Technical Data Sheet

LOCTITE® ECI 8090

March 2025

PRODUCT DESCRIPTION

LOCTITE® ECI 8090 provides the following product characteristics:

Technology	Thermoplastic
Appearance	Black paste
Filler type	Carbon
Operating temperature, °C	Max. 95°C
Cure	Hot air drying or infrared
Application	Conductive ink
Product benefits	• Screen printable • Flexible • Printable on most common substrates • Rapid heating with well-defined cut-off temperature, no external control devices needed • Self-regulation temperature ~85°C
Typical assembly applications	Self-regulating heating elements
Key substrates	PET, PEN, PI

LOCTITE® ECI 8090 is a positive temperature coefficient (PTC) ink for the creation of low voltage self-regulating heaters (< 50 V). It is screen printable. LOCTITE® ECI 8090 is often used for printing self-regulating heating elements onto polyester foil with a self-regulating temperature of ~85°C. Furthermore, it is compatible with the silver ink LOCTITE® ECI 1010. LOCTITE® ECI 8090 is blendable with non-conductive ink LOCTITE® NCI 8092 for resistance adjustment.

TYPICAL PROPERTIES OF UNDRIED MATERIAL

Solid content, (box oven 2 hours, 1hour @ 150°C), %	39
Density, g/cm^3	1.0
Viscosity, Rheometer, at 25°C, mPa·s (cP)	
Shear rate 1.5 s^{-1}	100,000
Thixotropic index, (1.5/15 s^{-1})	6.0
Theoretical coverage, m²/kg	
@ 10 µm coating thickness	38
Shelf life @ 8 to 28°C, days	365

TYPICAL DRYING PERFORMANCE

Recommended drying cycle

10 minutes @ 140°C

LOCTITE® ECI 8090 can be dried using forced air or infrared systems. Higher temperatures for longer time exposure will improve the performance. Care should be taken with infrared. Too much energy can destroy the coating.

Design drying rates for the maximum the substrate and production speeds can tolerate.

The above drying profile is a guideline recommendation. Conditions (time and temperature) may vary based on customers' experience and their application requirements, as well as customer drying equipment, oven loading and actual oven temperatures.

TYPICAL PROPERTIES OF THE DRIED MATERIAL

Physical properties

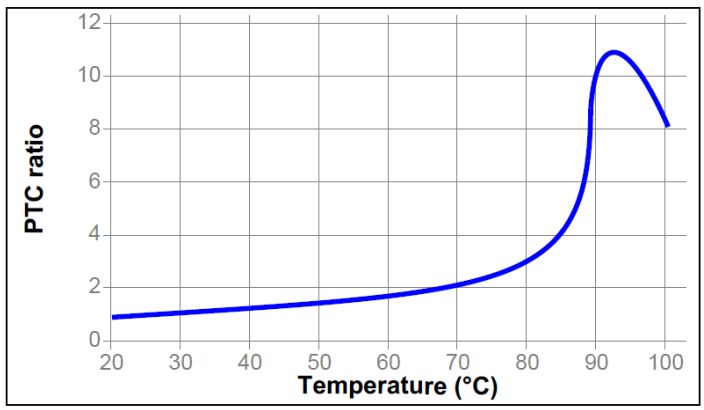
Adhesion on PET, Cross Hatch, ASTM 3359, grade	5B

Electrical properties

Sheet resistance, 4-point probe, Ohm/sq/25µm	
10 minutes @ 140°C	1,100
PTC ratio	8.2

Resistance vs. Temperature

PTC Ratio vs. Temperature curve of dried PTC-ink, measured on a test design. The PTC ratio is calculated by PTC Ratio (T) = R(T)/R(25°C)



GENERAL INFORMATION
Please consult the Safety Data Sheet (SDS) for safe handling information of this product.

Directions for use

Detailed on-boarding process, including in-depth design, processing, and testing guidelines are available. Starting with a test plan to explore the influence of different design parameters is highly recommended. You can reach out to your Henkel representative for more information.

1. Design guidelines

PTC carbon ink should be printed as small resistors, all in parallel connection, and connected by highly conductive silver ink.

To design a PTC self-regulating heater, you should at least know:
- Targeted self-regulation temperature
- Working voltage
- Initial power
- Heater dimensions
- Environmental condition and integration

The main design parameters are

- PTC Ink. Defines the self-regulation temperature.
- Busbars width. To be adjusted to the maximum inrush current to avoid over heating.
- Silver spacing. To be adjusted to reach self-regulation at the working voltage.
- Number of PTC element and aspect ratio (silver spacing/width). They are adjusted to match the targeted power and heat distribution.

2. Surface preparation

Surfaces to be coated must be clean, dry and free of dust.

3. Mixing/Dilution

- LOCTITE® ECI 8090 is supplied ready for use.
- Should dilution be necessary, use butyl glycol acetate (CAS: 112-07-2). Henkel recommends a maximum of 10 wt%. This should be accomplished by adding solvent at 0.5 wt% intervals until desired viscosity and printability is achieved.
- If needed, the product sheet resistance can be increased by adding LOCTITE® NCI 8092 up to 30 wt%.

Weight ratio ECI 8090 / NCI 8092	Sheet resistance (Ohm/sq/25µm)
100/0	1,100
97.5/2.5	1,200
95/5	1,300
92.5/7.5	1,400
90/10	1,600
85/15	1,900
80/20	2,400
70/30	3,700

- Blending with LOCTITE® NCI 8092 should be performed with a mechanical propeller mixer for the entire jar volume. Avoid rapid stirring as this causes air entrapment.
- After long time storage, a gel type viscosity may be observed. Mix thoroughly, preferentially using a mechanical propeller mixer at low speed, before use to ensure it is homogeneous.

4. Application

Recommended screen and printing parameters are

Screen type	
Polyester screen, mesh/cm	54
Stainless steel screen, mesh/cm	200
Dry coating thickness, µm	17
Emulsion, solvent resistant, µm	10 to 40
Squeegee shore hardness	70 to 90

5. Electrical circuit protection

- For electrical insulation and environmental protection, a layer on top of the PTC ink should be added. This layer will affect the resistance of the PTC ink, up to 50% increase, but should not cause long term drift.
- Different solutions are available:
  - UV-dielectrics LOCTITE® EDAG 456 and LOCTITE® EDAG PF-455B are compatible with PTC carbon inks.
  - Pressure sensitive adhesives, also known as tapes, to bond a protective foil. High purity adhesives without tackifiers are preferred.
  - Printable adhesives printed around the PTC elements to bond a protective foil.

Storage

Store product in the unopened container in a cool dry well ventilated area. Storage information may be indicated on the product container labeling.

Optimal storage: 8 to 28ºC. Storage below 8°C or above 28°C can adversely affect product properties.

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Henkel representative.

Not for product specifications
The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on the specifications of this product.

Conversions
(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

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