



**HIGH CONDUCTIVITY COPPER ALLOYS  
FOR PLASTIC MOULDING**



**REDUCE CYCLE TIME  
LOWER MACHINING COSTS  
IMPROVE PRODUCT QUALITY**



[www.ampcometal.com](http://www.ampcometal.com)

# LOWER COSTS + IMPROVE QUALITY



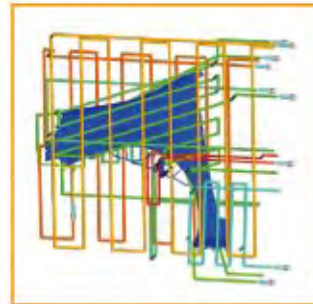
(Source: Crown Cork)

The use of AMPCOLOY<sup>®</sup> throughout the plastic injection process will maintain an even temperature and greatly simplify overall control procedures. AMPCOLOY<sup>®</sup> alloys shorten heat transfer times and thus reduce energy costs.

## LOWER MACHINING COSTS

Water cooling of steel moulds can be of assistance in removing heat from the moulds, but it greatly increases your machining costs and can be difficult to achieve on thin sections.

The use of AMPCOLOY<sup>®</sup> alloys gives designers **greater flexibility**, as cooling channels can be located further from mould walls and in many cases, the need for such cooling can be significantly reduced or eliminated altogether.



(Source: Cadflow)



## IMPROVE PRODUCT QUALITY

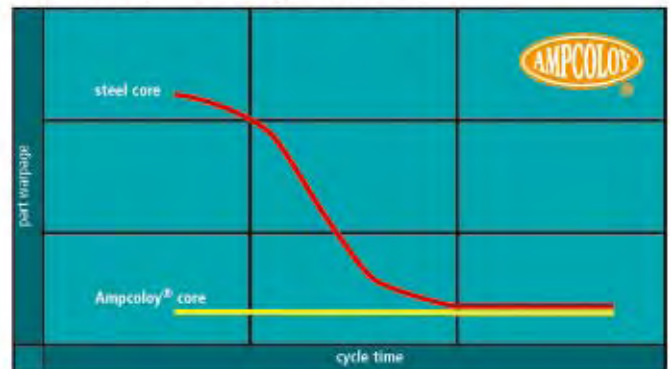
Using AMPCOLOY<sup>®</sup> cores instead of steel cores reduces the time required to produce high-quality parts.

In addition to the high thermal conductivity of AMPCOLOY<sup>®</sup> alloys, the material also exhibits outstanding **heat diffusivity** characteristics. Heat diffusivity controls the speed at which a material will return to its initial temperature after a large increase in temperature. The higher diffusivity of AMPCOLOY<sup>®</sup> means that moulded components will return to their **cool state quicker** and in turn, prevents the potential build-up of high wall temperatures, hot-spots, sink marks and other problems typical of plastic part overheating. The result is a great overall improvement in product quality.

## MINIMIZE COMPONENT JAMMING

When using AMPCO alloys for wear elements such as wear plates, rings, ejector pins, etc., **jamming of components can be avoided**, thus greatly extending the life of the mould. The exceptional inherent properties of AMPCO alloys, as well as our rigorous standards of production, make such **outstanding performance** possible.

## PART WARPAGE



## AMPCO<sup>®</sup> BRONZE FOR WEAR APPLICATIONS

| ALLOY | Thermal Conductivity W/m. <sup>2</sup> K | Thermal Diffusivity mm <sup>2</sup> /s | Brinell Hardness HB 30 | Tensile Strength N/mm <sup>2</sup> | Yield Strength N/mm <sup>2</sup> | Elongation % | Coefficient of Expansion 10 <sup>-6</sup> 1/ <sup>°</sup> K | Coefficient of Friction (dry conditions) |
|-------|--|--|------------------------|------------------------------------|----------------------------------|--------------|---|--|
| A18   | 63                                       | 19.8                                   | 192                    | 724                                | 358                              | 14           | 16  | 0.18                                     |
| A21   | 43                                       | 15.2                                   | 286                    | 758                                | 414                              | 1            | 16  | 0.21                                     |
| M4    | 42                                       | 12.4                                   | 260/300                | 960                                | 725                              | 8            | 16  | 0.23                                     |

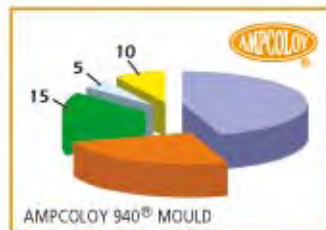
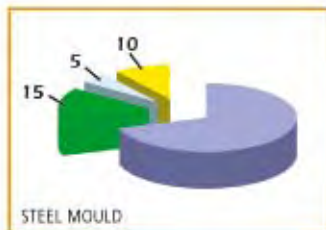
# REDUCE CYCLE TIME

BY AS MUCH AS 50% WITH AMPCOLOY®  
HIGH CONDUCTIVITY ALLOYS

No matter how efficient your operation, the laws of physics still hold true. With AMPCOLOY® in your mould tools, you can use these laws to your advantage, rather than fight against them!

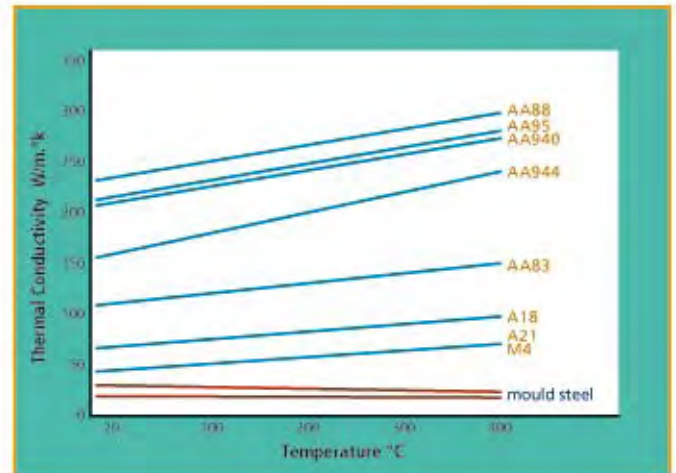
The limiting factor to **reducing cycle times** and improving productivity is all too often the speed at which you can cool the injected component. The graph below illustrates how quickly heat can be removed from critical areas of the mould.

The significantly **higher thermal conductivity** of AMPCOLOY® alloys greatly increases this rate of cooling and, unlike steel, the rate actually increases as the mould temperature rises.



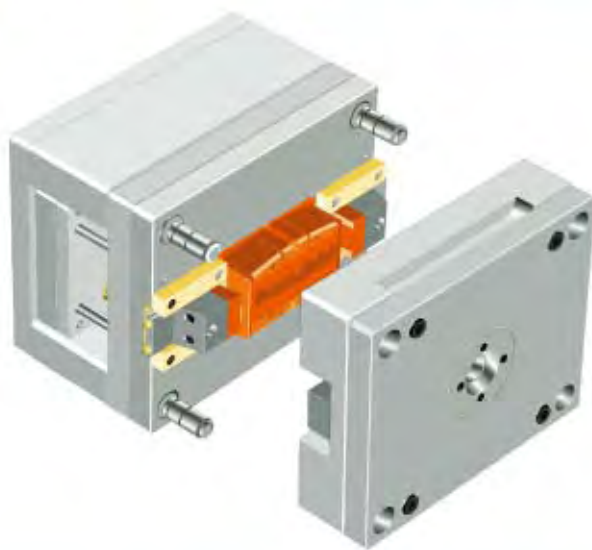
- FILLING
- Mould OPEN
- PACKING
- TIME SAVING
- COOLING

**FASTER COOLING MEANS  
REDUCED CYCLE TIMES  
AND LOWER COSTS!**



**70 seconds COOLING in STEEL  
45 seconds COOLING in AMPCOLOY®**

**A TIME SAVING OF 25 SECONDS !**



PRODUCTION REQUIRED : 100,000 UNITS  
INJECTION MOULDING COST : € 160.- / hour

|              | Cycle time (sec.) | Production hours for 100,000 units | Injection moulding cost (€) |
|--------------|-------------------|------------------------------------|-----------------------------|
| STEEL MOULD  | 100               | 2,778                              | 444,480.                    |
| AMPCOLOY®940 | 75                | 2,083                              | 333,280.                    |
| SAVINGS      | 25                | 695                                | 111,200.                    |

## AMPCOLOY® HIGH CONDUCTIVITY ALLOYS

| ALLOY | Thermal Conductivity W/m.°K | Thermal Diffusivity mm <sup>2</sup> /s | Brinell Hardness HB 30 | Tensile Strength N/mm <sup>2</sup> | Yield Strength N/mm <sup>2</sup> | Elongation % | Coefficient of Expansion 10 <sup>-6</sup> 1/°K | Coefficient of Friction (dry conditions) |
|-------|-----------------------------|--|------------------------|------------------------------------|----------------------------------|--------------|--|--|
| AA940 | 217                         | 63                                     | 210                    | 689                                | 510                              | 12           | 17.5   | 0.35                                     |
| AA944 | 156                         | 46                                     | 294                    | 938                                | 730                              | 5            | 15.7   | 0.35                                     |
| AA83  | 108                         | 30                                     | 360                    | 1310                               | 827                              | 5            | 16.5   | 0.20                                     |
| AA95  | 218                         | 60                                     | 240                    | 723                                | 537                              | 17           | 17   | 0.14                                     |
| AA88  | 230                         | 60                                     | 270                    | 890                                | 680                              | 14           | 17   | 0.17                                     |



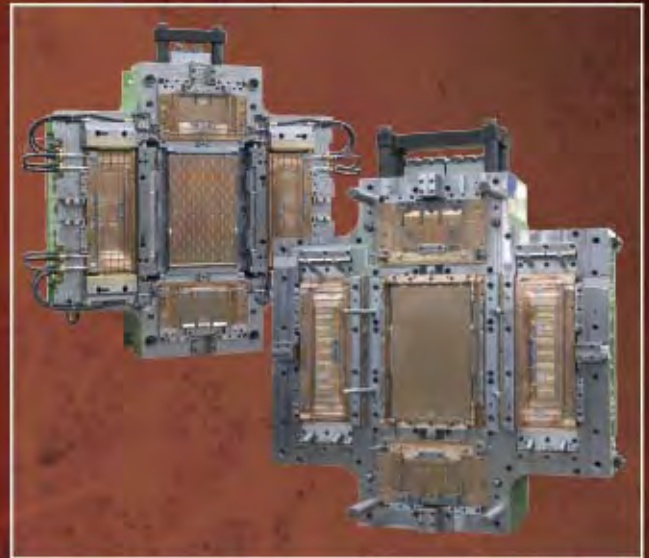
# COMMITTED TO INNOVATIVE PRODUCTS AND SUPERIOR CUSTOMER SERVICE FOR OVER 90 YEARS.

AMPCO METAL is an integrated metal producer, offering under the Ampco® and Ampcoloy® brands the widest range of premium specialty bronzes and copper alloys, famous for their exceptional physical and mechanical properties.

Our Ampcoloy materials provide the best combination of thermal, mechanical and chemical properties, such that they are considered the only alternative to produce pieces with a high quality of finish when the cooling cycle (typically 70% of the overall cycle time) is critical.

Professional value-added services, product quality and short delivery times are internationally guaranteed through our warehouses in Europe, USA and China.

Round bar, rectangles, tubes and plate are readily available as well as forged or cast shapes, produced specifically to your requirements. AMPCO METAL also has the facilities and expertise to deliver pre-machined or fully machined pieces, if required.



(Source: Tooling Holland)

## AMPCOLOY® ALLOYS

READILY AVAILABLE FROM STOCK  
IN THE SIZES YOU NEED:

Extruded/forged rounds:  
dia. 9.5 mm - 370 mm

Forged plates:  
thickness 12.7 mm - 304 mm

