



THE CARBON NANOTUBE SPECIALIST

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**THERMOCYL**

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## THERMOCYL™ – 01 / Product Data / Flame retardant coatings

### General information

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#### Description

THERMOCYL™ is for a newly developed product range, exhibiting exceptional fire resistance and thermal conductivity properties, thanks to the incorporation of Carbon Nanotubes in a thermoset matrix. The Carbon Nanotubes have been specifically designed for this purpose by Nanocyl, a major global Carbon Nanotubes player.

#### Application

Flame Retardant coating protecting a wide variety of different substrates

Practically, followed grades are recommended for some applications:

**Metal protection:** THERMOCYL™ NC 123 P1 & NC 323 AP1

**Wire&Cable:** THERMOCYL™ NC 113 P1 & NC 313 AP1

**Open cell foams:** THERMOCYL™ NC 113

**Textiles:** THERMOCYL™ NC 113

#### Benefits

THERMOCYL™ does not only stand for flame retardant properties but also:

- Good thermal properties
- Under the right conditions, antistatic properties
- Anti-fouling, release properties.

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## Properties and storage of different components

THERMOCYL™ is a two component resin system. This resin system can be easily modified in terms of viscosity (processability), curing time, fire retardancy, thermal and mechanical properties. Depending on the surface to protect, an adhesion primer must be used.

The nomenclature of the THERMOCYL™ product line gives an indication of its composition/properties. Four numbers are used to give additional information:

- First number for the curing chemistry
- Second number for the viscosity and the processing
- Third number for curing times
- Last series of characters for the adhesion primers

For example, a typical product name is THERMOCYL™ NC 111 P1.

- First 1 means curing through hydrosilylation
- Second 1 stands for a viscosity below 4000 cP
- Third 1 means curing in a few minutes
- Fourth 1 means applicable on metal using primer 1

### **Base of THERMOCYL™ (part A)**

In the base of THERMOCYL™ (Part A), there is reference to the first and second numbers in the name. The first number gives information on the stability (see below) (due to curing chemistry) and on the properties of the final coating (see below the properties of the coating)

Storage conditions:

- temperature : 5 – 40 °C
- closed container

Color : Black

Density : 1g/ml

Shelf life:

Shelf life is defined by the first number. The table below gives the product stability.

FIRST CHARACTER	STORAGE CONDITIONS	STABILITY
1	Between 5 and 40 °C, in closed container	More than 1 year
2	Between 5 and 40 °C, in closed container	More than 1 year
3	Moisture sensitive	To be defined

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The second number gives information on viscosity and processing.

SECOND CHARACTER	VISCOSITY AT 25 °C	WAY TO PROCESS
1	Max. 4000 cP	Spray paint, brush paint, injection
2	Between 4000 and 10000 cP	Brush paint, injection
3	Min. 10000 cP	injection

### **Curing agents of THERMOCYL™ (PART B)**

There are two kinds of curing agents.

The first one is suitable for the base having as first number 1 and 2 and must be mixed in a 1/1 ratio. Its properties are comparable with A component (viscosity, storage condition, stability and color).

The second one is suitable for the base having as first number 3. This one must be mixed in a 20/1 pbw ratio 20/1 (part A/partB). Its properties are:

Density: 1g/ml

Color: black for the first one and colorless for the second

Storage condition: between 5 and 40 °C in closed container

Shelf life:

The Shelf life is defined by the first number. The table below gives the product stability.

FIRST CHARACTER	STORAGE CONDITIONS	STABILITY
1	Between 5 and 40 °C, in closed container	More than 1 year
2	Between 5 and 40 °C, in closed container	More than 1 year
3	Between 5 and 40 °C, in closed container Light and moisture sensitive	To be defined

The third digit gives information about the curing kinetic. The table hereinafter gives an indication of the pot life of the A/B blend.

THIRD CHARACTER	TIME AT 25°C
1	Few minutes
2	Ca. 30 minutes
3	Ca. 2 hours

### **Adhesion primer for THERMOCYL™**

The selection of the adhesion primer is solely based on the substrate to be coated. The table below shows the primers to be used for different substrates.

PRIMER	SUITABLE SUBSTRATES
P1	Metals, glass, Epoxy, PS
P2	PVC, Wood
P3	PMMA

In case no primer is required the fourth digit will be zero. In case of cable & wire applications, it determined by the nature of your cable (generally primer 1).

Storage conditions:

- temperature : 5 – 40 °C
- closed box and light protection
- Light sensitive and moisture sensitive

## Processing conditions

### Mixing conditions

TRADE NAME	MIX RATIO (PBW : PARTA/PART B)	MIX PROCESS
THERMOCYL™ NC 1XXX	1/1	Classical mix process
THERMOCYL™ NC 2XXX	1/1	Classical mix process
THERMOCYL™ NC 3XXX	20/1	Classical mix process

### Coating conditions

- Clean the surface (e.g. solvent)
- If necessary, apply the adhesion primer through impregnated sponge or related
- Let dry the surface around 30 minutes (preferably at 24 °C and 50% of moisture)
- Mix the two components of the THERMOCYL™ in the indicate ratio
- Apply the THERMOCYL™ mixture (brush paint, spray, etc.)
- Let dry 24 h at room temperature

## Properties of the cured coating

Final Aspect: Solid, black

Density at 25°C: 1 g/ml

### Mechanical properties

	STIFFNESS [N/M]	YOUNG'S MODULUS [MPA]	LOAD AT BREAK [N]	STRESS AT BREAK [MPA]	% STRAIN AT BREAK	WORK AT BREAK [J]
THERMOCYL™ NC 131	346 ± 11	1,88 ± 0,06	24,4 ± 8,5	2,26 ± 0,85	93 ± 11	0,59 ± 0,17
THERMOCYL™ NC 121	296 ± 16	1,83 ± 0,06	21,5 ± 4,7	2,26 ± 0,47	83 ± 7	0,40 ± 0,10

Other properties such as hardness (shore A), scratch resistance, adhesive strength of the coating to the substrate, surface energy, adhesive strength of dirt to the THERMOCYL™ coating... are available on demand

**For technical assistance, sales or further information, please contact us :**

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