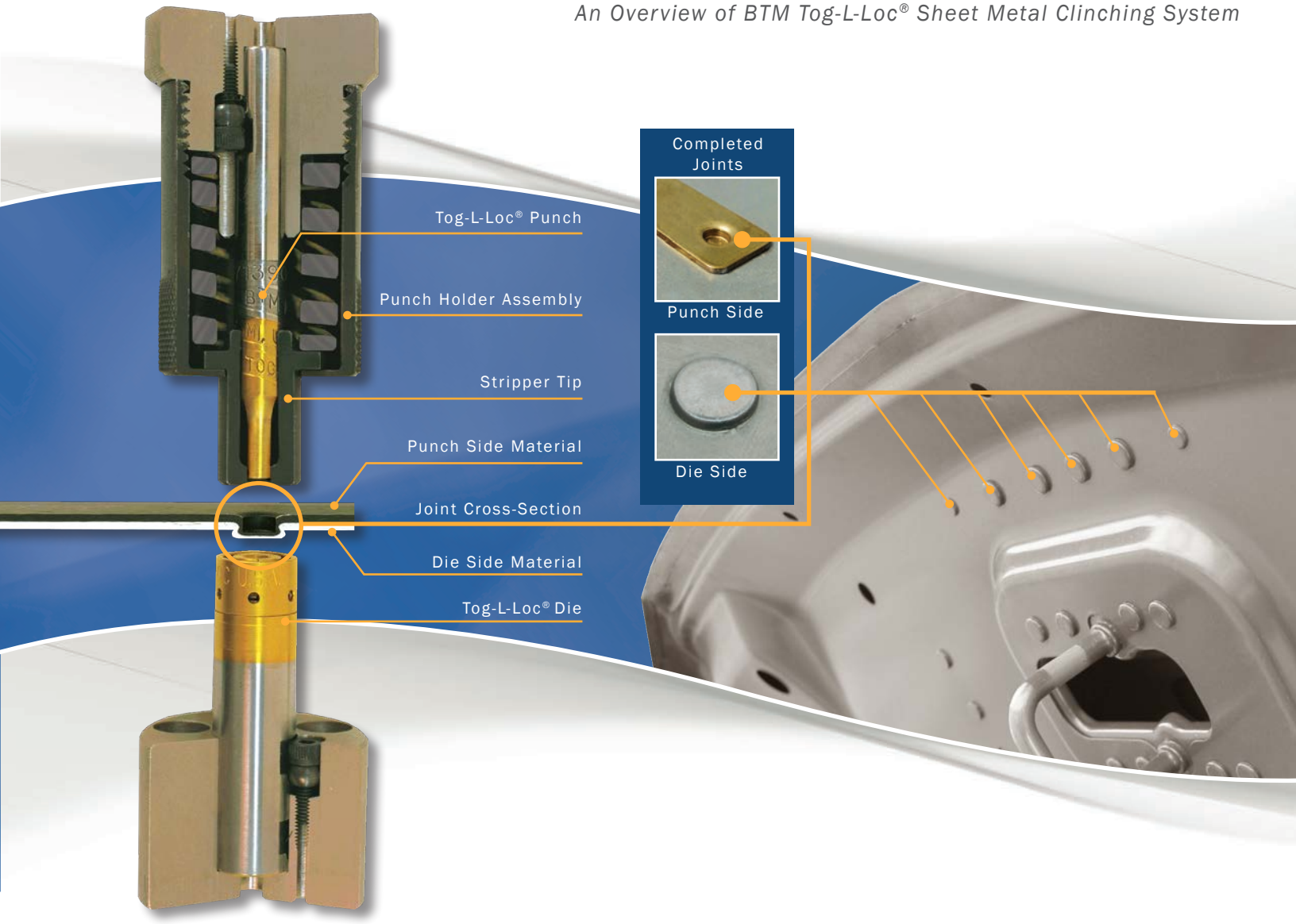
# Introduction to Tog-L-Loc®

*An Overview of BTM Tog-L-Loc® Sheet Metal Clinching System*

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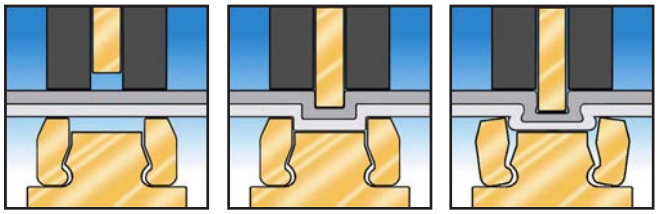
# INTRODUCING Tog-L-Loc® (pronounced: tog-uhl-lŏk)

Tog-L-Loc® is a BTM patented sheet metal clinching process. A special punch and die are used to form a strong interlocking joint within the metals themselves. The result of the process is a round, button shaped extrusion on the die side of the assembly, and a small cylindrical cavity on the punch side. The joint is comprised wholly of the sheet metals that were joined -no additional fasteners or welding is required. In fact, Tog-L-Loc® often replaces these traditional fastening techniques in an assembly, due to the repeatability and cost-effectiveness of the process.

## How a Tog-L-Loc® Joint is Made

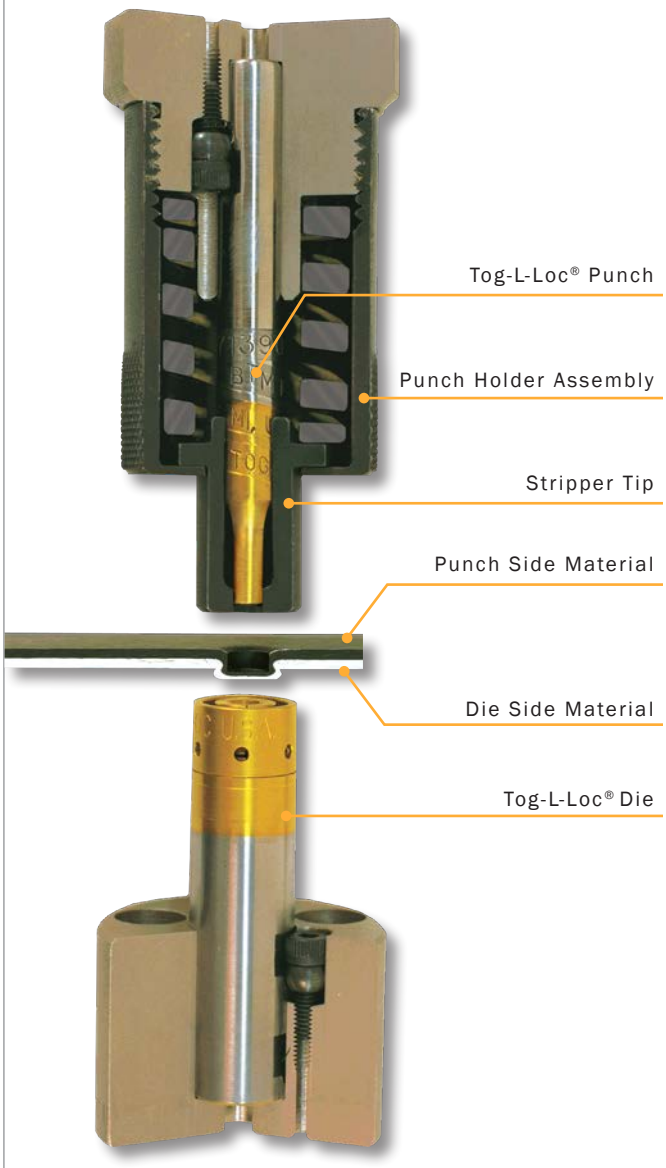


**Step 1: Clamp** **Step 2: Draw** **Step 3: Lock**

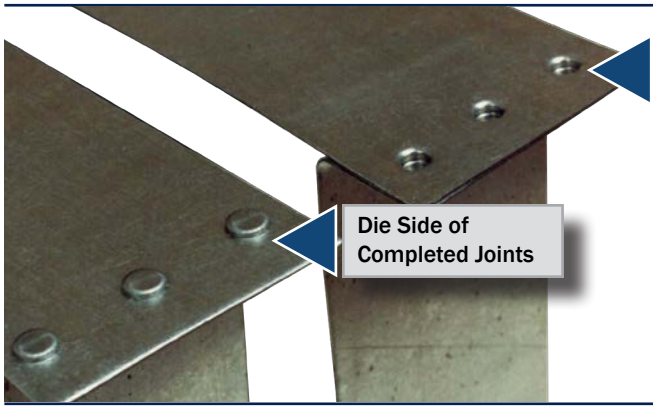
**Step 1:** Clamps
The stripper clamps the sheet metal parts being joined.

**Step 2:** Draws
The punch draws the sheet metal into the die and the metals expand when they contact the die anvil.

**Step 3:** Locks
The metals, unable to continue their downward expansion, are compressed against the anvil and are forced to expand laterally, forming an interlock below the bottom sheet. The die blades expand, allowing this interlock to occur.




Cutaway View of Tooling and a Completed Joint




Cutaway view of a completed Tog-L-Loc® joint. Notice how the metal flow has formed an interlock.

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## PRODUCTION EQUIPMENT



## OTHER INNOVATIVE SOLUTIONS FOR ASSEMBLY

# Natural Benefits

## The Tog-L-Loc® Process is

# ENVIRONMENTALLY FRIENDLY

CLEAN • LOW ENERGY CONSUMPTION • LOW NOISE EMISSIONS

With concern for the environment becoming a major factor in consumer buying decisions around the world, it is now more important than ever to consider using assembly processes which are environmentally friendly.

BTM Tog-L-Loc® sheet metal joining system can be ***very*** environmentally friendly, especially when the process is conducted utilizing "green" production equipment. This is because Tog-L-Loc® is a cold forming clinch process. In other words, there are no sparks, fumes, or harmful heat emitted even when joining galvanized or other coated materials. Because Tog-L-Loc® is a clinching process, no holes need to be tapped or drilled into the work piece, so no slugs or shavings are created when joining the metals.

Tog-L-Loc® can be environmentally friendly and it can also be friendly toward your profit margin. Unlike many green products or processes which can cost a lot more than their traditional counterparts, the Tog-L-Loc® process can actually reduce assembly costs when compared to traditional fastening methods.

Help keep the planet (and your profit margin) healthy with

# Tog-L-Loc®

# NO FASTENERS.. & NO WELDS

**Tog-L-Loc®** works independent of, and often replaces **spot welding** and **riveting**

## Tog-L-Loc® vs. Welding

Spot welding has a number of disadvantages when compared with Tog-L-Loc®. To name just a few, welding can burn pre-painted or pre-coated surfaces, it creates toxic fumes from galvanized metals, and it can be difficult to effectively join aluminum. In addition to that, welding can suffer from a lack of consistency due to cold welds. Tog-L-Loc® on the other hand can join metals with a range of coatings and keep them intact. Tog-L-Loc® does not emit harmful heat or noxious fumes even when joining galvanized metal, and tooling is available to clinch a range of aluminums, as well as dissimilar metal combinations.

A report prepared for Ontario Hydro by Iain Campbell from the Centre for Advanced Technology Education[1] mentions that operating costs can be significantly lower for clinching compared to certain welding techniques for reasons including tip maintenance. (p.42) It also mentions that, "on a joint by joint basis the potential energy savings of clinching over transgun (DC) RSW are in the order of 60%". (p.41)

Other advantages of clinching which are mentioned in the report include consistent, reliable joints, and the ability to non-destructively test for joint quality.

## Tog-L-Loc® vs. Riveting

Are you still riveting? Do you need to? Each and every rivet has a cost associated with it. This cost alone can be quite high when compared with Tog-L-Loc®. It is not uncommon for Tog-L-Loc® tooling to create over 300,000 joints before it needs to be replaced. This can mean significant savings. Also, when you consider the process does not require any holes to be pierced, and can be accomplished with cost-effective production equipment, the savings can be even greater.

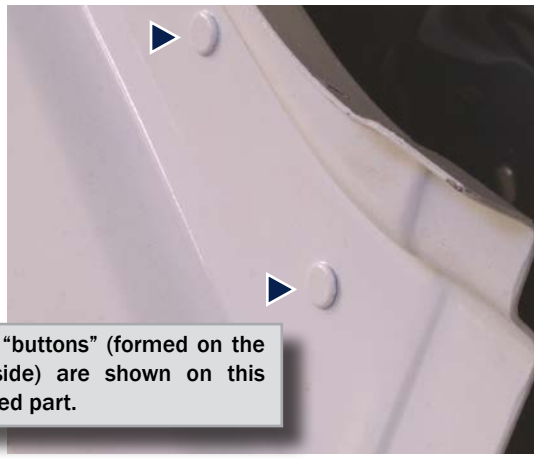
Contact BTM today to learn more about the cost-saving benefit of switching to Tog-L-Loc® for your sheet metal assembly needs!

## YOU CAN $AVE MONEY BY SWITCHING TO Tog-L-Loc®

1. "Clinch Technology as a Replacement For Resistance Spot Welding"
Iain Campbell - Center for Advanced Technical Education, Ryerson Plolytechnical Institute.
Prepared for Ontario Hydroelectric, Technical services Department. TSDD-91-054 / 1991

## Additional Benefits of Tog-L-Loc®

- Joins plain, coated, and dissimilar metals
- No rivets, screws, or other fasteners
- Eliminates spot welding operations
- Long tool life: 300,000 joints common
- Joins in a single press stroke
- Non-destructive joint quality testing
- Strong and highly fatigue resistant
- Leakproof joints
- No sparks, fumes, or soot



Joint "buttons" (formed on the die side) are shown on this painted part.

Volvo is a trade name/trade mark of its respective owner.

Tog-L-Loc® is a viable alternative to spot welding or external fasteners on a number of automotive components. Tog-L-Loc® has been used for years to join a variety of parts including gas tank straps, exhaust shields, sunroof frames, package trays, brake pedal brackets, engine components, window trim, air conditioning components, air bag components, and more. Contact BTM to see if Tog-L-Loc® is right for your application.

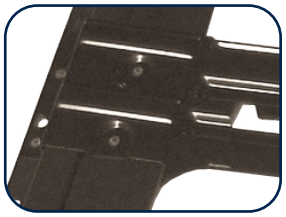
## Package Tray

## Gas Tank Straps

## Aluminized Steel Exhaust Shield

## Laminated Sound Deadening Material

## Sunroof Frame



## Tog-L-Loc® in the Automotive Industry

With today's competitive manufacturing environment, automakers and their suppliers are looking for ways to cut costs without sacrificing quality, and Tog-L-Loc® has proven to be effective in doing just that. Since the 1980's, Tog-L-Loc® has assisted in the assembly of vehicles from all around the world by clinching a wide range of components. Aluminum, pre-painted metals, dissimilar metal combinations, and even galvanized steel can easily be joined using the Tog-L-Loc® sheet metal joining system. Tog-L-Loc® is also prized for its leak-proof characteristics, consistent joint strength, and ability to be checked non-destructively.

Contact BTM today to schedule a FREE sample of your part joined with Tog-L-Loc®

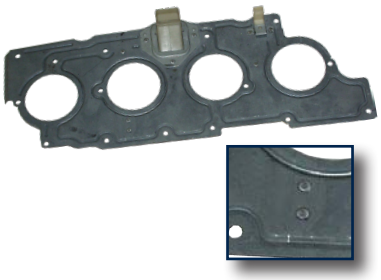
### Let Tog-L-Loc® Work for You.

When you contact BTM, our engineers will guide you through the Tog-L-Loc® process and work with you to develop a solution that is right for your own unique application. As an added benefit, if our engineers determine that Tog-L-Loc® is indeed a viable option for you, we can schedule a FREE sample joining of your part and provide joint data information.

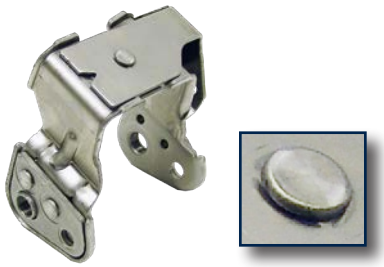
Contact BTM to schedule a FREE sample joining of your part!

**Gas Tank Shield**

**Gasket**



**Brackets**



**Air Conditioning Tube**

### Brake Pedal Bracket Machine

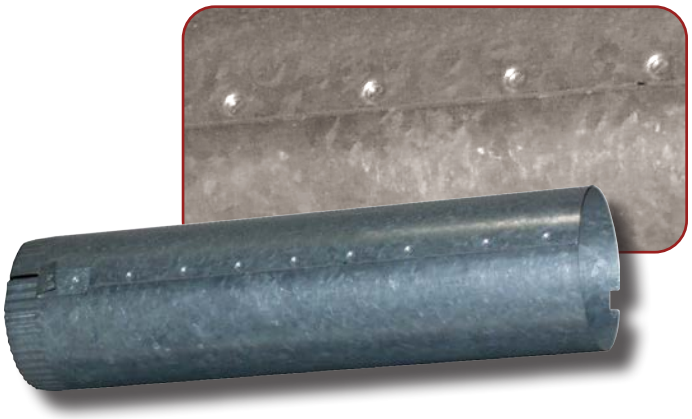
This custom built three station system is used to create 16 Tog-L-Loc® joints and 4 pierced holes in a brake pedal bracket.

Is your part made out of

# *Galvanized Steel?*

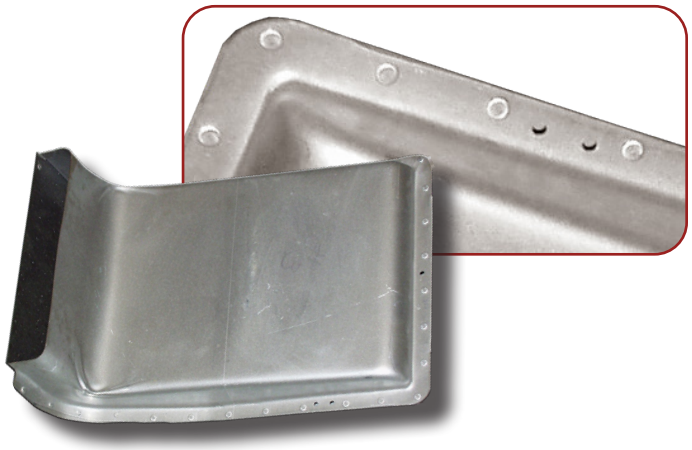
## Galvanized Coating is No Problem for Tog-L-Loc®!

Galvanized steel is popular in the HVAC industry, but welding it is a health hazard. Perhaps because of this, traditional fasteners such as screws, bolts, and rivets have become a popular method to join galvanized parts over the years. Unfortunately, the increased cost of using these fasteners in your assembly process deducts from your overall profits. How then can you join your galvanized parts safely, effectively, and without the increased costs associated with the use of external fasteners?



## Tog-L-Loc® is Your Solution!

Tog-L-Loc® can join galvanized parts quickly and easily while leaving the galvanized coating intact. Typical Tog-L-Loc® tool life is commonly in excess of 300,000 joints too, which can save you a lot of money over the cost of external fasteners.



## Tog-L-Loc® in the HVAC Industry

From furnace cabinets to sheet metal ductwork, Tog-L-Loc® can help decrease your assembly costs. A viable & inexpensive alternative to traditional fastening methods, Tog-L-Loc® uses virtually no external fasteners, requires no welds, and produces virtually no scrap, saving you time and money. Furthermore, the Tog-L-Loc® process produces strong vibration resistant joints, helping to ensure that your products stay assembled for years to come. Need extra strength? Tog-L-Loc® can be combined with a variety of adhesives to create a stronger joint.

### Is Your Part Pre-Painted? Aluminum? Something Else?

Tog-L-Loc® has been used to assemble components of a wide variety of shapes, sizes, and sheet metal types. From large pre-painted furnace cabinets to tiny components consisting of two different types of metal, Tog-L-Loc® has been utilized with impressive results. Contact BTM to find out if your part is a viable candidate for the Tog-L-Loc® sheet metal joining system.


### A Cost-Effective Solution for Your Unique Joining Situation.

Since 1966, BTM has been providing high quality, value added solutions to aid manufacturers. From simple press brake tooling to fully automated systems which combine processes, BTM has a solution to match your budget.

**Contact us Today to Schedule a *Free* Sample Joining of Your Part!**

## From *Garage Doors* to *Gabled Vents*...

## *Tog-L-Loc®* in Construction/Hardware Supply.

Tog-L-Loc® produces strong vibration resistant joints which can be checked non-destructively using a simple gauge or calipers. This saves you money, as does the fact that it is common for Tog-L-Loc® tooling to withstand more than 300,000 cycles before it needs to be serviced. With these features in mind, it is no wonder why Tog-L-Loc® is gaining popularity throughout the industry.

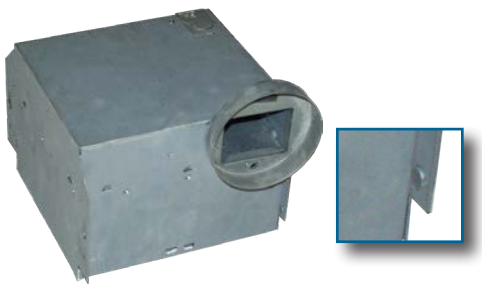
For many years, Tog-L-Loc® has reliably and effectively joined building materials ranging from lighting fixtures, electrical boxes, garage doors, fan housings, filter assemblies, and even roll formed sections used in steel frame construction. What makes Tog-L-Loc® so popular in the assembly of building materials? Consistent and leak-proof joints for one, a factor that greatly contributes to the longevity of the joint.

### Lighting Fixture

### Garage Door

### Electrical Box

### Fan Housing

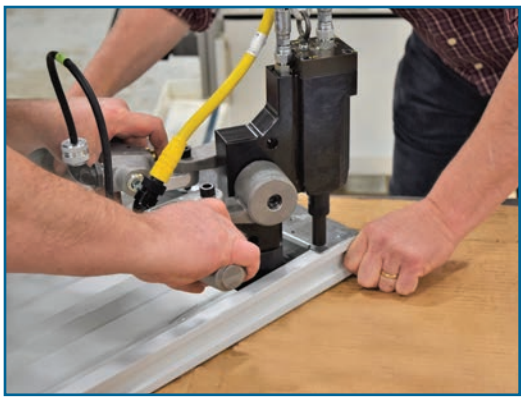


## Use Tog-L-Loc® clinching on your next project!

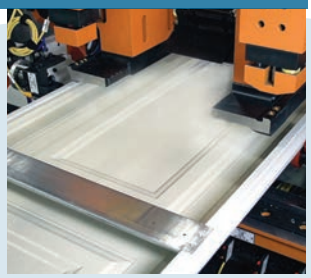
With today's competitive environment, reducing production costs is more important than ever. Tog-L-Loc® can help you do this in two basic ways: directly, by removing the recurring cost of purchasing external fasteners for your assembly process, and also by offering you cost effective production equipment that will help maximize your efficiency without breaking the bank.

### Versatile Tools to Simplify Your Assembly

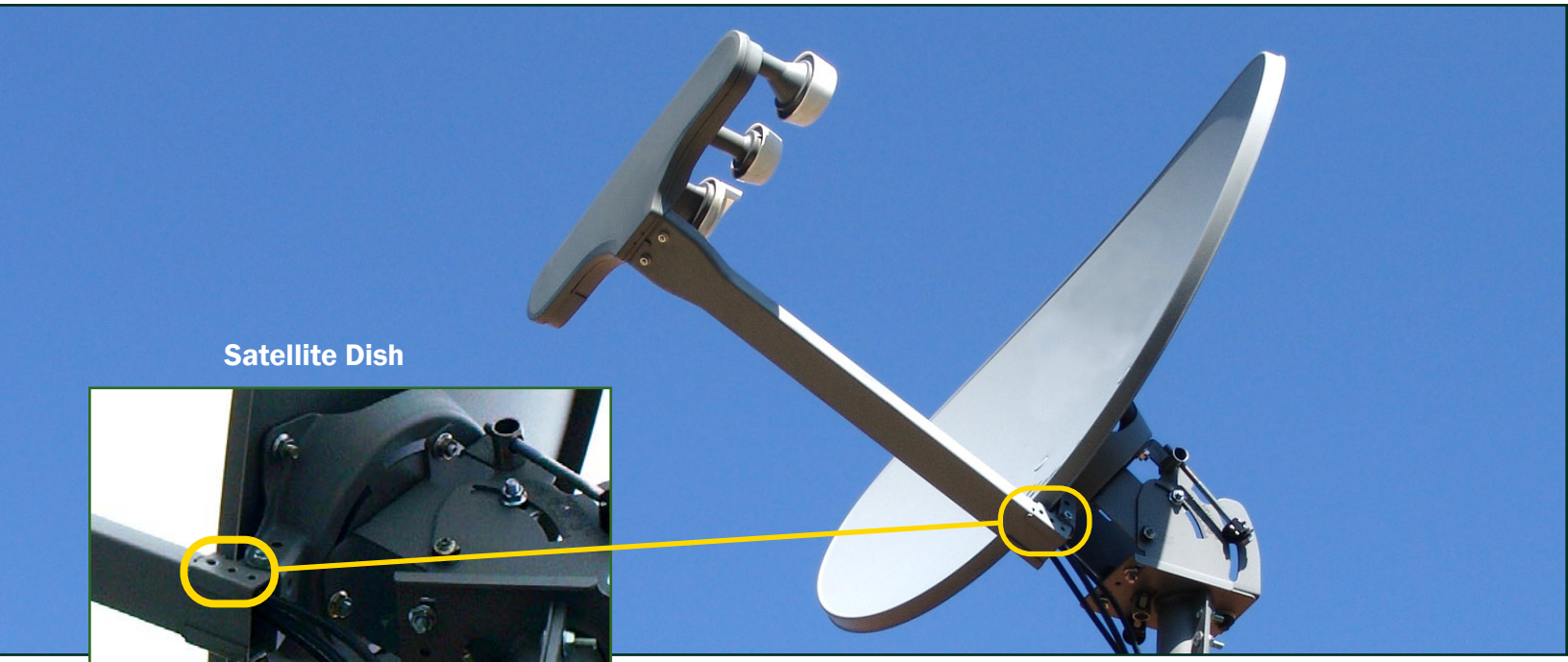
From fully automated custom designed and built machines to simple hand-held units, BTM manufactures an impressive line of products that will allow you to effectively utilize Tog-L-Loc® in your next project. Contact BTM today to find out how one of our many standard products can be adapted to your assembly operation, or how a special machine designed and built by our experienced staff can improve production time, and decrease your assembly costs.



### Garage Door High-Speed Automated Stile Attachment Systems, Production Line Integration To Manual Workstations



**Contact Us Today to Schedule a *Free* Sample Joining of Your Part!**



## Satellite Dish



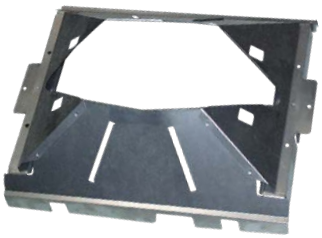
## Computer Case

## Electrical Motor - Bearing Support

## Automotive Battery Cable

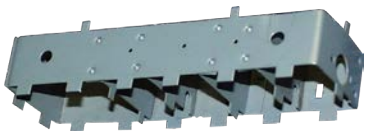
*(Dissimilar Metals)*

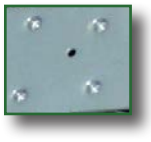
## Television Shield



## Computer Power Supply Cabinet

## Heat Sink





## Tog-L-Loc® in the ELECTRONICS Industry

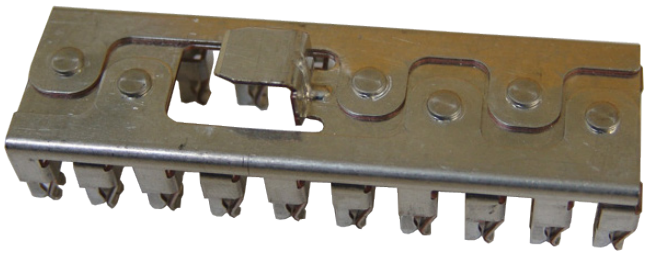
Electronics are on the forefront of innovation. Few things evolve as quickly and rapidly as electronic technology. The products on the cutting edge of today are outdated relics tomorrow. With such rapid change and product evolution, you need an assembly solution that is easily adaptable and low cost. Tog-L-Loc® may be what you are looking for.

### Small Components

These small electronic components feature a dissimilar metal combination joined using special Tog-L-Loc® tooling.

## A Solution Specific to Your Unique Joining Needs.

BTM can provide standard tooling and equipment, or it can build a custom solution for your unique application. Contact BTM today to learn more about our capabilities, and how we can start saving you money in your assembly process.



**Contact Us Today to Schedule a *Free* Sample Joining of Your Part!**

# Is your part Pre-Painted?

Washer/Dryer Shell

Dishwasher Frame

Refrigerator Shell

## How Do You Fasten Your Pre-painted Sheet Metal Parts?

Welding pre-painted surfaces is not practical because the paint gets burned and ruins the aesthetics of the part. Do you use external fasteners? That might work- but each fastener adds a cost to the assembly process which can become significant over the course of a product's manufacturing life. External fasteners may also present the possibility for leaking to occur since a hole is created when a fastener is installed.

Tog-L-Loc® is an economical solution when it comes to assembling pre-painted parts. The process is fast (a typical Tog-L-Loc® joint is created in under 1 second); the tooling typically has a long life (more than 300,000 joints common), and Tog-L-Loc® keeps most coated surfaces intact during the joining process. Furthermore, there is no piercing involved in the Tog-L-Loc® process, which means that Tog-L-Loc® joints are leak-proof, which can be beneficial, especially in wet environments.

From refrigerator cabinets, to microwave shells; small components to large assemblies- Tog-L-Loc® has been used for many years with great success in the Appliance industry.

The examples shown on these pages are only a small sampling of Appliance products which have used the Tog-L-Loc® clinching process. Contact BTM today to schedule a free sample joining of your unique part.

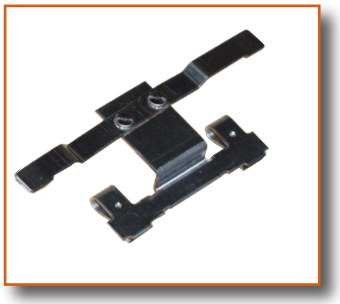
**Contact Us Today to Schedule a *Free* Sample Joining of Your Part!**

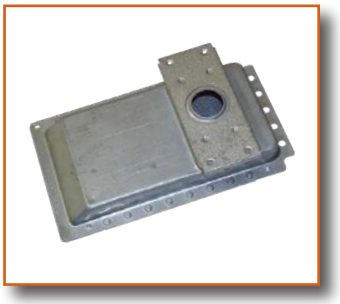
## Tog-L-Loc® in the APPLIANCE Industry

A viable & inexpensive alternative to traditional fastening methods, Tog-L-Loc® uses no external fasteners, no messy adhesives or welds, and produces virtually no scrap which saves you time and money. Furthermore the Tog-L-Loc® process produces strong vibration resistant joints which helps to ensure your products stay assembled for years to come.

## Looking to Reduce Weight in Your Sheet Metal Assemblies?

Because no fasteners are used, and no materials are added during the joining process, the weight of the assembly remains the same before and after it is clinched. This helps to ensure that your part's initial weight before being clinched is the same weight after it is clinched.





## A Solution for Your Specific Needs.

Since 1966, BTM has been providing high quality solutions to aid manufacturers - from simple press brake tooling to fully automated systems, BTM has a solution to match your budget.

## Is Your Material Able to be Clinched?

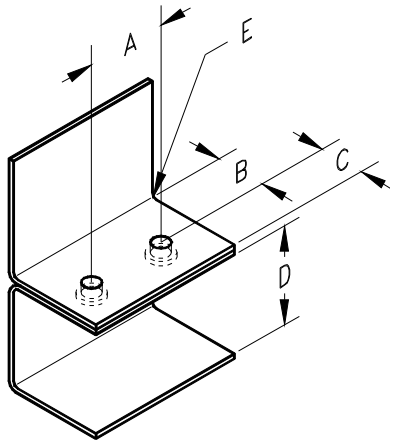
Although Tog-L-Loc® has been successfully used for sheet metals that fall outside of this range, a typical mild steel application has a combined material thickness of up to 7.87mm [.310"] and falls between 50-60 on the Rockwell "B" scale.

In addition to mild steel, Tog-L-Loc® has also been used to clinch galvanized steel, pre-painted steel, aluminum, copper, dissimilar metal combinations, and even some stainless steels. In addition to this, metals with an adhesive layer between them, and even sound deadening steel, have been successfully clinched using Tog-L-Loc®.

Whether or not a material can be clinched depends largely on its ductility, thickness, hardness, and whether or not there is enough room to make a joint.

***Note**: Some materials are too thick, or too hard to be joined effectively with Tog-L-Loc®. However, some of these metals may still be clinched using BTM Lance-N-Loc® sheet metal joining system.*

See page 22 for more info on Lance-N-Loc®.




## Is There Enough Room to Make a Joint?

Minimum distance requirements for each die listed below.

PREFERRED

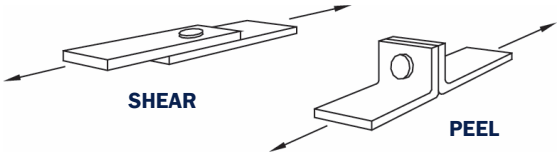
| Tooling | Dim | 3.0mm [.12"] | 3.8mm [.15"] | 4.6mm [.18"] | 5.5mm [.22"] | 6.4mm [.25"] |
|---|---|---|---|---|---|---|
|  Standard 940 Dies | A* | 12.50 [.492"] | 14.00 [.551"] | 16.50 [.650"] | 19.50 [.768"] | 22.50 [.886"] |
| | B | 6.8 [.27"] | 7.5 [.30"] | 8.8 [.35"] | 10.3 [.41"] | 11.8 [.46"] |
| | C | 3.0 [.12"] | 3.8 [.15"] | 4.6 [.18"] | 5.5 [.22"] | 6.4 [.25"] |
| | D | 24.0 [.94"] | 28.5 [1.12"] | 28.5 [1.12"] | 35.5 [1.40"] | 40.0 [1.57"] |
| | E | 0.8 [.03"] | 0.8 [".03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] |
|  MINI 940 Dies | A* | 11.00 [.433"] | 12.50 [.492"] | 14.00 [.551"] | 16.50 [.650"] | 21.00 [.827"] |
| | B | 6.1 [.24"] | 6.8 [.27"] | 7.5 [.30"] | 8.8 [.35"] | 11.0 [.43"] |
| | C | 3.0 [.12"] | 3.8 [.15"] | 4.6 [.18"] | 5.5 [.22"] | 6.4 [.25"] |
| | D | 24.0 [.94"] | 24.5 [.96"] | 28.5 [1.12"] | 35.5 [1.40"] | 40.0 [1.57"] |
| | E | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] |
|  3 Blade Elastomer Short Insert Dies | A* | 14.73 [.580"] | 12.70 [.500"] | 14.73 [.580"] | 19.05 [.750"] | 22.22 [.875"] |
| | B | 8.1 [.32"] | 7.1 [.28"] | 8.1 [.32"] | 10.3 [.41"] | 12.0 [.47"] |
| | C | 3.0 [.12"] | 3.8 [.15"] | 4.6 [.18"] | 5.5 [.22"] | 6.4 [.25"] |
| | D | 26.0 [1.02"] | 26.0 [1.02"] | 26.0 [1.02"] | 32.0 [1.26"] | 35.0 [1.38"] |
| | E | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] |
|  3 Blade Elastomer Style "A" Dies | A* | 11.18 [.440"] | 12.70 [.500"] | 14.73 [.580"] | 19.05 [.750"] | 22.22 [.875"] |
| | B | 6.4 [.25"] | 7.1 [.28"] | 8.1 [.32"] | 10.3 [.41"] | 12.0 [.47"] |
| | C | 3.0 [.12"] | 3.8 [.15"] | 4.6 [.18"] | 5.5 [.22"] | 6.4 [.25"] |
| | D | 35.0 [1.38"] | 35 [1.38"] | 35.0 [1.38"] | 35.0 [1.38"] | 52.3 [1.38"] |
| | E | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] |
|  2 Blade Dies | A* | 14.50 [.571"] | 14.50 [.571"] | 16.00 [.630"] | 18.00 [.709"] | 20.30 [.799"] |
| | B | 5.8 [.23"] | 5.8 [.23"] | 5.8 [.23"] | 6.9 [.27"] | 8.4 [.33"] |
| | C | 3.0 [.12"] | 3.8 [.15"] | 4.6 [.18"] | 5.5 [.22"] | 6.4 [.25"] |
| | D | 35.0 [1.38"] | 35.0 [1.38"] | 35.0 [1.38"] | 38.1 [1.50"] | 47.6 [1.88"] |
| | E | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] | 0.8 [.03"] |

* Tog-L-Loc® joints with noted minimum distances requires a special stripper block.

## Joint Strength and Tool Size.

Tog-L-Loc® tooling sizes are based on the punch tip diameter. Standard sizes include 3.0mm (.12”), 3.8mm (.15”), 4.6mm (.18”), 5.5mm (.22”), 6.4mm (.25”), and 7.6mm (.30”) (Non-Standard sizes are available including 1.5mm (.06”) and 2.3mm (.09”). Contact BTM for more information). As a rule of thumb, the larger the joint size, the stronger the joint. Determining the correct tool size for each project depends on factors such as the required joint strength, the type and thickness of the materials being joined, and how much space there is to make a joint.

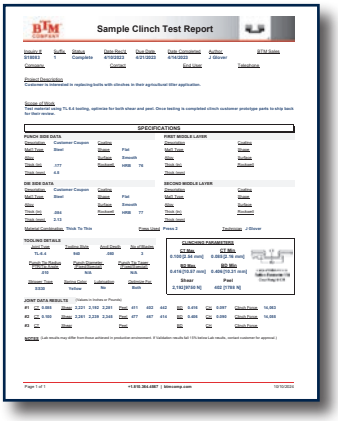

A joint’s strength is determined by its shear and peel values. Joints can be optimized for either shear or peel if required. This is accomplished through testing at BTM.




## Testing.

BTM has a test lab in which samples are joined and a variety of data is collected. Once the testing is complete, BTM is able to determine the optimal tool parameters for the application.

BTM generally offers FREE sample joining for parts which qualify. Contact a BTM sales application engineer to find out if your part qualifies for this FREE service.

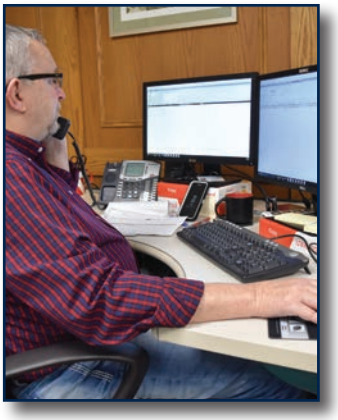

Sample Clinch Test Report

SPECIFICATIONS

## Getting Started.

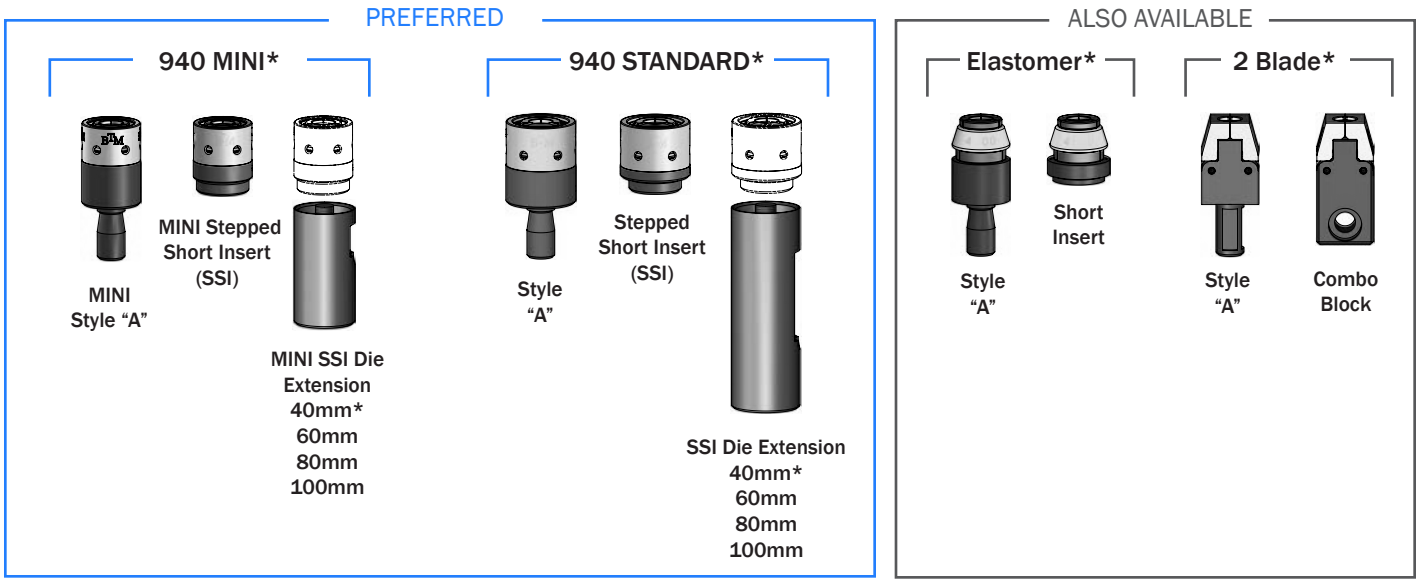
Contact BTM to learn more about Tog-L-Loc®, and to find out if our clinching technology process may be a viable candidate for your project.

Phone: +1.810.364.4567
Email: sales@btmcomp.com




## Standard Tog-L-Loc® Die Styles

Tog-L-Loc® dies are offered in three basic styles: 940 Series, Elastomer, and 2 Blade dies to ensure tooling compatibility with your specific project. 940 dies feature a built in die shield which guards the die blades and elastomer ring. Three bladed Elastomer dies and 2 Blade dies are available for tight space requirements. Contact BTM for die holder/mounting information.



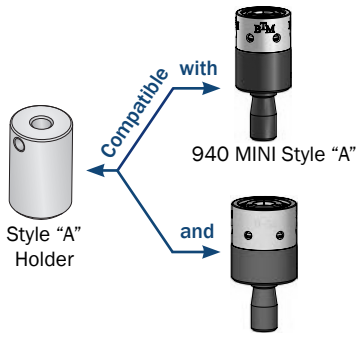

* Not all die styles available for all joint sizes.

## Standard Tog-L-Loc® Punch Styles

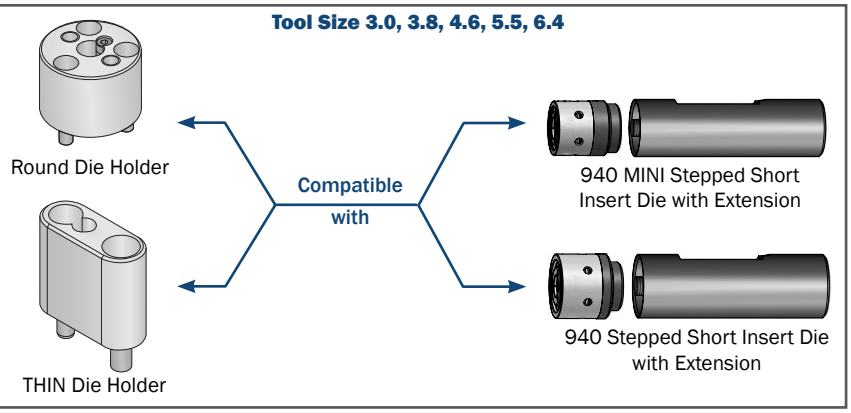
Tog-L-Loc® punches are offered in two basic styles: 940 and Ball Lock. The primary difference is the mounting retention. Contact BTM for information on special punches.

## Standard Die Holders

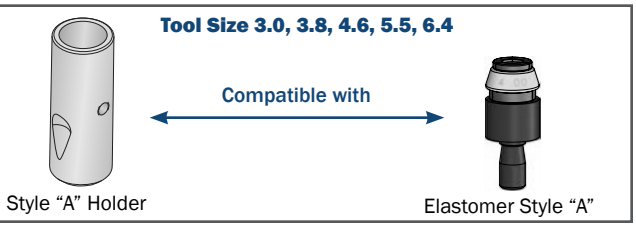
**Tool Size 3.0, 4.6, 5.5**



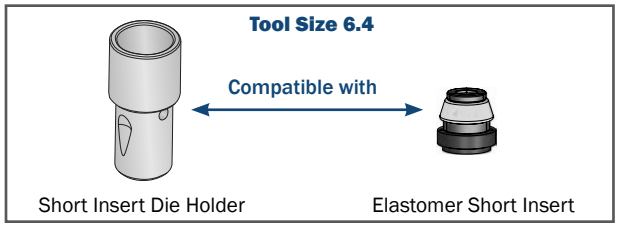

**Tool Size 3.0, 3.8, 4.6, 5.5, 6.4**




**Tool Size 3.0, 3.8, 4.6, 5.5, 6.4**



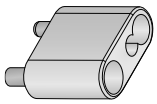

**Tool Size 6.4**




## Standard Punch Holders

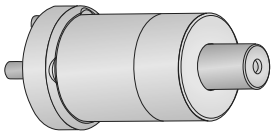
**940** (Preferred)

**Thin**



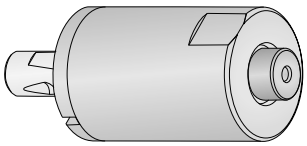
**Tool Size**
3.0, 3.8, 4.6, 5.5, 6.4

**Die Set Mounting**



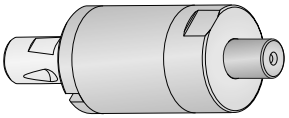
**Tool Size**
3.0, 3.8, 4.6, 5.5, 6.4

**SS30**



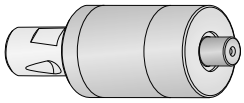
**Tool Size**
6.4

**SS25**



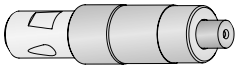
**Tool Size**
5.5

**SS20**



**Tool Size**
3.0, 3.8, 4.6, 5.5

**SS10**



**Tool Size**
3.0, 3.8, 4.6

## Hand-Held Presses

BTM offers a line of Hand-Held Presses designed for various clinching applications. Pneumatic, Hydraulic, and Self-Contained units are available.

## Floor & Bench Presses

BTM offers a full line of Single Point Clinching Presses which are able to easily adapt to join a variety of parts.

## Specialized Units

BTM manufactures a wide range of Pneumatic, Hydraulic, Air/Oil, and Electrically Driven units with single or dual motions for both stationary and robotic applications.

## Special Fixtures

Manually loaded and unloaded dedicated tooling can be built for a single part or a family of parts. Various units are available including Air/Oil, Air Toggle Press, Hydraulic, and more.

## Die Sets

Tog-L-Loc® tooling can be inexpensively designed into single or compound motion die set packages. Bump dies can also be provided for joining on sweeps.

## Custom Machine Solutions

BTM believes the success of a machine is derived from the proper application of design knowledge and experience combined with attention to detail. The value of the machine is then measured by the cost to operate it. BTM provides integrated production systems and purpose-built equipment for each customer's joining application.

## BTM Strives to:

- Take an innovative approach to problem solving with an emphasis on cost reduction.
- Use our ability to combine processes such as clinching & clinch fasteners, riveting & feeding, piercing, forming, bending, adhesive dispensing, parts feeding & transfer
- Consistently demonstrate an exceptional level of attention to detail
- Provide timely responses to customer requests
- Accommodate running product design changes
- Make application of our time tested knowledge and experience
- Apply our knowledge of customer specifications

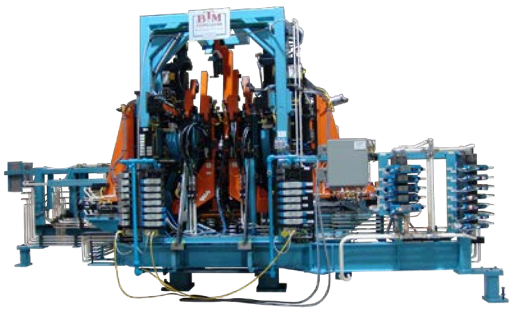
## BTM Service

Should you ever need service for one of our machines, BTM will provide a timely response to your request. You may also call our 24/7 Emergency Service at +1.810.432.8653 to receive instructions for placing an emergency service request.

The above points combine to provide our customers with a satisfying experience.

This custom solution uses a BTM 7007 hand-held unit, fixed to a track to easily clinch various locations of a part.

This custom dual workstation machine uses Tog-L-Loc® to assemble an automotive part.



This large custom-built machine was designed to pierce and insert Spac® nuts in an automotive front cradle assembly.

Note: Any absence of guarding and/or safety controls in the photos contained within this catalog does not absolve the customer from installing and implementing required safety features.

In addition to Tog-L-Loc® and Lance-N-Loc® , BTM offers additional round and Geo-Clinch® clinch joining technology. With 100,000 styles, dies and tooling combinations, BTM designed and engineered with premium steel and precision manufacturing. BTM will work with you to select the optimal tooling and equipment.

## Lance-N-Loc®

Lance-N-Loc® is commonly used where metals are insufficiently ductile to join using Tog-L-Loc® or in certain dissimilar combinations or multiple layers. BTM Lance-N-Loc® Joining System produces clean, strong and consistent joints in most coated or uncoated metals. The joints are characterized by a "button" formed on the die side layer of metal and a recess formed in the punch side layer. The button is a good indicator of joint quality and therefore, simplifies quality control. Two or more layers of metal typically ranging in thickness from .015 (0.4mm) to .157" (4.0mm) per sheet can be reliably joined in most cases.

**The first step in the process involves the clamping of the material with a punch side stripper.**

**CLAMPS**

**Next, the punch draws the material into the die.**

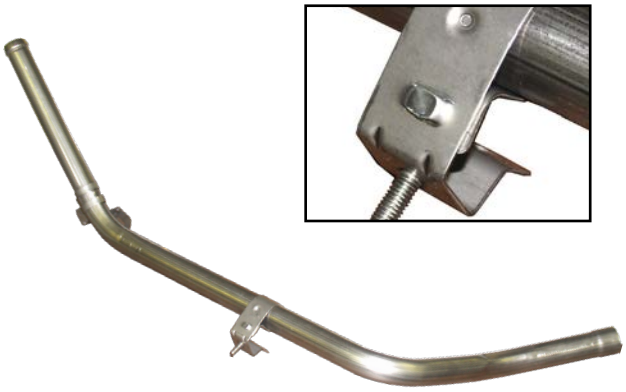
**DRAWS**

**As the material flows into the die, the die blades expand, allowing the metal to flow into a strong interlock below the bottom sheet.**

**LOCKS**

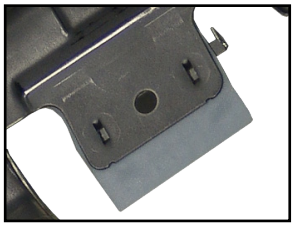
Punch Side
of Completed Joint

Die Side
of Completed Joint



**Air Conditioning Tube**

**Ductwork**



**Air Bag Assembly**

## Piercing

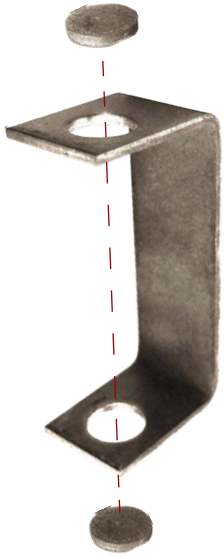
BTM has the ability to pierce a variety of hole sizes and shapes in a range of materials, including plastics. We offer a range of piercing solutions, from simple units or fixtures to fully automated systems which can combine piercing with multiple other processes. The examples that are shown in this brochure are just a small sampling of our capabilities. Contact BTM for more information.

Rectangular Hole

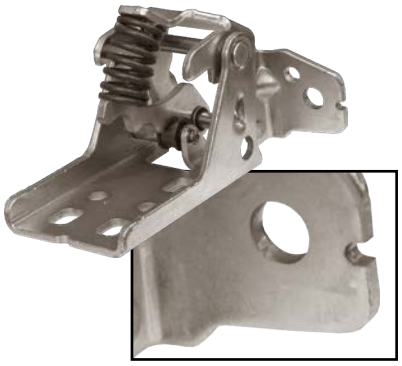
Oblong Hole

Circular Hole with Notch

Square Hole



Precise Inline Piercing



**Hinge Pierce & Notch**

Accurate hole location adjustment is accomplished in this heavy gauge steel. Notch location is adjustable for error proofing.

## Shearing

This trunk liner features a notch shear to accommodate a CD changer.

## Swaging

A custom BTM die set is used to swage the tubes into the plate, while keeping it distortion free.

BTM® COMPANY

## BTM Offers a Range of Production Equipment for Applying our Clinch Tooling.

### Hand-Held Presses

BTM hand-held presses are an economical approach to fastening sheet metal assemblies. Pneumatic, Hydraulic, and Self-Contained Units in a variety of styles are available. The units can be set up to join a range of thicknesses.

### Die Sets

Clinch tooling can be inexpensively designed into single or compound motion die set packages.

### Floor & Bench Presses

BTM offers a full line of Single Point Clinching Presses that easily adapt to join a variety of parts and a range of metal thicknesses.

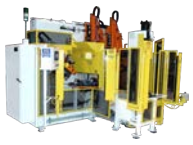
### Special Fixtures

Manually loaded and unloaded dedicated tooling can be built for a single part or a family of parts.

### Specialized Units

BTM provides Pneumatic, Hydraulic, Air/Oil, and Electrically Driven units with single or dual motions for both stationary and robotic applications.

### Special Systems



Achieve faster cycle times with automatic part transfer and by combining processes.

For more information, or to see our full line of products, please visit:

**BTMCOMP.COM**

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