

cutting-edge CAD/CAM/CAE technology, 3-D rapid prototyping and strict quality control," says Ciordas. "They are also the only Lambo-style door kits to pass a side impact test by [international TÜV] standards." (As an international service company, TÜV Rheinland Group documents the safety and quality of new and existing products, systems and services).

The universal weld-on-type hinge, named the GTF Diablo Door System, was invented by Dan Greenbank of the GT Factory (San Diego, California). "GT Factory is proud to offer the world's only universal application Diablo door hinge conversion," Greenbank says. "With more than three years of research and development, the GTF Diablo door conversion is the most precise mechanism available outside the exotic automobile manufacturers in Italy to motivate your doors to a new altitude," he adds. The GTF kit also allows doors to be adjusted up to a full 90 degrees—straight up.

The GTF kit also includes two heavy-duty chromoly steel nickel-plated hinge assemblies and four 150-psi nitrogen filled lift shocks (two for each side). GTF hinges are fully adjustable, and feature a "top stop" so both doors can be matched perfectly when up and an adjustable arch plate that locks the door into an "L" shape motion (out, then up).

"The arch plate is the biggest major difference between the weld-on style kits and the bolt-on style kits," Chase says. "The arch plate primarily keeps the door from closing into the fender when up." The arch plate on the GT Factory kit is CNC-machined from ¼-inch thick chromoly steel and is 2.5-inches long—the surface area that prevents the door from closing in when it's up.

The bolt-on style kits use an acorn nut that rubs on the inside of the swing arm. The difference is this acorn (or pyramid) nut is not adjustable and only one corner of it rubs on the inside of the swing arm to prevent the door from closing into the fender when up. "We've seen cases where after only a few months the acorn nut is ground down a one-sixteenth inch," Chase says. "That's not much, but one-sixteenth inch of play at the hinge assembly equals the door wobbling about 5 or 6 inches more at the other end." Vertical Doors's Connole says, "We know that is a problem with some products out there. We have resolved that issue by using high-quality nuts in different sizes for each application as needed."

Well-known tilt-up door kit manufacturer WingDoors (San Diego, California) took a different approach, making both weld-on (Mark I) and bolt-on (Mark II) kits that lift the doors straight up to 90 degrees (as well as suicide rear door kits). "After many years of development, we finalized our WingDoors design using revolutionary patent-pending technology that allows the doors to open up normally first, and then bring them up to 90 degrees for a sick new look that will have everyone talking," says general manager Nicole Ross. "Because of the innovative new design,

## Metallurgy 101 //

As you look at the elements of various Lambo-door kits, you'll find a number of technical terms that describe the materials and processes used by each company. Here's what those terms mean.

**CAD/CAM/CAE:** Acronyms for computer-aided design, computer-aided manufacturing and computer-aided engineering

**3-D Rapid Prototyping:** A process primarily used for rapid prototyping (automated freeform fabrication) of plastic, three-dimensional (3-D) parts automatically from a CAD file.

**Chromoly Steel:** An abbreviation for "chromium-molybdenum" steel, an alloy used to produce race-car frames and roll cages. It is not as lightweight as some steel alloys, but has the advantages of high tensile strength (the force required to break it) and pliability. It is also easily welded.

**Heat-Treated Steel:** The purpose of heat-treating plain-carbon steel is to change the mechanical properties of the steel (including flexibility, hardness, yield strength and impact resistance) to allow parts to be fabricated in an easily formable soft state.

**Cast Steel:** Steel produced by the pouring of molten iron into a mold. Cast steel components are common due to their relatively inexpensive production process. It is not recommended to weld on cast steel.

**Rockwell Hardness:** Rockwell hardness testing is a general method for measuring the bulk hardness of metallic and polymer materials. Hardness correlates with strength, and the material's resistance to wear and deformation.

**Nickel Plating:** The process of putting a nickel coating on a metal or other conducting surface by using an electric current. It is used to improve the appearance of materials and for protection against corrosion.

+ Decah Nissan Armada

+ Decah VDC kit

+ Decah BMWs

+ Short Decah-style shock and longer GT Factory-style shock.

