

Capacitors

Insulation

3 types, which is the best one?

While the winding of any capacitor, both Single-phase and Three-phase, is achieved through a metallized polypropylene film, the insulation (filling), can be realized in 3 systems.

Viscous Resin/Oil and metalized paper, are 2 «classic» insulation systems for both Single and Three-phase Capacitors.

Anyway, these insulation systems, do not ensure at 100 % to avoid some risks:

- infiltration of **air/humidity** inside the cylinder, which is the main cause of Capacitors breakage.
- **flammability** and **fire propagation**

Solution?



The insulation through **Nitrogen (N2) Gas**, only for Three-Phase Capacitors, **is actually the safest, most reliable and strongest way** for a proper filling and for avoiding any risk on infiltration of air and flammability.



Capacitors

Why Nitrogen (N2)?

The main problem to be solved in a manufacturing process of Capacitors, is certainly represented by **humidity**. It requires a proper attention during the filling phase, since **the presence of humidity within the cylinder, substantially compromises the life of the capacitor.**

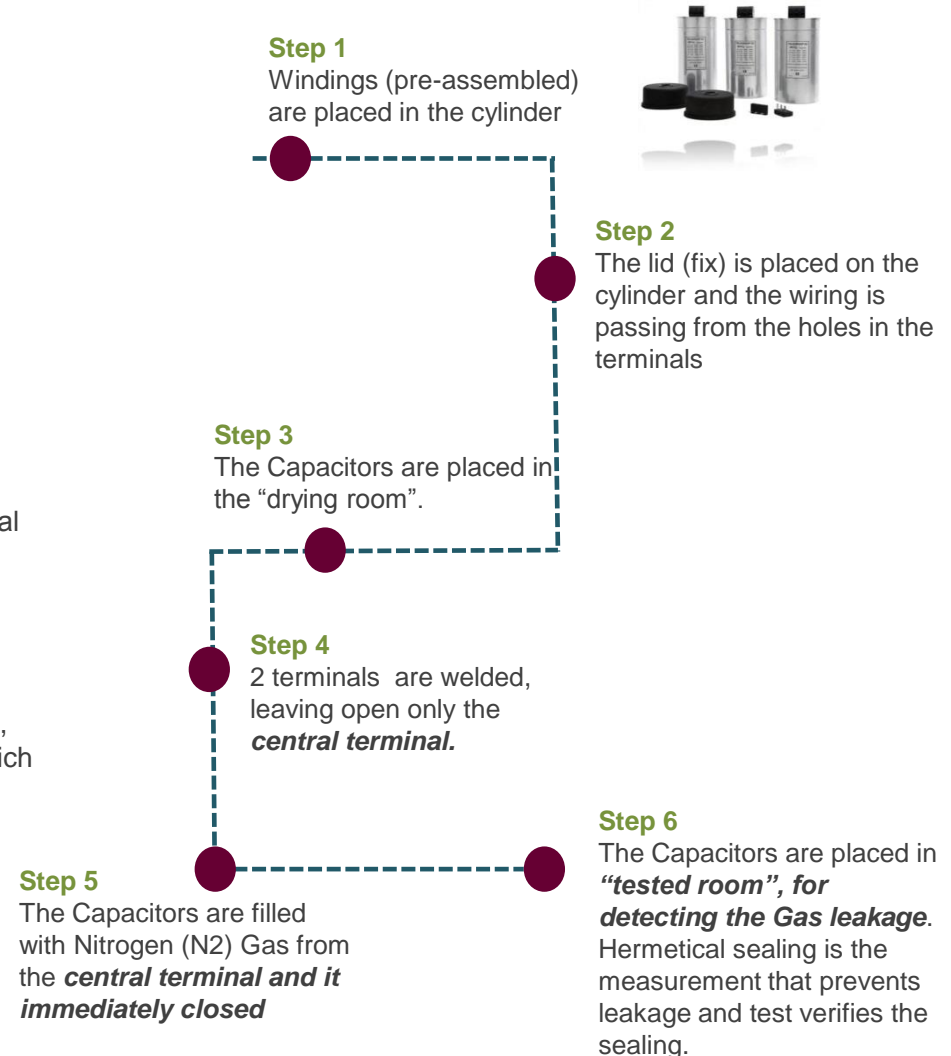
With the filling of the cylinder through the Nitrogen (N2), the possible presence of humidity, it's **completely ruled out**, since it's a totally **“dry type gas” (humidity free)**

In fact, it's also used in other specific areas, precisely for the removal of the same moisture from various conductors.

In addition, since **Nitrogen is a not flammable Gas**, also the possibility, in case of fault, of **fire propagation is totally avoided.**

These features means that already from the manufacturing process, this type of Capacitor is realized according to a perfect process, which obviously is reflected during its application.

Filling process in 6 steps



Capacitors

Key features of Nitrogen (N2) Gas

Rated Voltage (Uc): from 230 to 800 V

Rated Frequency: 50 – 60 Hz

Operating temperature: - 40° C / D

Insulation : Nitrogen Gas (N2)

Execution: Three-Phase

Discharge resistors: Included

Dielectric Losses: < 0,2 W / Kvar

Reference Standards: EN 60831 1-2 / UL N. 810



Temperature Class

Cat.	Max. ambient temperature		
	Max.	Average 24h	Average 365 days
B	45°	35°	25°
C	50°	40°	30°
D	55°	45°	35°
60°	60°	50°	40°

Overvoltage

Uc	Hz	Uc Max					
		24 h	8 h	30 min	5 min	1 min	Picco
440 V	50/60	440 V	490 V	510 V	530 V	575 V	1350 V
480 V		480 V	530 V	560 V	580 V	625 V	1450 V
525 V		525 V	580 V	600 V	630 V	680 V	1600 V

Overcurrent

The overcurrent value, can't be generalized to all Capacitors.

The overcurrent value of all TELEGROUP Capacitors (excluding Test Values up to 10 In), is **from 1,5 and 3 In**

Nitrogen Gas (N2) Capacitors

a benefit for projecting, manufacturing and installing

Nitrogen Gas (N2) Capacitors

Resin/Oil and Paper Capacitors

Risk of Humidity	ZERO	Nitrogen is a free humidity Gas	HIGH	the above insulation materials do not ensure the possible presence of humidity.
Expected life	> 150.00 hours	The 3Phase+(N2) Gas «combo», is actually the safest and most reliable technology; it's usual for us to find 10-12years old PFCs with the same current values.	< 80.00 hours	This value is especially referred to single-phases capacitors; the mentioned technical disadvantages + no proper manufacturing process + type of insulation, generate a drastic reduction of operating life.
In case of fault	NO fire, NO damages	It's not possible to talk about «explosion», since in case of fault, the Capacitor will just eject the N2 Gas, without damaging or compromising other components	Risk of fire, damages on components	For single-phases; displacement of capacitance bank, risk of fire, damaging of all components For three-phases; risk of fire, damaging of all components.
Flammability	ZERO	Nitrogen Gas is a not flammable Gas	HIGH	For its nature, the above materials are flame propagators.
Risk of fire	ZERO	Thanks to the above features	HIGH	Due to the above features
Mounting	Vertical / Horizontal	Thanks to the properties of N2 Gas and thanks to the last step of production (Step 6 leakage test)	Only Vertical	Leakage of insulation material in horizontal position.
Ecology	TOTAL	The dispose of N2 Gas Capacitors is the same of a Coke can; free and ECO	It depends from the insulation material	
Toxicity	ZERO		It depends from the insulation material	

Nitrogen Gas (N2) Capacitors

the results have awarded our choice

TELEGROUP was the first Company in Italy to marry entirely both the **Three-Phase technology**, abandoning the Single-phase type, and the **typology of Nitrogen Gas filled (N2) Capacitors**.

From the first use by TELEGROUP of the first Capacitor with Nitrogen insulation, have passed about 13 years.
 After a test period of approximately 4 years, thanks to the great results and customer satisfaction obtained using these Capacitors, we decided to develop, an entire PFC range with all Series, both standard and Detuned, using Nitrogen Gas Capacitors.

This choice has been profitable and satisfying, especially for critical application as:
 Automotives, Heavy Industries, Chemicals, Ceramics, Paper-mills, Banks, Data-centers...

Key numbers

kVAR realized since 2003

5 millions

Fault of Capacitors

0,00001 %

Warranty from 2014

24 months

Who chose it

