



Module 4: Transportation and Transfer

Objective



Upon completion of this module, participants should be able to describe how ethanol-blended fuels are transported & transferred as well as where the most likely points for error in these actions exist.

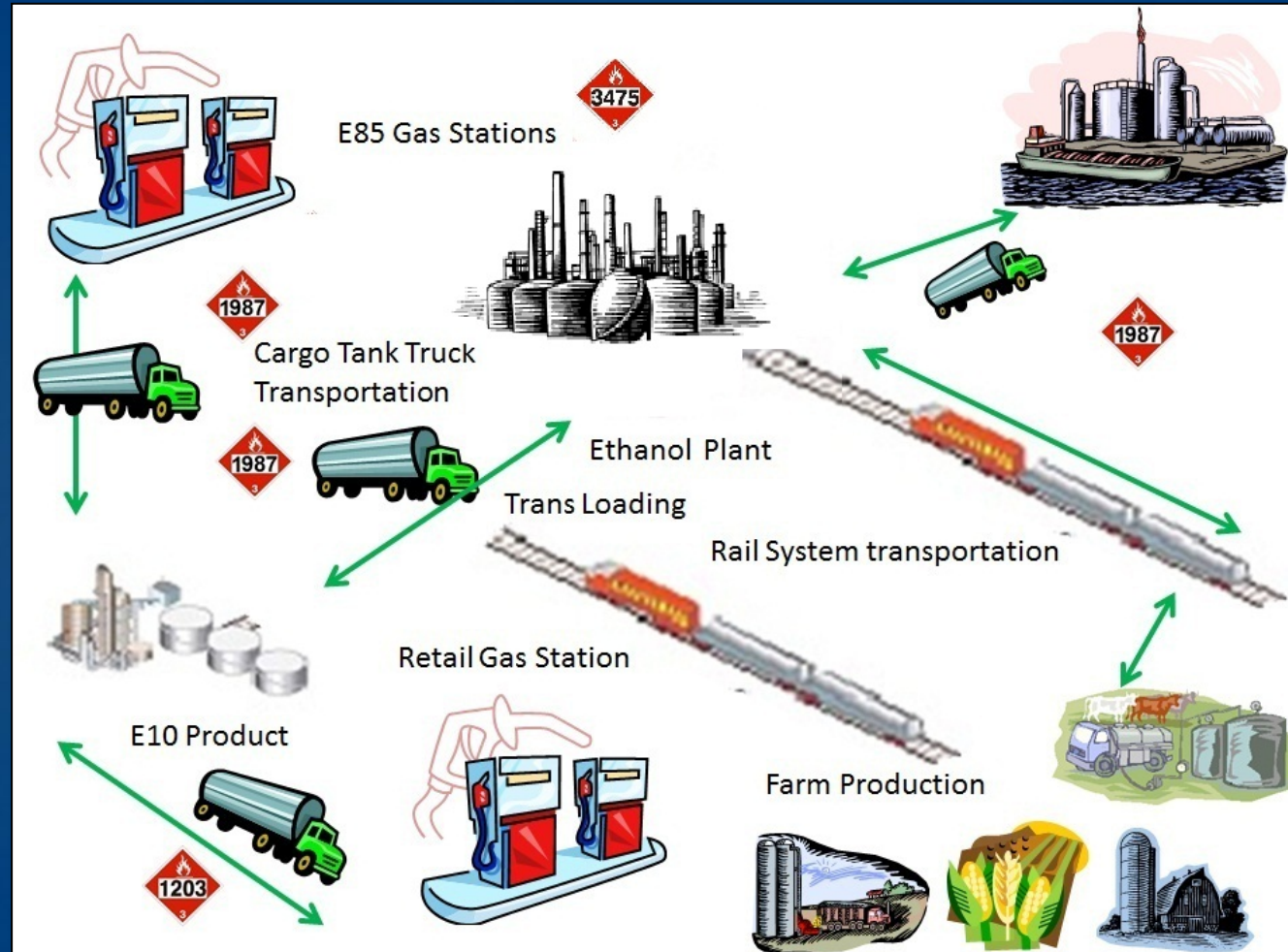


Introduction



- Essential to quickly & effectively identify presence of ethanol/ ethanol-blended fuels at scene of incident
- Important to recognize proper placarding & marking of ethanol-blended fuels
- Steps taken to ensure incidents managed effectively

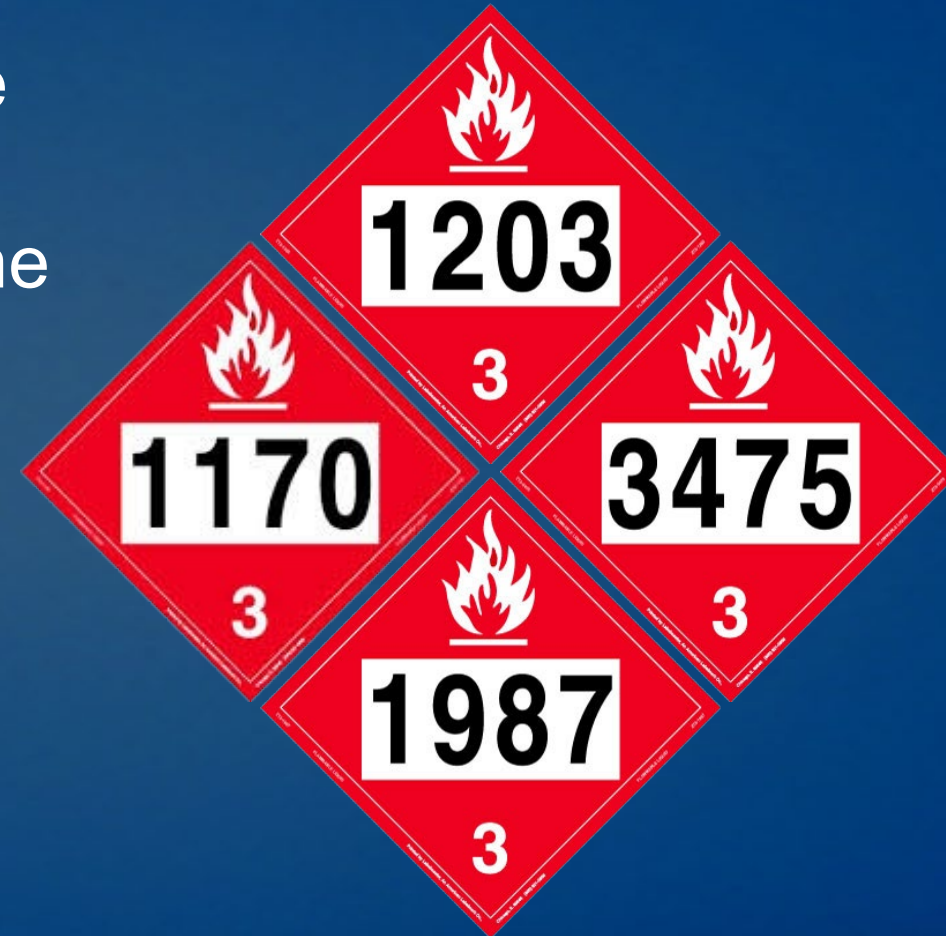
From Field to Your Vehicle



Transport Placards & Markings



- Identify the product through use of DOT placards
- Ethanol-blended fuels & gasoline transported in various types of containers
 - Cargo tanks
 - Rail tank cars
 - Freighter ships/ barges
 - Pipelines



Transport Placards & Markings







- DOT:
 - Classifies according to primary hazard
 - Assigns standardized symbols to identify hazard classes
- Ethanol & ethanol-blended fuels are flammable liquids



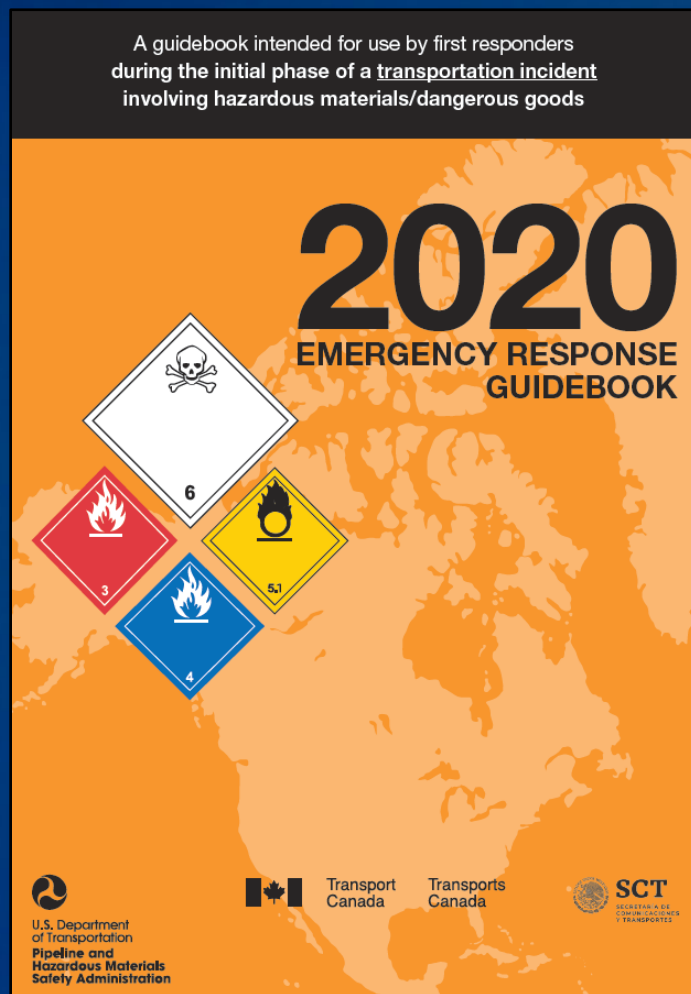
Hazardous Material Description



Ethanol Shipping Information

Identification Number	Ethanol Concentration	Preferred Proper Shipping Name	Common Ethanol Blends
 UN 1203	1% - 10%	Gasoline	E10
 UN 3475	11% - 94%	Ethanol & gasoline mixture	E15-E85
 UN 1987	95% - 99%	Alcohols n.o.s.	Denatured Fuel Ethanol, E95 - E98
 UN 1170	100%	Ethanol <i>or</i> ethyl alcohol	E100

Emergency Response Information



GUIDE 127 FLAMMABLE LIQUIDS (WATER-MISCIBLE)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE:** Will be easily ignited by heat, sparks or flames.
- **CAUTION:** Ethanol (UN1170) can burn with an invisible flame. Use an alternate method of detection (thermal camera, broom handle, etc.)
- Vapors may form explosive mixtures with air.

Fire Information: Large fire water spray, fog or alcohol-resistant foam. Do not use straight streams.

PUBLIC SAFETY

- **CALL 911. Then call emergency response telephone number on shipping paper.** If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Ventilate closed spaces before entering, but only if properly trained and equipped.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing provides thermal protection **but only limited chemical protection.**

EVACUATION

Immediate precautionary measure

- Isolate spill or leak area for at least 50 meters (150 feet) in all directions.

Large Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the ERAP Program Section (page 390).

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FLAMMABLE LIQUIDS (WATER-MISCIBLE) GUIDE 127

EMERGENCY RESPONSE

FIRE

CAUTION: The majority of these products have a very low flash point. Use of water spray when fighting fire may be inefficient.

CAUTION: For fire involving UN1170, UN1987 or UN3475, alcohol-resistant foam should be used.

CAUTION: Ethanol (UN1170) can burn with an invisible flame. Use an alternate method of detection (thermal camera, broom handle, etc.)

Small Fire

- Dry chemical, CO₂, water spray or alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- Avoid aiming straight or solid streams directly onto the product.
- If it can be done safely, move undamaged containers away from the area around the fire.

Fire Involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor-suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean, non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor, but may not prevent ignition in closed spaces.

FIRST AID

- Call 911 or emergency medical service.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air if it can be done safely.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim calm and warm.

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NFPA 704 for Ethanol



- NFPA 704 marking system (known as the Fire Diamond) uses, colors, numbers (0-4, ascending hazard), special symbols
- NFPA 704 Rating for Ethanol
 - Health - 2
 - Flammability - 3
 - Instability - 0



Hazard Rating



Number Systems



– NFPA Rating 0-4

- 0-least hazardous
- 4-most hazardous


– OSHA's Classification System 1-4


- 1-most severe hazard
- 4-least severe hazard

- The Hazard category numbers are NOT required to be on labels but are required on SDSs in Section 2
- Numbers are used to CLASSIFY hazards to determine what label information is required

	 NFPA 704	 HazCom 2012
Purpose	Provides basic information for emergency personnel responding to a fire or spill and those planning for emergency response.	Informs workers about the hazards of chemicals in workplace under normal conditions of use and foreseeable emergencies.
Number System: NFPA Rating and OSHA's Classification System	0-4 0-least hazardous 4-most hazardous	1-4 1-most severe hazard 4-least severe hazard • The Hazard category numbers are NOT required to be on labels but are required on SDSs in Section 2. • Numbers are used to CLASSIFY hazards to determine what label information is required.
Information Provided on Label	<ul style="list-style-type: none"> • Health-Blue • Flammability-Red • Instability-Yellow • Special Hazards*-White *OX Oxidizers W Water Reactives SA Simple Asphyxiants	<ul style="list-style-type: none"> • Product Identifier • Signal Word • Hazard Statement(s) • Pictogram(s) • Precautionary statement(s); and • Name address and phone number of responsible party.
Health Hazards on Label	Acute (short term) health hazards ONLY. Acute hazards are more typical for emergency response applications. Chronic health effects are not covered by NFPA 704.	Acute (short term) and chronic (long term) health hazards. Both acute and chronic health effects are relevant for employees working with chemicals day after day. Health hazards include acute hazards such as eye irritants, simple asphyxiants and skin corrosives as well as chronic hazards such as carcinogens.
Flammability/ Physical Hazards on Label	NFPA divides flammability and instability hazards into two separate numbers on the label. Flammability in red section Instability in yellow section	A broad range of physical hazard classes are listed on the label including explosives, flammables, oxidizers, reactives, pyrophorics, combustible dusts and corrosives.
Where to get information to place on label	Rating system found in NFPA Fire Protection Guide to Hazardous Materials OR NFPA 704 Standard System for Identification of the Hazards of Materials for Emergency Response 2012 Edition, Tables 5.2, 6.2, 7.2 and Chapter 8 of NFPA 704	OSHA Hazard Communication Standard 29 CFR 1910.1200 (2012). 1) Classify using Appendix A (Health Hazards) and Appendix B (Physical Hazards) 2) Label using Appendix C
Other	The hazard category numbers found in section 2 of the HC2012 compliant SDSs are NOT to be used to fill in the NFPA 704 diamond.	Supplemental information may also appear on the label such as any hazards not otherwise classified, and directions for use.
website	www.nfpa.org/704	www.osha.gov OR www.osha.gov/dqg/hazcom/index.html

For more information:

 National Fire Protection Association
www.nfpa.org | 800.344.3555

 Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov | 800.321.OSHA (6742)

Transportation Patterns



- Most hazardous materials incidents occur during transportation & transfer operations
 - Denatured fuel ethanol is classified as a hazardous material
- Be aware of areas/ routes where large number of shipments of ethanol & ethanol-blended fuels routinely pass
- Conducting a hazardous material flow study for your area would provide critical information to help with response needs



Transportation via Highway



- MC306/ DOT406
 - Capacity > 5,000
 - Aluminum shell
 - Multiple compartments
- MC307/ DOT407
 - Capacity > 5,000
 - Steel shell
 - Multiple compartments



Transportation via Highway



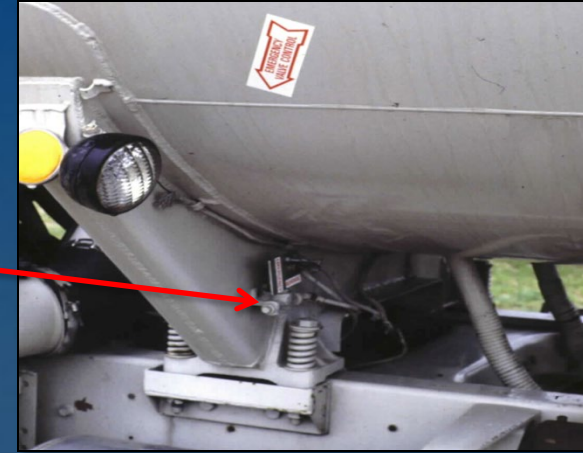
- Ethanol cargo tank trucks placarded & marked in the same manner as all other hazardous materials
- Pressure & vacuum relief devices function the same as currently found on gasoline specification cargo tank trucks
- Bottom loaded & unloaded
- Vapor recovery system equipped

Transportation via Highway



Safety devices:

- Emergency shutoffs
- Break away valves
 - Sheer protection
- Pressure relief devices
- Overfill protection
- Collision protection



Transportation via Rail



- Denatured fuel ethanol is regularly transported safely every day by rail
- Transportation occurs in multiple phases from production sites to transload facilities
 - Rail transport to fixed facility (terminal)
 - Rail transport directly to cargo tank truck
 - Rail transport directly to pipeline



Transportation via Rail



Rail tank car

- DOT111A100W1
- Non-pressure (general service rail tank car/ low-pressure)
- Approximately 30,000 - 34,000 gallon capacity

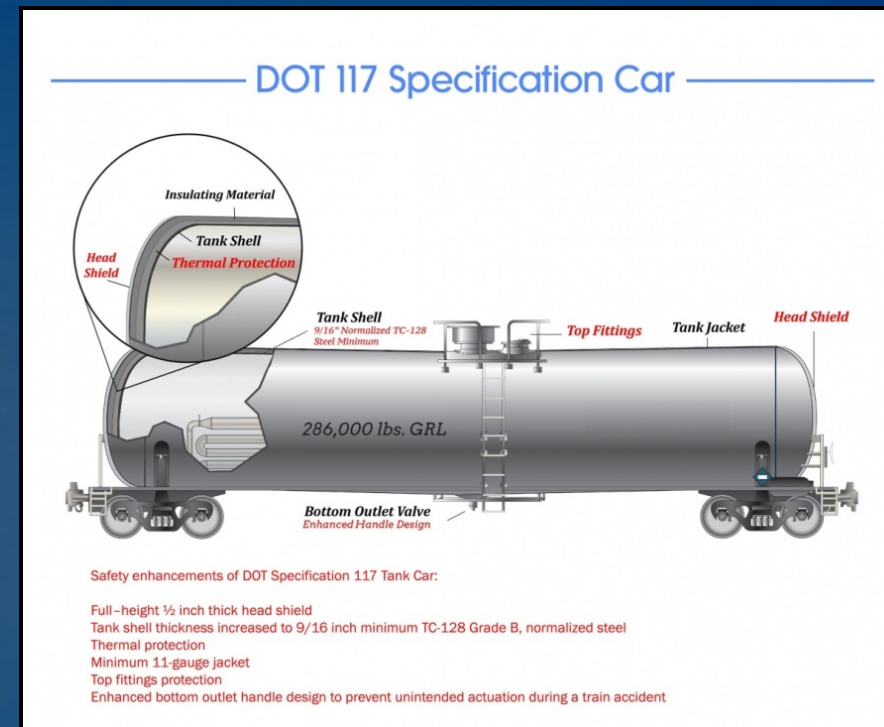


Transportation via Rail



Enhanced standards for new & existing rail tank cars

- New rail tank cars constructed after October 1, 2015 are required to meet enhanced DOT Specification 117 design or performance criteria
- Existing rail tank cars must be retrofitted by 2023 in accordance with the DOT-prescribed retrofit design or performance standard



Transportation via Rail



- Unit train
 - Consists of 80 - 100 rail tank cars
 - Single destination point
- Rail tank cars placarded & marked same as highway transport
 - Both sides & both ends
- Pressure relief devices
- Vacuum relief device (optional)
- Rail tank cars can be both top & bottom loaded & unloaded



Contacts & Apps



- Emergency Notification System (ENS)
 - Crossing ID for a specific location
 - Emergency phone number
- AskRail Mobile App
 - Data base in real time to determine owner, location and content of rail car based on ID number
 - <http://askrail.us/>



Shipping Papers



Placards & shipping papers example:

```
B804001 P M BRADY FD240269 11/30/15 13:03:23
K K EEEE Y Y TTTT RRRR AAA IIIII N N
K K E Y Y T R R A A I NN N
K K EEE Y T RRR RAAA I NN N
K K E Y T R R A A I N NN
K K EEEE Y T R R A A IIIII N N

***** This Key Train is scheduled to operate *****
***** within designated municipal area limits. *****
* See applicable timetable speed restrictions while operating *
* this train within designated municipal area MP limits *
*****

TRNN8001 ***** Train Documents ***** 11/30/15
P M BRADY 13:02:48CT
Train G SIOWAT7 24A Departed DELAMO CA 11/30/15 0454 2 hr 16 min Late
G SIOWAT7 24 Unit Train Set ID:
OPR
Head End DYN Dyn Evt Cum Loco Online D E ----Isolated----
Locos MP AVLMP RPK RPK Rec Axl Tons Dir Destin F M Cd From To
-----
BNSF 7108 4400 4400 8 EP* Y Y 6 210 WEST WATSCA Y
BNSF 4468 4400 4400 8 EP* Y Y 12 210 EAST WATSCA N IC FANCKE CLOVIS
BNSF 5063 4400 4400 8 EP* Y Y 18 210 EAST WATSCA N
Total 13200 13200 18 630
Incl DPU# 22000 22000 Actual HPT = 2.1 (22000 MP/10333 tons)
Scheduled HPT = 1.6

Seq Car L Contents Online J Gra Final Dest Cum 2
Num Init Number Rod E Warr Dy Destin T RAJP Ton Consignee City ST Axl 2
-----
Block Setout WATSON CA
1 ODKX 1382 HXR L GRAVEL WATSCA 95 LOMITARAITER WATSON CA 22
Block Totals 1 Cars 1 Loads 0 Empties 95 Tons 53 Feet

Block WAT Setout WATSON CA
2 CTXK 732110 TSI L HAZMAT WATSCA 128 LOMITARAITER WATSON CA 26
FL FLAMMABLE

>>> KEY SHIPMENT (TWENTY) <<<
***** 1 TK // 190368 LB
* HAZMAT UN1987 // ALCOHOLS, N.O.S.
***** (ALCOHOLS, N.O.S.)
3
PG II
EMERGENCY CONTACT: 8004249300
SHIPPER CONTACT: RFW3 INC HAZMAT STCC 4909152

RAIL CONSIGNEE RAIL SHIPPER
ABC Company DEF Company
City, State City, State
3 SHXK 208102 TSI L HAZMAT WATSCA 128 LOMITARAITER WATSON CA 30
FL FLAMMABLE

>>> KEY SHIPMENT (TWENTY) <<<
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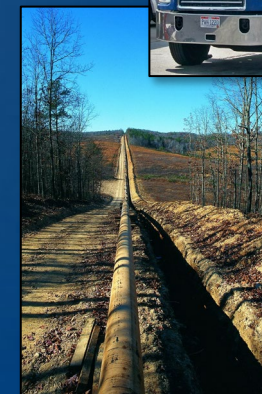
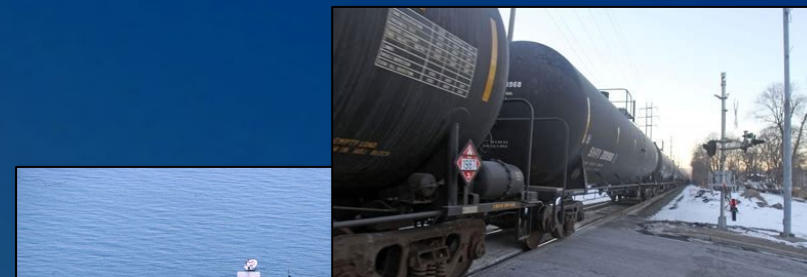


CHEMTREC
1-800-424-9300

Transportation Logistics



- The destination of denatured fuel ethanol determines the mode of transport
- Leaving the production facility:
 - Largest volume transported via rail
 - Second is cargo tank truck and then freighter ship/ barge
 - Very small amounts are transported by pipeline
- Arriving at storage terminals:
 - Storage terminals with no access to rail receive product by cargo tank truck, freighter ship/ barge or pipeline
 - Cargo tank truck from rail transloading facilities



Loading/ Unloading Operation



Terminal loading rack



Transloading facility

Loading/ Unloading Operation



Additional Resources



TRANSCAER®:

- Voluntary effort
- Nationwide members
- Resources available at www.transcaer.com



Summary



- Variety of sources for information available for identifying ethanol:
 - SDS
 - DOT placards & markings
 - NFPA 704 labeling system
 - Shipping papers
- Denatured fuel ethanol will be found in:
 - Highway cargo tank trucks
 - Railroad tank cars
 - Freighter ships/ barges
 - Pipelines

Activity 4.1: Ethanol Product Identification



- Purpose:
 - To allow participants to determine the hazards associated with an ethanol emergency.