HSLA-V Steel Fact Sheet

Definition of **HSLA-V Steel (High-Strength Low-Alloy Steel Microalloyed with Vanadium)**

HSLA-V steel is intended to represent those steel grades where a small addition of vanadium (generally less than 0.12%) provides enhanced strength over standard low C-Mn steels, while meeting or exceeding all requirements for ductility, weldability and toughness.

Advantages over Traditional Low C-Mn Steels

HSLA-V steel provides an increased strength-to-weight ratio over standard low C-Mn steels. Vanadium, when used as an alloy, helps to improve the critical engineering properties of standard low C-Mn steels without greatly increasing the cost.

HSLA-V steels enable lighter structures, compared to standard low C-Mn steel structures, since less steel is need to accomplish the same strength requirements and also provide:

- Weldability
- Ductility
- Strength
- Elongation

Vanadium, when used as an alloy, leads to:

- Ease of use during the steelmaking process
    - High recovery of alloy additions
    - Good castability
    - High solubility during reheating
    - Avoidance of high roll forces
- Effective strengthening at all carbon levels
- Predictable strengthening with the addition of up to 0.15% vanadium in HSLA-V steels

Availability

The following steel producers manufacturer HSLA-V Steel:

- Arcelor Mittal
- CMC Steel
- Gallatin Steel
- Nucor Steel
- SSAB
- Steel Dynamics
- WCI Steel
- US Steel

Future of the Steel Industry

Looking at the potential growth market for vanadium, there is a real opportunity in terms of the global explosion in demand for infrastructure, and therefore the need for raw materials - steel, reinforced concrete and other necessary resources to support and develop an infrastructure. Global steel production will be strained at the current levels. In a few years, it appears that demand will be about two billion tons of steel per year.

An attractive alternative is micro-alloy steels made with recycled scrap. It is possible to use about 30 to 40 percent less steel and achieve the same engineering objectives. As a consequence, there is also less impact on the environment.

Sustainability

Vanadium is always found combined in nature and widely distributed through a variety of minerals. In the United States, the primary source of vanadium is through recovery from spent catalyst from oil refining operations. These catalysts, along with other vanadium-bearing "waste" materials, are processed for recycling by several companies that, in turn, supply ferrovanadium alloys. The environmental benefits of recycled vanadium are worth noting.

Each year six million pounds of vanadium are recycled from spent catalysts. This reduces the need to mine for vanadium minerals, which reduces the energy consumption and subsequent pollution from mining. The use of recycled vanadium also reduces the energy requirements normally associated with processing ores, eliminating or reducing the need for land filling these "wastes," and ensuring a domestic supply of vanadium for U.S. steel producers.

When used as an alloy in the steelmaking process, less steel is needed to meet the same structural strength requirement as standard low C-Mn steel. This reduces the amount of energy needed in manufacturing.

There is also a savings in fuel consumption in operating lighter vehicles and pulling lighter weight trailers with components made from HSLA-V steel.