

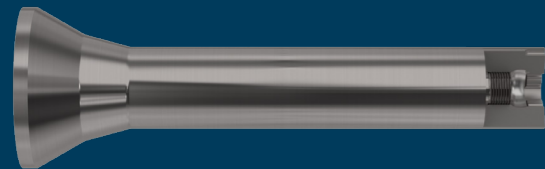
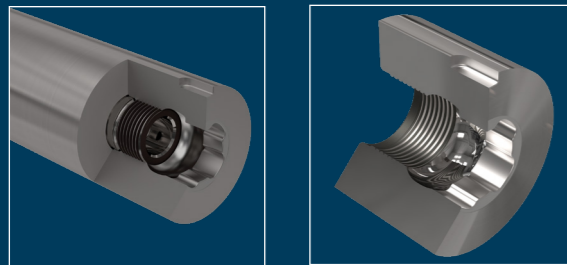
## BAYONET COUPLING

Castool's bayonet system is a unique way of attaching the dummy block to the stem. It allows for quick and easy replacement of the hot block without using screws or rods. The system also has a stabilizing stud behind the bayonet, which reduces the sideways movement of the block on the stem. This can lower the movement from 0.7 mm to 0.2 mm.



## BAYONET SPACER

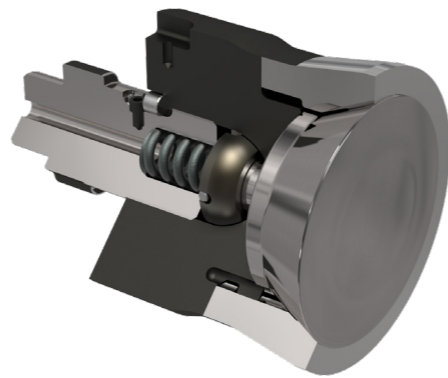
The existing stems can be modified to use the Castool bayonet system by adding a spacer. The spacer is connected to the stem by cutting and threading the bore of the stem. The faces of the stem and spacer must be aligned perfectly, and there should be no gaps. A dowel pin is also needed on the diameter of the stem/spacer to prevent rotation. If there is a gap between the stem and spacer, the stud will take all the pressure from the ram, and the threads can get damaged or stuck.



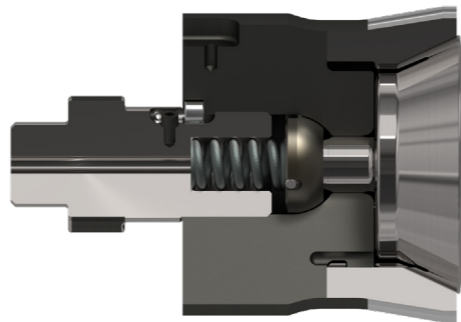
## REPLACEABLE RING BLOCK

### Replaceable Ring Block (RRB)

The dummy block is a crucial component of the extrusion process, as it is in direct contact with the billet. The front part of the dummy block, especially the outer edge of the shell, is subject to high wear and tear. Castool offers a solution that reduces the cost and time of replacing the dummy block: the replaceable ring block (RRB). The RRB consists of a holder, a mandrel and a wear ring that can be easily changed when worn out. The wear ring is designed to expand and contract elastically at specific pressures and sizes, ensuring optimal performance and durability. The RRB is available in different models for different types of long stroke presses with up to 100,000 psi. The RRB is an innovative and economical option for extrusion operators who want to extend the life of their dummy blocks.

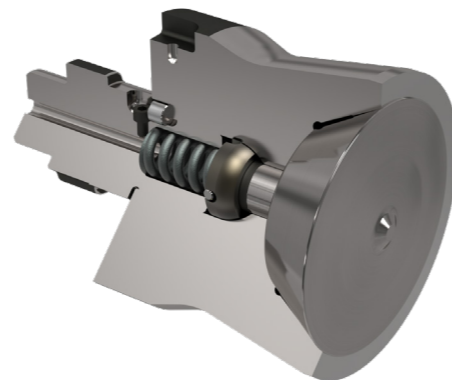


Standard dummy block with replaceable components for pressures less than 100 ksi

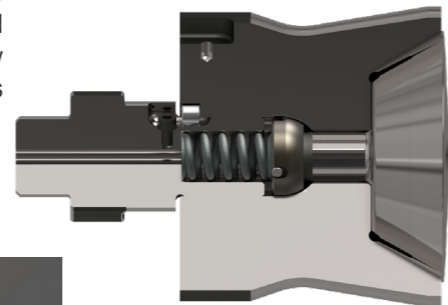


## MARATHON

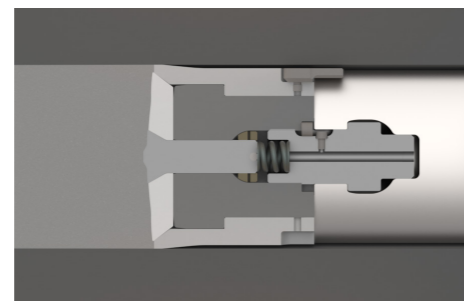
Our product is a durable 2-piece block that ensures high quality and long service life. The robust design offers excellent elasticity and rigidity for the dummy block. Our patented Tuff-Temper steel is superior to H13 steel in terms of strength, toughness and wear resistance. It contains 3 times more Molybdenum, which enhances the mechanical properties of the steel at high temperatures. Tuff-Temper has more carbides, which improve the abrasion resistance of the dummy block. The single-use marathon dummy block has no parts that can be replaced or repaired. It is simply discarded when it loses its retraction capability at the end of each cycle and stays permanently expanded.



High Pressure Marathon dummy block for pressures more than 100 ksi



HPR Dummy Block with thin 2-piece mandrel and bayonet coupling with stabilizing stud

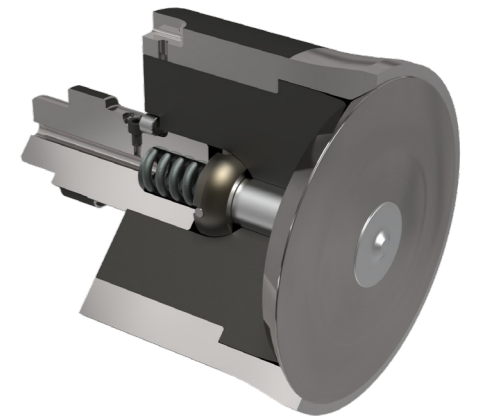
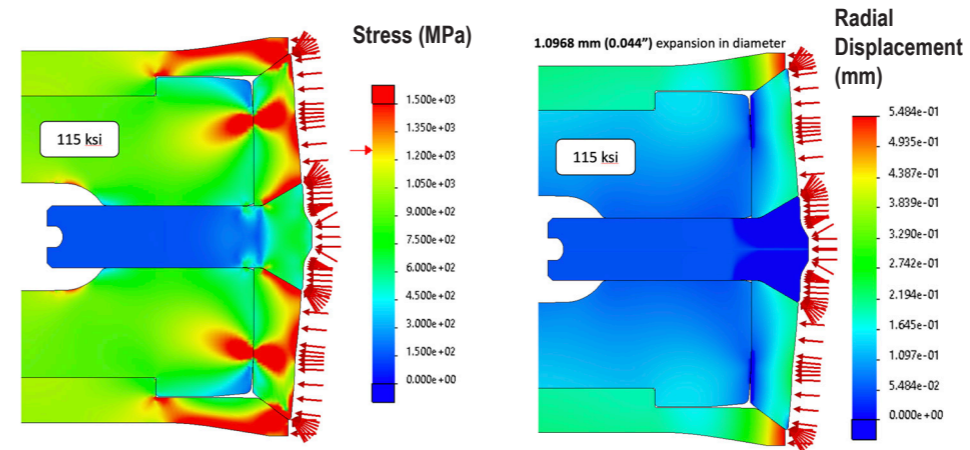


## HIGH PRESSURE RING (HPR)

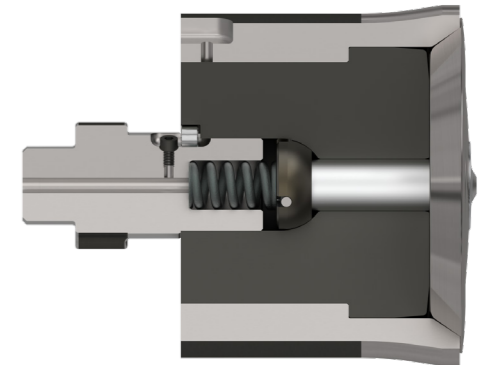
### High Pressure Ring Block (HPR)

The HPR ring is a new innovation that breaks away from our traditional design principles. We have developed it to cope with the new challenges posed by some of the new presses and alloys/profiles that we use. The HPR ring fits snugly with the holder, similar to how the liner and mantle fit a container. This allows us to increase the pad area, without needing any extra mechanism to secure the ring. The mandrel is very thin and flexible, which enables it to expand when needed.

The pad has a slight angle that helps with the expansion. We also use a separate stud to connect the mandrel to the body, which reduces the stress on the mandrel and allows for a slightly larger pad. For reference only, the mandrel angle is slightly sharper than the RRB and Marathon, and the expansion is proportional to the diameter, ranging from about 0.9 to 1.3 mm in diameter and 1.1 to 1.5 mm in clearance.

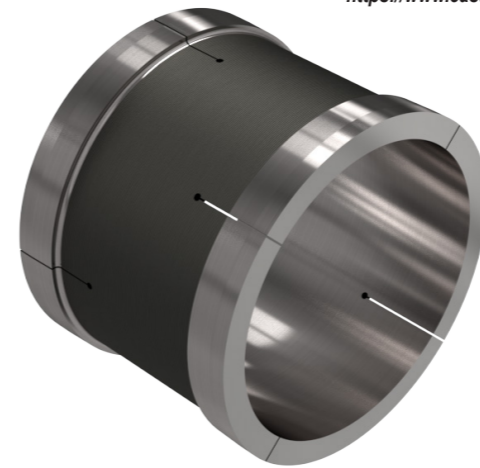


High Pressure Ring Block for extra high pressures



Alloy	Major alloying elements (Wt%)						Temper point to get initial hardness of 46 HRC	Maximum safe operation temperature for material tempered to 46 HRC	Toughness
	C	Si	Mn	Cr	Mo	V			
1.2343 (H11)	0.38	1	0.4	5	1.3	0.4	620°C	570°C	●●●○
1.2344 (H13)	0.40	1	0.4	5	1.4	1	630°C	580°C	●●●
1.2367	0.37	0.3	0.4	5	3	0.6	640°C	590°C	●●○
Tuff Temper	0.36	0.3	0.4	5	3.8	0.8	650°C	600°C	●●●

[https://www.castool.com/wp-content/uploads/2022/05/Material-Selection-for-Extrusion-Tooling\\_Part03\\_](https://www.castool.com/wp-content/uploads/2022/05/Material-Selection-for-Extrusion-Tooling_Part03_)



COLD-CLEAN OUT BLOCK with expansion slots

The Castool Clean-out Block has been designed for maximum efficiency in cleaning the liner wall. The block is long enough to sit on the billet loader and travel through the liner smoothly. It is made to be used at room temperature to make handling safer and to achieve better dimensional control. The block is made hollow to reduce weight and wire cut at both ends to allow it to flex slightly and retain contact with liner wall.



Once the customer has supplied the minimum container liner diameter at room temperature and the operating temperature of the liner, Castool applies the thermal expansion factors for both the liner and the clean-out block to calculate the best diameter for the cold clean-out.

The Castool clean-out block is precisely sized to meet the requirements of each individual container, and to remove the maximum amount of skull without abrading the liner wall.

## PURPOSE

▶ Alu-Ject is a product that helps to separate the dummy block from the billet quickly and easily after each extrusion cycle, preventing the extruded section from sticking to the die.

▶ Aluminium alloy can stick to steel when the temperature is 400°C or higher, which is more likely to happen with larger billet diameters because they have more surface area.

## FUNCTION

▶ Alu-Ject works by applying a precise amount of lubricant on the face of the billet, avoiding excess lubricant that can be wasteful and harmful to the environment.

▶ Alu-Ject also prevents any non-metallic substance from getting into the extruded product, which can affect its quality and performance

▶ Alu-Ject can be purchased as a liquid or a solid soap bar, depending on the preference and convenience of the user.

## BENEFITS

▶ Improved safety, as it does not pose a fire risk

▶ No graphite or oil contamination, which can damage the equipment and the product

▶ No health risk, as it does not contain any toxic or hazardous substances

▶ Enhanced product quality, as the extruded profile has a smooth and clean surface

▶ Reduced costly downtime, as it reduces the need for cleaning and maintenance

▶ Increased tooling life, as it reduces the wear and tear of the die and the dummy block



ALUMINUM EXTRUDERS COUNCIL



QUALITY



SAFETY



ENVIRONMENT

sales@castool.com

+1.905.852.0121

www.castool.com

## LUBRICATION



Liquid billet lubrication system



To prevent the dummy block from sticking to the butt after each extrusion cycle, it is important to apply a lubricant on both the billet and the dummy block. Otherwise, the dummy block may pull out the section from the die or damage the mandrel cone. This problem is more common with softer alloys and larger billets.

ALU-JECT is a water-based lubricant that contains a mixture of acids and salts that form a soap. The lubricant forms a protective layer on the billet that prevents the aluminum from adhering to the dummy block.

ALU-JECT is a clear lubricant that can be used for coating the billet, shear blade, liner seal face and other tooling. It has organometallic compounds that create a film that stops the billet from welding to the dummy block. This makes the release easier and smoother. ALU-JECT can withstand temperatures up to 112°F (600°C).

**NO SMOKE**  
**WATER BASED**  
**BIODEGRADABLE**



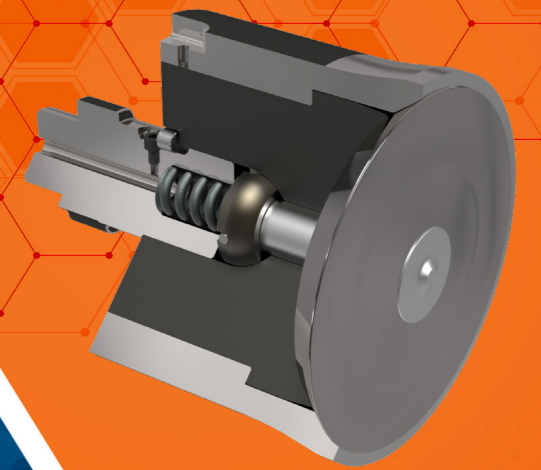
HEALTH	1
FLAMMABILITY	0
PHYSICAL HAZARD	0
INSTABILITY	0

ALU-JECT is a lubricant that can be diluted with water to achieve the desired viscosity and performance. The recommended dilution ratio for initial evaluations is 1:3, meaning one part of ALU-JECT and three parts of water. This ratio may vary depending on the application technique and the specific requirements of the process.

The best way to apply ALU-JECT is by spraying it on the surface, as this ensures a uniform and thin film that reduces friction and wear. Alternatively, ALU-JECT can be applied by swabbing it on the surface, but this may result in a thicker and less consistent film. ALU-JECT STICK is a solid form of ALU-JECT that comes in cream-colored soap bars. It is made of sodium-based soap and does not contain graphite. It has excellent lubricity and adherence properties and can be used for various applications.

**CASITOL**  
TOOLING SYSTEMS

# FIXED DUMMY BLOCK



## PURPOSE

▶ To prevent blisters from forming, let the gases escape when the billet is upset and the burp decompression occurs

▶ To avoid profile inclusions, keep a thin and even layer of aluminum on the inner diameter of the liner

## FUNCTION

A dummy block is a device that extends the ram or stem of an extrusion press and helps to push the alloy through the die. It has several functions that are essential for a successful extrusion process. Some of these functions are:

- ▶ Transmitting the force of the ram to the alloy at high temperatures
- ▶ Expanding to a specific size under load and creating a tight seal with the container wall, leaving only a thin layer of alloy on the liner
- ▶ Detaching from the billet at the end of the stroke
- ▶ Contracting quickly and returning through the container without removing the layer of alloy from the liner
- ▶ Preventing gas entrapment that can cause blisters or damage the container and/or dummy block
- ▶ Adjusting for minor press misalignment
- ▶ Being easy to remove and replace
- ▶ Working effectively until the end of a production run

## BENEFITS

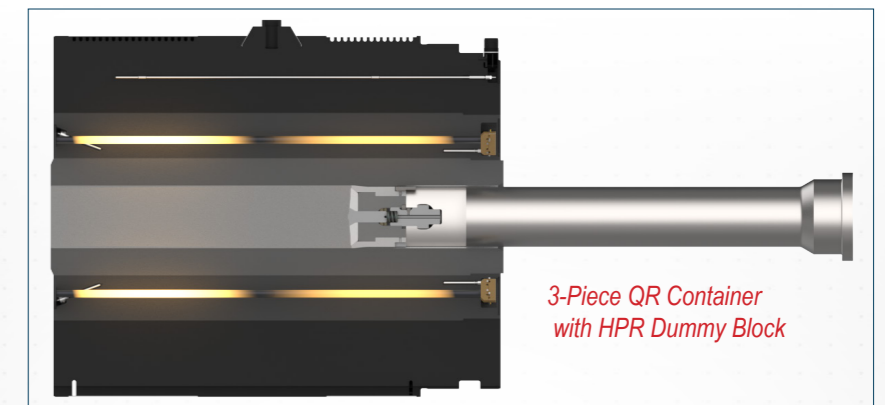
Using a dummy block can provide several benefits for extrusion operations, such as:

- ▶ Reducing scrap due to blisters and surface defects on the back-end of the billet
- ▶ Reducing operational costs
- ▶ Reducing downtime
- ▶ Increasing reliability and productivity
- ▶ Increasing the lifespan of the container liner

## DUMMY BLOCK

Majority of dummy blocks used for extrusion of aluminum alloys are mechanically expandable. They have a moving mandrel that pushes on the expandable ring during the process and opens the ring to desirable diameter. Dummy block is one of the most stressed tools in extrusion, and it is multi-component which move or slide against each other. This makes it difficult to balance the stress and deformation among its components. The face pressure can reach 825 MPa (120 ksi) during the extrusion of high strength aluminum alloys, this level of pressure can be harmful at stress concentration locations where stress can reach 1500 MPa. The yield stress of the material should be high enough to avoid failure at these locations, so that for extrusion of hard alloys such as 7xxx aluminum alloys stronger material is recommended.

Outer surface of the expandable ring (Ring OD) and its surrounding is the hottest part of the dummy block. Generally, a thin layer of aluminum remains on liner ID due to a gap between the ring and liner, this makes the deformation and friction conditions at ring OD very similar to die bearing, so that it experiences quite high temperature, which can be high enough to locally soften the material. This makes it necessary to use hot work tool materials such as H13 and TuffTemper, for manufacturing of dummy blocks.



Longer billets have put more stress on tooling and can decrease tooling life significantly. The solution is to use tooling designed specifically for high-pressure applications such as high-pressure dummy blocks and 3-piece containers. 3-piece containers can distribute stress between sub-liner and body, rather than concentrating the stress at the body ID in a 2-piece container.

CASITOL MAKES EXTRUSION BETTER