PRODUCT STEWARDSHIP SUMMARY

METHYLCYCLOPENTADIENYL MANGANESE TRICARBONYL (mmt®)

Introduction

Methylcyclopentadienyl manganese tricarbonyl (mmt®) is a fuel additive that boosts gasoline octane and reduces harmful vehicle emissions. It is used to produce cleaner burning gasoline, while saving energy and lowering emissions of greenhouse gasses. Manganese, a natural occurring element, is a key component of mmt®.

Uses and Advantages

mmt® is a fuel additive that raises gasoline octane levels, improves automotive performance, lowers tailpipe emissions, reduces fuel consumption, produces cleaner burning unleaded gasoline, and protects automotive catalyst systems. It has been added to unleaded gasoline in numerous countries.

Health Effects

Manganese is an essential element that must be taken in and the human diet contains abundant quantities of the metal. All significant aspects related to the health effects of manganese release from the combustion of mmt-containing gasoline have been thoroughly studied. A recent large and comprehensive health effects testing program demonstrated that mmt® use is safe and that potentially sensitive sub-populations are very well protected under current standards. Numerous regulatory and independent reviews have found that manganese release from combustion of mmt® does not represent an unacceptable risk to public health or welfare.

Environmental Effects

mmt® has a low environmental impact. The product is handled and used in a highly engineered, completely closed system. The use of mmt® as a fuel additive does not measurably alter the background levels of manganese in soil and vegetation, which naturally contain abundant quantities of the essential metal. This is due to the low fuel treat rate combined with a low manganese emission rate following combustion.

Exposure

Manganese is an essential element and is naturally found in food, water, soil, and air. Therefore, human exposure to manganese occurs naturally via diet and air. mmt's low treat and emission rates significantly minimize the quantity of manganese released into the environment from combustion of MMT-containing gasoline, and mmt® use does not significantly contribute to natural exposure to manganese through food, water, and air. A comprehensive airborne manganese personal exposure study conducted in Toronto, Canada, at a time when all gasoline contained mmt®, demonstrated that exposures to manganese were well below world-wide air standards.

Risk Management

Inherent hazards are associated with the refining and use of gasoline and other fuels. The parts per million quantities of mmt® used to improve octane and combustion do not alter or increase that risk. mmt® is delivered and metered into gasoline via a highly engineered, self-contained system that captures vapors and thus practically eliminates worker exposure. Gasoline containing mmt® is no more hazardous to consumers than gasoline without mmt®. For over 30 years, millions of pounds of mmt® have been safely used around the world.

Conclusion

Over the past 25 years, mmt® has been subjected to extensive health, automotive, regulatory, and legal reviews for use in unleaded gasoline. U.S. EPA has characterized mmt® as having been subjected to "the most extensive test program ever conducted." As a result of rigorous testing and scientific evaluation, the product is approved for use in unleaded gasoline in many countries around the world.

For additional information, contact us at:

Afton Chemical Corporation • 500 Spring Street • Richmond VA 23219 • 804-788-5800