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## **GENERAL INSTRUCTIONS REGARDING ARGON GAS QUALITY**

**Quintus Hot Isostatic press type QIH with Molybdenum furnace**

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## 1. General

The hydrocarbon content in the argon gas is the most critical impurity as regards proper running of a QUINTUS Hot Isostatic Press, since the  $C_nH_m$  will break up into free carbon and free hydrogen under the pressure and temperature achieved in the furnace. Internal convection in the furnace will cause the free carbon to carbonize the insulating parts, leading to low earth resistance and even short circuits to earth in the furnace. The free carbon will also react with molybdenum to create molybdenum carbide which makes the furnace very brittle.

## 2. Maximum allowed impurity values

The maximum impurity levels allowed in the argon gas used in the QIH equipment are limited to the following values:

**Argon content must be at least 99.995 %**

Type of impurity	Max allowed quantity	Concentration
N <sub>2</sub>	50 ppm (vol)	$6.3 \times 10^{-2}$ g/Nm <sup>3</sup>
H <sub>2</sub>	5 ppm (vol)	$5 \times 10^{-4}$ g/Nm <sup>3</sup>
H <sub>2</sub> O	10 ppm (vol)	$8 \times 10^{-3}$ g/Nm <sup>3</sup>
O <sub>2</sub>	5 ppm (vol)	$7 \times 10^{-3}$ g/Nm <sup>3</sup>
Hydrocarbons	1 ppm (vol)	$6.3 \times 10^{-4}$ g/Nm <sup>3</sup>
CO	1 ppm (vol)	$1.25 \times 10^{-3}$ g/Nm <sup>3</sup>
CO <sub>2</sub>	1 ppm (vol)	$2.0 \times 10^{-3}$ g/Nm <sup>3</sup>

The total amount of hydrocarbons + CO + CO<sub>2</sub> must not exceed 2 ppm (vol).

The oxygen and hydrogen are not a problem as regards earth faults but they are critical to the molybdenum in the furnace.

The amount of hydrocarbon contained in the argon gas can be determined by different methods.

### NOTE!

A cryo pump from a liquid supply is considered the cleanest way to fill a gas storage.

Warranty will not apply if ionic liquid compressors are being used. It is strongly advised not to do so. If a compressor based on ionic liquid is used, and the system is contaminated with it, the furnace and gas system will be damaged.

A GAS ANALYSIS WILL NOT DISCOVER THIS CONTAMINANT due to the extremely low vapour pressure of ionic liquid.