



North American Coating Laboratories Indium Tin Oxide (ITO) Coating Technical Data Sheet

North American Coating Laboratories Indium Tin Oxide (ITO) coating treatment is a transparent conductive oxide used in touch panel contacts, electrodes for LCD and electrochromic displays, energy conserving architectural windows, defogging aircraft and automobile windows, As well as for Electromagnetic and Radio Frequency Interference (EMI/RFI). The coating material layers are deposited on the substrate using electron beam, ion assisted, vacuum deposition technology to produce a thin uniform layer that provides continuous electromechanical conductivity across the substrate when contacted.

North American Coating Laboratories Indium Tin Oxide (ITO) coating treatment can also be Index Matched, or paired to the refractive index of the base substrate material, or to air. Adding an Index Matched dielectric coating layer improves the transmission of the optical window, and reduces reflection in order to properly display an image. Adding an Index Matched coating top layer can improve transmission levels to upwards of 99% in some cases, and can lower reflectance levels to $\leq 1.0\%$.

Index Matched Indium Tin oxide (IMITO) is predominantly used in touch panel displays, or other image/viewer intensive applications. Index Matched Indium Tin

Oxide is also heavily used in displays that are laminated to other materials such as polarizing films and LCD's. North American Coating Laboratories is capable of Index Matching numerous epoxies and bonding agents to assure a clean and well transmitted image. North American Coating Laboratories can customize the Index Matched Indium Tin Oxide coating structure's wide range of frequencies across the visible spectrum to meet virtually any spectral performance requirement.

North American Coating Laboratories Indium Tin Oxide (ITO) coating treatment can be fully customized to meet the conductivity or sheet resistance requirements of many applications. This conductivity or sheet resistance reading is most commonly referred to as Ohms Per Square or Ω/\square . Most ITO coated glass provided by North American Coating Laboratories coated at resistivities from 4 Ω/\square to 1000 Ω/\square , and 40 Ω/\square - 1000 Ω/\square on polymers.

North American Coating Laboratories Indium Tin Oxide coating treatment meets a wide range of demanding environmental requirements, due in part to the superior hardness and durability of the coating. While Indium Tin Oxide coatings can be readily etched, they are resistant to most commercial solvents such as xylene, naphtha, acetone, methyl ethyl ketone, toluene and mineral spirits. However, Indium Tin Oxide coatings are soluble in diluted mineral acids.



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North American Coating Laboratories Indium Tin Oxide (ITO) coating treatment has also been tested and approved for the standard Military Specifications. MIL-STD 810E Method 506.3 (Rain) MIL-STD 810E Method 507.3 (Humidity) MIL-STD 810E Method 509.3 (Salt Fog) MIL-STD 810E Method 510.3 (Sand and Dust) MIL-STD 810E Method 521.1 (Icing, Freezing Rain).

As a standard interference coating this treatment also must exceed all durability requirements of: MIL-C-675C, MIL-C-14806A, MIL-C-48497A and MIL-F-48616. North American Coating Laboratories Indium Tin Oxide (ITO) coating treatment conforms to the spectral requirements of the above listed military specifications.

North American Coating Laboratories provides specialized optical coatings for a wide variety of customers in both the polymer and glass optics markets. Our specialized knowledge and experience in both dip-applied and vacuum-applied processes make NACL one of the most respected and trusted organizations in the optical coatings field. Our coating competencies include Protective, Scratch-

resistant, Reflective, Anti-reflective, Hydrophobic, Filter, Conductive, ITO, and Chemically Resistive coatings. North American Coating Laboratories is certified to ISO 9001:2000 quality standards and has been in business since 1974.

Currently North American Coating Laboratories services clients in the automotive, aeronautic, consumer electronic, military, medical, and ophthalmologic fields as well as many others. Our customers range from high end sunglass manufacturers to military attack planes. Because of the ubiquitous nature of our technology we are able to add value and increase the performance of virtually any optical element that light passes through or that images are viewed through.

For more information on North American Coating Laboratories Indium Tin Oxide (ITO) coating treatment please contact Dan Fiore, Director of Business Development for North American Coating Laboratories at 866-216-6225, or visit our website at www.nacl.com.