



# PHMSA Issues Final Rule on Enhanced Tank Car Standards and Rail Operational Controls for Flammable Liquid Transport

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The U.S. Department of Transportation's (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) has issued a final rule imposing new specifications for rail tank cars used in high-volume flammable liquid service, new classification requirements for unrefined petroleum-based products, and rail operational restrictions for certain trains (Final Rule). The primary purposes of the rule are to reduce the probability and consequences of accidents of trains moving large quantities of flammable liquid. PHMSA received comments from over 3,200 stakeholders during the last stage of the rulemaking process and published the Final Rule nine months after issuing a Notice of Proposed Rulemaking (NPRM) in August 2014. PHMSA's rulemaking has occurred against the backdrop of a number of accidents involving crude oil unit trains in the US and Canada, as well as pressure from Congress, the National Transportation Safety Board, and numerous industry stakeholders seeking regulatory clarity.

PHMSA developed the new rules in coordination with the Federal Railroad Administration (FRA) and Transport Canada, which recently issued new safety rules for rail transport of flammable liquids in Canada. PHMSA's rules will likely require the expenditure of billions of dollars for retrofitting or replacement of thousands of rail tank cars and the installation of new braking technologies, and will result in reductions in train speeds. While some stakeholders have voiced support for the Final Rule and the regulatory certainty it provides, some in the railroad industry have begun to signal that certain aspects of the rule are not supported by adequate study or cost-benefit analyses and may be challenged. Other stakeholders have signaled that the rules do not go far enough regarding phase-out schedules and crude volatility.

The [Final Rule](#) was published in the Federal Register today (May 8, 2015) and is **effective beginning on July 7, 2015**, with a series of phased implementation deadlines occurring over the next decade. The Final Rule supersedes some, but not all, of the emergency orders issued by DOT, PHMSA, and FRA since August 2013.

## High Hazard Flammable Trains

The Final Rule applies largely to High-Hazard Flammable Trains (HHFTs), defined as trains transporting 20 or more loaded tank cars of Class 3 flammable liquid in a continuous block, or 35 or more such cars in any configuration. The Final Rule provides a degree of flexibility beyond the NPRM, which had proposed a more sweeping threshold of 20-plus flammable liquid cars in a block. The Final Rule has been changed to capture higher-risk bulk quantities transported in unit trains, while excluding some lower-risk manifest trains.

## Enhanced Braking

One of the most controversial aspects of the Final Rule appears to be the portion of the enhanced braking requirements related to Electronically Controlled Pneumatic (ECP) brakes. The Final Rule establishes two-tiered braking requirements based on risk. First, all HHFTs operating at speeds above 30 mph must be equipped with a two-way end-of-train device (EOT) or a distributed power (DP) braking system. These systems allow for faster brake applications across a train in the event of an emergency, and many railroads already use them for crude oil unit trains. This requirement is effective **July 7, 2015**.

Second, the Final Rule imposes an additional requirement on High-Hazard Flammable Unit Trains (HHFUT) (a new definition not proposed in the NPRM), defined as a train transporting 70 or more loaded cars of Class 3 flammable liquid. HHFUTs containing any Packing Group I material and operating at speeds above 30 mph must have Electronically Controlled Pneumatic (ECP) brakes by **January 1, 2021**. All HHFUTs operating above 30 mph, regardless of the Packing Group of the material, must be equipped with ECP brakes by **May 1, 2023**. Some railroads believe that ECP brakes provide little to no safety benefit compared to EOT or DP systems, and are expensive to implement. The government and many environmental groups disagree. ECP brakes are likely to be a key issue if the Final Rule is challenged.

### Speed Restrictions

HHFTs are limited to 50 mph, consistent with the speed restrictions issued by the Association of American Railroads (AAR) in its August 5, 2013 Circular No. OT-55-N. In High Threat Urban Areas (HTUAs), a designation established by the U.S. Department of Homeland Security (DHS) for certain large cities or groups of cities and surrounding areas including a 10-mile buffer zone. In such areas, the Final Rule limits HHFTs to 40 mph if any of the cars containing a Class 3 flammable liquid does not meet the new tank car design specification. DHS regulations include a table listing HTUAs. In the Final Rule, PHMSA elected the HTUA threshold, rather than the more aggressive options of a 100,000 population threshold or a uniform speed limit regardless of population. PHMSA estimates that the HTUA restriction affects approximately 2% of track miles. Speed restrictions are also a significant issue for the railroads, which assert that speed restrictions can have far-reaching effects on the rail network.

### New Tank Car Specifications

New tank cars built for use in HHFT service after **October 1, 2015**, must meet the new DOT 117 Specification which includes the following requirements:

- Shell thickness: 9/16" minimum
- Tank material: TC-128, Grade B normalized steel with protective exterior coating
- Gross rail load: maximum 286,000 lbs.
- Head shield: full height; 1/2" thick
- Thermal protection: required to meet the performance standards specified in 49 C.F.R. § 179.18 (likely means thermal insulation is required)
- Pressure relief valve: reclosing pressure relief device required
- Jacket: 11 gauge A1011 steel (equivalent to 1/8"), with weather flashing and protective coatings
- Bottom outlet valve: handles removed or designed with protection systems
- Top-fittings protection: according to modern AAR standards (AAR's specification for Tank Cars, M-1002, appendix E, paragraph 10.2.1); Toxic by Inhalation Hazard-style rollover protection not required
- Brakes: EOT or DP (HHFTs); ECP brakes (HHFUTs) – see above.

The DOT-117 specification most closely resembles tank car Option #2 from the NPRM, except for the ECP brakes requirement. Tank cars in HHFT service may alternatively be built to the more-flexible DOT-117P performance standard, which does not require specific shell thickness, head shield or jacket types. Tank cars built to the DOT-117P specification must meet a series of impact tests designed to simulate the forces in a derailment.

### Retrofit Specification

Existing DOT-111 (including CPC-1232) tank cars must be phased out or retrofitted according to the new DOT-117R specification for continued use in HHFT service, according to the timeline set forth below. The specification DOT-117R is the same as the DOT-117 new car specification discussed above, except for the following important differences:

- Shell thickness: 7/16" minimum
- Shell material: built with steel authorized under the regulations when constructed
- Top-fittings protection: existing protections acceptable, retrofit not required

### Retrofit Timeframes

Existing DOT-111 (including CPC-1232) cars used in HHFT service must be removed from this service or retrofitted by the following dates:

<b>Packing Group I:</b>	DOT-111 (non-CPC-1232; non-jacketed)*	<b>January 1, 2018</b>
	DOT-111 (non-CPC-1232; jacketed)	<b>March 1, 2018</b>
	DOT-111 (CPC-1232; non-jacketed)	<b>April 1, 2020</b>
	DOT-111 (CPC-1232; jacketed)	<b>May 1, 2025</b>
<b>Packing Group II:</b>	DOT-111 (all non-CPC-1232)	<b>May 1, 2023</b>
	DOT-111 (CPC-1232; non-jacketed)	<b>July 1, 2023</b>
	DOT-111 (CPC-1232; jacketed)	<b>May 1, 2025</b>
<b>Packing Group III:</b>	DOT-111 (all)	<b>May 1, 2025</b>

\* By **January 1, 2017**, owners of non-jacketed DOT-111 cars in HHFT service must report the number of tank cars that they own or lease that have been retrofitted, and the number that have not yet been retrofitted. This reporting deadline was not in the NPRM. In general, these retrofit timeframes allow more time, in some cases significantly so, to complete retrofits than the deadlines proposed in the NPRM.

### Rail Routing and Notification

The Final Rule requires carriers transporting HHFTs to comply with the route analysis, routing, and notification requirements that currently apply to railroads transporting explosive, poisonous by inhalation, and radioactive materials. Carriers of HHFTs must perform a routing analysis that considers, at a minimum, 27 safety and security factors, and then select a route in according to the findings. Railroads must also notify state and local governments along HHFT routes regarding these rail movements. Carriers of HHFTs must complete initial route planning by **March 31, 2016**.

### Classification: Sampling and Testing Requirements

The Final Rule imposes new sampling and testing requirements for the classification of "unrefined petroleum-based products." These requirements are not limited to HHFTs; they apply to any shipment (by rail, truck, etc.) that is governed by the DOT's Hazardous Materials Regulations (HMR). PHMSA developed these requirements in light of concerns with products that are extracted from the earth and have not yet been refined, and which may exhibit variability (though they may have undergone initial processing). Examples of products covered by the rule are crude oil, raw-mix NGLs, lease condensate, and petroleum-based liquid and gas wastes and byproducts. PHMSA jettisoned the "mined gasses and liquids" definition from the NPRM, which commenters found confusing.

Offerors must develop a sampling and testing plan to ensure accurate classification. The plan must provide for sampling throughout the transportation chain, empirically-based sampling and testing frequencies, program quality control, annual program review, and certification and documentation. The Final Rule does not adopt the newly-issued API RP 3000 crude oil testing standard, but notes that API RP 3000 is largely consistent with the new regulations and may be used to satisfy the sampling provisions of the rule.

### Harmonization with Canadian Regulations

Trains carrying flammable liquids operate on an integrated rail network and regularly cross the U.S. Canada border, making harmonization of tank car specifications and certain operational rules critical. In the Final Rule PHMSA observes that the HMR amendments have been harmonized as much as possible with Canadian requirements. The two main areas where the rules differ are braking requirements (ECP brakes not required in Canada) and a shorter Canadian retrofit timeline for non-jacketed, non-CPC-1232, DOT-111 tank cars in Packing Group I service (U.S. retrofit deadline: January 1, 2018; Canada retrofit deadline: May 1, 2017).

### Observations

As stakeholders digest the new rules and final [Regulatory Impact Analysis](#), a number of issues may warrant further discussion. For example:

- Does the cost-benefit analysis support the new requirements, including the ECP brake mandate?
- Do underlying technical data and analyses support PHMSA's adoption of each component of the new rule?
- Are PHMSA's assumptions regarding retrofit shop capacity, new-build capacity, and the shift of cars into other service types correct?
- Will HHFT speed limits further congest the rail network and drive industry to put more trains on the tracks to compensate for lower speeds?
- How will rail maintenance and operational factors, which have played a role in a number of recent accidents (cracked rails, wheel issues, operator error, etc.), be addressed going forward?
- The Final Rule does not resolve the ongoing debate among stakeholders over the effects of product volatility on accident outcomes. There are several ongoing "upstream" efforts at the state and federal level still under discussion that seek to address unrefined product volatility. Will subsequently-collected volatility findings confirm the approach taken in the Final Rule or result in more regulation?
- How will the costs associated with the Final Rule affect the economics of crude by rail, in particular in a low commodity price environment?

### For more information

Van Ness Feldman will make available two redline documents reflecting the changes made by the Final Rule – one showing differences between the NPRM and the Final Rule, and one showing changes to the HMR that will be made by the Final Rule. For complimentary copies, please contact the authors ([Jim Curry](#), 202-298-1831 or [jbc@vnf.com](mailto:jbc@vnf.com) or [Robin Rotman](#), 202-298-1836 or [rnr@vnf.com](mailto:rnr@vnf.com)).

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