



# LOCTITE® ECI 7004HR

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PRODUCT DESCRIPTION

LOCTITE® ECI 7004HR provides the following product characteristics:

Technology	Thermoplastic
Appearance	Black liquid
Filler type	Carbon
Product benefits	<ul style="list-style-type: none"><li>• High resistivity</li><li>• Screen printable</li><li>• Flexible low temperature drying cycles</li></ul>
Operating temperature	max 105°C
Cure	Heat drying
Application	Electrically conductive ink, Inks and coatings
Typical assembly applications	Force sensitive modules, Printed resistors and Sensing devices
Key substrates	PET, PEN, PI, Paper

LOCTITE® ECI 7004HR is a carbon ink that can be blended with LOCTITE® NCI 7002 to adjust the resistance in the range of 5,000 to 500,000 Ohm/sq/25µm. It is often used to create printed resistors, and force sensing resistor (FSR) elements on polyester foil. LOCTITE® ECI 7004HR is also recommended for use in the assembly of printed temperature sensors in the 0 - 80 °C range. The product and blends can be applied by screen printing. The coating will be compatible with the silver inks LOCTITE® EDAG PF 410 and LOCTITE® ECI 1010.

TYPICAL PROPERTIES OF UNDRIED MATERIAL

Solid content, wt(%)	23
Viscosity, Brookfield RVT, 20°C after 15 min, mPa.s (cP)	10,000
Speed @ 20 rpm	
Density, g/cm <sup>3</sup>	1.1
Theoretical coverage, m <sup>2</sup> /kg @ 10 µm dry film thickness	19.4

TYPICAL SCREEN PRINTING PROCESS

Emulsion thickness	
Emulsion thickness, µm	20 to 40
Recommended squeegee	
Polyurethane, durometer	70 to 75
Recommended screen type	
Monofilament polyester screen, threads/cm	61 to 90
Stainless steel screen, threads/cm	77 to 110

Printing equipment type

- Manual
- Semi-automatic
- High speed reel-to-reel

TYPICAL DRYING PERFORMANCE

Recommended drying cycle  
10 minutes @ 120°C

LOCTITE® ECI 7004HR mixed with LOCTITE® NCI 7002 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 treated PET, ASTM 3359, grade 5B

Electrical properties

Sheet resistance, 4-point probe, Ohm/sq/25µm 3,600  
after blending with LOCTITE® NCI 7002 5,000 - 500,000

Blending ratios of LOCTITE® ECI 7004HR and LOCTITE® NCI 7002.

LOCTITE® ECI 7004HR E&C (% by weight)	LOCTITE® NCI 7002 E&C (% by weight)	Sheet resistivity (Ohm/sq/25µm)
100	0	3,600
90	10	5,800
80	20	10,100
70	30	17,300
60	40	33,600
50	50	96,000
40	60	360,000
30	70	not conductive

If used in China, the amount of LOCTITE® ECI 7004HR in the blend with LOCTITE® NCI 7002 should be equal or less than 70% by weight to ensure compliance with VOC regulations.



**GENERAL INFORMATION**

**For safe handling information on this product, consult the Safety Data Sheet (SDS).**

**Directions for use**

1. LOCTITE® ECI 7004HR 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 is achieved.
2. If a gel structure forms after extended storage, the product may be warmed slightly in a water bath (not exceeding 50°C) and stirred with a mechanical stirrer. Very often, stirring is enough to obtain a proper viscosity again.
3. Blending with LOCTITE® NCI 7002 should be performed with a mechanical propeller mixer for the entire jar volume. Avoid rapid stirring as this causes air entrapment.

**Clean-up**

The screen and equipment can be cleaned with dilution solvent, or esters (PM-acetate, propylacetate, or ethylacetate), or ketones (MEK, Acetone), or similar solvents.

**Storage**

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

**Optimal Storage: 8°C to 28°C. Storage below 8°C or greater than 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**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\mu\text{m} / 25.4 = \text{mil}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{N/mm}^2 \times 145 = \text{psi}$   
 $\text{MPa} \times 145 = \text{psi}$   
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$   
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$   
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$   
 $\text{mPa}\cdot\text{s} = \text{cP}$

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