

# Punching Holes for Added Strength

*An In-Depth Look at Flared-Hole Fabrication*

By Robin Stover

PHOTOGRAPHY: COURTESY OF LIGHT RACING

**S**ome call them “dimples” and some mistakenly refer to them as “speed holes,” but for the skilled truck builder these purposeful fabrication techniques are appropriately referred to as “flared holes.” Flared holes can be found on high-tech race cars, trophy trucks, and even in some commercial building reinforcements. They originally came from, and were likely developed by, the aircraft industry where light weight and strength go hand in hand. We’ve seen examples of this “structure-enhancing” practice used in automobiles dating as far back as the 1950s, when racing outfits such as Lotus and Jaguar first promoted their use. Today, however, the idea is foreign to most home-brew fabricators because very little information exists about the proper technique and the tooling that is required to make flared holes. So what’s the big secret? We think the lack of available tooling and seemingly limited knowledge about creating “flared holes” is attributed to simple laws of supply and demand.

You see, high-end chassis builders use flared holes to lighten and stiffen structural members; aside from them, flared holes are rarely used. It’s not every day that Robby Gordon strolls into the local fab shop commissioning another trophy truck to be built. So, flared-hole equipment typically remains tucked away in fabricator storage cabinets until the appropriate piece of metal requires additional strength and rigidity. This article should help shed some light on what’s actually required to make

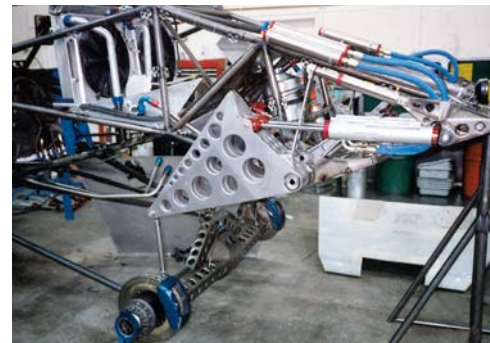


flared holes and why they may or may not be right for your 4x4 project.

## What Is It?

This is a die used for making flared holes. They are basically two hardened metal pucks with curved shoulders that fit snugly together. The ones shown here are manufactured by Light Racing by Specialty Products Company. The Light Racing Group is located in Catheys Valley, California, and has been designing and developing specialized off-road racing vehicles and high mobility suspension systems for over 25 years. Vice President Bryan Kudela began incorporating the use of

flared holes back in 1983. Because Light Racing specializes in high-performance lightweight sheetmetal components, they are unarguably experts when it comes to flared holes. Kudela explains further, “Flared holes have become part of our marketing image. We did some serious R&D while working with GM Truck Engineering in the mid-’90s while we were developing a lot of lightweight suspension and structural components.” The Die you see here is currently offered by Light Racing as an individual piece or as part of a complete a set.



## How It Works

A flared hole removes a small circular portion of material while adding a formed flare that stiffens the material



surrounding the hole. In many structural sheetmetal components or frame members, thin sheetmetal sides might buckle under the tension and compression loads they need to bear. For these, a flared hole is likely the solution to the problem. By utilizing well-placed flared holes, you inherently decrease the overall mass of the panel by removing material and simultaneously increase the stiffness and buckling limits of the same panel. This produces a more efficient solution, resulting in lighter weight parts.

### Benefits of Flared Holes

Since the design efficiency is often governed by the “weakest link,” the flared hole technique is appropriate for thin sheet components. One welcomed benefit of a flared hole is a lighter weight structure. It should be noted, however, that the benefit of this technique is proportional to the ultimate efficiency of the design. In other words, if the part is over-designed, with too many flared holes, the material will simply end up weaker than before. It’s better to space out perforations and use less flared holes to stiffen a particular section of metal. In real-world terms, a fabricator may easily shed up to 500 pounds from a 5,500-pound trophy truck using good sheetmetal design integration which includes the flared hole technique.

### What’s Else Is Needed?

The only equipment needed to utilize the flared-hole die is a common hand press, except for the larger sizes and when using harder materials like chromoly. Even the smallest shop press will accommodate most flaring jobs. A bench vise or small arbor press will suffice in a pinch for most small- to

medium-size holes. Professionals typically burn holes with laser cutters, but the tried-and-true process for a small shop or home garage simply uses a standard hole saw.

### Flaring and Material Choices

Flared holes work with almost any type of metal if it is formable by the process without destroying the material properties. Steel probably benefits most from the process as it is typically heavier and needs lightening in the first

place. Flaring holes in aluminum is easiest of all because of its soft malleable state. More critical to the process are the proportions. With today’s typical material usage in race vehicles, you could probably say that the benefits increase as the material gets thinner. Again, this implies proper design in the first place. Generally speaking, flared holes are most effective when used with 0.040- to 0.080-inch thickness range. Light Racing’s dies are designed for up to 0.090-inch 4130 chromoly or up to 0.120-inch mild steel. ●



### More about Light Racing by Specialty Products Company

Some of the successes Light Racing is associated with include five Riverside Off-Road World Championships, two MTEG Manufacturers Cup Titles, seven consecutive SCORE Class 7 Desert Championships, and the 2004 SCORE Trophy Truck Champion as well as the current 2005 First and Second place SCORE Trophy Truck points leaders. For more information on Light Racing, click on [www.lightracing.com](http://www.lightracing.com) or call 800/525-6505.