

### General

Inertgases are suited for extinguishment of fires in enclosed rooms. The Inert gas extinguishes the fire by diluting the oxygen concentration in Air to a level that cannot support combustion. The oxygen content in Air is approx 21%. In order to create an atmosphere that extinguishes the fire the oxygen level must be reduced to less than 15%. When introducing 50% Inertgas into an enclosure the oxygen level normally drops to 12,5%. Inert gases are especially suited to extinguish fires in flammable liquids and gases, so called class B fires. The Inert gases are also capable to suppress surface fires in class A fires, fires involving paper, textiles etc. Deep seated fires in class A materials is however a problem. Fires involving products that "bleeds" oxygen can not be extinguished by Inert gases. Reactive products such as Magnesium and Titan or Metal hydrides can not be extinguished by Inertgases

### The Gas:

IG55 is a gas mixture consisting of 50% Argon and 50% Nitrogen. The product is sold under many different trade names such as Argonite or Nitrogon. IG 55 is listed in all international and national standards for Inertgases such as NFPA and ISO.

### Extinguishing Quantity:

Normally a 50 litre, 300 bar cylinder can protect 25 cubic meter of room if the desired Oxygen level should be 11%. This dimensioning rule has shown itself to be sufficient in many installations made. If a calculation should be made the following formula can be used:

$$Q = V \frac{S_R}{S} \times \ln \left( \frac{100}{100-C} \right)$$

Where

Q = Required quantity of Inert gas in m<sup>3</sup>

V = The protected enclosures net volume in m<sup>3</sup>

SR = The inertgas specific reference volume in m<sup>3</sup>/kg

S = The Inertgas specific volume at a certain temperature in m<sup>3</sup>/kg

C = The Inertgas design concentration

The resulting Oxygen concentration can be calculated using the following formula:

$$O_2 = 20.9 \times \left( \frac{100-C}{100} \right)$$

### **System description IG55**

The Dafo Inertgas system IG55 is designed as a Highpressure/low pressure principle, where the high pressure side consists of the cylinders, hoses, manifold and the pressure reduction unit (orifice) and where the low pressure part is consisting of the piping system and the nozzles.

The system uses 300 bar cylinders, at the moment there are 50 and 80 liter cylinders available.

The cylinders are approved according ASS 1998:7 or 1999/36/EEC/TPED

A specially developed calculation program the dimensioning of the pressure reduction orifice based on the number of cylinder/amount of gas and desired release time. The orifice area of each nozzle is also calculated based on the desired maximum pressure at a certain pip dimension and gas distribution between the nozzles.

The high pressure parts are made of pre fabricated manifolds, that can be joined together with fitting called for 6000 PSI. The manifolds and fittings are made according to ASTM A350LF2. The high pressure part is joined with a suited pressure reduction part(Orified unit), there are made in stainless steel.

The low pressure side is made of stainless thread pipes and fittings in SS233/43/48 as well as nozzles with orifice plates that can be calibrated individually. The pressure rating is 100 bar up to DN25 and 65 bar between DN32-DN50. The low pressure parts are pressure tested to minimum 1,3 the expected work pressure according to rules and regulations.

The system configuration has been verified by "ÅF-Konroll" to comply with AFS 99:4 (97/23/EG)

The Dafo Inertgas system has been tested by SP (Swedish National Research and Testing Institute) to according to IMO MSC/Circ 848 and is approved by the Swedish Maritime Authority.

### **Other**

Each cylinder is fitted with a pressure gauge and pressure transmitter for low pressure indication.

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