

# Fluxes and Degassers

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## **Fluxes:**

Flux provides two primary purposes in the foundry. The first is to provide a cover layer over the molten metal. The second is to promote the separation of impurities from the melt. For the average hobby foundry fluxing is recommended for every melt.

Typically  $\frac{1}{2}$  of the recommended flux is added to the crucible and metal while still cold. During the heating phase the metal chunks will melt into a puddle at the bottom of the crucible called a "heel". The flux will float on top of the heel and form a protective barrier to keep the furnace atmosphere away from the newly molten metal. It is important to keep oxygen, hydrogen and other gasses away from the heel to prevent their absorption into the molten metal. Gasses go into solution easily and can be the cause of casting defects. The gas will come out of solution in the mold at the interface of the molten metal and the sand due to the pressure differential at the interface. This can cause surface imperfections in the form of pock marks. Voids and internal defects can also result from dissolved gas. As the metal cools it contracts. This contraction can result in a pressure drop internally that will cause dissolved gas to come out of solution as a bubble. These bubbles can remain as hidden voids in the finished parts.

The second major function of flux is to help separate impurities from the metal. The flux lowers the surface tension between lighter and heavier components of the melt. After the metal has completely melted the initial flux is skimmed off the top. The second  $\frac{1}{2}$  is then added and carefully stirred in. This application will cause suspended impurities to separate from the melt. The heavier impurities will sink to the bottom of the crucible as slag. The lighter components will float to the surface as a dry, light dross. This dross is skimmed, and the clean shiny metal is ready to degas or to pour.

The down side to fluxing is increased erosion of the crucible. The reactive flux can quickly eat into the wall of a crucible at the surface of the melt. For this reason it is good practice to change the level of the molten charge from melt to melt to help distribute the wear. Also only use the minimum amount of flux needed to provide complete coverage of the surface. Using more wastes flux and increases wear. Inspect your crucibles before each use and check for excessive wear that can weaken the crucible. Discard worn units. Safety First.

## **Degassers:**

Degassers provide enhanced removal of dissolved gas from the molten metal. This is important when using scrap metals, or when creating parts that require a fine surface finish or strong internal structure.

Degassers are typically added after the second dross skimming. The degassing chemical is applied using a fluxing tool to bubble the resulting gas thru the molten metal. The object is to create as many fine bubbles as possible. This will allow the degasser to bind with dissolved gasses such as hydrogen and oxygen and bring them to the surface. Some manufacturers suggest adding  $\frac{1}{2}$  the degasser to the cold charge. This may provide a degree of protection against gas absorption during melting. After degassing it may be necessary to skim again before pouring.

Degassing should be done with proper ventilation using completely dry tools. The fumes liberated can be particularly hazardous and should not be inhaled or allowed to contact the skin or eyes. The chemical itself is hazardous as well, and should be handled according to directions, being very careful about getting it into your eyes, nose, mouth or onto skin.