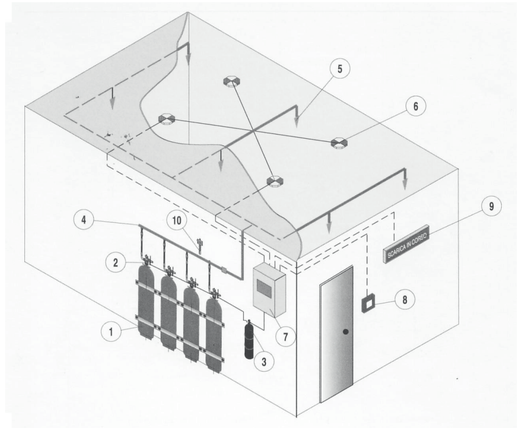

NargoTech® Cylinder	6. Detectors
High Rate Discharge Valve	7. Fire detection unit
Pilot cylnder	8. Pushbutton
Manifold	9. Acoustic-optics plate
Nozzles	10. Pressure switch

7. Advantages

- Environmental friendly
- Low costs of the extinguishing agent
- No damages to furniture and structures
- High visibility during discharge
- Reduced discharge time
- No fire residual



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tema sistemi
FIRE TECHNOLOGY

nargotech®



Inert Gas
Fire Fighting Protection System

1. Regulations References

- UNI 14520-1:06 Gas fire suppression systems and extinguishing agents
  Physical properties and systems engineering – General Requirements.
- UNI 14520-14:06 Gas fire suppression systems and extinguishing agents
  Physical properties and systems engineering – Extinguishing Agent IG – 55
- NFPA 2001:2008 Standard on Clean Agent Fire Extinguishing System

2. Introduction

NargoTech® is a Argon (50% ± 5%) and Nitrogen (50% ± 5%) pressurized mixture at 200 or 300
NargoTech® is an odorless and colorless gas without electrical conductivity with a density approximately equal to that of the air. When it comes into contact with flames it does not produce decomposition harmful substances, therefore it is not environmental harmful.
The following table contains the chemical/physical properties according with the Regulation UNI 14520-14.

PROPERTIES	UNIT	VALUE
Molecular Weight		33,98
Boiling Point at 1,013 bar (absolute)	°C	-
Solidification Point	°C	-
Critical Temperature	°C	-
Critical Pressure	bar	-
Critical Volume	cc/mole	-
Critical Density	Kg/m³	-
Steam Pressure 20°C	Bar	-
Liquid Density 20°C	Kg/ m³	-
Saturated Steam density 20°C	Kg/ m³	-
Specific volume of the superheated Steam at 1,013 bar and at 20°C	m³/kg	0,708
Chemical Formula	N^2 50%volume Ar 50%volume	
Chemical name	Nitrogen/Argon	

	Argon	Nitrogen
Purity	99,99%	99,9%
Humidity	15 x 10^{-6}	10 x 10^{-6}

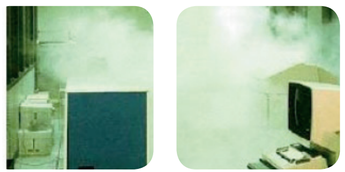
3. Applications

Over 90% of the combustible products will cease to burn when Oxygen drops in the air below the 15%. Therefore, with the injection of **NargoTech®** in the area where the fire is developing, if the oxygen in the air is diluted below 15%, a timely fire suppression is guaranteed.
Total Flooding Systems such as **NargoTech®** can be used to suppress all classes fires.
NargoTech® system, composed by gas naturally present in the air, does not damage the mildest materials and it is usable for the following applications:

- Data processing centers
- Telephone stations
- Electrical Substations
- Communication centers
- Banks
- Archives and Libraries
- Storage of flammable liquids

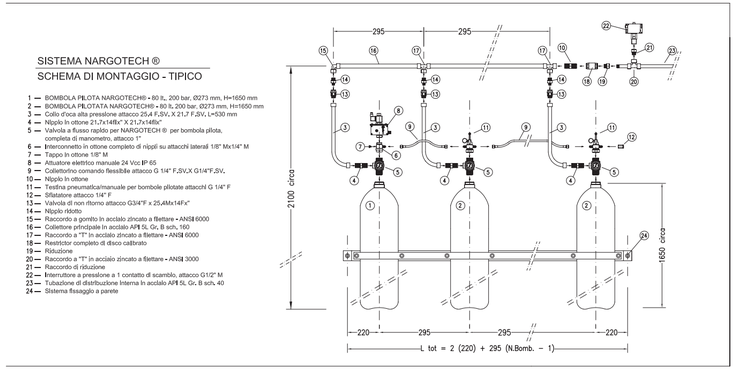
4. Safety References

NargoTech® is a mixture of gases present in the air, however, it is necessary to consider the possible risks for the personnel that can arise from combustion products.
Besides the high speed gas leakage could move the objects near the delivery nozzles.
Different from other inert gases systems, **NargoTech®**, thanks to the high innovative delivery nozzle complete with silencer, eliminates the risk related to the high noise level during the gas discharge phase.



5. System Engineering

For a proper engineering of **NargoTech®** system it is necessary to perform a risk analysis in order to determine the type of combustible, the related project concentration and the amount of the substance to be used.
The suppression concentration is the lowest extinguishing concentration of a material according with previous suppression tests, it is important to establish the design concentration.



6. Calculation software

For the **NargoTech®** system engineering, Tema Sistemi S.p.A., uses a hydraulic calculation software VdS able to provide the following results:

- Calculation of the suppression concentration value
- Calculation of the amount in Kg of the product to be stored.
- Calculation of the pipes section, of the nozzles orifices and of the restrictor.
- Calculation of the discharge time with related simulation
- Calculation of the required opening according the overpressure volume.
- Calculation of residual oxygen after discharge.

7. System Operation

NargoTech® system consists of a battery of high capacity cylinders, pressurized at 200 or 300 bar, provided with high rate discharge valve complete with opening control, manometer and pressure switch, manifold connected to the extinguishing products supply and connected to the nozzles.
In addition, the System consists of a pilot cylinder, provided with electrical/manual actuator, that activates the system piloted cylinders.

The system can be activated in several ways:

1. Automatic Activation: through the detection system present in the protected area.
   When the fire takes place, the fires detection system activates the solenoid valve on the pilot cylinder, activating consequently the whole cylinders battery, through the pneumatic line;
2. Electrical/manual activation: the operation is the same as the automatic one, the solely difference is that the activation is generated by a control button put outside the protected area;
3. Manual Emergency Activation: in case of power energy absence, a manual pull release will allow the system activation.

There are different system configurations that can consider one or more cylinders to protect different type of spaces.
In case of the system protects more than one space, the manifold is provided with direction valves with electro-pneumatic activation.
The manifold is provided with overpressure valve in case of malfunction of the system.