

## Ask the Expert (Metals)

**Expert:**

Annemarie Weist  
Global Lead, Gas Recovery and Recycle

**Question:**

Our gas quenching process uses a lot of gas and then vents it. Can we purify and reuse that gas?

**Answer:**

Hello, I am Dr. Annemarie Weist. I am the global lead for gas recycling here at Air Products. I work mainly with the metals processing group. Typically, our customers use oxygen, nitrogen, helium, argon, and hydrogen in their processes. Lately we have received questions concerning whether or not these gases can be recycled.

The answer is yes. However, the economics of recycling depends on the gas type, volumes and ease of capture. Typically, the gases we recycle are helium, argon, and hydrogen due to their rarity and cost. There are three main components to a recycle system. The first, gas capture, is dependent on the customer's application. The next component is purification and finally, storage for re-use.

I am going to focus on purification. In some applications this step can be skipped because either the gas is very pure when it leaves the application or the application itself does not require very high purity. However, in most cases some degree of purification is needed. This is an area of expertise at Air Products.

There are four main technologies used to purify gases -- cryogenics, adsorption, membranes, and reactive systems. Cryogenics is only economical for large scale operations, so it is typically not used for on-site recycle operations.

Adsorption is key because it is very versatile. We can tailor it and layer the adsorbents to help remove a variety of impurities to low levels – quite economically and simply. In some cases however, such as removing hydrogen, we use a proprietary reactive cycle. In a few instances, membranes can be very economical in treating helium, especially if very high purities are not required.

The best way to determine if your process is amenable to recycle is to have one of our Air Products engineers perform an assessment of your operation. Please call 800-654-4567 for more information.