

Helipure Membrane Gas Separation System



The Helipure is used periodically, in conjunction with the gas bag, compressor and filtration package of the Gaspure system. Dirty gas (Helium with air) is decanted for the Gaspure storage tube through the Helipure system where the air is removed. It is then passed to the gas bag from where the compressor recompresses the now clean gas and passes it through the filtration package.

After this the gas can be routed into an empty, clean storage tube for subsequent re-use within the dive system. It should be noted that a gas analysis should be carried out on this cleaned gas before re-use to ensure the oxygen is within usable limits.

Helipure Performance

Due to the number of variables, individual cases require detailed modelling, but typically in a single pass nitrogen will be reduced to one third and oxygen to three quarters of their original concentrations.

Introduction

Membrane Separation Technology although fluid separation using permeable membranes is an established technique for liquid purification, similar systems have only recently been developed for the separation of mixed gases. These systems have mainly been used within large industrial complexes for the separation of natural gas. JFD developed this technique to produce a compact, low cost unit for the purification of helium to compliment its existing range of gas management systems for the commercial diving industry. This has now been significantly improved by incorporating new technology acquired by JFD.

Operational Scope

During normal diving operations Helium is reclaimed from the diving complex using the Gaspure system. This routes Helium vented from equipment locks, bell de-pressurisations, etc. to a gas bag. When the gas bag is filled, gas is pumped to High Pressure Storage via a JFD HP Compressor and filtration system.

A single storage tube within the ship's gas storage system is normally dedicated to receive this reclaimed Helium and this gradually fills over a period of days. In the past, there has been a problem in re-using this gas due to the fact that it contains significant quantities of air (typically 5% to 10%).

The Helipure system allows this air to be removed and the gas to be safely reused within the dive complex.

The build up of nitrogen can affect decompression and oxygen removal enables the gas to be readied for deeper diving.





Performance Illustration

The following example illustrates the performance from a single pass at 60 scfm.

Inlet Pressure	30 to 200 Bar
Outlet Pressure	Atmospheric

	Before	After
Helium	85%	96.1%
Nitrogen	10%	1.1%
Oxygen	5%	2.8%
Helium Recovery	-	95%+

The above performance is based on a single pass optimised for recovery. Due to the very high recovery rates the dump flow can be increased, which reduces recovery, but improves the outlet purity. Also the exceptionally high recoveries mean that multipasses of the process gas can be made without significant loss. Each pass will reduce the contaminants by one further order of magnitude.

Helipure Upgrade Kit

Helipure Upgrade Kit: From January 2014, all Helipure systems are equipped with the Analox ATA Helium analyser. This new unit allows for greater accuracy in analysis of gas mixes and is available as an upgrade kit for existing Helipure systems to replace the current sensor.



Order Codes

Helipure Membrane
Gas Separation System
GR10270AA

Helipure ATA Analyser
Upgrade Kit
GR10270204

GR-MDS-310 R5