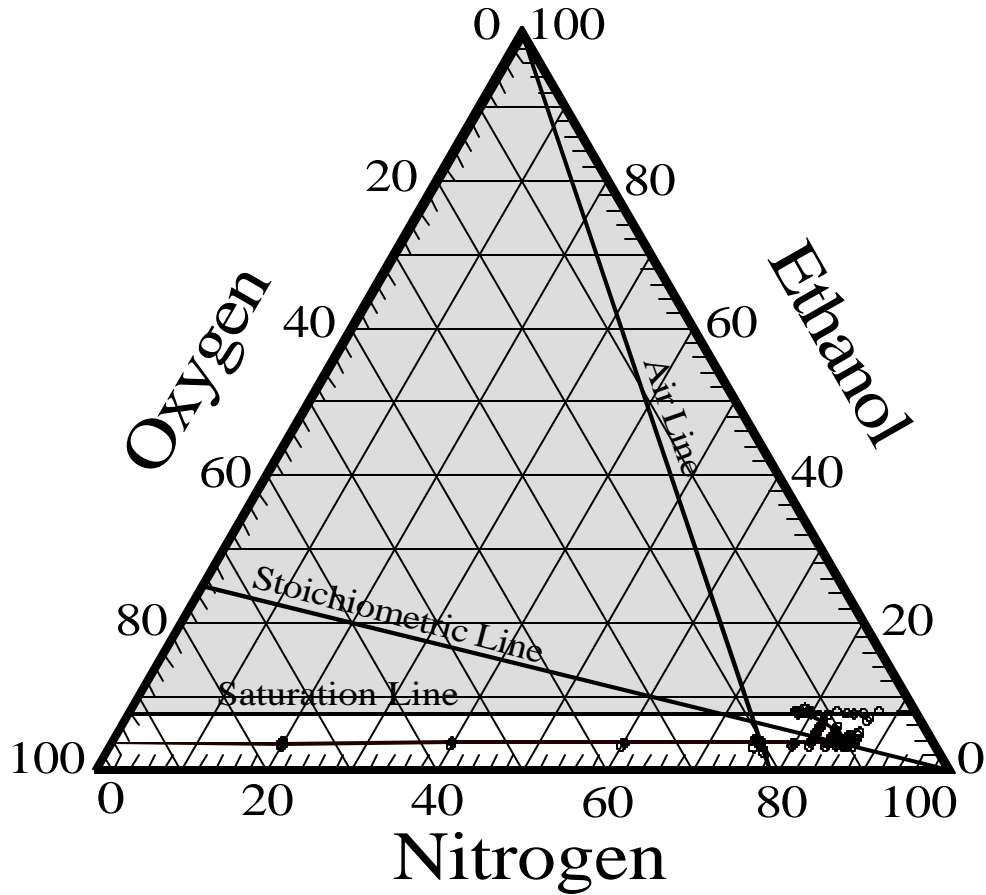


## Flammability Diagram for Ethanol



Mark R. Brooks and Dr. Daniel A. Crowl  
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 Michigan Technological University  
 Houghton, Michigan  
 May 7, 2001

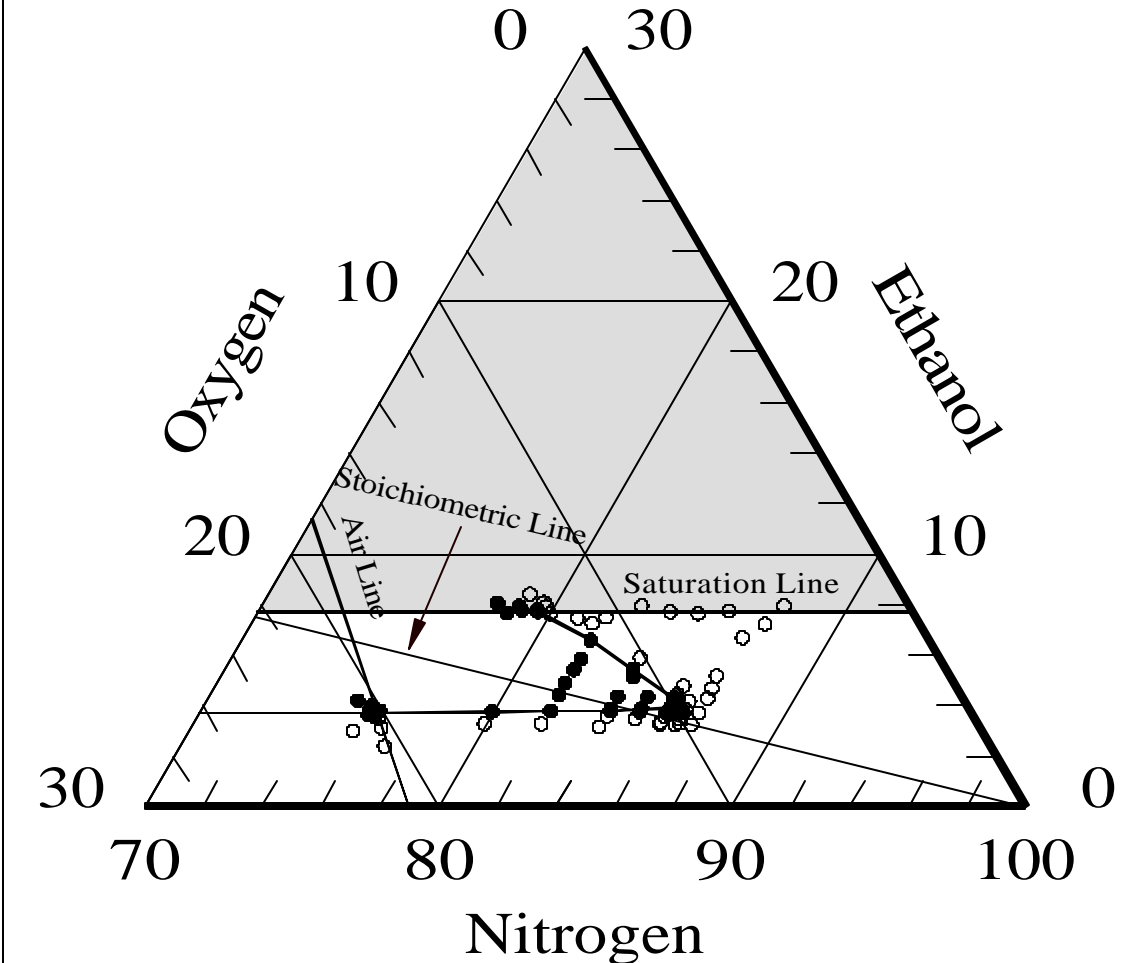
### Flammability Parameters

Lower Flammability Limit (LFL): 3.7% Ethanol  
 Minimum Oxygen Concentration (MOC): 9.8% O<sub>2</sub>  
 Flammable Boundary at Saturation (FBS): 12.7% O<sub>2</sub>

- Flammable Mixture
- Non-Flammable Mixture
- Flammable Zone Boundary

Initial Pressure: 14.70 psia  
 Initial Temperature: 25°C  
 Reactor Volume: 20 L  
 Igniter Location: Center  
 Igniter Type: 1 cm 40 AWG SnCu / 500 VA  
 Igniter Energy: 10 J

## Flammability Diagram for Ethanol (Close-Up View)



Mark R. Brooks and Dr. Daniel A. Crawl Hazards Evaluation Laboratory Michigan Technological University Houghton, Michigan May 7, 2001	<h3 style="text-align: center; margin: 0;">Flammability Parameters</h3> Lower Flammability Limit (LFL): 3.7% Ethanol Minimum Oxygen Concentration (MOC): 9.8% O <sub>2</sub> Flammable Boundary at Saturation (FBS): 12.7% O <sub>2</sub>
<ul style="list-style-type: none"> <li>● Flammable Mixture</li> <li>○ Non-Flammable Mixture</li> <li>— Flammable Zone Boundary</li> </ul>	Initial Pressure: 14.70 psia Initial Temperature: 25°C Reactor Volume: 20 L Igniter Location: Center Igniter Type: 1 cm 40 AWG SnCu / 500 VA Igniter Energy: 10 J