ANNEX 6

SPECIFIC REQUIREMENTS FOR TANKER TRUCKS

1.0	**SCOPE**
1.1	This annexure specifies constructional and functional requirements for Tanker Trucks meant for transporting non-hazardous substances like milk, water etc. necessary for roadworthiness of N category vehicles as defined in IS 14272 amended from time to time.
1.2	Tanker trucks as defined in this standard shall necessarily meet the requirements specified in Part 1 of AIS 163 amended from time to time. Additionally, the vehicles shall meet the requirements specified in this Annexure for those special purpose duty application for which the vehicle is intended to perform.
1.3	Manufacturer may have the option to refer ISO 1496-3 for design and construction
1.4	For tanker mounting requirements, section 6 of AIS 093 Rev 1 (latest version) shall be validated by test agency for compliance.
1.5	Any alteration or modification in already type approved vehicle to build Tanker trucks shall be carried out in accordance with sound engineering practices and in compliance with Central Motor Vehicles Act 1988 and Central Motor Vehicles Rule, 1989, as amended from time to time.
2.0	**REFERENCE**
2.1	ISO 1496-3: 1995 Series 1 freight containers – Specification and testing Part 3: Tank containers for liquids, gases and pressurized dry bulk
2.2	AIS 093 Rev 1: 2015 Code of Practice for Construction and Approval of Truck Cabs, Truck Bodies and Trailers
3.0	**DEFINITION**
	In addition to the definitions available in Part 1 of this standard, following definition shall apply to Tanker trucks.
3.1	**"Approval of a Vehicle"** - The approval of Tanker trucks with regard to its special function as defined in Clause No. 3.2 of this Annexure.
3.2	**"Tanker Trucks"** are specialized vehicles designed to transport non-hazardous substances like milk, water etc., These vehicles come in various sizes and designs to accommodate different types of liquids.
4.0	**APPLICATION FOR TYPE APPROVAL** – The application for type approval of a vehicle type shall be submitted by the vehicle / appliance manufacturer / Truck Body Builder along with at least the details given in Appendix 1 to this annexure

5.0	**SPECIFIC REQUIREMENTS**
5.1	Tanker trucks shall be Special Purpose Vehicle with following specifications:
5.1.1	Maximum speed shall be 60 kmph.
5.1.2	The tank materials shall be suitable for, or adequately protected from, the cargo and the environment in which the tank may be operated. Due regard should be given to the problems of variation in ambient temperature, corrosive atmospheres, the possibility of uncontrolled cargo release in fire etc.,
5.1.3	When insulation is provided, the design and construction shall be such that the insulation will in no way impinge on the specified requirements nor interfere with the proper function of the tank fittings.
5.1.4	When heating or refrigeration is provided, due consideration shall be given to the safety of the tank and its contents. Suitable safeguards shall be provided to avoid the development of excessive temperature and stresses
5.1.5	Tanker shall meet External restraint (longitudinal), Internal restraint (longitudinal), Internal restraint (lateral), Stability ratio as specified in clause 6.0 of this annexure.
5.1.6	The vehicle shall be loaded to its technically permissible maximum mass distributed between the axles as declared by the vehicle manufacturer. Where provision is made for several arrangements of the mass on the axles, the distribution of the maximum mass between the axles shall be such that the mass on each axle shall not exceed maximum permissible mass for each axle.
5.1.7	Vehicle shall be fitted with reverse parking alert system as per the requirements defined in AIS 145 amended from time to time
5.1.8	TCD / TCCD requirements shall be compliant with IS 12222: 2011 as amended from time to time
5.1.9	Timber shall not be permitted in body construction to ensure structural integrity and occupant safety
5.1.10	All surfaces of the access system designed for walking, climbing, stepping or crawling shall be slip-resistant (including any device or structural component designed as part of an access system)
5.1.11	Handrails / Handholds complying to IS/ISO 2867: 2011 shall be provided in non-hazardous tankers, for better accessibility.
5.1.12	Tank shall be provided with manholes or other openings to allow for complete internal inspection. The size of manholes shall be a minimum of 500 mm in diameter and shall be determined by the need for men and machines to enter the tank to inspect, maintain or repair the inside.
5.1.13	Specific requirements for baffles

5.1.13.1	The tank shall be suitably baffled to prevent surge when the vehicle is braking, cornering or accelerating.
5.1.13.2	The baffles shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purposes.
5.1.13.3	The tank shall be mounted on not less than three cross members to counteract stresses caused by chassis flexing and shall be so secured that it can be removed.
5.2	**Provisions for consideration for CMVR requirements exemption** –
	Testing Agency may only grant exemption(s) if the manufacturer demonstrates that the vehicle cannot meet the below requirements due to its special purpose.
	a) External Projection as per IS 13942 provided there shall not be any projection at the rear beyond RUPD or front beyond FUPD or sides beyond SUPD / LUPD in vehicle actual running condition on road
	b) Installation of lighting and light-signalling devices as per AIS-008 (Rev 1)
	c) Spray Suppression System as per AIS-013 (Rev.1)
	d) Rear Under Run Protection Device as per IS 14812
	e) Vehicle Lateral Protection Side SUPD as per IS 14682
	f) Approval of Retro-Reflecting Devices as per AIS-057 (Rev.1)
	g) Constant Speed Fuel consumption test as per IS 11921 exempted
	h) Retro-Reflective marking installation as per AIS 090.
6.0	**TANKER TEST REQUIREMENTS**
6.1	**External restraint (longitudinal)**
6.1.1	This test shall be carried out to prove the ability of a tank to withstand longitudinal external restraint under dynamic conditions while moving on roads, which implies accelerations of 2g.
6.1.2	The tank shall be loaded in such a way that the combined mass of tank and test load is equal to R. Tank container under test. unless otherwise stated, shall be loaded with a suitable fluid/dry bulk to achieve the test load or loading specified.
6.1.3	A force of 2R shall be applied horizontally to the tank in both forward & rearward direction in the anchor points
6.1.4	On completion of the test, the tank shall not show leakage or permanent deformation or abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied. Computer simulation method may be used to check the strength of tanker vehicle and its mountings.

6.2	**Internal restraint (longitudinal)**
6.2.1	Separate tests shall be carried out to prove the ability of the tank to withstand the effects of the inertia of the tank contents both on the tank itself and the tank-to-framework connections under the conditions of longitudinal acceleration of 2g.
6.2.2	The tank shall be loaded in such a way that the combined mass of the tank and test load is equal to R. Tanks which are not structurally symmetrical with respect to internal divisions or tank-to framework connections shall be tested at both ends.
6.2.3	On completion of the tests, the tank shall not show leakage or permanent deformation or abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied Computer simulation method may be used to check the strength of tanker vehicle and its mountings.
6.3	**Internal restraint (lateral)**
6.3.1	Separate tests shall be carried out to prove the ability of the tank to withstand the effects of the inertia of the tank contents both on the tank itself and the tank-to-framework connections under the conditions of lateral acceleration of 2g.
6.3.2	The tank shall be loaded in such a way that the combined mass of the tank and test load is equal to R.
6.3.3	On completion of the tests, the tank shall not show leakage or permanent deformation or abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied Computer simulation method may be used to check the strength of tanker vehicle and its mountings.
6.4	**Pressure test**
6.4.1	The requirement of this test shall apply to tank vehicles specifically designed to carry gases or liquids under pressure, to prove the ability of the tank to withstand the specified internal pressure. Where practicable, it shall be carried out last if other tests are to be performed, but before the addition of thermal insulation, if any. Shot-blasting or other preparation normally required prior to applying lining or insulation need not be performed prior to this test.
6.4.2	The tank shall be hydraulically tested. If the liquid tank is provided with compartments, in addition to hydraulic testing, each compartment shall be tested with the adjacent compartments empty and at atmospheric pressure. The test pressure shall be measured at the top of the tank or compartment with the tank in its normal position. The test pressure shall be maintained for as long as is necessary to enable a complete examination of the tank and its fittings to be made, but in any case for not less than 30 min. Relief devices, where fitted, shall be rendered inoperative or

	removed for the purpose of this test. The pressure at which the tank is tested shall be selected with regard to the intended use of the tank.
6.4.3	During the test the tank shall show no leakage. On completion of the test, the tank shall not show leakage or permanent deformation or abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.
	NOTE: Pressure test may be exempted for the vehicles for tanker applications (water, milk etc.) where the internal pressure is almost equal to the atmospheric pressure (non-pressurized tankers) and tanker itself is not designed to hold pressure.
6.5	**Stability ratio** - It should never be more than one. The usual recommended stability ratio is 0.7 to 0.9. The stability ratio can be calculated as below:
	Stability ratio = 2h x Tan 23°/ b
	moment W.R.T. ground - 2h x Tan 23°
	h = CG ht. Under laden condition in m
	b = Rear outer tyres center distance in m
6.5.1	Stability of fire tenders shall be validated by physical method or simulation method or by calculation as agreed by test agencies.
7.0	**STATUTORY PLATE**
	Each appliance shall be clearly and permanently marked with the following information:
	Manufacturer’s name, or trade-mark, if any;
	Year of manufacture.

APPENDIX 1 TO ANNEX 6

INFORMATION TO BE SUBMITTED AT THE TIME OF APPROVAL OF TANKER TRUCKS

Sl. No.	General	Details
1.0	**Tanker trucks manufacturer details**	
1.1	Name and address of the manufacturer / Truck body builder	
1.2	Name of Base model	
1.3	Name of variants, if any:	
1.4	Plant/(s) of manufacturer:	
2.0	**Description of vehicle under test**	
2.1	Vehicle category	
2.2	Vehicle type	
2.3	Truck manufacturer	
2.4	Truck CMVR certificate no	
2.5	Dimensions (mm)	
2.5.1	Length	
2.5.2	Width	
2.5.3	Height	
2.6	Gross vehicle weight	
2.7	Test pressure (if applicable)	
2.8	Maximum allowable working pressure	
2.9	Total cubic capacity of tank	