

POLYCONTROLS

Technologies

QUAY
MAGNESIUM

SF6 Usage Reduction in Chinese Mg Industries

SF6 Meeting

November, 2006

San Antonio, Texas

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I. At present, the Chinese Mg Industry consists of two molten Mg processes

A. The raw material ingot production industry

1) Estimated to be potentially as much as 80% of world supply

B. The die casting industry

1) Fledgling industry at just over 10+ years experience growing many-fold each year



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II. Magnesium Ingot Production

A. In the great majority of magnesium ingot production capacity SF6 reduction is not a possibility as SF6 is not used. Much like Western Mg ingot production started many decades ago, Chinese ingot production uses:

1) Mg chloride-based flux for protection of liquid Mg in melting and casting crucibles

2) SO2 and/or dry sulfur powder (which produces SO2 when melted on the Mg surface) for ingot protection



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III. Magnesium Die Casting

A. Molten Mg protection in the die casting industry is directly influenced by the Original Equipment Manufacturer (OEM) initial selection, due to the relative lack of process experience by the industry

1) If the die cas equipment was provided from European OEMs that prefer dilute SO₂/Nitrogen, then this is what that respective Chinese die caster uses



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III. Magnesium Die Casting

2) If the die cast equipment was provided from other Western equipment OEMs that use SF6-based protection, then this is what that respective Chinese die caster uses

3) Overall, the method of protective cover gas blending seen (regardless of whether SF6 or SO2 is the active gas) is very variable, both in method chosen and variability in gas blend accuracy (and therefore moten metal protection)



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IV. Local, Provincial & National environmental bureau interest in SF6 reduction

A. In the recent past, the priority for investment into new manufacturing infrastructure within China was higher than stringent adherence to Western environmental policy. This was especially true for domestic ventures versus Western joint venture enterprises



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IV. Local, Provincial & National environmental bureau interest in SF6 reduction

B. Within the past few years, there is a positive shift growing in momentum (driven from the national environmental bureau level) to eliminate this “industry-first” perception. SF6 reduction in Mg is viewed as an easy example to show this dedication



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IV. Local, Provincial & National environmental bureau interest in SF6 reduction

C. More importantly, this effort is being commercially driven in China with the advent of CDM projects being approved to eliminate SF6. As further example, several companies that provide this service exhibited at the recent International Magnesium Association annual meeting in Beijing, China in May, 2006



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D. To illustrate the “hand-in-hand” relationship that drives these CDM efforts, it has been inferred that a portion of any CO2 credits go to the government as a partner in this effort, to facilitate project approval



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E. Progress regarding SF6 replacement is in very early stages in China, with a bias toward dilute SO2-based alternatives instead of SF6 alternatives using fluorine as the active protective ingredient of the blended cover gas. This is due predominately to the facts that there is 10+ years of Mg die casting experience in using dilute SO2-based cover gases in China, and there is an infrastructure of technical support from emerging Chinese domestic equipment suppliers for SO2-based solutions



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V. Culture

A. Economics drive everything in China, including environmental improvement

1) A large Mg die caster now using SF6 is presently investigating using dilute SO2/dry air blends versus their current protective gas solution, solely for economic improvement



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V. Culture

B. Management decision-making is MUCH faster in China than in Western peer companies. It is the authors' opinion that if an economic return is foreseen from an environmental improvement, China will be much faster to convert away from SF6 than Western industry



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VI. Conclusions

A. Attitudes towards environmental compliance are changing in China from an “industry-first” philosophy to a proactive compliance philosophy. SF6 elimination in the Mg industry is seen as an easy example of this effort

B. Economic return on investment for environmental improvement will have more impact in China than Western regions in the world



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VI. Conclusions

C. Don't assume that the Chinese Mg industry is waiting for Western technology to enable them to achieve this improvement "someday". The speed of technical implementation and management resolve to improve themselves is dramatically greater than Western peers



Questions

