



ASSOCIATION
OF AMERICAN
RAILROADS

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March 31, 2008

CASUALTY PREVENTION CIRCULAR

(CPC-1187)

**SUBJECT: Change to the Implementation of the AAR Standard for Tank Cars
Transporting Toxic Inhalation Hazard Commodities**

T87.4

TO THE MEMBERS AND PRIVATE CAR OWNERS:

At the request of the AAR, the effective date of March 31, 2008, as published in CPC-1185, has been postponed through April 30, 2008, for tank cars ordered built new for TIH service. All other dates remain unchanged. CPC-1187 will now replace CPC-1184 as the standard for cars used to transport TIH commodities. This delay will be used to evaluate the impact of the DOT proposed rule on this standard.

The goal of this standard is to enhance safety in the rail transportation of hazardous materials by reducing the probability of release of product from a tank car, given a derailment or collision. The expected performance improvement will be calculated using the information available in RSI/AAR Tank Car Safety Project Report RA 05-02 or alternatively demonstrating an equivalent improvement in safety by another method to the TCC. The target figures for improvements to heads, shells, head shields and jackets were selected based on earlier work done by the University of Illinois at Urbana-Champaign and are intended to reflect a verifiable level of risk reduction. These improvements, in conjunction with the top fittings protection design criterion, are intended to achieve the desired overall reduction in risk.

The revised standard is included in this circular and is in effect as of the publication date of this circular. The revision is shown in underlined text. Under the provisions of Standard S-050, which may be found on the TPCI web site (AAR.com), this circular reflects the final action on this matter.

Respectfully Submitted,

K.B. Dorsey

2.1.10 Toxic Inhalation Hazard (TIH) Materials

(Note: This section, as written, will serve for ALL TIH and replace 2.1.8 and 2.1.9 as previously approved for Anhydrous Ammonia and Chlorine service, respectively. The paragraph numbers will change for inclusion in M-1002.)

2.1.10.1 Definitions:

Base car – the current minimum Department of Transportation/ Transport Canada (DOT/TC) specification tank for the commodity as of 7/18/2007.

Car owner is defined as the owner of the reporting mark stenciled on the car. Where multiple owners utilize one reporting mark, the Owner's Mark field in UMLER is to be used.

CPR - Conditional Probability of Release

P_{base} - Baseline performance of the tank car in terms of CPR from the head and shell

P_{proposed} - Expected CPR of the proposed tank car from the head and shell

TIF – Tank Improvement Factor

2.1.10.2 Implementation

Car owners are to provide plans which must provide for compliance (per paragraph 2.1.10.3) for 100 percent of their fleet used to transport TIH materials by December 31, 2018. Plans must be considered and approved by the Tank Car Committee. Car owners are to submit implementation plans to AAR by December 31, 2008 and provide progress reports by March 31 each year beginning in 2010. For purpose of measuring compliance with the fleet reduction requirements described above, starting fleet size will be determined on the date an implementation plan is submitted to AAR, but no later than December 31, 2008.

2.1.10.3 New and Existing Cars

2.1.10.3.1 (for DOT/TC base car 105*300W or 112*340W as of 7/18/2007). Cars ordered after April 30, 2008, for TIH service must comply with DOT/TC specification 105J500W or 112J500W, respectively, with a minimum head and shell thickness of 13/16-inch and be equipped with full-height ½” thick or equivalent head shields and top fittings protection in accord with paragraph 2.1.10.4. Existing cars that currently, or are modified to, meet or exceed these requirements will be considered in compliance.

2.1.10.3.2 (for DOT/TC base car 105*500W as of 7/18/2007). Cars ordered after April 30, 2008, for TIH service must comply with DOT/TC specification 105J600W with a minimum head and shell thickness of 15/16-inch and be equipped with full-height ½” thick or equivalent head shields and top fittings protection in accord with paragraph 2.1.10.4.

2.1.10.3.3 (for DOT/TC base car 105*600W as of 7/18/2007) Effective Cars ordered after April 30, 2008, for TIH service must comply with DOT/TC specification 105J600W with a minimum head and shell thickness of 15/16-inch and be equipped with full-height ½” thick or equivalent head shields and top fittings protection in accord with paragraph 2.1.10.4.

Alternatively, tank cars which have been equipped with top fittings protection in accord with paragraph 2.1.10.4 and built or modified to demonstrate a reduction in CPR relative to the base car using the appropriate formula (below) are also acceptable. Commodity-specific factors for

Tank Improvement Factor (TIF), as well as the tank parameters used in the determination of those factors, are shown in Table 2.1.10, below. Upon request, AAR will augment this table with data for other TIH commodities as they become known.

$$1-(P_{\text{proposed}}/P_{\text{base}}) \geq \text{TIF}$$

Other alternative validation methodology and analysis techniques may be utilized to document safety performance for designs that meet or exceed the commodity-specific TIF, subject to approval by the AAR Tank Car Committee.

2.1.10.4 Top Fittings Protection

Top fittings protection must be designed to withstand, without loss of lading except through the pressure relief device, a rollover with a linear velocity of 9 mph minimum, applied at the geometric center of the loaded tank as a transverse vector. The rolling surface is assumed to be flat, level, and rigid.

Commodity Name	Baseline DOT Minimum Tank				Possible Enhanced Tank Car Used to Calculate TIF				
	Current DOT Minimum Specification	Head Shields Type	Head Thickness (in.)	Shell Thickness (in.)	Proposed DOT Minimum Specification	Head Shields Type	Head Thickness (in.)	Shell Thickness (in.)	Tank Improvement Factor (TIF)
Acetone Cyanohydrin, Stabilized	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8951	0.8951	0.67
Acrolein	105J500W	No	0.8950	0.8950	105J600W	Full-Height	1.2429	1.2429	0.80
Allyl Alcohol	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8951	0.8951	0.67
Ammonia, Anhydrous	105J300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	1.0300	0.8900	0.69
Bromine	105A300W	No	0.5625	0.5625	105J500W	Full-Height	0.8125	0.8125	0.68
Chlorine	105J500W	No	0.7870	0.7870	105J600W	Full-Height	1.1360	0.9810	0.69
Chloropicrin	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8125	0.8125	0.56
Chlorosulfonic Acid	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8125	0.8125	0.56
Dimethyl Sulfate	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8179	0.8179	0.57
Dinitrogen Tetroxide	105J300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8179	0.8179	0.57
Ethyl Chloroformate	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8179	0.8179	0.57
Ethylene Oxide	105J300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8951	0.8951	0.67
Hexachlorocyclopentadiene	105S300W	No	0.5625	0.5625	105J500W	Full-Height	0.8125	0.8125	0.68
Hydrogen Chloride, Refrig. Liquid	105J600W	Full-Height	*	*	105J600W	Full-Height	*	*	**
Hydrogen Cyanide, Stabilized	105A500W	No	0.8950	0.8950	105J600W	Full-Height	1.2429	1.2429	0.80
Hydrogen Fluoride, Anhydrous	112A340W	No	0.7040	0.7040	105J500W	Full-Height	0.8951	0.8951	0.63
Hydrogen Sulfide	105J600W	No	*	*	105J600W	Full-Height	*	*	**
Methyl Bromide	105J300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8125	0.8125	0.56
Methyl Mercaptan	105J300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8951	0.8951	0.67
Nitrosyl Chloride	105J300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8179	0.8179	0.57
Phosphorus Trichloride	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8179	0.8179	0.57
Sulfur Dioxide	105J300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8179	0.8179	0.57
Sulfur Trioxide, Stabilized	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8125	0.8125	0.56
Sulfuric Acid, Fuming	105S300W	Full-Height	0.5980	0.5980	105J500W	Full-Height	0.8125	0.8125	0.51
Titanium Tetrachloride	105S300W	Full-Height	0.5625	0.5625	105J500W	Full-Height	0.8125	0.8125	0.56

** Must comply with M-1002 paragraph 2.1.10.3.3

Table 2.1.10