



# GRAPHALLOY® | Bushings for Molten Sulfur Pumps

DS2529-37

## MOLTEN SULFUR PUMPS: A TOUGH ENVIRONMENT FOR BUSHINGS

95% of all sulfur handling in North America is in a molten state. Molten Sulfur pumps are used in the following applications: oil refineries– stack gas emissions, mining-sulfide mineral ores, sour natural gas and oil, sulfur re-melt piles, truck or rail car loading and unloading. This service is difficult for many bushings due to its high temperature and the high cost of downtime for bearing failure due to galling or shaft seizing.

## ADVANTAGES OF GRAPHALLOY BUSHINGS

- ◆ **Self-Lubricating:** GRAPHALLOY is lubricated by the pumpage and needs no additional lubrication. Runs dry and keeps on running.
- ◆ **Non-Galling:** Permits closer running clearances between rotating parts resulting in lower shaft vibration and increased efficiency. Survives high speed contact that would gall metal parts.
- ◆ **High-Temperature Resistance:** Iron grade Graphalloy operates to 750°F (400°C) - well beyond required temperatures for molten sulfur!
- ◆ **Submerged: Maintains dimensional stability when submerged,** under load, and over wide temperature swings. Provides constant running clearances. Will not swell.

## WHERE TO USE GRAPHALLOY

- ◆ Line shaft bushings
- ◆ Bowl Bushings
- ◆ Throat Bushings



## GRAPHALLOY SUCCESS STORIES

### Petroleum Refinery

- ◆ **Application:** Vertical Sulfur Degassing Pumps – Lewis® Weir MSS-2254 292°F, 1750 RPM. There are eight vertical column pumps in their sulfur pit, four of which are “quite the trouble-makers” when it comes to high vibration. Vibration data usually indicates some sort of imbalance.
- ◆ **Problem:** Pumps were fitted with nickel-chromium (Ni-Cr) bearings to handle the high temperature environment. To avoid seizing and galling, the line shaft and volute bearings were fit with 0.020 – 0.025” running clearance. However, the pumps were experiencing high vibration, approaching 1.0 inches/second peak. When the pump was disassembled, the bearing clearances had opened up to 0.030 – 0.034”.
- ◆ **Solution:** Pump was rebuilt using GM110.3, GRAPHALLOY Bushings with a shaft to bushing clearance of 0.006 – 0.007”. The tighter clearances were possible due to the non-galling properties of GRAPHALLOY.
- ◆ **Results:** The overall high vibration level decreased to a maximum of 0.21 inches/second peak. The pump worked so well that the refinery has since rebuilt three additional pumps to the same standards using GRAPHALLOY Bushings.



### Pump Repair Shop / Refinery

- ◆ **Application:** Vertical Molten Sulfur Pump – LaBour Taber
- ◆ **Problem:** The pump repair shop had to rebuild the pump since an “operator error” at the refinery resulted in the pump being started cold which damaged the pump.
- ◆ **Solution:** The bushings were GRAPHALLOY GM 110.3 and the shop manager said GRAPHALLOY was “working great” and they were placing an order with us to replace these bushings. He said most of the repair work they had to do was on the impellers.
- ◆ **Results:** The Taber vertical pump with steam jacketing is ideally suited for this difficult application. LaBour recommends using bearings that can withstand up to 500°F. The pump was put back into service and is working well.

