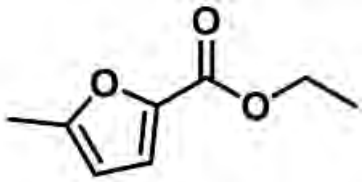
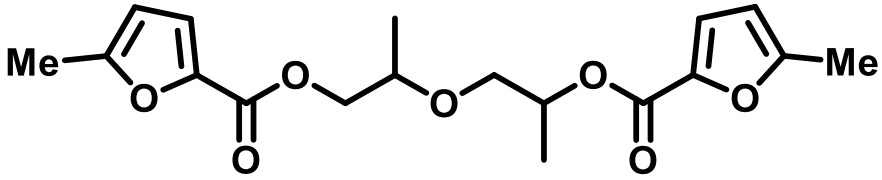


xF Technologies



Renewable, non-toxic and cost competitive Solvents and Plasticizers

June 2015

Overview

- Renewable Products Company
  - xF Technologies licenses IP and process technology
  - Target partners: ethanol producers, chemical companies and petro-chemical refiners
- Products are Furoate and Difuroate Esters
  - Novel combinations of sugar derivatives with alcohols or diols
  - Granted patents cover production and use
- Target Markets
  - Cleaning and processing solvents, plasticizers, emollients
  - Gasoline and diesel fuel oxygenate
- Economics
  - CapEx and OpEx competitive with petrochemical based products

Global Solvent Market

Solvents (Global)
$35.7B (2014) --> $43.4B (2018)[1]

Volume:
~29MM MT in 2014
(~63B lbs or ~7B gal)

Furoate Esters

Plasticizers (Global)
$15.0B (2014) --> $19.4B (2019)[2]

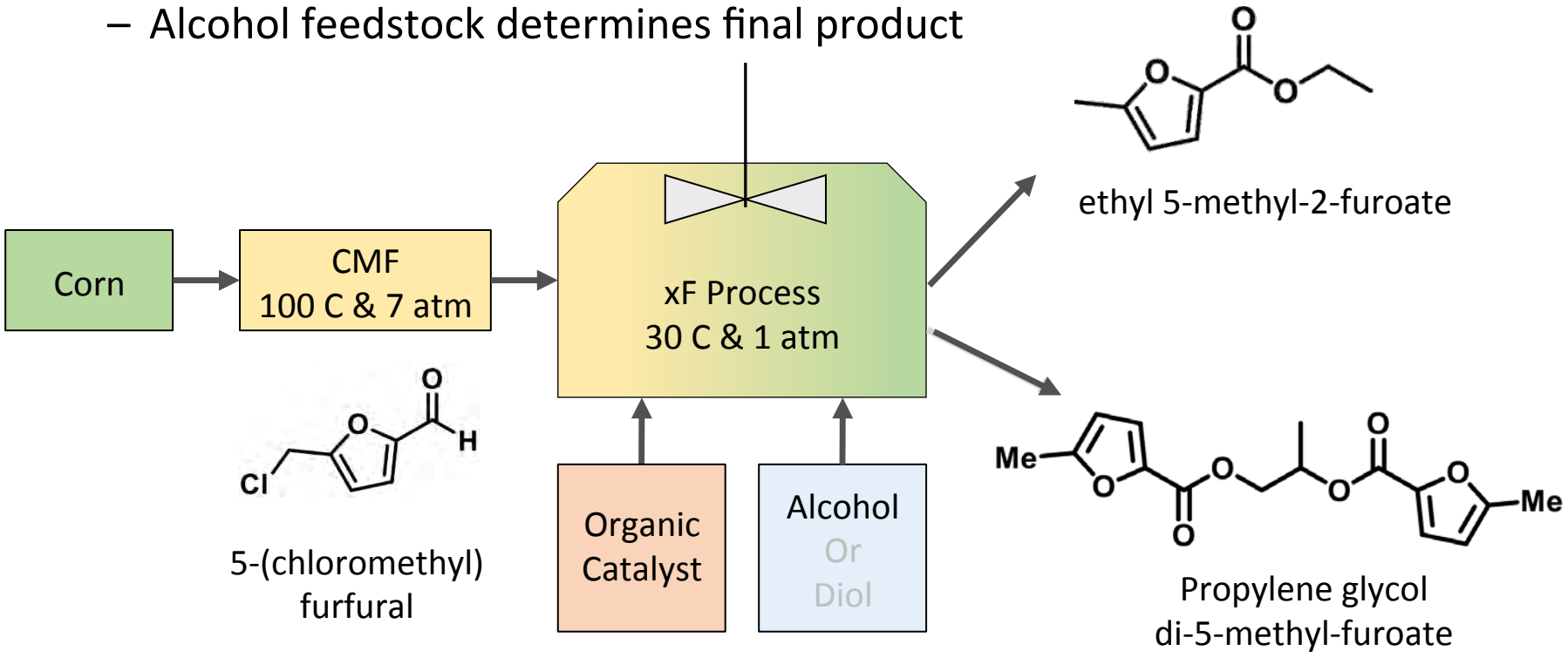
Volume:
~7.4MM MT in 2014
(~16B lbs or ~2B gal)

Difuroate Esters

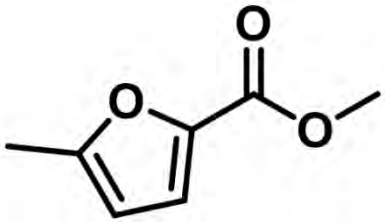
[1]Source: Marketsandmarkets (marketsandmarkets.com/Market-Reports/solvent-market-1325.html)
[2]Source: Marketsandmarkets (marketsandmarkets.com/Market-Reports/plasticizers-market-688.html)

Simplified Process Flow Diagram

- Cost Advantaged, 2-Step Thermochemical Process
  - Biomass feedstock agnostic
  - Recycles processing chemicals
  - Alcohol feedstock determines final product

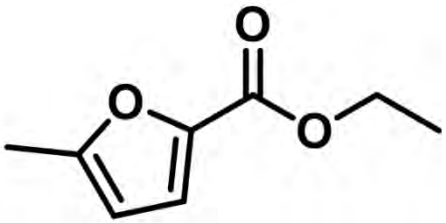


The 408 Family of Furoate Esters



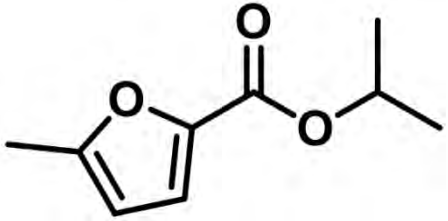
Methyl Furoate

Methyl 408



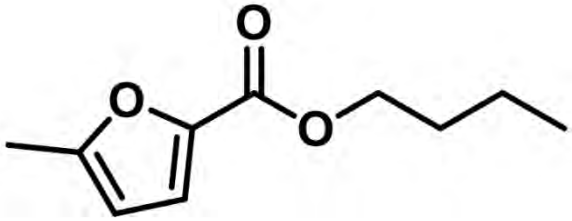
Ethyl Furoate

Ethyl 408



Isopropyl Furoate

Isopropyl 408



Butyl Furoate

Butyl 408

Note: '408' is a phonetic spelling of furoate

Pilot Plant in Albuquerque, NM

xF as Solvents: TURI Study

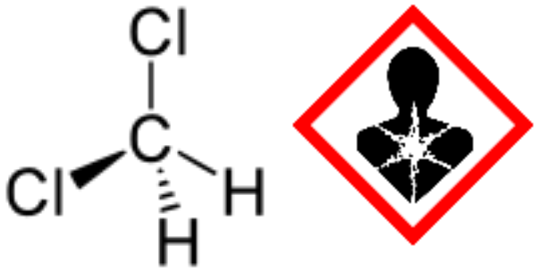
- Toxics Use Reduction Institute (TURI)
  - Engaged to do evaluation of 408s as cleaning solvents

TURI Test	xF solvents	Compared solvents
Paint Stripping	MF and EF	DCM, NMP, Green Alternative
Degreasing	MF and EF	TCE, NPB, Green Alternative
Wax Removal	MF and EF	DCM, TCE, Green Alternative
Dry Cleaning	MF and EF	PCE, Green Alternative
Precision Cleaning	MF and EF	TCE, PCE, HFE, Green Alternative

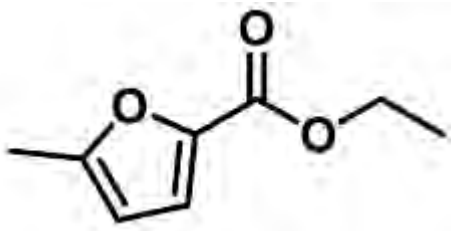
- TURI Findings
  - Initial results indicate MF and EF as good as chlorinated solvents
  - Better than leading "green" candidates

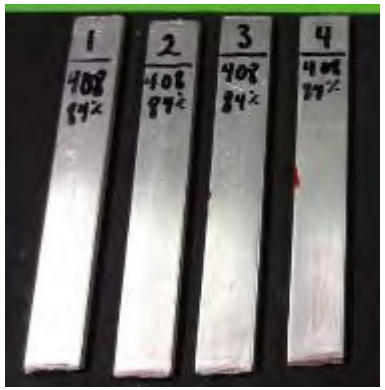
Solvent Strength on Acrylic Paint

Dichloromethane



Ethyl 408





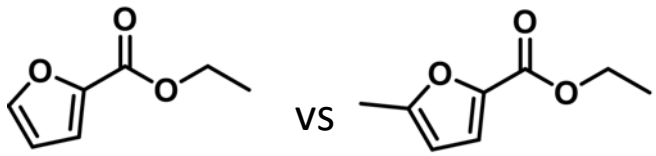
Note: Acrylic paint, solvent was 84% Ethyl 408 & 16% ethanol, substrate was an aluminum bar, temp was 65F

Toxics Studies of 408 Surrogate

Summary Of Health & Welfare Information Search For Ethyl-2-Furoate

Characteristic	Tests Conducted By	Number & Species Of Test Subjects	Exposure Concentrations /Duration	Study & Research Findings
Ingestion (Humans) [Ref 7.2.2A&B]	World Health Organsiation (WHO) and European Food Safety Authority (EFSA) Published Scientific Studies	Humans	Up to 100 mg/kg in food	No safety Concerns
Exposure Via Intraperitoneal [Dermal] (Animals) [Ref 7.3.2]	Journal of Pharmacology and Experimental Therapeutics. Vol. 58, Pg. 174, 1936.	Rodent - rat	75 mg/kg LDLo - Lowest published lethal dose	Details of toxic effects not reported other than lethal dose value.
Exposure Via Intravenous (Animals) [Ref 7.3.2]	U.S. Army Armament Research & Development Command, Chemical Systems Laboratory, NIOSH Exchange Chemicals. Vol. NX#00372	Rodent - mouse	180 mg/kg LD50 - Lethal dose, 50 percent kill	Details of toxic effects not reported other than lethal dose value.

Note: All toxicological data is based on Ethyl 2-Furoate (CAS: 614-99-3), a flavoring agent in US and Europe (UNII: S1H449R92T, EFSA: 13.122).



Phtalate Plasticizers

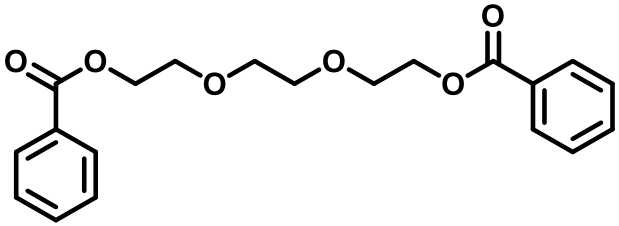
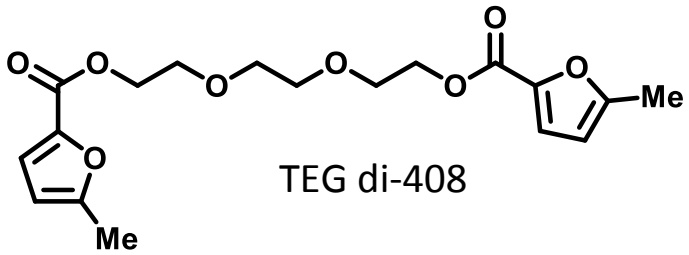
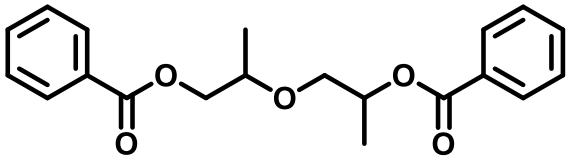
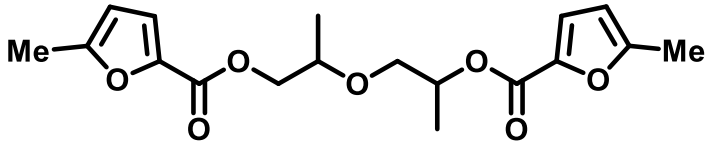
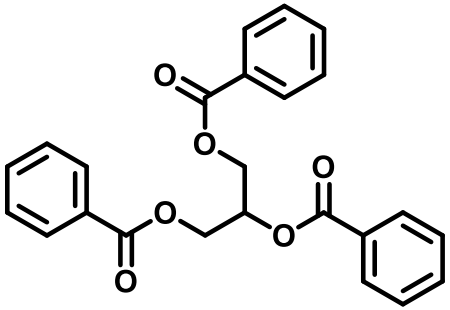
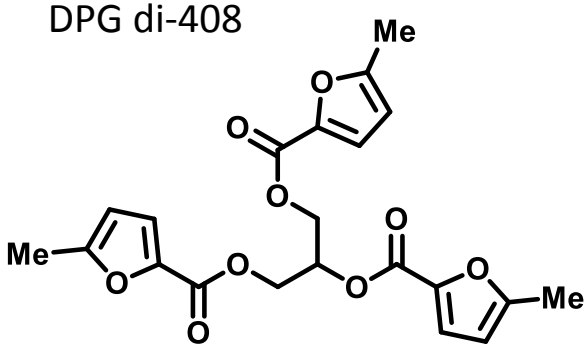
- Plasticizers are molecules that soften plastics
- PVC is the dominant plastic
- The global consumption is 16 billion pounds
- Phthalate share is 85% or 14 billion pounds
- These chemicals can lead to:
  - **Cancer**
  - **Birth defects**
  - **Developmental disorders**

Source: http://www.plasticisers.org

Non-Phthalate Plasticizers

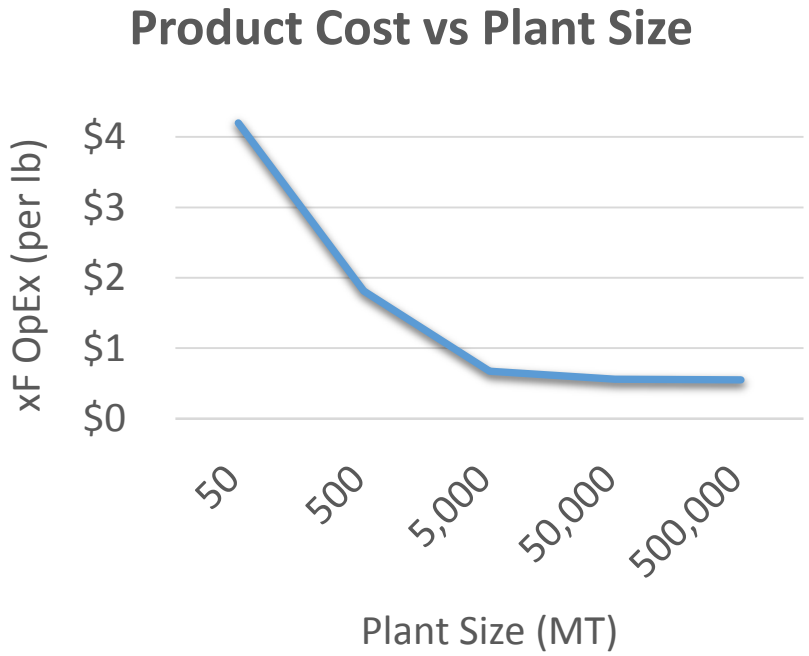
- Dibenzoates are non-phthalates that are considered safe
- Although relatively expensive, they have advantages including
  - Improved low temperature properties
  - High solvating power, fast fusion, good gelation properties
  - Direct food contact approval
  - Low volatility
- We can use our chemistry to make analogs that perform well

xF di-408 Plasticizers

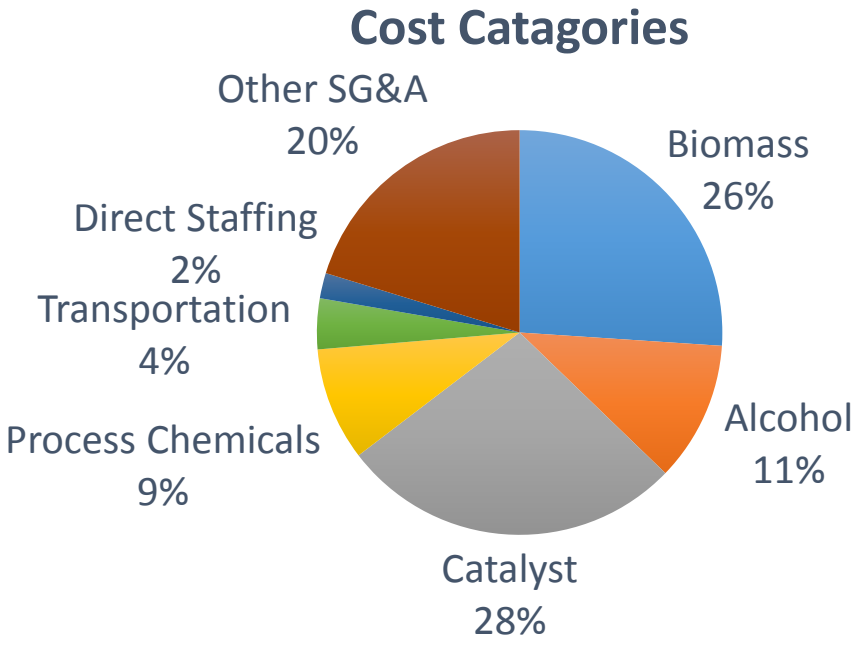
Dibenzoate	Bridge	xF Analog
	Triethylene Glycol	 TEG di-408
	Dipropylene Glycol	 DPG di-408
	Glycerol	 Glycerol tri-408

Product Cost

- EF Cost of Production is a Function of Plant Size
  - Production cost $0.46-$0.60/lb
  - Market value $0.80-$1.80/lb



- Cost Breakdown
  - For 5,000 MT Plant



IP Status

Informal Name	U.S. Priority Date	Application Number	Status
xF Production	Aug 20, 2010	PCT/US2011/048009	Issued
CMF Production	Sep 3, 2013	PCT/US2013/057795	Allowed
xF as solvents	May 22, 2014	62/001,806	Pending
HTC Applications	Aug 22, 2014	62/042,923	Pending

Funding Request

- Funding Needs
  - Seeking a Series B investment of $15 million
  - Significant participation by current investors
  - Closing date: 4Q-2015 or 1Q-2016

- Use of Proceeds
  - Upgrade and optimization of Pilot Plant
  - Continued R & D for other applications and derivatives
  - Market development and support

Albuquerque, NM
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