

# Hard Pressed Composite Laminates

Lower Weight Alternatives for  
Aluminum and Titanium

MACRO Industries, Inc.

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# Aluminum Price vs. Weight

Information based on a 4'x 8' sheet

Material is ballistically qualified and certified per specification 1560-MULTI-001

\*Discounted Price for 2010

	Aluminum			MACRO MP017			
Sheet Thickness	Weight lbs	Tensile Str. lbs / in	Price	Weight lbs	Tensile Str. lbs / in	Price*	Weight Savings
2024 T6 Sheet .032" - 71 ksi	14.45	2,272	\$103	7.74	3,600	\$147	46%
5052 H32 Sheet .032" - 31 ksi	14.45	992	\$64	3.87	1,800	\$74	73%
6061 T6 Sheet .032" - 42 ksi	14.45	1,344	\$73	3.87	1,800	\$74	73%
7075 T6 Sheet .032" - 78 ksi	14.45	2,496	\$148	7.74	3,600	\$147	46%

	Aluminum			MACRO MP009			
Sheet Thickness	Weight lbs	Tensile Str. lbs / in	Price	Weight lbs	Tensile Str. lbs / in	Price*	Weight Savings
2024 T6 Sheet .032" - 71 ksi	14.45	2,272	\$103	5.18	3,300	\$294	64%
5052 H32 Sheet .032" - 31 ksi	14.45	992	\$64	1.73	1,100	\$98	88%
6061 T6 Sheet .032" - 42 ksi	14.45	1,344	\$73	3.46	2,200	\$196	76%
7075 T6 Sheet .032" - 78 ksi	14.45	2,496	\$148	5.18	3,300	\$294	64%

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# Titanium Price vs. Weight

Information based on a 4'x 8' sheet

Material is ballistically qualified and certified per specification 1560-MULTI-001

\*Discounted Price for 2010

	Titanium			MACRO MP017			
Sheet Thickness	Weight lbs	Tensile Str. lbs / in	Price	Weight lbs	Tensile Str. lbs / in	Price*	Weight Savings
0.032	23.59	4,000	\$954	11.62	5,400	\$221	51%
0.064	46.45	8,000	\$2,117	19.36	9,000	\$368	58%
0.125	92.16	15,625	\$3,939	34.85	16,200	\$661	62%

	Titanium			MACRO MP009			
Sheet Thickness	Weight lbs	Tensile Str. lbs / in	Price	Weight lbs	Tensile Str. lbs / in	Price*	Weight Savings
0.032	23.59	4,000	\$954	6.91	4,400	\$392	71%
0.064	46.45	8,000	\$2,117	13.82	8,800	\$784	70%
0.125	92.16	15,625	\$3,939	25.92	16,500	\$1,469	72%

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# Hard Pressed Composite Laminate

- Two options are readily available
- Custom laminates can be produced - sheet sizes up to 4'x 8'
- Material ballistically qualified and certified per specification 1560-MULTI-001
- Material Environmentally tested in accordance with MIL-STD-810F
- Material Tests
  - Elmendorf Tear Strength ASTM D1424
  - Tear Strength ASTM D2261
  - Tongue Tear – Five Highest Peaks
  - 1" Strip Coating Adhesion ASTM D751
  - Cold Crack Resistance @ 20o F (SEC 61-65)
  - Puncture Resistance ASTM D751
  - Abrasion Resistance of Textile Fabrics Oscillatory Cylinder Method ASTM D4157
  - Tensile Properties ASTM D638-03