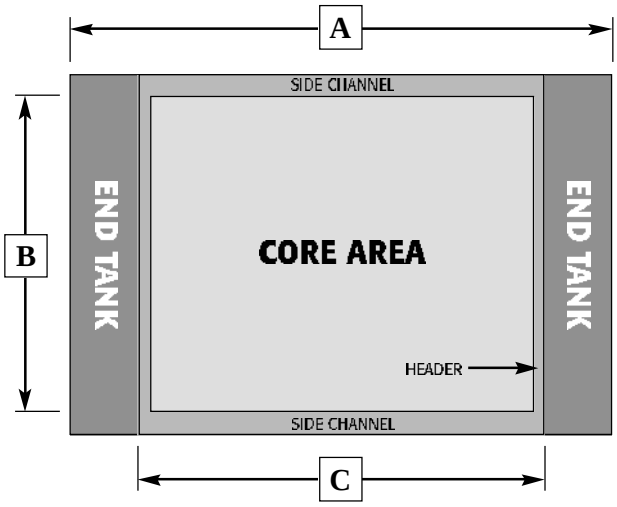
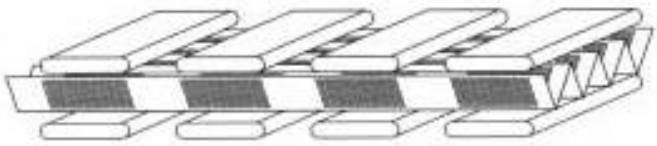
Radiator Terms & Measurements



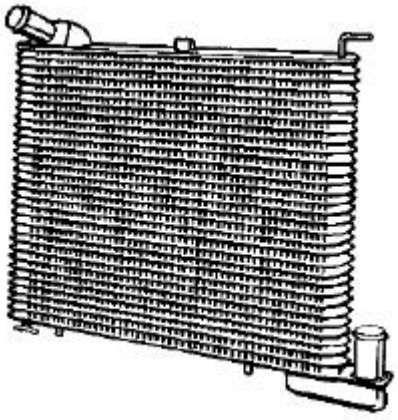
The illustration to the left is typically called a "**cross flow**" type radiator. The center area that includes the fin and tubes is the "**core**". Each end of the core has an "**end tank**" welded or brazed to the core. The coolant flow path is horizontal through the tubes. When the end tanks are on the top & bottom, the radiator is called a "**down flow**" as coolant travels vertically. Most radiator manufacturers refer to the "C" and "B" dimension only when calling out the radiator size. The overall length "A" is seldom used. "B" is the distance measured between the two side channels.

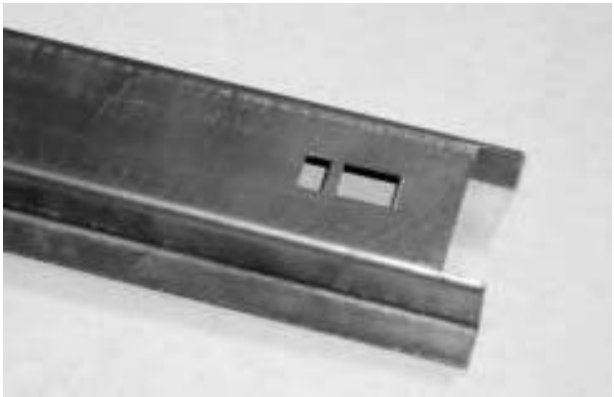
The illustration to the right shows the end view of the core with the end tank removed. Many people incorrectly call this a "four core" when it is actually a "**four row**" design. Here, we are referring to the number of "tubes" that carries the coolant.



Re-coring or remanufacturing

A "**re-core**" refers to a process whereby the end tanks are un-soldered and the center "**core**" is replaced with a new one. This process is only possible with a brass/copper radiator because aluminum radiators cannot be "un-soldered". The original aluminum stack plate design used between 1960-72 had no end tanks at all. This special high performance radiator was all "**core**".





Radiators are viewed with the inlet tanks on the top. The support beams perpendicular to the end tanks are called "side channels". All cross flow GM radiators used during 1966-82 used the side channels to the left. They featured four bends for superior strength and punch holes for haning the radiators during the painting phase. We choose to standardize on this type of channel with our Direct Fit® aluminum radiators because it offers both strength and a stock factory look. It also allows for standardization when it comes to mounting electric fan kits.

Why Aluminum?

There are many philosophies on how to properly cool Corvette engines. From electric blower fans to water additives, people will try just about anything to keep that temperature gauge down. But many Corvette owners overlook the obvious, a good radiator.

Let's start with something as basic as the thermostat. A thermostat is supposed to modulate, just like the thermostat in your house turns the furnace on and off. When the coolant reaches the thermostat setting, it opens and lets flow go through the radiator. The radiator, if capable, will drop the temperature down to a point the thermostat modulates. This sounds pretty simple, but this doesn't always happen.

In many cases, the thermostat opens and the radiator isn't effective enough to lower the temperature. So it goes 30-40 degrees higher than the thermostat. You can't solve this problem with blower fans, high-octane booster, or an $8 bottle of special water.

Depending on what year Corvette, the problem can vary, but the solution is always the same. Aluminum radiators can solve your overheating problem. Why are aluminum radiators so much better?

Look at the cut away view of a typical four-row brass/copper (Fig. 1) radiator. The area "a" indicates where the tube is in contact with the fin. This is the only area that provides heat dissipation. The area "b" is dead space and does not provide any cooling.

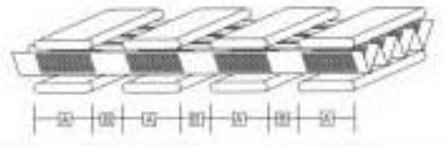


Fig. 1 Typical (4) four tube brass/copper design

The trick to better cooling is wider tubes. This increases the "tube to fin" contact area, which determines the radiator efficiency. A typical copper radiator uses 3/8" wide tubes (Fig. 1) while the aluminum radiators (Fig. 2) use tubes 1" wide. When a radiator is designed with wide tubes, the tubing wall thickness must be increased to prevent the tube from expanding or a term known as "ballooning".

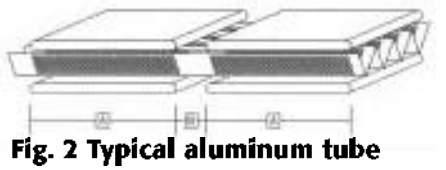


Fig. 2 Typical aluminum tube design

Designing a brass/copper radiator with wide tubes is not practical because the radiators could weigh as much as sixty pounds. The lighter weight aluminum can be designed with a heavier wall thickness with very little effect on weight. Several major companies including Delphi, Visteon, Griffin, and many others have adopted this theory and no longer make any brass/copper radiators.

Almost every racecar today is currently using an aluminum radiator because of the benefits described above.

The chart below illustrates the test results when comparing two equal size radiators.
As you can see, the brass radiator was rated almost 30% below the factory design.

Radiator	Material	BTU Rating
2 row	Aluminum	4115
4 row	Brass/Copper	3296

If your Corvette was originally equipped with an aluminum radiator, then it must stay that way to function properly. If the original factory radiator was brass & copper, then you might want to consider upgrading to aluminum. This is a great idea for cars with Big Blocks or air conditioning.

When considering a new radiator, ask a lot of questions. If your dealer believes the only difference between the copper/brass and aluminum is the cost, look somewhere else. Anyone suggesting you deviate from an original aluminum radiator either doesn't know any better or just wants to sell you what's in stock. A good radiator is the only way to protect your engine from excessive heat.