Grade)
- Kevlar® (Aero/Military Grade)
- Stainless Steel
- Polypropylene
- Polycarbonate

### Sizes:

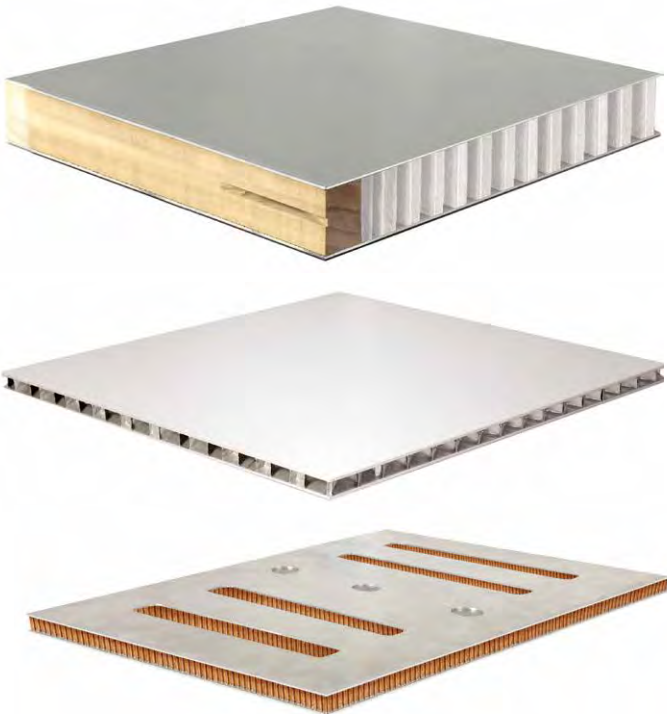
- Thickness: 1/8" – 3" standard
- Width: 48" and 60" standard
- Length: up to 190" standard

### Skin Finishes:

- Clear Epoxy Primer
- Mill Finish
- Bond and/or Paint Ready
- Decorative
- Powder Coat

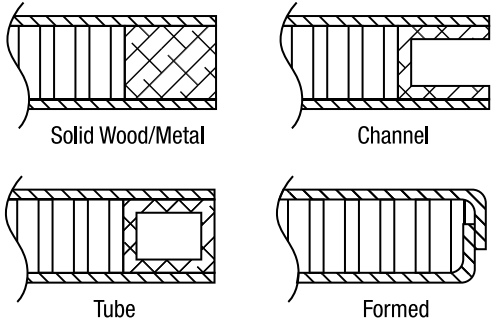
### Adhesives:

- Commercial grade toughened epoxy
  - Cost-effective
  - Service Temperature options up to 180° F
- Modified Epoxy Film Adhesive
  - Service Temperature options up to 400° F
  - Multiple weights available
  - Can be MIL spec or ASTM certified

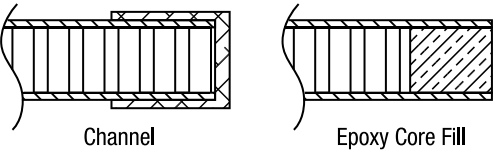


## Fabrication Options

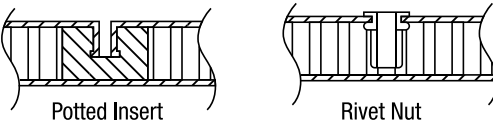
### Co-Fabricated Edge Closeouts



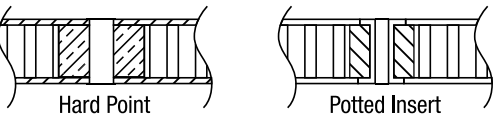
### Post-Fabricated Edge Closeouts



### Blind Fastening



### Thru Fastening

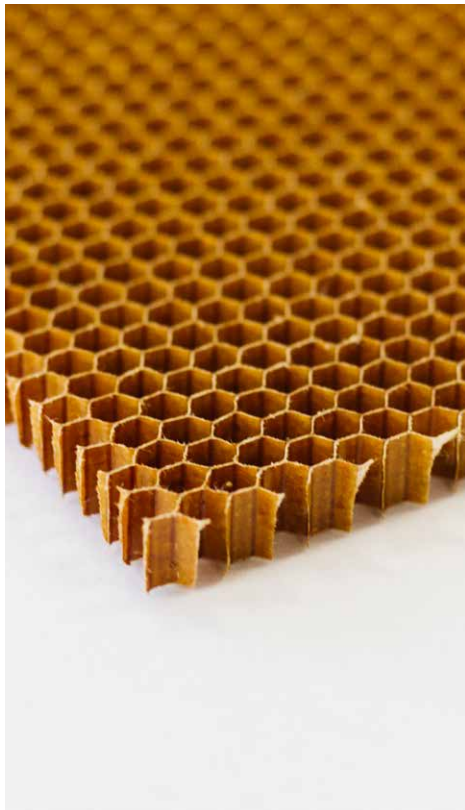


## Manufacturing Competencies

- Chemical Surface Treatment
- Adhesive Formulation
- Core Forming

- Laminating Presses
- Panel Fabrication
- 4-Axis CNC Machining

- Panel Assembly
- Powder Coating
- Custom Packaging



# Honeycomb Panel Technical Data

Plascore Honeycomb Panels are made by adhering two “skin” sheets to a Honeycomb Core. The result is a high-strength, lightweight structure. Honeycomb Core, as opposed to solid material, increases the flexural rigidity of a panel, which allows the end user to utilize less material and reduce weight.

The table below shows some examples of common panel constructions, using aluminum as the core and skin material. This is to give an idea of strength, flexural rigidity, weight and deflection on the most commonly used panels. We can customize your panel material and construction to best fit your needs.

## Specifications

Panel Construction	Thickness		Flexural Rigidity (per unit width)		Deflection with 100 lb. load		Deflection with 250 lb. load		Deflection with 500 lb. load		Weight	
	(in)	(mm)	(lb x in <sup>2</sup> )	(N-mm <sup>2</sup> )	(in)	(mm)	(in)	(mm)	(in)	(mm)	(lb/ft <sup>2</sup> )	(kg/m <sup>2</sup> )
0.020" 5052 skins on 3.6# 3/8" cell alum. HC	0.25	6.35	5370	606720	0.559	14.190	1.397	35.475	2.793	70.950	0.80	3.89
	0.50	12.70	23270	2629160	0.129	3.275	0.322	8.187	0.645	16.373	0.87	4.26
	0.75	19.05	54000	6101190	0.056	1.411	0.139	3.528	0.278	7.056	0.95	4.62
	1.00	25.40	96420	10894010	0.031	0.790	0.078	1.976	0.156	3.951	1.02	4.99
0.020"/0.040" 5052 skins on 3.6# 3/8" cell alum. HC	0.25	6.35	6550	740050	0.458	11.634	1.145	29.084	2.290	58.168	1.07	5.24
	0.50	12.70	29670	3352260	0.101	2.568	0.253	6.421	0.506	12.841	1.15	5.60
	0.75	19.05	69230	7821950	0.043	1.101	0.108	2.752	0.217	5.503	1.22	5.97
	1.00	25.40	122720	13865510	0.024	0.621	0.061	1.552	0.122	3.105	1.30	6.34
0.040" 5052 skins on 3.6# 3/8" cell alum. HC	0.25	6.35	8940	1010080	0.336	8.523	0.839	21.309	1.678	42.617	1.36	6.64
	0.50	12.70	42180	4765700	0.071	1.807	0.178	4.516	0.356	9.033	1.44	7.01
	0.75	19.05	99990	11297370	0.030	0.762	0.075	1.905	0.150	3.810	1.51	7.38
	1.00	25.40	180000	20337300	0.017	0.423	0.042	1.058	0.083	2.117	1.59	7.74
0.063" 5052 skins on 3.6# 3/8" cell alum. HC	0.25	6.35	11250	1271080	0.267	6.773	0.667	16.933	1.333	33.867	2.00	9.75
	0.50	12.70	60000	6779100	0.050	1.270	0.125	3.175	0.250	6.350	2.07	10.12
	0.75	19.05	142100	16055160	0.021	0.536	0.053	1.341	0.106	2.681	2.15	10.48
	1.00	25.40	270000	30505950	0.011	0.282	0.028	0.706	0.056	1.411	2.22	10.85
0.063" 5052 skins on 5.2# 1/4" cell alum. HC	0.25	6.35	11290	1275600	0.266	6.749	0.664	16.873	1.329	33.747	2.03	9.89
	0.50	12.70	61360	6932750	0.049	1.242	0.122	3.105	0.244	6.209	2.13	10.41
	0.75	19.05	150000	16947750	0.020	0.508	0.050	1.270	0.100	2.540	2.24	10.94
	1.00	25.40	270000	30505950	0.011	0.282	0.028	0.706	0.056	1.411	2.35	11.47

*\*Deflections are for a simply supported panel with quarter point loading. Panels are 48 in. wide with a span of 48 in. Note that these are calculated, typical values, not tested values and are for reference only. Flexural rigidity can be tested per ASTM C393 to verify calculated values.*

*\*\*Stabilized compression strength for each panel can be assumed to be stated bare compressive strength of core and can be tested per ASTM C365 upon request.*

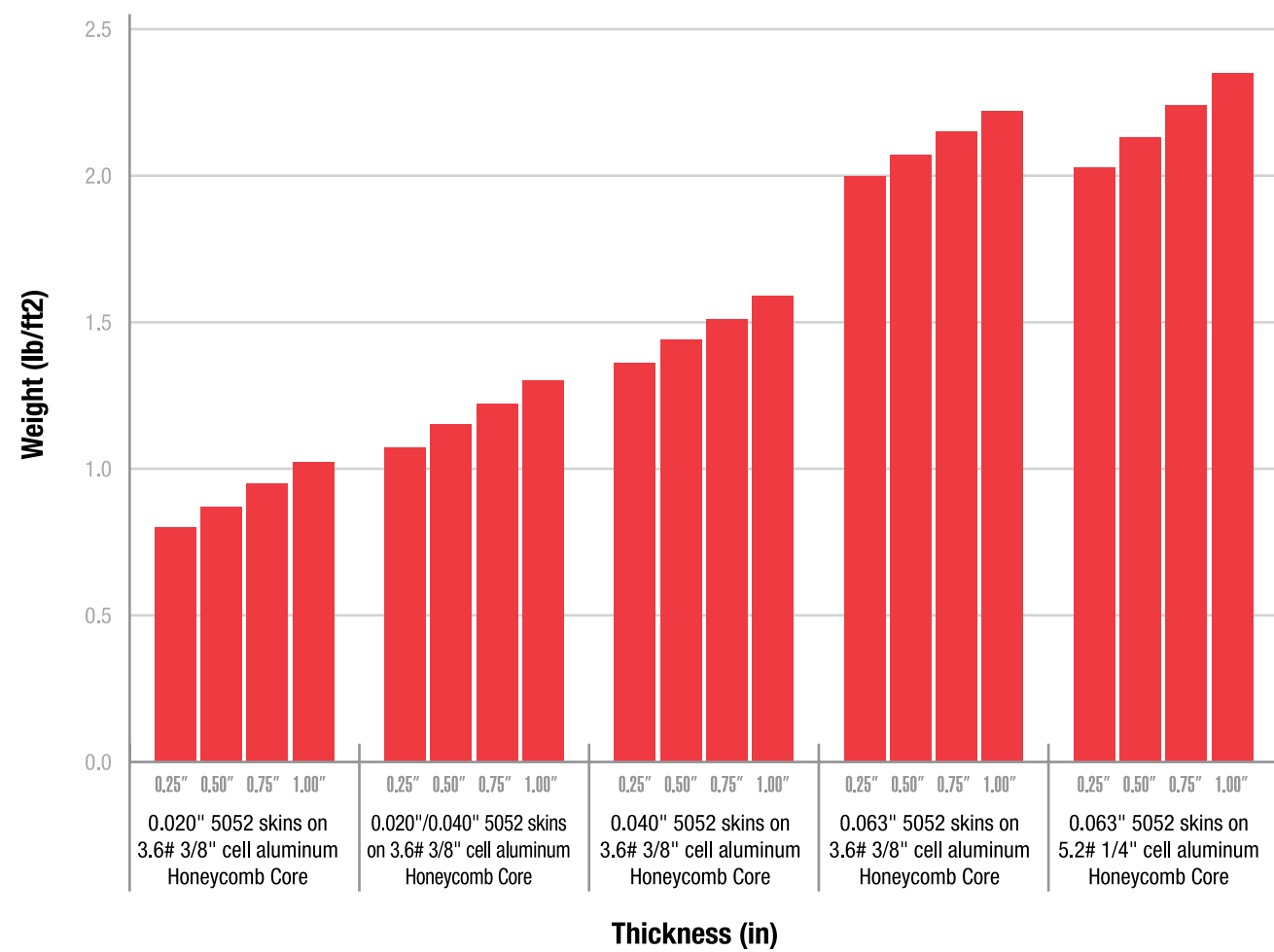
*\*\*\*Climbing drum strength and flatwise tensile strength will be dependent upon combination of skin material, core type, and adhesive type. Plascore can perform either test per ASTM D1781 or C297 upon request.*



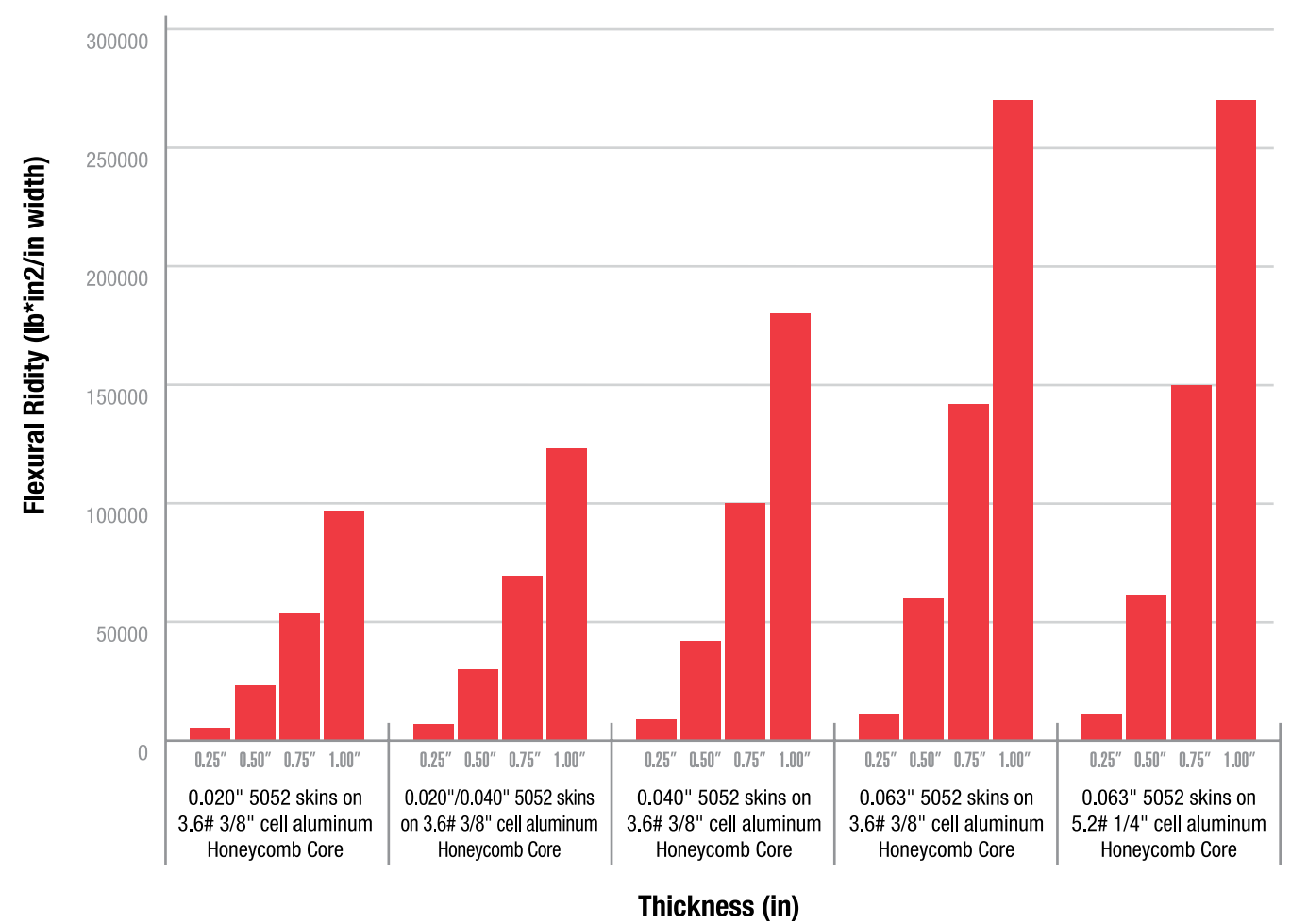




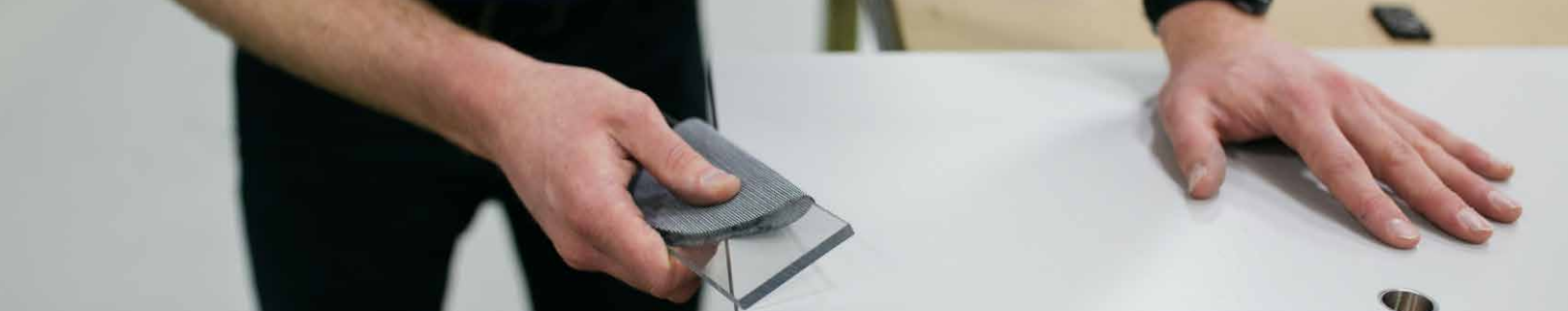
## Weight-to-Thickness Ratios



## Flexural Rigidity-to-Thickness Ratios



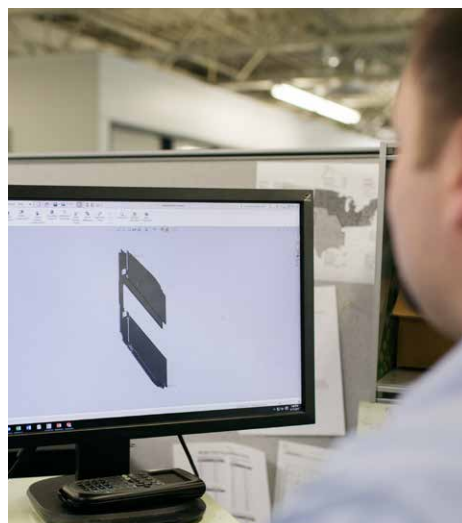




# Our Process

At Plascore, the quality of our process is as important to us as the quality of our product. Along with strong, lightweight Honeycomb Panels, we will walk you through the process of creating the products you need, from idea to design to deployment.

## 1. Sales & Design



Our Sales Team will be your first point of contact, and will follow up with you throughout the entire process. The Sales Team is a liaison between you and the rest of the Plascore team, from communicating design requirements to conducting negotiations. As part of the Sales Team, our Sales Engineers will review and analyze your project. If they think your design needs any changes, they will offer suggestions and finalize blueprints. *This step of the process may go a few rounds, to ensure the project is ready to go before we move on to the next steps.*

Our purchasing department works with our engineers to source the raw materials needed for your project. We have a large and established supply base and are capable of handling large, complex projects. We make decisions about make versus buy and yield optimization to help your project to be cost effective.

## 2. Purchasing / Procurement

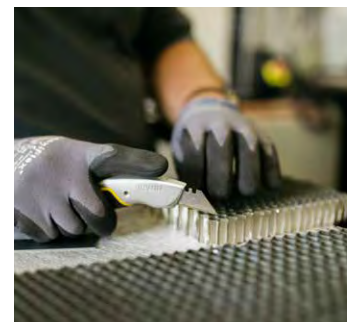


## 3. Production



Our Production Team includes Manufacturing Engineers, Panel Technicians, CNC Programmers and Operators. Your project will be led by a Production Supervisor, who will optimize the use of equipment, minimize waste, and ensure on-time delivery. Our engineers will help set up the process for your specific project and ensure that your product meets quality standards. Our CNC programmers work with CAD/CAM Software such as Solidworks, AutoCAD, and Catia V5.

## 4. Quality & Certification



Our quality control department works alongside our manufacturing group to ensure your product is made correctly according to your specifications.

### Accreditations include:

- AS/EN/JISQ 9100
- ISO 14001
- ISO 9001:2000
- NADCAP

### Our quality department and lab performs a variety of testing such as:

- Compression
- Adhesive Testing
- Salt Spray
- Tension
- Thermal Loading
- NFPA 130
- Shear
- Humidity
- Testing per ASTMs

They also can provide First Article Inspections and reports as well as finished panel Certifications. At Plascore we are also ISO certified.

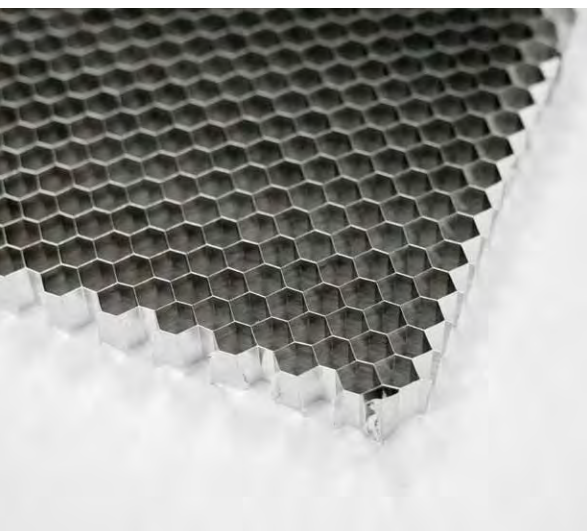
## 5. Shipping



Our shipping department has a close relationship with a variety of carriers in order to provide the best shipping rate with the least amount of transit time. They will work with your preferred carrier as well.

- Just-In-Time Delivery
- Custom Kit packaging
- Warehousing





### Corporate Headquarters

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Plascore, Inc. employs a quality management system that is AS/EN/JISQ 9100, ISO 9001:2008 and ISO 14001:2004 certified.

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