ETHOCEL™

Ethyl Cellulose Polymers for Industrial Applications

Where science
& creativity meet

WHAT ARE ETHOCEL™ ETHYL CELLULOSE POLYMERS?

ETHOCEL™ Ethyl Cellulose (EC) Polymers are cellulose ethers that are derived from natural wood or other cellulosic materials. To obtain ETHOCEL™, wood pulp is treated with sodium hydroxide to form alkali cellulose, which is then treated with ethyl chloride to form ethyl cellulose.

CELLULOSE

ETHOCEL™
Ethyl Cellulose

IFF IS A WORLD LEADER IN CELLULOSIC DERIVATIVES

ETHOCEL™ EC Polymers offer specific properties that are unique compared to other cellulose ethers. Most cellulose ethers, such as carboxymethyl cellulose or hydroxypropyl methylcellulose, are water-soluble. ETHOCEL™ EC Polymers are not water-soluble, making them an excellent choice for protecting materials and products against water.

IFF invented ETHOCEL™ EC Polymers and has continued to pioneer them for over 80 years. Like other cellulosic polymers in IFF's portfolio, ETHOCEL™ can be fine-tuned to create customized solutions. ETHOCEL™ is backed by IFF's world-class Research & Development team, regional Technical Application teams and regional laboratories. ETHOCEL™ EC Polymers are manufactured in our Michigan Operations plant in Midland, Michigan, USA.

A RANGE OF FUNCTIONAL PROPERTIES

- Organo solubility
- Binder
- Forms clear and resistant films
- Water barrier
- Thermoplasticity
- Viscosity (4 to 300 mPas in 5% solution)
- Rheology modification
- High purity: combusts without residue
- Low toxicity
- No ionic charge
- Enzymatic resistance

UNIQUE PROPERTIES DEVELOPED FOR YOUR APPLICATION NEEDS

Film Former

Forms clear and resistant films. Improves spreadability, suspension and homogeneity in paints, coatings and inks.

Low Toxicity

Naturally-derived cellulose ether, making it a good choice for consumer applications, such as food contact packaging.

Binding

Exhibits superior binding capabilities and is used in many electronic applications where binding, high purity and film-forming properties are required.

Viscosity & Rheology Modification

Extensive product and molecular weight options enable users to customize the required viscosity and rheology according to their applications.

Organo Soluble

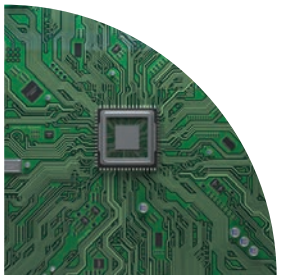
Soluble in many organic solvents. (Solvent solubility indicated on Page 6).

Water Barrier

Useful property in various applications across a wide range of industries, particularly in specialty packaging.

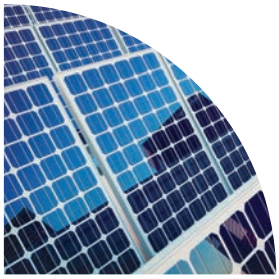
Low Ash Content

ETHOCEL™ has a very low ash content, providing high purity and clean burn out for high-end electronic applications.



ETHOCEL™ EC APPLICATIONS

ETHOCEL™ is a versatile polymer, soluble in many organic solvents.
Though it can be used in a wide variety of applications, below are a few select examples.



Photovoltaics

Widely used in photovoltaics applications because of binding properties in silver or aluminum electrode pastes.

Coatings, Inks

Used in coatings, paints and inks formulations because of ideal binding, rheology modification and stabilization properties. ETHOCEL™ is a good alternative to other polymers made from nonrenewable sources.

Displays

The premier bin der for plasma display panels (PDPs).

Agriculture

Used as a seed coating polymer and in crop treatment products with oily actives to stabilize emulsions.

Electronics

ETHOCEL™ is the world-premier binder for multi-layer ceramic capacitors (MLCC) and other high-end electronic ceramic parts. It provides clean burn-out, high purity, high solubility, thixotropy for print and adhesion for lamination.

OUR LARGE PRODUCT LINE OPTIMIZES YOUR APPLICATION PERFORMANCE

This product table highlights the key grades in our ETHOCEL™ family. Other product options are available depending on your specific application requirements.

PRODUCT	Viscosity (mPa*s)	Ethoxyl Content (Weight %)	Industrial Applications
ETHOCEL™ Standard 4	3.0 – 5.5	48.0 – 49.5%	Conductive pastes Printing inks Specialty coatings
ETHOCEL™ Standard 7	6.0 – 8.0	48.0 – 49.5%	Conductive pastes Printing inks Specialty coatings
ETHOCEL™ Standard 10	9.0 – 11.0	48.0 – 49.5%	Ceramics Conductive pastes Printing inks Specialty coatings
ETHOCEL™ Standard 20	18.0 – 22.0	48.0 – 49.5%	Specialty coatings Printing inks
ETHOCEL™ Standard 45	41.0 – 49.0	48.0 – 49.5%	Ceramics Conductive pastes Printing inks Specialty coatings
ETHOCEL™ Standard 100	90 –110	48.0 – 49.5%	Ceramics Conductive pastes Low solid coatings Specialty coatings
ETHOCEL™ Standard 200	180 – 220	48.0 – 49.5%	Conductive pastes Low solid coatings Specialty coatings
ETHOCEL™ Standard 300	270 – 330	48.0 – 49.5%	Conductive pastes Low solid coatings
ETHOCEL™ Medium 70	63.0 – 77.0	45.0 – 47.0%	Conductive pastes Optical films

* All viscosity test solutions are prepared with 5% ETHOCEL™ and measured in an Ubbelohde viscometer at 25°C:

- for Standard products, solvent is a 80% toluene and 20% ethanol combination
- for Medium products, solvent is a 60% toluene and 40% ethanol combination

Please contact an IFF sales representative to discuss product options.

PROCESSING RECOMMENDATIONS FOR ETHOCEL™

ETHOCEL™ solubility

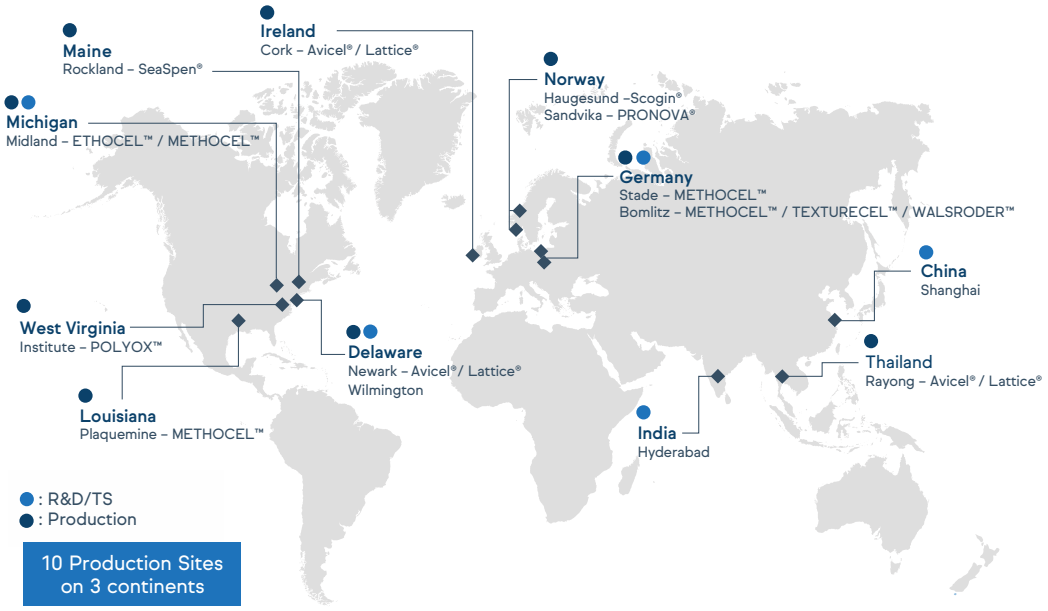
The table below does not list concentrations or viscosities and is only intended as a general guide for the solubility of ETHOCEL™ Standard grades. In general, ETHOCEL™ polymers are most soluble in blends of aromatic hydrocarbons and aliphatic alcohols.

Completely Soluble	Moderately Soluble	Insoluble
Clear Solutions	Hazy Solutions / Swollen Gels	No Interaction
Aromatic Hydrocarbons	Acetates	Aliphatic Hydrocarbons
Chlorinated Hydrocarbons	Esters	Mineral Spirits
Monohydric Alcohols	Alkyl Ethers	Glycols
Glycol Ethers	Naphtha	Glycerol
Ketones	Turpentine	Water

GLOBAL SPECIALTY SOLUTIONS

- Global manufacturing and technology footprint
- Robust business continuity planning

MANUFACTURING & RESEARCH SITES



WHAT WE DO

ETHOCEL™ EC Polymers for industrial applications are available only from IFF and its distributors. IFF's Global Specialty Solutions business, manufactures cellulosic polymers alongside other IFF portfolio products. Our dedicated team of experts commercializes these products into various global markets.

WHO WE ARE

We are innovative problem solvers, drawing on deep application understanding and market insight to help our customers turn challenges into high-value business opportunities.

Connect with us

For more information connect with IFF sales and application experts

iff.com

Product Safety

When considering the use of any IFF products in a particular application, please review our latest Material Safety Data Sheets first to ensure that your intended use can be accomplished safely. For Material Safety Data Sheets and other product safety information, contact IFF at the provided numbers. Before handling any other products mentioned in the text, obtain available product safety information and take necessary steps to ensure safety of use.

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