WHERE IS HIGH-STRENGTH STEEL TYPICALLY FOUND IN TODAY’S VEHICLES?

**Cutting Performance**

The Hurst Jaws of Life® S 700 Series cutter offers up to 77% more cutting power exactly where profiles of a car body are cut. The theoretical maximum cutting force for many cutters apply at a material diameter close to zero, which is an irrelevant figure in real world applications. It also shows that maximum forces for traditional cutters apply at small material diameters where the force which is required to cut the material is very low (red line).

### Cutting Force (tons) vs. Material Diameter (mm/in)

<table>
<thead>
<tr>
<th>Material Diameter (mm)</th>
<th>Cutting Force (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 17.3 mm</td>
<td>0.68 in</td>
</tr>
<tr>
<td>C2 27.5 mm</td>
<td>1.08 in</td>
</tr>
<tr>
<td>C3 33.5 mm</td>
<td>1.32 in</td>
</tr>
<tr>
<td>C4 42.2 mm</td>
<td>1.66 in</td>
</tr>
<tr>
<td>C5 48.3 mm</td>
<td>1.90 in</td>
</tr>
<tr>
<td>C6 60.5 mm</td>
<td>2.38 in</td>
</tr>
<tr>
<td>C7 73.2 mm</td>
<td>2.88 in</td>
</tr>
<tr>
<td>C8 88.9 mm</td>
<td>3.50 in</td>
</tr>
<tr>
<td>C9 101.6 mm</td>
<td>4.00 in</td>
</tr>
</tbody>
</table>

**Maximum Cutting Force**

Most of the hydraulic cutters on the market today achieve their advertised maximum cutting force as the blades’ leading edges cross past each other nearest to the blades’ pivot point. This means the cutter’s weakest point is when the blades are in the full-open position.

Cutting Force S510 | Cutting Force S700 | Force Required
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td>Maximum Cutting Force</td>
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</table>

- **Cutting Force S510**: The cutter achieves its maximum cutting force as the blades’ leading edges cross past each other nearest to the blades’ pivot point.
- **Cutting Force S700**: The cutter offers up to 77% more cutting power exactly where profiles of a car body are cut.
- **Force Required**: The theoretical maximum cutting force for many cutters apply at a material diameter close to zero, which is an irrelevant figure in real world applications.

### Relevant Working Range

- **A-Pillar and Roof Rail**
- **B-Pillar**
- **Floor Pan and Center Tunnel**
- **Rockers**

### Cutting Performance

**NOTE**: Locations and characteristics of high-strength steel may vary depending on the vehicle. These material variations may include any combination of martensitic steel, boron-press-hardened steel, ultra-high-strength steel, high-strength steel and dual-phase steel.
Essential Elements in Cutting Capability

Typically, rescue cutters have been marked by maximum cutting force. The standard has been - the more, the better.

While cutting force and operator technique is very important, cutter blade design, which includes blade geometry and composition in conjunction with the manufacturing, forging and heat treating processes, is a key factor when determining a cutter’s ultimate cutting capability.

Because it comes down to saving lives, Hurst Jaws of Life® is dedicated to researching those resuscators, and those resusciting equipment decisions on their behalf, understanding the key elements that doles quality performance. We believe you deserve to be armed with the facts, so you can choose the best rescue tools for your community.

Drawing Capability

Cutting Force at the Right Point

Today’s modern vehicles are highly advanced types of steel in their construction. These highly reinforced structures do not compress into a tight bundle like the A-Posts, Roof Rails and B-Posts of passenger vehicles built in the 80s and 90s. Instead, when the cutter comes into contact with these highly reinforced areas of the vehicle, the blades begin to close more before welding flange, the tip of the outside blade is able to more easily punch through the highly reinforced areas of the A Pillar-posts and B-posts while maintaining the tool’s position outside the vehicle. This new cutter blade design eliminates the tendency of the tool to rotate into the passenger compartment.

Additionally, the S 700 series cutter blades have three distinct cutting angles. As the blades close, the press-hardened Boron sheet metal and martensite steel cracks and fractures. As the cutters continue to close, blade angles change resulting in improved done of the post material in the stronger cutting areas of the rear of the blades.

All Hurst Jaws of Life cutter blades, including those on the new S 700 series, feature a forged shock resistant tool steel that has been subjected to heat treatment using a four-step tempering process, which reduces the blade’s heat and stress resistant while maintaining ductility. This is crucial when cutting today’s high-strength steels.

The S 700 series’ validation capabilities include unparallel damage control, structural collapse, aircraft egress and hundreds of real world challenges. The S 700 series is fully equipped with brush safety features, such as hand guards, front guard, and power internal relief valves.

The Hurst Jaws of Life® S 700 Series includes the 7 106 and 7 106C. The S 706E is part of the eDRAULIC line of rescue tools. These tools were engineered to free rescue workers of power units and heavy hoses, eliminating the set-up time associated with traditional rescue tools.

Hurst Jaws of Life® S 700 Series

The new Hurst Jaws of Life® S 700 series cutter design has improved blade geometry, which enables the largest shock resistant tool steel blades to attain maximum cutting capabilities at a lower opening. The blades on the Hurst Jaws of Life® S 706E Series cutters (the 7.3-inch opening is in the fully open position and is specifically shaped to generate a high degree of power at the tip of the blade, making these tools more suitable for cutting the larger diameters and stronger steel being encountered by rescuers today.

Cutting Force at the Right Point

Today’s modern vehicles are highly advanced types of steel in their construction. These highly reinforced structures do not compress into a tight bundle like the A-Posts, Roof Rails and B-Posts of passenger vehicles built in the 80s and 90s. Instead, when the cutter comes into contact with these highly reinforced areas of the vehicle, the blades begin to close more before welding flange, the tip of the outside blade is able to more easily punch through the highly reinforced areas of the A Pillar-posts and B-posts while maintaining the tool’s position outside the vehicle. This new cutter blade design eliminates the tendency of the tool to rotate into the passenger compartment.

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Essential Elements in Cutting Capability

Typically, rescue cutters have been marketed by maximum cutting force. The standard has been - the more, the better. While cutting force and operator technique is very important, cutter blade design, which includes blade geometry and composition in conjunction with the manufacturing, forging and heat treating processes, is a key factor when determining a tool's ultimate cutting capability.

Because it comes down to saving lives, Hurst Jaws of Life® is dedicated to producing robust cutters, and testing those equipment design decisions on their behalf, understanding the key elements that allow double cutters to perform incredibly well. We believe you deserve to be armed with the facts, so you can choose the best rescue tools for your community.

Drawing Capability

Often overlooked is the cutter blade's ability to draw material to the rear of the blades, which is a key component in cutting capability. An effective cutter draws the metal to the rear of the blade where the cut force is greatest.

Cutting Force at the Right Point

Today's modern vehicles are highly advanced types of steel in their construction. These highly reinforced structures do not compress into a tight bundle like the A-Posts, Roof Rails and B-Posts of passenger vehicles built in the 80s and 90s. Instead, when the cutter blade is first engaged with the high strength outer layers of steel in today's significantly larger posts, they are immediately on the ultra-high-strength press-forged Boron sheet metal and Martensite Boron Steel which lines the inside diameter of the structure.

Most rescue cutters护肤品 lubricating coating on the outside layer of steel in today’s significantly larger posts, they are immediately against the ultra-high-strength press-forged Boron sheet metal and Martensite Boron Steel which lines the inside diameter of the structure. All of this means that when cutting larger diameter posts on today’s vehicles, maximum cutting energy is gained at the tips of the blades near full open position.

Real World Capability v. Laboratory All Star

Cutting Force Calculations

There is some confusion in the marketplace regarding how laboratories are testing cutters, whether advertised cutting force may vary from NFPA, National Fire Protection Agency guidelines, and how some manufacturers inflame cutting force measurements for marketing purposes.

In the Hurst Jaws of Life testing lab, our engineers calculate force measurements based on known facts, and thus conduct repeated tests with production-grade tools to verify the data. And finally when our tools are tested, internal and external, and again we are completely certain that our tools exceed the highest-recognized rescue forces. This data is then published, patented and stored over the next ten years.

Some manufacturers go the other direction. They push equations to the brink when calculating force measurements in order to maximize cutting force – even going far as to claim cutting force numbers that could never be attained in the real world.

NFPA Compliant

There is also confusion regarding the meaning of NFPA Compliant. To be clear, the NFPA does not provide certification. The organization validates standards which manufacturers are required to meet to attain NFPA labels, which certify that a product meets those standards.

The NFPA positions a respected process for testing and releasing standards based on a cutter's ability to cut different size and shape solids. These solids are published as AC, BC, etc. These letters and numbers represent different types and sizes of raw metals – specifically solid round bar, flat bar, Angles, square tube, round pipe and square iron – which must consistently be cut 0.12” which is a size no damage to the cutter blade is done. All compliant cutters will feature a label stating NFPA Tested Compliant.

This standard provides the industry with a valuable starting point, but it is important to remember that modern rescue cutters and other equipment and tools are being developed and designed to be far above the allowable nature of tests. Rescue cutters do not cut perfectly round or exact 0.12”, as would be the case with a tool listed as an NFPA tool.

It is also important to note that the NFPA has not issued a standard for cutting Boron type materials.

Cutting Technique

Light weight at the current hydraulic cutters, the most successful tool path for cutting through a highly reinforced B-Post is parallel with the vehicle’s body. This is due to the blades are able to cut easier even before cutting into the metal, which generates force when the tool is cut fairly open and perpendicular to the vehicle. This means the tool is positioned in the vehicle, which would potentially block access to the area engaged for medical care or worse, the rescue cutter could rotate instead moving contact with the patient.

S 700E

The new Hurst Jaws of Life® S 700 series cutter design has improved blade geometry, which eliminates the largest shock resistant tool blades to attain maximum cutting capability at a low opening. The blades on the Hurst Jaws of Life® S 700 series cutters include 7.0-inch opening in the fully open position and are specifically shaped to generate a high degree of power at the tip of the blade, making these tools more suitable for cutting the largest diameters and stronger steel being encountered by rescuers today.

The tip of the blades on the new S 700 series cutter has a punch-like design. Punching the inside blade cutter and the pivot point, the tip of the outside blade is able to more easily punch through the highly reinforced areas of the A Pillar posts and B-Posts while maintaining the blade's position outside the vehicle. This new cutter blade design eliminates the likelihood of the tool to rotate into the passenger compartment.

Additionally, the S 700 series cutter blades have three distinct cutting angles. As the blades close, the press-forged Boron sheet metal and Martensite steel harden and fracture. As the cutters continue to close, blade angles change resulting in improved done of the post material to the strongest cutting area of the rear of the blades.

All Hurst Jaws of Life cutter blades, including those on the new S 700 series, feature a forged shock-resistant tool blade that has been subjected to wear testing using a four-step tempering process, which reduces the blade tool grain size while maintaining blade hardness. This is crucial when cutting today’s high-strength steels.

The S 700 series validation capabilities include independent damage control, structural collapse, aircraft engine and handtools of other world challenges. The S 700 series is fully equipped with a host of safety features, such as safety controls, hand-guards, and pressure relief valves.

The Hurst Jaws of Life® S 700 series includes the S 700E and S 700 Tablets. The S 700E is part of the eDRAULIC line of rescue tools. These tools were engineered to free rescue workers of power units and heavy hoses, celebrating the set of tools associated with traditional rescue tools.

S 700E: Designed to be field deployed to suit any rescue scenario. The S 700E is the ultimate choice for any rescue mission where access to traditional rescue tools may be restricted due to the environment, terrain, or conditions.

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Essential Elements in Cutting Capability

Typically, rescue cutters have been marketed by maximum cutting force. The standard has been - the more, the better. While cutting force and operator technique is very important, cutter blade design, which includes blade geometry and composition in conjunction with the manufacturing, forging and heat treating processes, is a key factor when determining a tool’s ultimate cutting capability.

Because of the demanding rescue environment, Hurst Jaws of Life is dedicated to researching and researching new materials, and those new materials enable to design better cutting blades. We believe you deserve to be informed with the facts, so you can choose the best rescue tools for your community.

Cutting Force at the Right Point

Today’s modern vehicles are highly advanced types of steel in their construction. These highly reinforced structures do not compress into a right triangle like a Post, Post rail or Door Posts of passenger vehicles built in the 90s and 80s. Instead, when the cutter blades make contact with the high-strength outer layer of steel in today’s significantly larger posts, they are immediately halved by the ultra-high-strength press-finished Boron steel sheet metal and Martensite Boron Steel which lines the inside diameter of the structure.

All of this means that when cutting large diameter posts on today’s vehicles, maximum cutting energy is required at the tips of the blades at near full open position.

Real World Capability v. Laboratory All Star

Cutting Force Calculations

There is some confusion in the marketplace regarding how laboratory, actually delivered cutting force may vary from NFPA, National Fire Protection Agency guidelines, and how some manufacturers often use cutting force measurements for marketing purposes.

In the Hurst Jaws of Life testing lab, our engineers calculate force measurements based on known facts, and then conduct real-world tests with production grade tools to verify the data. And finally, we make sure our products are tested, tempered, and heat treated, until we are completely certain that our tools handle the toughest emergency rescue. This data is then published, tested and shared with the facts.

Some manufacturers go the other direction. They push equations to the brink when calculating force measurements in order to market higher cutting forces – even going so far as to publish cutting force numbers that could never be attained in the real world.

NFPA Compliant

There is also confusion regarding the meaning of NFPA Compliant. To be clear, the NFPA does not provide certification. The organization publishes a list of standards which independent labs, such as TUV and UL, test to certify that a product meets these standards.

The NFPA publishes a respected process for testing and making claims based on a cutter’s ability to cut different size and shape metals. These ratings are published as A7, B6, etc. These letters and numbers represent different types and sizes of raw metals – specifically solid round bar. Test bars, square bars, round bars and angle bars – that must consistently be cut out of a piece of raw steel to cut the designated size metal at the designated cutting rate.

All Hurst Jaws of Life cutter blades, including those on the new S 700 Series, feature a forged shock-resistant tool steel that has been uniquely heat treated using a four-step tempering process, which makes the blades dent and chip resistant while maintaining blade durability.

This is crucial when cutting today’s high-strength steels.

The S 700 Series extrication capabilities include pliable damage control, structural collapses, aircraft egress and hundreds of other real world challenges. The S 700 Series is fully equipped with built-in safety features, such as manual and electronic, hard-guards, and pressure relief valves.

Cutting Technique

Light-weight at the current hydraulic cutters, the most successful tool position for cutting through a highly reinforced B-pillar post is parallel with the vehicle’s body. In this position the blades are able to close even before coming into contact with the metal, which generates more force than if the tool were fully open and perpendicular to the vehicle. This ensures the best test position of the vehicle, which could potentially block access to the Gabriel post for medical care or worse, the rescue cutter could rotate inward causing contact with the patient.

The S 700 series has the new S 700 cutter blade design, which enables the cutter blade to cut the outer post at a near-flat plane angle, the tip of the outside blade to be more easily pushed through the highly reinforced area of the A Pillar posts and B-posts while maintaining the tool’s position outside the vehicle. This new cutter blade design relieves the tendency of the tool to rotate into the passenger compartment.

Additionally, the S 700 series cutter blades have three distinct cutting angles. As the blades close, the press-finished Boron sheet metal and Martensite steel is sheared and fractured. As the cutters continue to close, blade angles change resulting in improved done of the metal in the stronger cutting area of the blade.

All Hurst Jaws of Life cutter blades, including those on the new S 700 Series, feature a forged shock-resistant tool steel that has been uniquely heat treated using a four-step tempering process, which makes the blades dent and chip resistant while maintaining blade durability.

This data is then published, tested and shared with the Hurst Jaws of Life® S 700 Series

$ 700E

$ 700

S 700E that delivers more cutting force in the relevant cutting zone and is specifically designed to generate a high degree of power at the tip of the blade, making these tools more suitable for cutting the larger diameters and stronger steel being encountered by rescuers today.

The tip of the blade on the new S 700 series cutter has a punch-like design. Rounding the nose of the inside blade will be added, punch-like design will be added, punch-like design will be added to be more easily pushed through the highly reinforced area of the A Pillar posts and B-posts while maintaining the tool’s position outside the vehicle. This new cutter blade design relieves the tendency of the tool to rotate into the passenger compartment.

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This is crucial when cutting today’s high-strength steels.

The S 700 Series extrication capabilities include pliable damage control, structural collapses, aircraft egress and hundreds of other real world challenges. The S 700 Series is fully equipped with built-in safety features, such as manual and electronic, hard-guards, and pressure relief valves.

The Hurst Jaws of Life S 700 series includes the S 700E and S 700 E Cutters. The S 700E is part of the eDRAULIC line of rescue tools. These tools were engineered to free rescue workers of power units and heavy hoses, eliminating the set-up time associated with traditional rescue tools.
Where is high-strength steel typically found in today’s vehicles?

### Cutting Performance

The Hurst Jaws of Life® S 700 Series cutter offers up to 77% more cutting power exactly where profiles of a car body are cut. The theoretical maximum cutting force for many cutters applies at a material diameter close to zero, which is an irrelevant figure in real world applications. It also shows that maximum forces for traditional cutters apply at small material diameters where the force which is required to cut the material is very low.

**Where is high-strength steel typically found in today’s vehicles?**

- **A-Pillar and Roof Rail**
- **B-Pillar**
- **Floor Pan and Center Tunnel**
- **Rockers**

**Where is high-strength steel typically found in today’s vehicles?**

Cutter S 700
- **Blade Opening**: 7.3 in/185 mm
- **Dimensions**: l x w x h 36.4 x 11.8 x 11.4 in/925 x 300 x 290 mm
- **Weight**: 54.1 lbs/24.5 kg* 
  *Weight without cable plug or battery
- **Certification**: A8/B9/C8/D9/E9

**Cutter S 700E**
- **Blade Opening**: 7.3 in/185 mm
- **Dimensions**: l x w x h 31.1 x 11.8 x 10.2 in/790 x 300 x 258 mm
- **Weight**: 47.0 lbs/21.3 kg
- **Certification**: A8/B9/C8/D9/E9

**Cutting Force (tons)**

<table>
<thead>
<tr>
<th>Material Diameter (mm/in)</th>
<th>Cutting Force S510</th>
<th>Cutting Force S700</th>
<th>Force Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>17.3 mm</td>
<td>1.32 in</td>
<td>0</td>
</tr>
<tr>
<td>C2</td>
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<td>1.08 in</td>
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<td>C3</td>
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<td>0</td>
</tr>
<tr>
<td>C4</td>
<td>42.2 mm</td>
<td>1.66 in</td>
<td>0</td>
</tr>
<tr>
<td>C5</td>
<td>48.3 mm</td>
<td>1.90 in</td>
<td>0</td>
</tr>
<tr>
<td>C6</td>
<td>60.5 mm</td>
<td>2.36 in</td>
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**Material Diameter (mm/in)**

**Testing Equipment: 6980**

**Testing Force S510**

**Testing Force S700**

**Testing Equipment: 6980**

**Force Required**

**Maximum Cutting Force**

Most of the hydraulic cutters on the market today achieve their advertised maximum cutting force as the blades’ leading edges cross past each other nearest to the blades’ pivot point. This means the cutter’s weakest point is when the blades are in the full open position.

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WHERE IS HIGH-STRENGTH STEEL TYPICALLY FOUND IN TODAY’S VEHICLES?

Material Diameter (mm/in) Cutting Force (tons)
A-Pillar and Roof Rail
B-Pillar
Floor Pan and Center Tunnel
Rockers

WHERE IS HIGH-STRENGTH STEEL TYPICALLY FOUND IN TODAY’S VEHICLES?

Maximum Cutting Force
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WHERE IS HIGH-STRENGTH STEEL TYPICALLY FOUND IN TODAY’S VEHICLES?

Cutting Performance
Relevant Working Range

NFPA Classes Cutting Force S510 Cutting Force S700 Force Required

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