The choice of material is dependent on the concentration of various corrosives present in the application environment and other physical properties necessary to meet the design specifications.

To begin the selection process, one must consider the general atmosphere as well as the corrosive agents which can be present in an application. Defining the corroding agents and determining the concentration can be a complex process. Usually several corrosive elements are present and interactions are not always well documented.

Water (and water states such as ice, snow, mist, fog, vapor) is the most common corrosive and is usually present to some extent in every enclosure application. Each environment is unique and all possible corrosive agents should be identified for the intended enclosure application.

To select the best enclosure material for an application; chemical resistance, physical strength and economic data are presented in several tables beginning on the next page. In Table 1 enclosure materials are rated on a continuum from "Recommended" to "Limited or Unacceptable" in three broad categories of chemicals. Since the chemical resistance categories in the table are extremely broad, some materials may perform well in specific corrosive environments within a general category and it is best to consult the detailed Chemical Resistance Information provided in Table 3.

Besides the enclosure material, the corrosion resistance of windows, gaskets, latches, etc. must also be considered. Table 4 provides corrosion resistance information that can be used to select the commonly used materials for these features.

Much of the chemical resistance information in Table 3 is based on total immersion testing in the chemical for a minimum of 30 days at 72°F. Some fiberglass test specimens were evaluated using procedures outlined in ASTM D 543, Test Method for Resistance of Plastics to Chemical Reagents. The information in these tables is intended as a guide only. Total immersion testing is considered quite severe and **the results may not necessarily reflect the performance under actual field conditions.** The user assumes responsibility for selection of the material based on the characteristics of the application environment.

Specifications for Stahlin Enclosure Back Panel Construction Materials

Fiberglass (FG)
Fiber reinforced polymer made of a plastic matrix reinforced by fine fibers made of glass. The plastic matrix is a thermosetting plastic made of polyester.

Carbon Steel (CS)
A low carbon, rolled steel produced by passing bar stock through a set of rolls. Stahlin CS back panels are powder coated for appearance and protection.

Stainless Steel (SS)
Stainless steel is defined as a steel alloy with a minimum of 11% chromium content by mass. Stainless steel is used where both the properties of steel and resistance to corrosion are required. Stahlin hardware and SS backpanels are fabricated utilizing 3000 series stainless steel.

Aluminum (AL)
A lightweight metal that quickly forms a natural oxide layer to resist corrosion. Stahlin fabricates back panels from Type 3003 H14 Aluminum, the highest strength non-heat treatable aluminum alloy recommended for marine applications.

TABLE 1. BROAD CATEGORIES OF ENCLOSURE MATERIAL CHEMICAL RESISTANCE

CONTINUUM OF USE	GENERAL CATEGORY OF CHEMICALS		
	Acids	Alkalines	Solvents
⬇ ⬇ Recommended ⬇ ⬇	Stainless Steel Fiberglass	Fiberglass Stainless Steel	Fiberglass Stainless Steel Aluminum Powder Coated Steel
Acceptable ⬇ ⬇	PC PVC Powder Coated Steel	PC Galvanized Steel Powder Coated Steel	Galvanized Steel
Limited or Unacceptable ⬇ ⬇	Aluminum Galvanized Steel	PVC Aluminum	PC PVC

TABLE 2. RELATIVE MATERIAL STRENGTH AND COST COMPARISON OF COMMONLY USED ENCLOSURE MATERIALS

MATERIAL	RELATIVE PHYSICAL STRENGTH	RELATIVE COST	APPLICATION CONDITIONS	TEMPERATURE LIMITATIONS
Aluminum	Average	Average	Indoor and Outdoor, Marine, Solvents, Petrochemical Sulfates, Nitrates and Specific Acids.	None for enclosure applications
Fiberglass	Average	Low-Average	Indoor and Outdoor for continuously damp and highly corrosive environments. Petrochem, Water Treatment, Food Processing, Coating, Salts and Chemicals, Solar.	-40°F(C) to 250°F(121°C) Stahlin -76°F to 274°F (-60°C to 134°C)
Mild Steel: Galvanized Painted	High	Average Low	Indoor and Outdoor where the respective coating provides acceptable protection in a mildly corrosive environment.	None for enclosure applications.
Stainless Steel	High	Average-High	Indoor and Outdoor in highly corrosive applications. Food and Dairy Processing or Marine.	None for enclosure applications.
Acrylic	Average	Low	Enclosure Windows. Weatherable, Scratch Resistant. Good resistance to Solvents.	-31°F(-35°C) to 180°F(82°C)
Poly-carbonate	Average	Low-Average	Enclosure Windows. Not recommended for direct sunlight, exposure to organic solvents and concentrated alkalis.	-31°F(-35°C) to 248°F(120°C)
Nylon	Average	Low	Cord Grip, Hinges, Latches.	-22°F(-30°C) to 212°F(100°C)
Gaskets: Neoprene Silicone Urethane	 Low Low Low	 Low Average Average	 Oil Resistance. Seams may be a problem Oil Resistance Temperature & Chemical Resistance. Water and Oil Resistance, Chemical Resistance.	 -40°F(C) to 225°F(107°C) -40°F(-40°C) to 350°F(175°C) -40°F(C) to 200°F(93°C)

Detailed material strength information is beyond the scope of this catalog and should be obtained from a materials reference; however, Table 2 provides some relative data to help with this selection.