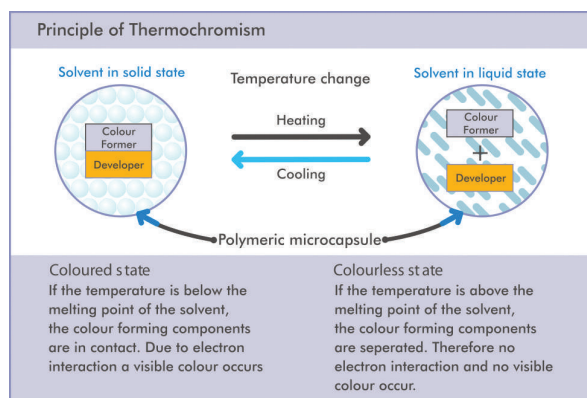


### Principle of Thermochromism:

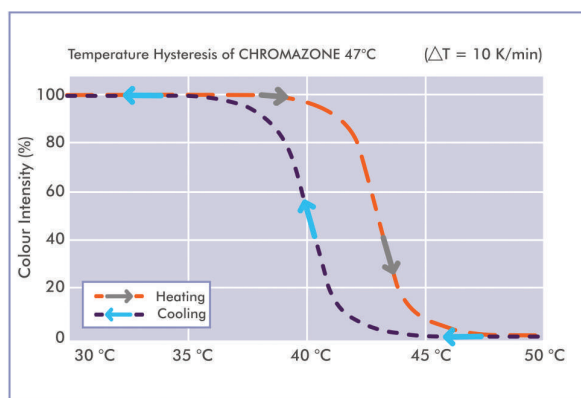
Chromazone® is a microencapsulated chromagenic material with an impervious polymeric wall which produces a thermochromic system which loses its colour when heated and returns when cooled.

Graphic 1 explains the principle of the thermochromic reaction. This reaction can be disrupted by several external influences such as high exposure to UV light, presence of polar solvents, very high temperatures or excessive shear.

Due to their physical and chemical properties the visible colour change of Chromazone® pigments occurs over a temperature range of approximately 5°C and additionally shows a thermal hysteresis. This is where the temperature at which the colour disappears on heating is higher than the temperature at which full colour strength is achieved on cooling and is show in Graphic 2.



Graphic 1



Graphic 2

### Formulation

Chromazone® is supplied in two formats:-

#### Aqueous Slurry

Slurries are ideally suited for **water based inks** however highly alkaline products (such as ammonia), alcohols and glycols should be avoided when formulating.

As slurries hold the microcapsules in their original particle size, dispersion without high shear is easy and better colour can be achieved.

If a flushing system is available then this should be used with products such as **oil based inks** for best results.

#### Free Flowing Powder

Powders have designed to have optimal chemical and solvent resistance for use in **UV and Solvent based inks** however checks should be made when formulating.

The microcapsules can withstand most standard mixing and application procedures however if too much shear energy is used (e.g. bead mills) the microcapsules can be crushed destroying the thermochromic functionality. Three rolls mills are fine however gaps on the rollers must not be taken below 9 µm.

Full technical data sheets and material safety data sheets (TDS & MSDS) are available for both products on request.

### Specifications

#### Aqueous Slurry

Temperature rating: +/-2°C

Solids: 48% +/- 2%

Particle Size: 90% < 6 µm

pH: 4.9 – 6

Light fastness: 1–3 (BWS) depending on Colour

#### Powder

Temperature rating: +/-2°C

Solids: 98% +/-2%

Original Particle size: 90% < 7 µm (note particles may agglomerate during powder production).

Light fastness: 1–3 (BWS) depending on Colour

### Storage

A shelf life of 2 years is guaranteed provided that their containers are not opened and are stored in an ambient of 16 to 22°C with no exposure to UV (Sun) light.

All raw materials used for production of standard Chromazone® pigments are listed in EINECS, TSCA and DSL/NDSL.