

Increased Availability of Balloon Grade Helium

An Opportunity for Independent Distributors

By Phil Kornbluth

The great majority of the gaseous helium that has been supplied to helium customers in recent years has been Grade 5 helium, which means that it is 99.999 percent pure. In fact, the typical purity of standard commercial grade helium has migrated over the years from 99.995 percent purity (Grade 4.5) to Grade 5, despite the fact that several of the major helium applications would be perfectly fine using helium of lesser purity.

So why do many helium customers purchase higher purities than they require? The simple answer is that the great majority of helium sold globally starts out as extremely pure liquid helium that is filled into bulk liquid ISO containers for cost-efficient transportation to world markets, despite the fact that most end customer demand is for helium in gaseous form. The typical liquid helium ISO container holds approximately one million standard cubic feet (SCF) of helium, while the largest tube trailer or skid utilized to transport gaseous helium only holds about 180,000 SCF. This means that transportation of bulk liquid helium is more efficient than transportation of bulk gas by a factor of more than five. While the purity of liquid helium is not directly measurable due to its extreme cold, it easily exceeds Grade 5 purity. Since the global helium supply chain has developed around bulk liquid transportation, and high purity helium is readily available, it follows that Grade 5 helium has become the standard commercially sold product. In fact, it would add operational complexity and cost for most helium suppliers to offer helium of lesser purity.

While Grade 5 helium is typically consumed by end users, several important applications are well-suited to utilize helium of lesser helium purity. CGA Grade H helium (97.5 percent purity), often called Balloon Grade, is ideal for filling party balloons and



IACX Energy's Woodside #2, Emery County, Utah (US Helium Reserve #1).

would be sufficient, in some cases, for use in other helium applications such as lighting balloons, leak detection, heat transfer, air bag inflation, and some low quality welding applications. If Balloon Grade helium were readily available to helium consumers at a lower price consistent with the lesser purity, it would make sense for some helium customers to downgrade their purity requirements.

During the last few years, we have begun to see the advent of lower purity helium production via non-cryogenic processes in the United States and Canada. Typically, plants utilizing PSA technology, or membrane/PSA hybrids, purify helium from natural gas that has low concentrations of hydrocarbons and very high helium concentrations. IACX Energy, based in Dallas, already has six plants in operation in Arizona, Colorado, Kansas and Utah producing 98 percent pure helium, with several more projects in the works. A company called Quantum Helium Management Company is also operating a small plant that produces Balloon Grade helium in Saskatchewan,

Canada. While some of this helium is being sold as crude helium feedgas for further processing into liquid helium, an increasing portion of this lower purity helium is being sold as Balloon Gas to Balloon Gas distributors, chain stores, and independent gas and welding distributors. To date, it has not made its way to the other applications where it would be suitable for use.

Gas and welding distributors appear to be an especially attractive market for Balloon Grade helium, as it is estimated that one-third to a half of distributors' helium demand, equivalent to 100 million SCF per year or more, is utilized for balloon inflation. These distributors have usually supplied all of their helium customers with Grade 5 helium, including those who did not require such high purity. With increasing production of Balloon Grade helium from IACX, Quantum Helium Management and others, distributors will increasingly have the opportunity to reduce their cost by supplying Balloon Grade helium to those customers where it is suitable.

To take advantage of this opportunity, distributors would need to treat Balloon Grade helium as a completely separate product from its Grade 5 helium, with separate storage capacity, filling manifolds, cylinders, etc. This would add some operational cost and complexity, and each distributor would need to determine if this is a profitable undertaking in their unique situation.

It is reasonable to expect that Balloon Grade helium will make increasing inroads into the distributor market as well as other markets where lower helium purities are sufficient in the coming years.

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