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 US Department of Transportation Federal Railroad Administration		Sample Car Inspection Checklist For: S-2044 Appendix E-4 Safety Appliances for Tank Cars with End Ladders and Low Side-Mounted Hand Brakes		OMB No. 2130-0565 FRA F6180.161 N
Inspector(s):		Inspection Location:		Date:
Builder:		Car Initial and Number:	Car Type:	No. of cars to be Built:
Builder Job No.				
ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes	
Hand Brake	This appendix to Standard S-2044 defines the safety appliance requirements that apply specifically to tank cars with end ladders and low side-mounted hand brakes. Cars with end ladders and high end-mounted hand brakes shall be equipped in accordance with Appendix E2. Except as stated herein, the requirements of the base standard apply to the cars covered by this appendix. These requirements are illustrated in Figs. E4.1, E4.2, and E4.3. In the event of discrepancy between the text of this appendix and the illustrations, the text shall govern.	Appendix E4, 1.0		
	Each car shall have at least one AAR-approved vertical-wheel hand brake that complies with MSRP Section E, Standard S-475 and that operates in harmony with the power brake equipment on the car. Total braking force applied to the brake shoes by the hand brake shall comply with the requirements of MSRP Section E, Standard S-401, but in any event shall be not less than that developed by 50 psi brake cylinder pressure. The hand brake wheel and chain drum of vertical-wheel hand brakes shall be arranged so that both will revolve when applying and gradually releasing the hand brake. The hand brake shall be provided with means to prevent application of the brake by turning the brake wheel in a counterclockwise direction.	Appendix E4, 2.1.1		
	The hand brake wheel shall have a nominal diameter of 22 in. The brake wheel shall be of shallow configuration and shall be of steel or other material of equivalent strength.	Appendix E4, 2.1.2		
	The hub of the hand brake wheel shall be 2 5/8 in. deep with a square tapered fit to the shaft. The taper on the brake wheel hub and shaft shall be 1 in. in 12 in. on each side, or 2 in. in 12 in. total, with the small end of the shaft opening 7/8 in. square. The brake wheel shall be secured to the brake shaft with an American National Standard 7/8—9 heavy hex nut and 3/16 in. × 1 1/2 in. cotter, or their equivalent.	Appendix E4, 2.1.3		
Location	The hand brake shall be located so that it can be safely operated from the car while the car is in motion and safely operated from the ground while the car is stationary. The hand brake on cars equipped with one hand brake shall be applied on the left side of the car at the B end. The hand brakes on cars equipped with more than one hand brake shall be located as specified in paragraph 9.0 of the base standard.	Appendix E4, 2.2.1		



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Manner of Application	The center of the hand brake shaft on cars equipped with one hand brake shall be located in the longitudinal direction not more than 21 in. from the inside face of the inboard vertical leg of the sill step and shall be not less than 26 in. above the lowest sill step tread nor more than 46 in. above the highest sill step tread. In addition, the center of the hand brake shaft shall be not more than 61 in. above the top of rail.	Appendix E4, 2.2.2	
	The face of the hand brake wheel shall be not more than 6 in. inboard or outboard of the outboard surface of the adjacent vertical side handhold.	Appendix E4, 2.2.3	
	Clearance around the rim of the hand brake wheel shall be not less than 4 in. Clearance between the grip portion of the release lever, if used, throughout its full range of travel and any part of the car shall be not less than 2 1/2 in.	Appendix E4, 2.2.4	
	If the hand brake application is such that the requirements of paragraph 2.2.4 can be met only with hand brakes having short hand brake release levers or only with long release levers, but not both, the car shall be marked adjacent to the hand brake in 1 1/2 in. high letters "SHORT (LONG) RELEASE LEVER BRAKE ONLY."	Appendix E4, 2.2.5	
	The hand brake housing shall be securely fastened. The hand brake application, including bolt hole pattern, shall conform to MSRP Section E, Standards S-475 and S-401. Hand brake mounting brackets may be welded to pads applied to the tank or tank jacket.	Appendix E4, 2.3.1	
	The hand brake chain shall conform to the requirements of Standard S-475, but in any event shall have minimum working load of 5,875 lb and minimum proof test of 11,750 lb.	Appendix E4, 2.3.2	
Sill Steps	Hand brake rods shall be not less than 3/4 in. diameter.	Appendix E4, 2.3.3	
Dimensions	There shall be four sill steps.	Appendix E4, 3.1	
	Sill steps shall conform to the requirements of Standard S-2042. Minimum usable length of tread shall be not less than 18 in.	Appendix E4, 3.2.1	
	Sill steps shall be of steel not less than 1/2 in. thick and not less than 4 in. wide and shall be provided with a slip-resistant surface.	Appendix E4, 3.2.2	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Sill Steps	Sill steps shall have sufficient treads such that the top tread is not more than 21 in. below the lowest adjacent horizontal side handhold, if the car is so equipped. If there are no horizontal side handholds, sill steps shall have sufficient treads such that the top tread is not more than 21 in. below the walking surface of the transverse end running board. Sill step treads shall be spaced not more than 21 in. apart. The clear depth above the entire usable length of all sill step treads shall be not less than 8 in., and the clear width of the lowest sill step tread shall be not less than 6 in. for both loaded and empty conditions with the trucks rotated to simulate the maximum curvature specified for the uncoupled car.	Appendix E4, 3.2.3 Appendix E4, 3.2.4	
Location	One sill step shall be applied near each end of each side of the car. The sill steps shall be located in the longitudinal direction such that the inside face of the outboard vertical leg of the sill step is no more than 2 in. inboard of the inside surface of the outboard side handhold. The inside face of the inboard vertical leg of the sill step shall be not less than 16 in. from the inboard side of the outboard side handhold. In the transverse direction, the outside edge of any sill step tread shall be not more than 6 in. inboard or outboard of the inside surface of the adjacent side handholds. With the exception of the side handholds, side ladder, and side safety railings and their supports, hand brake, bell crank, hand brake chain, sheave wheels, sheave wheel brackets, and brake levers, no part of the car below 66 in. above the top of the rail shall extend further than 6 in. outboard of the outboard edge of the lowest sill step tread. The outside edge of any sill step tread shall be not more than 4 in. inboard of any car structure at or below the transverse end running board in the area between the side handholds. The lowest tread shall be not more than 17 in. above the top of rail.	Appendix E4, 3.3.1 Appendix E1, 3.3.2 Appendix E1, 3.3.3	
Manner of Application	Sill steps shall be securely fastened.	Appendix E4, 3.4	
Side Handholds	There shall be eight vertical side handholds, two at each corner on each side of the car.	Appendix E4, 4.1	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Dimensions	Side handholds shall conform to the requirements of Standard S-224 and shall be of solid steel not less than 1 in. diameter or pipe of 1 1/4 in. nominal pipe size with Schedule 40 minimum wall thickness. Minimum clearance shall be 2 in., preferably 2 1/2 in.	Appendix E4, 4.2.1	
	Side handholds shall have an uninterrupted span between the upper and lower clearance points.	Appendix E4, 4.2.2	
	When applied, elective vertical handholds adjacent to the outboard vertical side handholds shall conform to the requirements of Standard S-224, shall be of steel not less than 3/4 in. diameter, shall have clearance not less than 2 in., preferably 2 1/2 in., and shall have clear length not less than 8 in.	Appendix E4, 4.2.3	
Location	Two vertical handholds, one at either end of each sill step, shall be applied.	Appendix E4, 4.3.1	
	The inside surface of the outboard vertical handhold shall be not more than 14 in. from the inside surface of the nearest end handhold. The clear opening between the inside surfaces of the vertical handholds and their supports shall be not less than 18 in. The width over the outside surfaces of the vertical handholds shall be not more than 30 in.	Appendix E4, 4.3.2	
	The clearance points of the bottom end of the vertical handholds shall be not more than 42 in. above the top of rail, and the clearance points of the top end shall be not less than 33 in. above the adjacent walking surface of the transverse end running board.	Appendix E4, 4.3.3	
Manner of Application	Side handholds shall be securely fastened.	Appendix E4, 4.4	
End Handholds	There shall be four end handholds, one near each side on each end of the car.	Appendix E4, 5.1	
Dimensions	Handholds shall be of steel not less than 3/4 in. diameter and shall conform to the requirements of Standard S-224. Minimum clear length shall be 16 in. Minimum clearance shall be 2 in., preferably 2 1/2 in.	Appendix E4, 5.2	
Location	The end handholds shall be oriented horizontally and located not more than 45 in. above the top of rail.	Appendix E4, 5.3.1	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Manner of Application	The clearance points of the outboard end of the end handholds shall be not more than 14 in. from the inside surface of the outboard side handholds.	Appendix E4, 5.3.2	
Transverse End Running Boards	End handholds shall be securely fastened.	Appendix E4, 5.4	
Dimensions	There shall be two transverse end running boards, one on each end of the car.	Appendix E4, 6.1	
	End running boards shall conform to the requirements of Standard S-226. The running board shall have uniform slip-resistant surfaces and shall be of construction to provide sufficient clear opening to permit elimination of accumulated snow and ice.	Appendix E4, 6.2.1	
	The running boards shall have a minimum width not less than 10 in. anywhere along their length. End running boards shall have a transverse length not less than 110 in. and shall be centered on the car.	Appendix E4, 6.2.2	
	At each end, the running board shall be not less than 18 in. wide. The 18 in. width shall be maintained for a length of 12 in., or the running board shall taper from 18 in. to the narrowest width over a length not less than 24 in.	Appendix E4, 6.2.3	
	Transverse end running boards shall be continuous across the end of the car and may be made up of several pieces secured to mounting brackets.	Appendix E4, 6.2.4	
Location	Where conventional draft gears or cushioning devices having less than 6 in. longitudinal coupler travel in buff are used, the outside edge of the end running boards shall extend no farther from the end of the car than the striker or end of the center sill. Where draft gears or cushioning devices having 6 in. or greater longitudinal coupler travel in buff are used, the outside edge of the end running boards shall extend no more than 6 in. beyond the striker or end of the center sill with the cushioning device (if used) at full buff. The inboard edge of the end running board shall be no more than 1 in. outboard of the inboard edge of the horizontal end running board safety railing at any point.	Appendix E1, 6.3.1	
	The ends of end running boards shall not be outboard of, and shall be not more than 2 in. inboard from, the outboard surface of the sides of the car directly below the running board ends.	Appendix E1, 6.3.2	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
	Minimum vertical clearance above the end running board, measured from the walking surface of the end running board, shall be not less than 5 in. No part of the car end or fixture on the car end above the end running board and less than 84 in. above the walking surface of the end running board, other than the side handholds and side handhold mounting brackets, shall extend closer to the outboard edge of the end running boards than 7 in.	Appendix E4, 6.3.3	
	Clearance between a vertical surface extending outboard up and down from the outside surface of the end running board safety railing and any part of the car more than 24 in. but less than 84 in. above the walking surface of the end running board shall be not less than 15 in., preferably 18 in. Clearance between a vertical surface extending outboard down from the outside surface of the end running board safety railing and any part of the car 24 in. or less above the walking surface of the end running board shall be not less than 10 in.	Appendix E4, 6.3.4	
Manner of Application	The end running boards shall be securely fastened with not less than 3/8 in. diameter fasteners.	Appendix E4, 6.4	
Horizontal End Running Board Safety Railings	There shall be two horizontal end running board safety railings. One horizontal end running board safety railing shall be applied on each end of the car above the transverse end running board.	Appendix E4, 7.1	
Dimensions	Horizontal end running board safety railings shall conform to the requirements of Standard S-224 and shall be of solid steel not less than 1 in. diameter or pipe of 1 1/4 in. nominal pipe size with Schedule 40 minimum wall thickness. Minimum clearance shall be 2 1/2 in.	Appendix E4, 7.2	
Location	The height from the top of the end running board safety railing to the walking surface of the end running board shall be not less than 36 in. nor more than 54 in.	Appendix E4, 7.3.1	
	If the safety railings have vertical legs at their ends, the inboard surface of the vertical legs shall be not more than 8 in. from the inside surface of the inboard side handhold. If the safety railings do not have vertical legs at their ends, the clearance points at the ends of the safety railings shall be not more than 8 in. from the inside surface of the inboard side handhold.	Appendix E4, 7.3.2	
Manner of Application	Horizontal end running board safety railings shall be securely fastened.	Appendix E4, 7.4.1	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
	Horizontal end running board safety railings shall be supported at each end. Safety railings not interrupted at ladders shall be supported at a minimum of two intermediate locations along their horizontal span. The spacing between centerlines of any two supports shall be not less than 24 in. Mounting brackets shall be not less than 3/8 in. thick and not less than 2 in. wide and may be welded to the tank, head shield, or tank jacket. Brackets welded to head shields or jackets less than 3/8 in. thick or to the tank shall be welded to reinforcing pads on the tank, head shield, or jacket. When the mounting brackets are welded to reinforcing pads on the jacket, there shall be supports attached to the tank located beneath the jacket pads.	Appendix E4, 7.4.2	
	When end running board safety railings are interrupted at the ladders, each portion of the safety railings shall be supported at each end and at a minimum of one intermediate location. The 24 in. minimum spacing does not apply between intermediate supports and the ladder stiles.	Appendix E4, 7.4.3	
Side Safety Railings	There shall be two side safety railings.	Appendix E4, 8.1	
Dimensions	Side safety railings shall conform to the requirements of Standard S-224 and shall be of pipe of 1 1/4 in. nominal pipe size with Schedule 40 minimum wall thickness. Minimum clearance shall be 2 1/2 in.	Appendix E4, 8.2	
Location	There shall be side safety railings on each side of the car, extending between the body bolsters. Car structure or a continuation of the safety railings shall be applied between the end running boards and the body bolsters. The top of the side safety railing shall be not more than 45 in. above the top of rail. The inboard surface of the side safety railing shall be not less than 51 in. from the centerline of the car in the transverse direction.	Appendix E4, 8.3	
Manner of Application	Side safety railings shall not be interrupted or obstructed between body bolsters except at safety railing support brackets, hand brakes, and operating cabinets. Side safety railings shall be supported at the ends and operating cabinets if interrupted, and at intervals as required, not to exceed 10 ft between support centerlines. Each section of side safety railing shall be securely fastened at not less than one location. Welding is permitted on the support brackets and associated parts. Welding is not permitted on side safety railings except as provided in the base standard.	Appendix E4, 8.4	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Ladders	Two ladders shall be applied to any tank car with top fittings used in loading or unloading, one at each end of the car. Ladders are not required if all fittings used in loading and unloading the tank are accessible from ground or end running boards.	Appendix E4, 9.1	
Dimensions	Ladder stiles shall be of steel not less than 3/8 thick and not less than 2 in. wide or other section of equivalent strength and stiffness. Ladder treads shall be of steel not less than 3/4 in. diameter and shall conform to the requirements of Standard S-224. Minimum clear length shall be 14 in. Minimum clearance shall be 2 in., preferably 2 1/2 in.	Appendix E4, 9.2	
Location	The ladder treads shall be oriented horizontally with the actual distance between them not more than 19 in. The actual distance between the top ladder tread and the top of the longitudinal running board shall be not more than 19 in. The actual distance between ladder treads and from the top ladder tread to the top of the longitudinal running board shall be uniform within a maximum variation of 2 in. The horizontal end running board safety railing may be used as a ladder tread.	Appendix E4, 9.3.1	
Manner of Application	The bottom ladder tread shall be not more than 19 in. above the walking surface of the end running board.	Appendix E4, 9.3.2	
	Ladder treads shall be securely fastened to the ladder stiles.	Appendix E4, 9.4.1	
	Ladders shall be securely fastened at their top and bottom ends.	Appendix E4, 9.4.2	
	Ladder support brackets shall be securely fastened. Mounting brackets shall be not less than 3/8 in. thick and not less than 2 in. wide and may be welded to the tank, head shield, or tank jacket. Brackets welded to head shields or jackets less than 3/8 in. thick or to the tank shall be welded to reinforcing pads on the tank, head shield, or jacket. When the mounting brackets are welded to reinforcing pads on the jacket, there shall be supports attached to the tank located beneath the jacket pads.	Appendix E4, 9.4.3	
	On each end of the car, each ladder tread shall be not more than 3 in. inboard of a plane extending from the lowest ladder tread to the highest ladder tread. Each ladder tread shall be not more than 3 1/2 in. inboard or outboard of the ladder treads immediately above and below it. No ladder tread shall be more than 3 in. outboard of the lowest ladder tread.	Appendix E4, 9.4.4	
Ladder Transition Handholds	There shall be a transition handhold extending up from each side of each end ladder.	Appendix E4, 10.1	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Location	When the clearance plate limit to which the car is designed permits, the top surface of each transition handhold shall be not less than 40 in. and not more than 44 in. above the walking surface of the longitudinal running board. If the clearance limit does not permit a 44 in. height, the top surface of each transition handhold shall be not more than 4 in. below the maximum height permitted by the clearance limit. The clear width between the transition handholds adjacent to the ladder shall be not less than 18 in. and not more than 24 in. The inside surface of each transition handhold shall not infringe on the clear width of the ladder treads and shall be not more than 5 in. outboard in the transverse direction from the clearance point of the adjacent ladder tread. The inside surface of each transition handhold shall be not more than 2 in. outboard of the adjacent edge of the running board. When longitudinal running board safety railings are applied, the adjacent transition handhold extending from the ladder shall terminate within 4 in. of the safety railing. Each transition handhold shall extend not less than 12 in. in the longitudinal direction from the end of the running board.	Appendix E4, 10.3.1 Appendix E4, 10.3.2	
Manner of Application	Transition handholds shall be securely fastened at their ends.	Appendix E4, 10.4	
Longitudinal Running Boards	Longitudinal running boards shall be applied to any tank car with top fittings used in loading or unloading the tank. Longitudinal running boards are not required if all fittings used in loading and unloading the tank are accessible from the ground or end running boards.	Appendix E4, 11.1	
Dimensions	The longitudinal running boards shall conform to the requirements of Standard S-226. The running boards shall have uniform slip-resistant surfaces and shall be of construction to provide sufficient clear opening to permit elimination of accumulated snow and ice. Longitudinal running boards shall be not less than 7 in. wide. At the ladders, there shall be a section of running board not less than 18 in. in the transverse direction and not less than 12 in. in the longitudinal direction.	Appendix E4, 11.2.1 Appendix E4, 11.2.2	
Location	Longitudinal running boards shall extend from the operating platform to the end ladders on each end of the car. When running boards are not located on the centerline of the car, the running boards at the two ends of the car may be on the same side of the car or located at diagonal corners.	Appendix E4, 11.3.1	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
	The facing surfaces of running boards and adjacent operating platform boards that are nominally at the same height shall not be farther apart than 3/8 in., and their walking surfaces shall not vary in height by more than 1/4 in.	Appendix E4, 11.3.2	
	When running boards and adjacent operating platform boards are not at the same height, they shall conform to the requirements of the base standard.	Appendix E4 11.3.3	
	When running boards are not adjacent to the nearest operating platform boards, the ends of the running boards shall be not more than 2 in. in the longitudinal direction from the outboard surface of the operating platform safety railing.	Appendix E4, 11.3.4	
Manner of Application	Longitudinal running boards shall be securely fastened to the car with not less than 3/8 in. diameter fasteners. Mounting brackets shall be not less than 3/8 in. thick and not less than 2 in. wide and may be welded to reinforcing pads on the tank or tank jacket. When the mounting brackets are welded to reinforcing pads on the jacket, there shall be supports attached to the tank located beneath the jacket pads.	Appendix E4, 11.4	
Longitudinal Running Board Safety Railings	One running board safety railing shall extend along the outboard edge of all longitudinal running boards that are less than 24 in. wide.	Appendix E4, 12.1	
Dimensions	Running board safety railings shall conform to the requirements of Standard S-224 and shall be of pipe of 1 1/4 in. nominal pipe size with Schedule 40 minimum wall thickness. Minimum clearance shall be 2 1/2 in.	Appendix E4, 12.2	
Location	When the clearance plate limit to which the car is designed permits, the top of the running board safety railings shall be not less than 40 in. and not more than 44 in. above the walking surface of the running boards. If the clearance limit does not permit a 44 in. height, the top of the running board safety railings shall be not more than 4 in. below the maximum height permitted by the clearance limit. In any event, the height of the safety railings above the walking surface of the running boards shall be not less than 24 in. If the clearance limit does not permit safety railings 24 in. high or greater, safety railings shall not be applied and the running boards shall be not less than 24 in. wide.	Appendix E4, 12.3.1	
	The planes extending down from the inboard surfaces of the longitudinal running board safety railings shall be not more than 2 in. from the outboard edge of the running boards.	Appendix E4, 12.3.2	
	Longitudinal running board safety railings shall extend from the ladder transition handholds at the ends of the car to the operating platform safety railing.	Appendix E4, 12.3.3	



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Manner of Application	Longitudinal running board safety railings shall be supported at each end and at intermediate locations as required such that spans between support centerlines do not exceed 10 ft. The ends of the safety railing shall be securely fastened to the operating platform, operating platform safety railing, or platform supports at one end; to the running board or running board supports at the other end; and/or to separate mounting brackets. Where the safety railings are supported by mounting brackets separate from the operating platform, operating platform safety railing, operating platform supports, running boards, or running board supports, the safety railings and their supports shall be securely fastened to the mounting brackets, which shall be attached to metal pads welded to the tank shell or jacket. When the mounting brackets are welded to reinforcing pads on the jacket, there shall be supports attached to the tank located beneath the jacket pads.	Appendix E4, 12.4.1 Appendix E4, 12.4.2	
Operating Platform	Operating platform(s) shall be applied to any tank car with top fittings used in loading or unloading the tank. An operating platform is not required if all fittings used in loading and unloading the tank are accessible from the ground or end platform. The working area of the operating platform is that portion of the platform that extends from the closest transverse section of the safety railing to the center of the top loading or unloading fittings and/or manways and for an equal distance toward the other end of the car beyond the fittings and/or manways.	Appendix E4, 13.1.1 Appendix E4, 13.1.2	
Dimensions	The operating platform boards shall be considered running boards under Standard S-226 and shall conform to the design, manufacturing, and test requirements of Standard S-226 applicable to running boards. The platform boards shall have uniform slip-resistant surfaces and shall be of construction to provide sufficient clear opening to permit elimination of accumulated snow and ice. Platform boards shall be not less than 7 in. wide and shall extend to within 2 in. of the planes extending down from the inboard surfaces of the operating platform safety railing and running board safety railing.	Appendix E4, 13.2	
Location	Operating platforms shall be located such that they provide access to all fittings used in the top loading or top unloading of the tank and/or manways.	Appendix E4, 13.3	



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Manner of Application	The operating platform boards shall be securely fastened to the car with not less than 3/8 in. diameter fasteners. Mounting brackets shall be not less than 3/8 in. thick and not less than 2 in. wide and may be welded to reinforcing pads on the tank or tank jacket. When the mounting brackets are welded to reinforcing pads on the jacket, there shall be supports attached to the tank located beneath the jacket pads.	Appendix E4, 13.4	
Operating Platform Filler Plates (Optional)	When filler plates are applied, there shall be one filler plate at the inboard edge of each longitudinal operating platform board.	Appendix E4, 14.1	
Dimensions	Filler plates shall be of steel or other material of equivalent strength and shall have uniform slip-resistant surfaces. Flat filler plates shall be not less than 1/4 in. thick, and filler plates with a longitudinal flange shall be not less than 11 gauge (0.12 in.) thick.	Appendix E4, 14.2.1	
	When filler plates do not extend for the full length of the platform boards, there shall be sloped transitions from the ends of the filler plates to the surface of the tank or jacket. The slope shall be not more than 30° from the horizontal.	Appendix E4, 14.2.2	
Location	Filler plates shall be oriented horizontally and shall be applied for the full length of the working area of the operating platform boards.	Appendix E4, 14.3.1	
	The horizontal space between adjacent sections of filler plates, and between filler plates and the adjacent operating platform boards, shall not exceed 3/4 in. The distance between the tank, tank jacket, or mounting pad and the closest edge of the filler plate, measured perpendicular to the tank, shall not exceed 3/4 in.	Appendix E4, 14.3.2	
	The difference in height of the top surfaces of adjacent sections of filler plates and of the top surfaces of the filler plates and the adjacent operating platform boards shall not exceed 1/4 in.	Appendix E4, 14.3.3	
Manner of Application	Filler plates applied to mounting brackets shall be applied with not less than 3/8 in. diameter fasteners. Filler plate mounting brackets, and filler plates applied directly to the car without separate mounting brackets, shall be welded to pads on the tank or tank jacket. Filler plates shall be supported at spacings not greater than 30 in.	Appendix E4, 14.4	
Operating Platform Vertical Toe Boards (Optional)	When toe boards are applied, there shall be one toe board along the outboard edge of each platform board.	Appendix E4, 15.1	
Dimensions	Toe boards shall be of any combination of material grade, thickness, and support structure that will prevent more than 1/4 in. horizontal deflection in response to a 100 lb horizontal load applied at any point along the toe board.	Appendix E4, 15.2.1	



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Safety Appliances for Tank Cars with End Ladders and
Low Side-Mounted Hand Brakes

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FRA F6180.161 N

ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Location	The height from the top of the operating platform boards to the top of the toe boards shall be not less than 4 in. nor more than 6 in. The height above the top of the operating platform boards to the bottom of the toe boards shall be no greater than 1/4 in. Toe boards shall extend vertically for the full length and width of the working area of the operating platform boards except at openings in the operating platform safety railing. Toe boards shall not be applied at openings in the operating platform safety railing.	Appendix E4, 15.2.2 Appendix E4, 15.3.1 Appendix E4, 15.3.2	
Manner of Application	Toe boards shall be securely fastened with not less than 3/8 in. diameter fasteners at mounting brackets, operating platforms, or safety railings. Toe boards shall be supported at not less than two locations at spacings no greater than 34 in.	Appendix E4, 15.4	
Operating Platform Safety Railing	One operating platform safety railing shall be applied surrounding the working area of the operating platform. Intermediate safety railings are optional. When applied, they shall be applied at those locations of the working area of the operating platform where there is an operating platform safety railing.	Appendix E4, 16.1.1 Appendix E4, 16.1.2	
Dimensions	Operating platform safety railings, including intermediate safety railings, shall conform to the requirements of Standard S-224 and shall be pipe of 1 1/4 in. nominal pipe size with Schedule 40 minimum wall thickness. Minimum clearance shall be 2 1/2 in. Openings in the safety railing at running boards, as measured between the vertical portions of the safety railing, shall be not less than 18 in. and not more than 24 in. Openings in the safety railing other than those at running boards, as measured between the vertical portions of the safety railing, shall be no wider than 36 in. When horizontal intermediate safety railings are applied, the top of the intermediate safety railing shall be not more than 21 in. above the top of the operating platform surface.	Appendix E4, 16.2.1 Appendix E4, 16.2.2 Appendix E4, 16.2.3 Appendix E4, 16.2.4	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Location	Safety chains, when applied, shall be of steel and shall have link thickness not less than 1/4 in. Safety chain fastening components shall be securely fastened with fasteners not less than 1/4 in. diameter. The length of safety chains shall not exceed by more than 4 in. the minimum chain length that will enable the chain to be attached at its free end when pulled tight. The operating platform safety railing shall enclose the operating platform and all fittings used in loading and unloading the tank. Safety railings at running boards shall extend vertically down to the running board or running board supports. When the clearance plate limit to which the car is designed permits, the top of the operating platform safety railing shall be not less than 40 in. and not more than 44 in. above the walking surface of the operating platform. If the clearance limit does not permit a 44 in. height, the top of the operating platform safety railing shall be not more than 4 in. below the maximum height permitted by the clearance limit. Openings in the safety railing other than those at the running boards shall have safety chains fastened to each side of the opening. Safety chains shall not be applied at openings in the safety railing at running boards. Safety chains shall be applied in line with the top safety railing only. No intermediate safety chains shall be applied.	Appendix E4, 16.2.5 Appendix E1, 16.3.1 Appendix E4, 16.3.2 Appendix E4, 16.3.3	
Manner of Application	Operating platform safety railings shall be supported at or near every corner of the operating platform and at intervals as required such that the spans between support centerlines do not exceed 10 ft. The ends of the safety railing shall be securely fastened to the operating platform or platform supports. Where the safety railing is supported by mounting brackets separate from the operating platform or operating platform supports, it shall be securely fastened to the mounting brackets, which shall be attached to metal pads welded to the tank shell or jacket. When the mounting brackets are welded to reinforcing pads on the jacket, there shall be supports attached to the tank located beneath the jacket pads.	Appendix E4, 16.4.1 Appendix E4, 16.4.2	
Clearance at End of Car	No part of the car above the end sill more than 30 in. from the longitudinal centerline of the car, except the transverse end running boards or horizontal end handholds, shall extend beyond the striker or end of the center sill with the draft gear or cushioning device (if used) at full buff. No other part of the car end or fixtures on the end above the end sill and less than 84 in. above the walking surface of the end running board, other than the exceptions herein noted, shall extend beyond the outer face of the striker or end of the center sill.	Appendix E4, 17.0	
Uncoupling Devices	There shall be a minimum of two uncoupling devices that conform to the requirements of the base standard.	Appendix E4, 18.0	



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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
Uncoupling Devices	Uncoupling devices and their application shall conform to MSRP Section S, Part III, Standard S-129, S-131, S-133, or S-134; or Specification M-961. One uncoupling device shall be applied at the left side of the B end of the car (BL corner) and one at the right side of the A end of the car (AR corner). Under all operating conditions, the outside surface of the uncoupling device handles shall be not more than 12 in. closer to the car center than the inside surface of the adjacent side handholds. There shall be not less than 2 in. clearance, preferably 2 ½ in., around the uncoupling device handles for a length not less than the lowest 4 in. of straight handles and not less than 4 in. in the grip portion of handles having clearly defined grip portions. The lower ends of the handles shall be not less than 12 in. nor more than 15 in. below the top surface of the uncoupling device at the device support and not less than 15 in. above the top of rail. Uncoupling device mounting brackets shall be securely fastened to the car with fasteners not less than 5/8 in. diameter.	S-2044 6.1 (Base Standard) S-2044 6.2 S-2044 6.3 S-2044 6.4 S-2044 6.5	
Stenciling	Car initial, numbers and built date stenciled on the car.	49 CFR Part 215.301	
Reflectorization.	Reflectorization must meet all requirements. Attached Drawing	49 CFR Part 224	
Coupler Height	Verify coupler height 31½ inch minimum, 34½ inch maximum.	49 CFR Part 231.31(a)(1)	
Power Brakes	Except for cars equipped with nominal 12-inch stroke (8 ½ and 10-inch diameters) brake cylinders, all cars shall have a legible decal, stencil, or sticker affixed to the car or shall be equipped with a badge plate displaying the permissible brake cylinder piston travel range for the car at Class I brake tests and the length at which the piston travel renders the brake ineffective, if different from Class I brake test limits. The decal, stencil, sticker, or badge plate shall be located so that it may be easily read and understood by a person positioned safely beside the car.	49 CFR Part 232. 103	

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ITEM	Number - Dimensions - Location - Manner of Application	Appendix Reference	Notes
SCT	All equipment ordered on or after August 1, 2002, or placed in service for the first time on or after April 1, 2004, shall have train brake systems designed so that an inspector can observe from a safe position either the piston travel, an accurate indicator which shows piston travel, or any other means by which the brake system is actuated. The design shall not require the inspector to place himself or herself on, under, or between components of the equipment to observe brake actuation or release. A single car air brake test shall be performed on each new car prior to placing or using the car in revenue service.	49 CFR Part 232.305	

- Miscellaneous

Check for any sharp or protruding objects or areas on the equipment that may create a safety concern or personal injury.

Check for potential pinch points at all safety appliance arrangements.
- Digital Photos

General Arrangement Photo Sheet ~ No Deviations Noted (six photos minimum, A & B ends, each corner at 45 degree angle)

Deviation Photo Sheet ~ As many photos as necessary to fully depict, document and illustrate deviations of S-2044 Appendix E4 or CFR Parts (e.g. 215, 224 & 232)