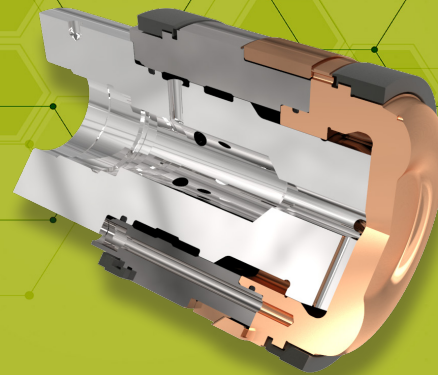


PLUNGER TIPS

AMP

Allper Modular Plunger



PURPOSE

- ▶ Prevent alloy from penetrating between the shot sleeve and plunger, prolonging tooling life.
- ▶ Move smoothly and consistently, with a minimum of lubrication, through the shot sleeve bore increasing casting properties.
- ▶ Maintain a secure seal with the shot sleeve wall necessary for an effective vacuum to be drawn reducing porosity.
- ▶ Cool the biscuit quickly to reduce cycle times.

FUNCTION

The function of the plunger tip is the extension of the plunger rod, which pushes the molten alloy into the mould. There are a number of functions that must be satisfied by an effective plunger tip.

- ▶ To repeatedly transmit the force of the plunger rod, at high temperature, to the alloy.
- ▶ To maintain a seal with the shot sleeve wall during the shot, eliminating flash or blow-by and preventing air from being drawn into the alloy when using a vacuum.
- ▶ To remain thermally and therefore dimensionally stable throughout the shot allowing consistent and repeatable shot velocities.
- ▶ Since the tip is dimensionally stable, and the gap controllable, steel wear rings can be attached to the plunger tip body to provide a guarantee that the seal is maintained.

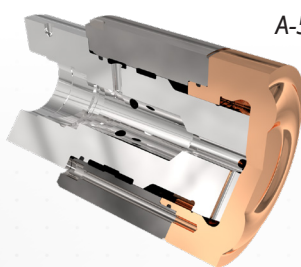
FUNCTION continued on next page

THE AMP PLUNGER

The **Allper Modular Plunger (AMP)** is excellent for large machine from 90 mm up to 300 mm diameter. The demands on the plunger tip, particularly in strength and stability, outgrew the **Allper Ring Plunger (ARP)**. This led to the development of the **Allper Modular Plunger (AMP)**.

The plunger head can be made from Con-Duct (CD) or special A-52 ultra high strength copper alloy. The Con-Duct has a 1000 MPa tensile strength minimum and 42 W/mK thermal conductivity A-52 alloy has a 750 MPa tensile strength minimum and 240 W/mK thermal conductivity. These specific combinations of properties leads to thermal and mechanical stability of plunger head. The body of the AMP is made of A-45 copper alloy. The A-45 has the high thermal conductivity 220 W/mK, which assists the plunger to remain thermally stable. A-45 copper body with CD or A-52 head is fastened to a stainless steel holder with a quick release bayonet coupling. The heat transfer to the coolant is more effective than with the ARP. The tip is more thermally and therefore dimensionally stable, allowing it to be used on today's very large castings.

AMP PLUNGER

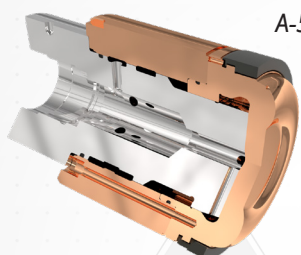


A-52



Con-Duct / Dievar

AMP-A: In some cases, because of the die or shot sleeve configuration, it is difficult to use the split ring. In these cases, a forged ultra high strength Con-Duct steel or beryllium copper head is attached to the AMP stainless steel holder and copper body.



A-52



Con-Duct / Dievar

AMP-R: A nitride H-13 (1.2344) steel ring rests freely in a groove machined near the front of the AMP plunger tip. It is split, and expands against the inside wall of the shot sleeve to maintain a better seal. The cost of consumables is reduced.

FUNCTION continued..

- ▶ Because the rings is flexible, it makes continuous contact with the inside of the shot sleeve. Flash, which is a major cause of wear, is essentially eliminated. Shot speeds are consistent.
- ▶ Since the expanding wear ring ensures a secure seal between the plunger and the shot sleeve, a better vacuum can be drawn.
- ▶ An additional advantage is that the face of these is considerably cooler than that of other plunger tips. This cools the biscuit much faster, and reduces the cycle time significantly.

BENEFITS OF THE CASTOOL ALLPER PLUNGER TIP

- ▶ Reduce cost per shot
- ▶ Increase plunger life
- ▶ Increase shot sleeve life
- ▶ Improve vacuum seal
- ▶ Reduce scrap rate
- ▶ Reduce downtime

With the *Allper Plunger Tip*, Castool again sets a new standard of excellence in the die casting industry.

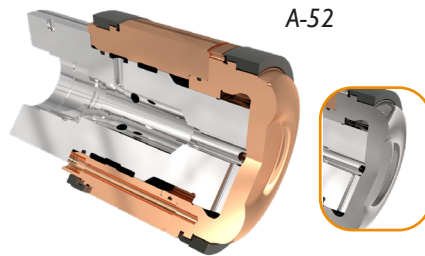
Results may vary depending on individual press characteristics and setup.



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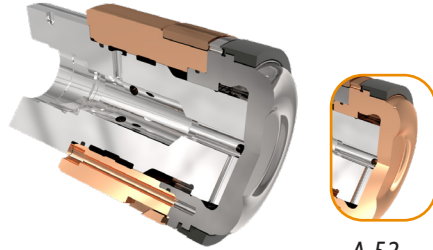
🌐 www.castool.com



A-52

Con-Duct / Dievar

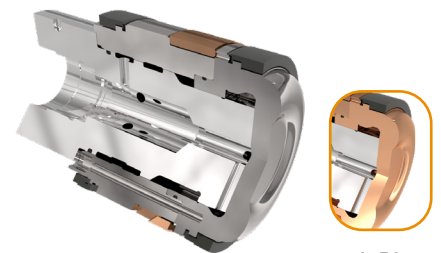
AMP-RR: Similar to the AMP-R, but has two expanding wear rings instead of one, specifically for large, convoluted close tolerance castings.



A-52

Con-Duct / Dievar

AMP-RV: The RV incorporates a forged beryllium copper bushing around the copper body. A more positive seal is achieved.



A-52

Con-Duct / Dievar

AMP-RVR: The RVR incorporates a forged beryllium copper bushing around the copper body, between the 2 rings. A more positive seal is achieved.

COMPONENT PARTS

HOLDER: A stainless steel tip holder is screwed onto the shot rod, and the body is securely fastened to it with a quick release bayonet type connector. The front of the steel holder lies in full contact with the inside face of the plunger tip and absorbs the total pressure of the shot. The face can then be very thin for better heat exchange.



The water flow is from the center of the shot rod, through the stainless holder, and directly to the inside face of the plunger tip where a turbulent flow is generated to maximize the heat transfer. It then goes through four channels to the circular external coolant return passage. Approximately 10 to 50 l/min. of water flow are necessary to use this system depending on plunger diameter.



RING: Replaceable wear rings create a superior seal for vacuum applications and reduces cost. The internal radius has been increased by 8 times, reducing the stress concentration factor by 1/3. The overlap length has also been reduced. The total effective stress from the reduced overlap and increased radius reduces the stress to at least 1/5 of the original milled ring.

Two pin hoods are now being machined into most rings. The split is kept away from the pour spout and also erosion prone area of the shot sleeve, under the pour spout. The ring complies to the ID of the shot sleeve better than with a single hood opposite the split. It is also easier for the operator to access the split for removing and installing a new ring.



CASTOOL MAKES DIE CASTING BETTER