PREVENT CASTING DEFECTS & THEIR COSTS

with Automated Green Sand Molding

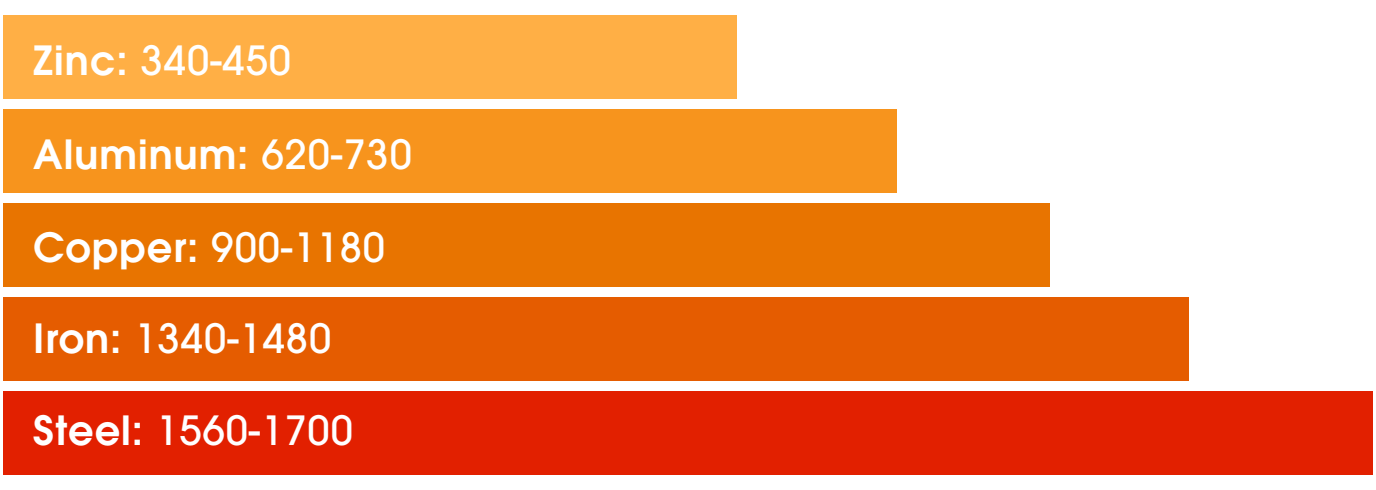
Parts manufacturing can involve many steps that vary from one production run to the next. To deliver the most cost-effective parts, a manufacturer has little to no room for error.

Fully-automated green sand molding is a highly accurate, repeatable, efficient and economical manufacturing process for various types of applications, part complexities, and production quantities. Choosing a manufacturing partner capable of fully-automated molding can help reduce the chance of defects and save on parts.

Call Boose to see if green sand molding is right for your part. 717-336-5581

HOW DEFECTS OCCUR

Each production run is unique and must be planned and executed with accuracy. Inconsistencies during production, such as incorrect pouring temperatures of a metal, can negatively impact the end product. Even if the pattern and mold are produced with high precision, errors during the molding process can cause defects that can drive up manufacturing time and costs.



Pouring Temperature Ranges (°C)

Temperatures above are simplified for this document. For precise pouring temperature ranges of metal alloys, consult a professional manufacturing foundry.

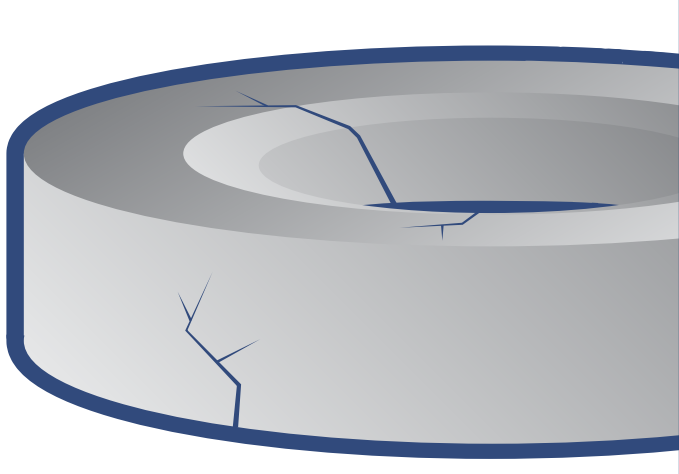
COMMON DEFECTS & POSSIBLE COST IMPACTS

MOLD EXPANSION

When molten metal is poured, moisture in the molding sand evaporates into steam. As the metal cools, steam condenses into a moist coating that can weaken and expand the mold. Expansion causes unwanted cracks/grooves commonly known as rattails and buckles that can weaken and damage parts.

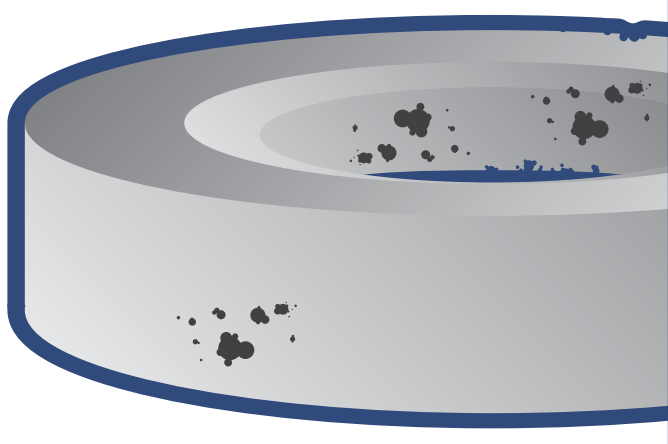
METAL PENETRATION

The significant temperature difference in molten metal and molding sand causes metals to cool immediately after being poured. Rapid cooling causes a thin layer to form on the mold that prevents the liquid metal from penetrating the sand. If the metal is too hot when poured, this layer will not form right away causing mold surfaces to crack.



GAS DEFECTS

Gases (i.e. hydrogen, nitrogen, oxygen) typically dissolve in molten metals. As metals cool, the ability to hold gases decreases and small bubbles are released as gas escapes. If pouring temperatures are too high, bubbles form more frequently, leaving behind rough inconsistencies in the casting's surface called *pinholes.*



INADEQUATE FLUIDITY

A metal's ability to flow into the mold before solidifying is known as fluidity. If metals are not kept at high enough temperatures prior to pouring, fluidity decreases and the metal will not fill the mold completely. This causes the dimensions of the end product to be inaccurate.

HONING IN ON POURING TEMPERATURE: WHAT CHOICE YOU CAN MAKE?

Pouring turbulence and poor sand quality are known to cause casting defects; however, pouring temperature is a key factor that is highly controllable and preventable. If metals are heated to and maintained at the recommended temperature ranges, the result will be a more accurate and affordable end product.

Choosing a manufacturer with fully-automated sand molding capabilities is an effective way product designers can improve temperature consistency, prevent defects, and reduce production costs.

Temperature Control Advantages of Fully-Automated Sand Molding:

TEMPERATURE CONTROL SYSTEMS:

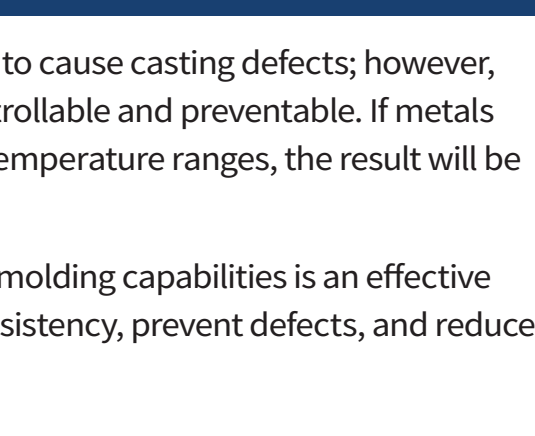
Since unnecessarily high pouring temperatures are known to cause rattails, buckles, and pinholes, many automated molding operations offer advanced temperature control systems. These systems can be pre-programmed and closely monitored during production to ensure metals are heated to the recommended pouring temperatures every time.

HEATED POURING SYSTEMS:

Many automated molding operations have heating systems integrated the robotic pouring equipment. This keeps metal at the right temperature as it's transferred from melting to pouring. In addition to metal heating, these automated systems offer highly accurate and repeatable pouring.

OPTIMIZED POURING SPEED:

Optimized pouring speed is another key advantage of automated molding systems. Slow or inconsistent pouring speeds can cause metals to lose heat and begin solidifying too early. The pouring speeds of automated systems can be increased to cut the metal's time spent in the pouring ladle, so heat loss (and related defects) can be prevented.



WHAT'S NEXT?

1. **DETERMINE** the importance of consistent pouring temperatures for your part and its application.
2. **SPEAK** to your manufacturing partners about their automated sand molding capabilities.
3. **SUBMIT** specs to **Boose Aluminum** for engineering support and cost-effective, automated sand molding at **www.boosealum.com/rfq**.

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BOOSE ALUMINUM SAND CASTINGS

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