

## Inspection of SF6 Distribution System performed at Chicago White Metal Casting, Inc by Equipment Imaging and Solutions, Inc.

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On August, 20 Equipment Imaging and Solutions, Inc. performed a thorough inspection of Chicago White Metal's SF6 mixing and distribution system to determine if there were any leakage points.

SF6 (Sulfurhexafluoride) is used as a cover/blanket gas over molten magnesium in the production of magnesium die castings.

Chicago White Metal operates with a central mixing SF6 system using air, dried to a dew point of -100 degrees F. The SF6 is mixed with air at a ratio of only .4% SF6 and 99.6% air. From the mixing station, one central line carries the gas mixture at 90 psi, through a service corridor located behind the die casting machines. At each point adjacent to a furnace, a line branches off from the central line to feed that furnace. These lines branch off and the gas passes through a pressure reducing regulator set at 20 psi.

After the regulator, a flow meter is located on the branch line feeding at a rate of 6-8 cubic feet/hr., depending on the capacity/size of the furnace.

SF6 gas can be detected using an infrared visual imaging system

The inspection began at the central mixing station. A small leak was found immediately. The gas tended to hover around the mixing station which prevented us from identifying the source. Therefore, a fan was used to disperse the gas quickly and the source was quickly identified.

There was a regulator flange and a solenoid valve that were leaking inside the mixing cabinet. The regulator flange needed two screws to be tightened and the solenoid valve needed to be replaced.

These repairs were effected immediately and the source of the leak was discontinued.

Next we inspected the central distribution line as well as all the branch lines in our service corridor. All lines were meticulously inspected and there were no leakage points detected.

We then began our inspection of the regulators, flow meters, the feed lines that lead directly into the furnaces and any point that might be an avenue for leakage. In general, the results were very good in that we found only 3 leakage points related to pipes, tubing and fittings. These were specifically at die cast machine # 21, 26 and 29.

We were able to eliminate two of the leaks by tightening a fitting and the third by replacing the fitting.

We did however find one common leak point that was evident on every machine. Leakage was consistently found where the plunger submerges into the gooseneck. The fit between these two is intentionally loose so the plunger travels freely.

We did not have a quick fix for this point of leakage and we are still working on a solution at this time. We have made one significant change since the time of the inspection and that is with our piping which leads from the concrete floor to the furnace. This piping was all copper with compression connectors and it was determined that normal wear and tear created potential leak points. All of this piping was replaced with teflon tubing and braided stainless steel jackets.

It is our opinion that this inspection was worthwhile for Chicago White Metal, EIS, the SF6 emission reduction partnership and the environment. We know that we have reduced SF6 emissions to the atmosphere as a result of this inspection. We cannot quantify that reduction at this time, but we do know there was a reduction. This reduction will also result in a cost savings to CWM, but once again we cannot currently quantify that amount.