

الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards Metrology & Quality Organization (SASO)

مشروع مسودة مواصفة

Draft of Standard

إعداد مجموعة عمل مركبات الترحيل (القلابات) التابعة للفريق الفني لمركبات الطرق

Prepared by of the **Tipper Vehicles Working Group** under the **National Technical Committee for Road Vehicles**.

SASO / DS / 33927

مركبات الطرق - المتطلبات العامة للقلابات.

Road Vehicles - General Requirements for Tippers

This document is a draft Saudi Standard circulated for comments. It is, therefore, subject to alteration and modification and may not be referred to as a Saudi Standard until approved by SASO.

هذه الوثيقة مشروع مواصفة قياسية سعودية تم توزيعها لإبداء الرأي والملاحظات بشأنها، لذلك فإنها عرضة للتغيير والتبديل، ولا يجوز الرجوع إليها كمواصفة قياسية سعودية إلا بعد اعتمادها من الهيئة.

TABLE OF CONTENTS

1. SCOPE	2
2. COMPLEMENTARY REFERENCES.....	2
3. TERMS AND DEFINITIONS.....	3
4. GENERAL REQUIREMENTS	5
5. HYDRAULIC SYSTEM.....	9
6. DANGER ZONE.....	10
7. COVERING THE LOAD.....	12
8. ELECREICAL AND CONTROL REQUIRMENTS.....	13
9. LOAD GATE (DOOR).....	15
10. SAFETY REQUIREMENTS	16
11. MARKINGS, LABELING, AND INSTRUCTION MANUAL.....	18
ANNEX A.....	20
REFERENCES	22

1. SCOPE

This standard specifies the general safety and design requirements for tipper bodies mounted on road vehicles of categories N and O, including truck chassis, semi-trailers, and full trailers used for transporting and discharging materials.

2. COMPLEMENTARY REFERENCES

SASO-469 “Motor Vehicles — Dimensions and Weights”

SASO-2910 “TRAILER - GENERAL REQUIREMENTS”

SASO-GSO-42 “Motor Vehicles - General Requirements”

SASO-ISO-20474-6 “Earth-moving machinery — Safety Part 6: Requirements for dumpers”

SASO-ISO-13333 “Earth-moving machinery — Dumper body support and operator's cab tilt support devices”

SASO-ISO-2867 “Earth-moving machinery — Access systems”

SASO-ISO-4413 “Hydraulic fluid power — General rules and safety requirements for systems and their components”

SASO-ISO-4414” Pneumatic Drives and control - General rules and safety requirements for the systems and their components”

SASO-ISO-12100 “Safety of machinery — General principles for design — Risk assessment and risk reduction”

SASO-IEC-60204-1 “Safety of machinery - Electrical equipment of machines – Part 1: General requirements”

NOTE: *Some of the above standards may not fully apply to the scope of this standard, but relevant clauses may be used where applicable.*

3. TERMS AND DEFINITIONS

For the purposes of this document, the following terms and definitions apply:

- 3.1 **Truck:** A motor vehicle intended for carrying goods, or towing a trailer.
- 3.2 **Tractor:** A truck (provided with fifth wheel) designed primarily for drawing a semitrailer and not so constructed as to carry a load other than a part of the weight of the semitrailer
- 3.3 **Trailer:** A vehicle of which, on account of its design, no substantial part of the total weight is supported by the towing vehicle. A semi-trailer with dolly is considered as a trailer
- 3.4 **Semi-trailer:** A trailer which is designed to be coupled to a tractor by fifth wheel and to impose a part of its total weight on the tractor.
- 3.5 **Tipper body:** Container intended for the transport of materials, mounted on a vehicle chassis, of which at least one side allows the load to be discharged.
- 3.6 **Tipper Truck:** An N-category vehicle equipped with a tipper body designed to transport and discharge its load by tilting the body.
- 3.7 **Tipper Trailer \ Semi-Trailer:** An O-category trailer or semi-trailer equipped with a tipper body designed to transport and discharge its load by tilting the body.
- 3.8 **Maximum (gross) vehicles weight (GVW):** Weight of the vehicle loaded with the maximum load specified by the manufacturer
- 3.9 **Stabilizer:** A structural component fitted to a tipper vehicle, designed to enhance stability during tipping operations by reducing lateral movement and preventing rollover, typically consisting of heavy-duty steel members with articulated joints, shafts, and bushes that allow controlled movement and provide for lubrication.
- 3.10 **Subframe:** Structural framework mounted between the chassis and the tipping body, designed to support the body, distribute loads, and accommodate tipping forces while protecting the chassis from stress and deformation.
- 3.11 **Hatch:** Closable opening made in the rear door or in one of its leaves.
- 3.12 **Unloading gate:** A movable panel at the rear or side of the tipper body that opens to allow the load to discharge.
- 3.13 **Rear door:** Rear part of the body that can be opened for unloading purpose.
- 3.14 **Associated machine:** Supplementary unit attached to the body whose operation is linked to it, for example: a chip spreader.

- 3.15 **Maximum working pressure:** Maximum hydraulic operating pressure of the equipment as defined by the body manufacturer.
- 3.16 **Total height:** The vertical distance between the road surface and the uppermost point of the vehicle.
- 3.17 **Total width:** The horizontal distance, measured perpendicularly to the longitudinal axis of the vehicle, between the outermost protrusions on both sides.
- 3.18 **Maximum operating load of the equipment:** Maximum technical load permitted for the equipment, compatible with vehicle stability (including safety factor), within the limits defined by the body manufacturer.
- 3.19 **Danger zone:** The zone inside and/or around a tipper body within which the presence of an exposed person subjects that person to a risk to their safety or health.
- 3.20 **Exposed person:** Person wholly or partially within a danger zone.
- 3.21 **Operator:** Person responsible for operating, and/or maintaining the Tipper body.
- 3.22 **Control Station:** The location from which the operator controls the tipping functions of the tipper body.

4 GENERAL REQUIREMENTS

- 4.3.1 The overall dimensions, axle loads, and mass limits shall comply with SASO-469
- 4.3.2 The design of the tipper body shall take into consideration the vehicle or trailer/Semi-trailer Gross Vehicle Weight Rating (GVWR), ensuring that the body dimensions, materials, and structural configuration do not exceed the allowable limits associated with the rated GVWR and SASO-469
- 4.3.3 Tipper trucks shall comply with the applicable technical regulations and standards issued by the Gulf Cooperation Council Standardization Organization (GSO) for vehicles, in accordance with SASO GSO 42, in addition to all applicable national technical regulations and legislation in force in the Kingdom of Saudi Arabia.
- 4.3.4 Where the tipper body is installed on an O-category trailer or semi-trailer, the trailer or semi-trailer shall comply with SASO 2910.
- 4.3.5 The tipping body shall be designed in accordance with the principles of SASO-ISO-12100 for relevant but non-significant hazards not addressed in this document.
- 4.3.6 The tipper body shall be equipped, with an onboard weighing system to indicate the total load and assist the operator in verifying that the load does not exceed the maximum permitted load or axle load limits specified in SASO-469.
- 4.3.7 All hoses, installations and wiring harnesses shall be neatly arranged and securely fixed, and shall not rub against or interfere with moving parts.
- 4.3.8 All operating handles and valves shall be installed for convenient operation, with clear operating indication markings provided in visible locations.
- 4.3.9 All fasteners shall be treated for anti-corrosion (rust prevention); exposed ferrous metal parts shall be corrosion-protected.
- 4.3.10 The welding quality of welded components shall ensure structural integrity, durability, and safety under the intended service conditions.
- 4.3.11 Weld seams shall be smooth, uniform, and continuous, with proper fusion and penetration. They shall be free from defects such as burn-through, incomplete fusion, lack of penetration, cracks, porosity, slag inclusions, undercut, and overlap.

- 4.3.12 All welding slag, spatter, and sharp edges shall be completely removed. Welded joints shall be properly finished and, where necessary, treated to prevent corrosion.
- 4.3.13 The tipping body shall be designed to ensure stability against overturning of the vehicle or trailer throughout all positions of the tipping stroke, under the normal conditions of use defined by the body manufacturer.
- 4.3.14 The tipper body, subframe, and associated components shall be protected by a suitable painting or coating system to provide effective corrosion resistance, durability, and long-term performance under normal operating conditions.
- 4.3.15 The tipping body shall be designed to ensure stability against overturning of the vehicle or trailer throughout all positions of the tipping stroke, under the normal conditions of use defined by the body manufacturer.
- 4.3.16 The tipping body shall be designed so as not to generate dangerous lateral movements on the vehicle under road-going conditions. For example, guiding or retaining means between the body and the body subframe may be installed.
- 4.3.17 The center of gravity of the loaded body in category N shall be compatible with the technical limits defined by the manufacturer of the vehicle on which it is installed.
- 4.3.18 Each tipper body shall be equipped with a stabilizer and shall meet requirements in Annex A.
- 4.3.19 If the maximum tipping angles are adjustable, the adjustment shall be protected from modification by the operator.
- 4.3.20 The Tipper body on a semi-trailer shall be designed such that the load on the fifth-wheel coupling remains positive at all positions during tipping.
- 4.3.21 Where the design of the Tipper body requires the operator to access elevated points (e.g., for tarpaulin operation, load inspection, or cleaning), access systems including steps, ladders, platforms, and handholds shall comply with the relevant requirements of SASO-ISO-2867, with anti-slip surface treatment and adequate handhold/guardrail provision according to the applicable fall height.
- 4.3.22 The tipper body shall have no sharp corners or edges.
- 4.3.23 The sub-frame shall be continuous and strong. The tipping pivots and ram cross-member shall be built into the sub-frame, not mounted separately.

- 4.3.24 The Tipper body shall have no holes, cracks, or openings in the floor or walls through which loose material can escape.
- 4.3.25 The tipper body shall have a permanent mark on both side walls showing the maximum load level. The mark shall not be easy to remove or change. The load shall not exceed this level.
- 4.3.26 In case a protective element is added to the top edge of the tipper body wall, it shall not exceed 10 cm in height. It shall not be used to increase the volume of the tipper. It shall not prevent the cover from closing fully over the body. See **Figure 1** for more explanation about protective element is added to the top edge of the tipper body wall.

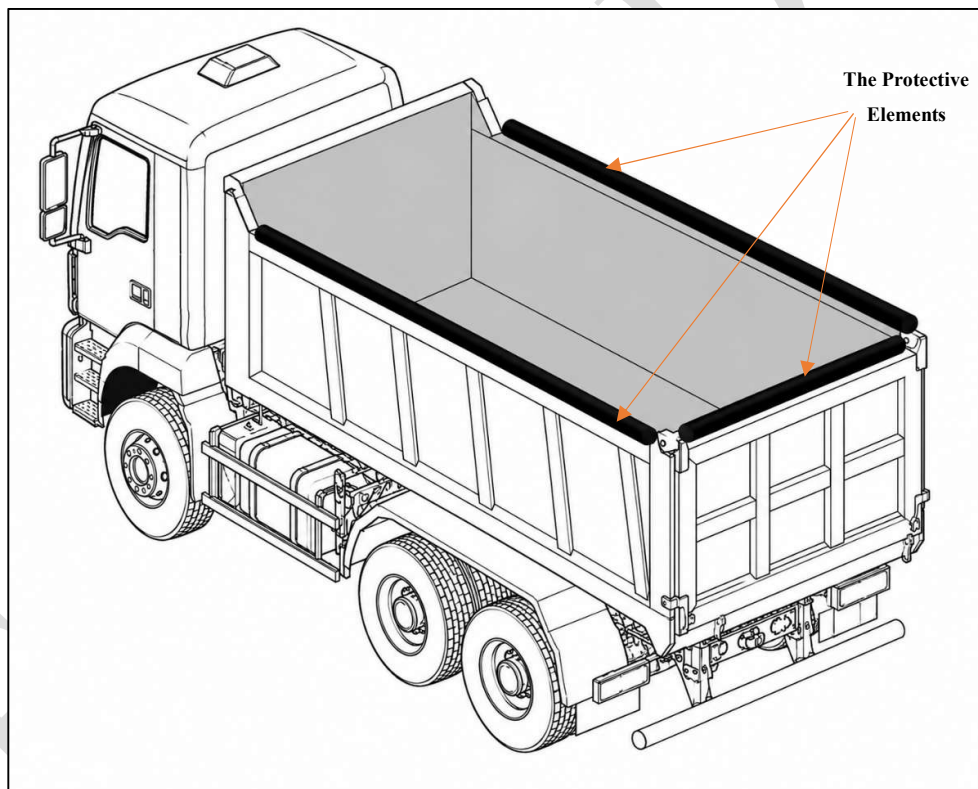


Figure 1 — Protective element added to the top edge of the tipper body wall

NOTE 1: The illustration shown in Figure 1 is for clarification and guidance purposes only. It is not intended to prescribe or imply any specific design, construction, or configuration for tipper truck.

- 4.3.27 A tipper truck carries heavy hard materials (e.g. rocks) that pose a higher impact risk to the cab shall have a cab shield or canopy fixed permanently at the front of the body. It shall cover the full body width, protect the driver from material that falls or shifts during loading or sudden braking, and shall not block the driver's rear view or field of vision. The cab shield or canopy shall cover the full operator cabin. See Figure 2.

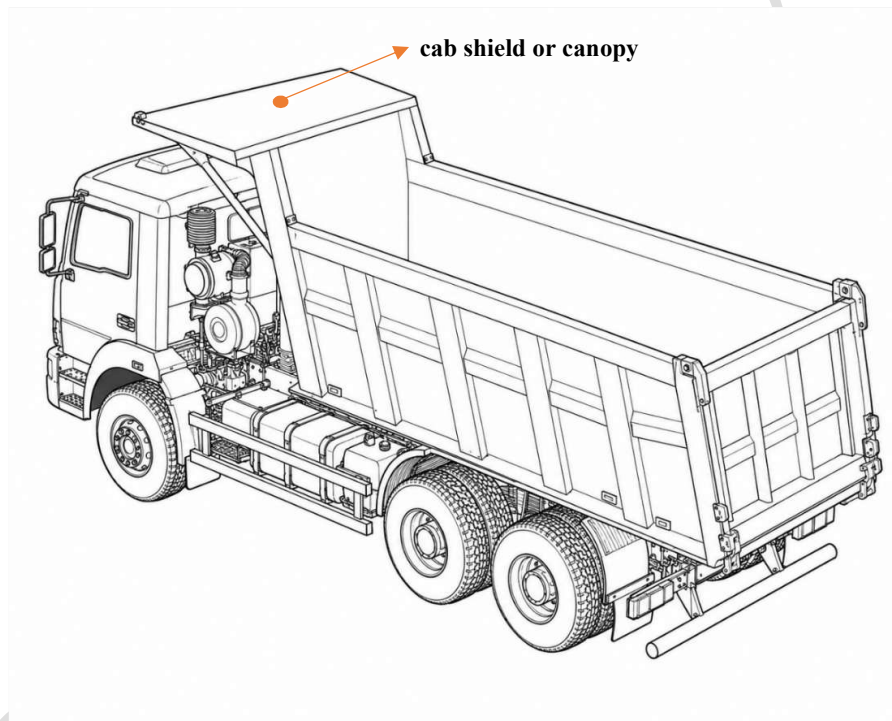


Figure 1: Cab shield or canopy for tipper truck

NOTE 2: The illustration shown in Figure 2 is for clarification and guidance purposes only. It is not intended to prescribe or imply any specific design, construction, or configuration for tipper truck.

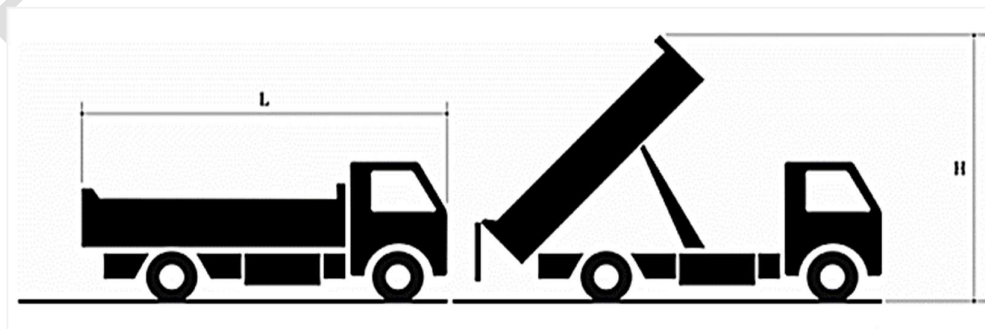
5 HYDRAULIC SYSTEM

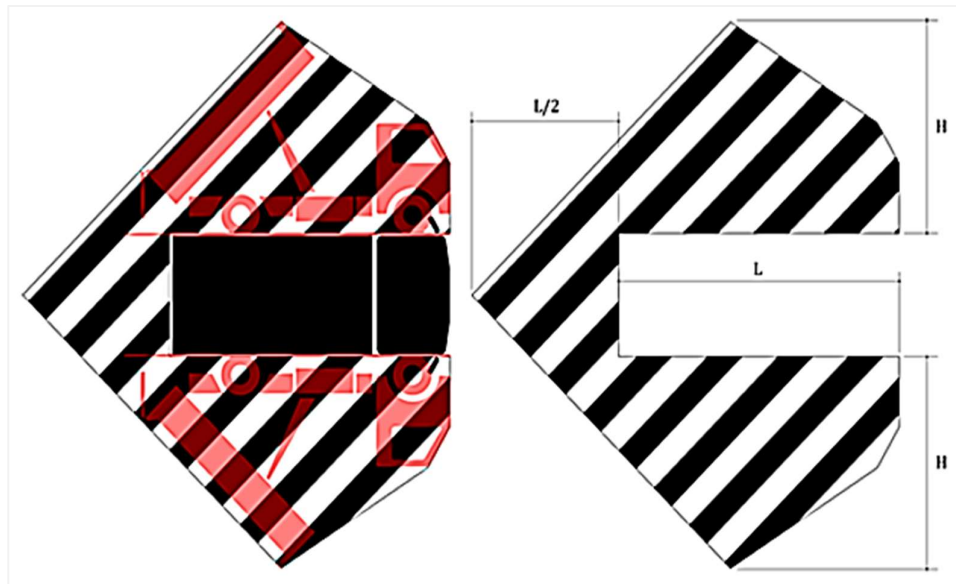
- 5.3.1 The hydraulic system shall comply with SASO-ISO-4413.
- 5.3.2 The connecting parts of hydraulic system shall have sufficient rigidity and strength to ensure normal operation.
- 5.3.3 Every hydraulic tipping system ram must be fitted with hydraulic protection; to prevents the raised body from dropping down suddenly in the event of a hydraulic failure.
- 5.3.4 The hydraulic system shall be provided with a safety relief valve, and should preferably include a filter.
- 5.3.5 A check valve (non-return valve) shall be installed between the hydraulic pump and the directional control valve to prevent reverse flow of hydraulic oil from damaging the pump.
- 5.3.6 The connecting components of the hydraulic cylinder shall have sufficient rigidity and strength to ensure the normal operation of the hydraulic cylinder.
- 5.3.7 All hydraulic hoses and fittings shall conform to recognized standards, to ensure safety, durability, and compatibility with the tipper hydraulic system
- 5.3.8 The hydraulic oil tank shall be kept away from heat sources. Where heat sources cannot be avoided for structural reasons, reliable thermal insulation protection measures shall be taken.
- 5.3.9 The hydraulic oil tank shall have sufficient strength and rigidity to avoid significant effects from vibration during vehicle travel.
- 5.3.10 The hydraulic oil tank should be separate from the vehicle structure and detachable, and vibration-damping devices (Such as Anti-vibration pads) shall be installed between the tank and the vehicle.
- 5.3.11 The hydraulic oil tank should be provided with a liquid level indicator and it shall be easy to observe and clearly showing the maximum and minimum and the 'minimum' level permitted by the system shall be permanently marked.

- 5.3.12 Tipper trucks shall be equipped with a lifting limit device which, in the event of failure of the hydraulic system limit device, ensures lifting safety and avoids cylinder pull-out or vehicle rollover.
- 5.3.13 Quick-connect (quick-release) couplings shall be selected to ensure that upon disconnection, they automatically seal the hydraulic oil at both the upstream and downstream ends.
- 5.3.14 Each hydraulic tipping cylinder shall be factory tested at a minimum of 1.5 times its rated maximum working pressure prior to installation.
- 5.3.15 Hydraulic oil shall be suitable for continuous operation at ambient temperatures without excessive thinning, foaming, or loss of lubricating performance. Where calculated or measured oil temperature may exceed the oil manufacturer's maximum recommended operating temperature, an oil cooler may be fitted if needed.
- 5.3.16 The hydraulic oil tank shall be permanently labeled indicating the oil type/grade to be used, positioned adjacent to the filler point and visible during servicing.

6 DANGER ZONE

- 6.1 The danger zone is determined by the total height that the raised tipper body can reach at its maximum angle (H), measured from the ground, and by the length of the vehicle fitted with the body (N) or of the trailer fitted with the body (O). See Figure 1 for the measurement of H and L . It extends a distance H laterally on both sides of the vehicle or trailer and $L/2$ towards the rear, as described in Figure 2.





- 6.1.1 The Tipper body shall be designed so as to allow the operator to see the danger zone from the control station at the beginning of the tipping movement. When direct visibility is not achievable, indirect visibility shall be obtained by the installation of devices such as mirrors or a closed-circuit television system (CCTV)
- 6.1.2 The tailgate swing zone shall be kept clear of all persons during tipping by visual Warnings near tailgate.
- 6.1.3 The manufacturer shall identify the danger zone in the operator's manual and by means of safety signs affixed to the vehicle where appropriate and visible for the operator in control area. Where multiple danger zones exist due to different operating modes, each danger zone shall be identified and documented.

7 LOAD COVERING MECHANISM

- 7.3 Each tipper body shall be provided with an effective method for covering the load, designed to prevent spillage, dust emission, and loss of load during transportation.
- 7.4 A tarpaulin cover shall be used for the load covering mechanism, and it shall be heavy-duty, weather-resistant, and suitable for protecting materials and equipment from weather and dust. It shall be waterproof, UV-resistant, and tear-resistant. Equivalent materials that comply with the requirements of this standard are acceptable
- 7.5 The covering mechanism shall remain securely closed under all normal operating conditions, including vibration, vehicle acceleration, braking, cornering and wind loads encountered during road transport.

7.6 Manual Covering Method

- 7.6.1 The tipper body shall be equipped with lashing points designed such that the number of anchor points, their position, and their strength are suitable for securing the load.
- 7.6.2 The Tarpaulins used for coverings shall be provided with reinforced attachment points along edges and corners for secure fastening and tie-down.
- 7.6.3 The cover shall not extend beyond the body outline or drag on the ground during travel.
- 7.6.4 The cover shall be sized to fit the body. A cover that does not fully close over the body shall not be used.

7.7 Automated Covering Method

- 7.7.1 The covering system shall not interfere with the tipping mechanism. It shall not be possible to raise the body while the cover is in the closed position unless an interlock prevents damage to the cover.
- 7.7.2 The covering mechanism shall stop automatically at the fully opened and fully closed positions without imposing excessive loads on the drive system.
- 7.7.3 Electrically actuated covering method: the opening and closing time of the motor-driven cover shall not exceed 60 s.

- 7.7.4 The rated operating voltage of a motor-driven cover device shall be consistent with the vehicle operating voltage, and it shall operate normally under a 20% voltage fluctuation.
- 7.7.5 The drive mechanism shall include overload protection to prevent damage in the event of obstruction or excessive resistance.
- 7.7.6 The covering mechanism shall be capable of repeated opening and closing without damage or deterioration that affects its intended function.
- 7.7.7 Moving parts of the automated covering mechanism shall be designed or guarded to minimize crushing, shearing and entanglement hazards.
- 7.7.8 The controls for operating the load covering mechanism shall be designed or protected against unintended operation while the vehicle is in motion.

8 ELECTRICAL AND CONTROL REQUIREMENTS

- 8.1 The electrical installation shall comply with SASO-IEC-60204-1
 - 8.1.1 The main electrical supply shall be provided with a circuit breaker to isolate the circuit and its components when the Tipper body is not in use or during maintenance operations. It shall be accessible and lockable.
 - 8.1.2 The installation of wiring on the Tipper body and in the chassis shall be ensured by rigid fasteners and a positioning that does not risk damaging the electrical conductors (pinching, sharp edge contact, heat source...). Cables shall be protected against the risk of short-circuit by appropriate insulators and protective covers.
 - 8.1.3 All electrical connections between the tractor unit and trailer \ semi-trailer shall be made using waterproof, sealed connectors designed to withstand repeated connection/disconnection and exposure to water, dust, and road contaminants.
 - 8.1.4 An overcurrent protection device shall be placed as close as possible to the power source (battery) and at any location necessary for the protection of the circuit, components and operator.

- 8.1.5 The electrical system of the Tipper body shall be sized according to the maximum electrical consumption of its components. For category N, it shall also comply with the bodybuilding Reference of the vehicle manufacturer on which the Tipper body is installed.
- 8.1.6 The control unit shall be designed to prevent inadvertent or unintended operation.
- 8.1.7 The Tipper body shall be equipped with at least one control station located in the cab (fixed or wired) or a radio remote control.
- 8.1.8 Where more than one control unit is provided (e.g. a fixed control station and a remote control), only one control station shall be enabled at any one time. A lockable mode selector shall be provided to select the active control station. Changing between control stations shall not cause any unintended movement of the tipper body.
- 8.1.9 The in-cab control unit shall be designed and located such that tipper body movements cannot be commanded from outside the cab.
- 8.1.10 When a remote-control station is installed, it shall be designed such that:
- 8.1.11 The remote-control unit shall enable the operator to control the tipper body from a position outside the danger zone while maintaining adequate visibility of the tipping operation.
- 8.1.12 Loss or interruption of the communication signal between the remote-control unit and the receiver shall immediately stop all movement of the tipper body.
- 8.1.13 At the start of each motorized movement of the tipper body, an audible and visual warning signal shall be activated to alert persons who may be within the danger zone.
- 8.1.14 The audible signal emitted shall have a minimum level of 75 dB, for a minimum duration of 5 seconds or corresponding to the total duration of the movement.
- 8.1.15 The visual warning signal shall be clearly visible to persons approaching or located within the danger zone.

- 8.1.16 Where the hydraulic pump is driven via a Power Take-Off (PTO) unit, the PTO engagement status shall be indicated to the driver by a dedicated warning light in the cab, illuminated whenever the PTO is engaged. The tipping control unit shall only permit body-raising operation when the PTO is correctly engaged and the parking brake is applied.
- 8.1.17 The control system shall be designed such that the Power Take-Off (PTO) cannot be engaged unless the parking brake is applied and the transmission is in neutral. The system shall further prevent or warn against vehicle propulsion (forward/reverse gear engagement) while the PTO remains engaged, to protect the hydraulic system components and prevent unintended tipping body movement during travel.

9 UNLOADING GATE (DOOR)

- 9.1 The loads discharge gates shall be equipped with an effective sealing system to ensure that no material leakage specially for loose bulk materials occurs (e.g. sand) during transport on highways.
- 9.2 The sealing shall be durable, properly fitted, and capable of maintaining containment under all normal operating conditions.
- 9.3 Gaps between the body and any load gate shall be minimized to prevent leakage of the intended load during transportation.
- 9.3.1 Each load gate shall be equipped with a locking device that securely retains the load gate in its intended position and prevents inadvertent opening or movement during transportation and tipping operations.
- 9.3.2 Where removable locking pins are used to secure a load gate, the pins shall be permanently attached to the tipper body or load gate, or otherwise retained to prevent loss.
- 9.3.3 Where manual operation is provided, the load gate shall be designed to be opened by the operator from a position outside the danger zone.
- 9.3.4 The load gate and its locking mechanism shall withstand the loads encountered during transportation and tipping without loss of function or unintended opening.

10 SAFETY REQUIREMENTS

- 10.1 The tipper body shall be equipped with an audible and visual warning device inside the cab. The device shall alert the driver whenever the body is not in its fully lowered position or whenever the tipping mechanism is in operation.
- 10.1.1 The tipper body shall be equipped with an audible and visual warning device outside the cab. The device shall alert persons in the danger zone whenever the body is not in its fully lowered position or whenever the tipping mechanism is in operation.
- 10.1.2 The vehicle shall be prevented from exceeding a travel speed of 15 km/h until the tipper body is fully lowered.
- 10.1.3 The warning indicator required under Clauses 10.1 & 10.2 shall be activated by a mechanical or electronic position sensor independent of hydraulic system pressure, so that the indicator remains functional and accurate even in the event of hydraulic system failure or leakage.
- 10.1.4 The tipper body shall incorporate safety features to prevent unintended or uncontrolled unloading of the load during transportation, normal vehicle operation, and tipping.
- 10.1.5 If the maximum tipping angles are adjustable, the adjustment shall be protected from modification by the operator.
- 10.1.6 Tipper bodies shall be equipped with support devices for adjustment and maintenance operations, complying with SASO-ISO-13333
- 10.1.7 A first-aid kit shall be provided on the tipper vehicle and shall be readily accessible at all times. Personnel operating or working around the tipper shall be trained and competent in the proper use of the first-aid kit.
- 10.1.8 Each tipper body shall be provided with a suitably rated fire extinguisher permanently mounted at a fixed, easily accessible location on the vehicle. The fire extinguisher shall comply with the applicable fire safety standards and regulatory requirements.

- 10.1.9 The Tipper body shall be equipped with an inclination (tilt) monitoring device that continuously measures the lateral (side-to-side) and longitudinal inclination of the chassis prior to and during the tipping operation. The device shall provide the operator with an audible and visual alarm when the lateral inclination exceeds the maximum safe value defined by the vehicle/body manufacturer. The manufacturer shall specify this maximum permissible lateral inclination in the instruction manual.
- 10.1.10 The trip handle or release mechanism for the rear door/tailgate shall be positioned and arranged such that, when actuated during the tipping operation, the operator remains clear of the door's swing path and of any material discharge zone.
- 10.1.11 Where the design of the Tipper body obstructs the driver's direct view to the rear, the vehicle shall be equipped with a reverse signal alarm audible above the surrounding ambient noise level, automatically activated when reverse gear is selected. The installation of a rear-view camera system is recommended as an additional means of reducing blind-spot risk.

11 MARKINGS, LABELING, AND MANUALS

11.3 The tipper body shall be provided with permanent, legible, and durable safety signs and warning labels in accordance with SASO ISO 3864-2.

11.1 Safety signs and warning labels shall be affixed at appropriate locations to warn of residual hazards. The safety signs and warning labels shall include the below risks, where applicable:

- Ensuring the area of danger zone around the vehicle is clear before tipping.
- Verifying that there are no overhead obstructions before raising the tipper body.
- No working beneath a raised body unless the maintenance support device is engaged.
- Crushing, impact, and trapping hazards associated with body and load gate movement.
- Unloading on inclined or uneven ground.
- Warning against tipping in high wind.

11.2 Explicit warning that no person shall work beneath a raised tipper body unless the maintenance prop/support device required under Clause 10.7 is correctly engaged, and that the hydraulic system shall never be relied upon as the sole means of supporting the raised body.

11.3 Explicit warning that no person shall stand, work, or place any part of the body within the movement area of the load gate during opening, closing, or tipping operations due to the risk of impact, trapping, or crushing.

11.4 The Tipper body shall be fitted with a permanent warning label, visible from the control station, instructing the operator to verify the absence of overhead obstructions (including power lines) before raising the body.

11.5 Any hazard or risk not covered by this standard shall be communicated to the user by a suitable warning sign or label. The manufacturer shall determine the signal word, text, and location based on the risk severity, and declare it in the instruction manual.

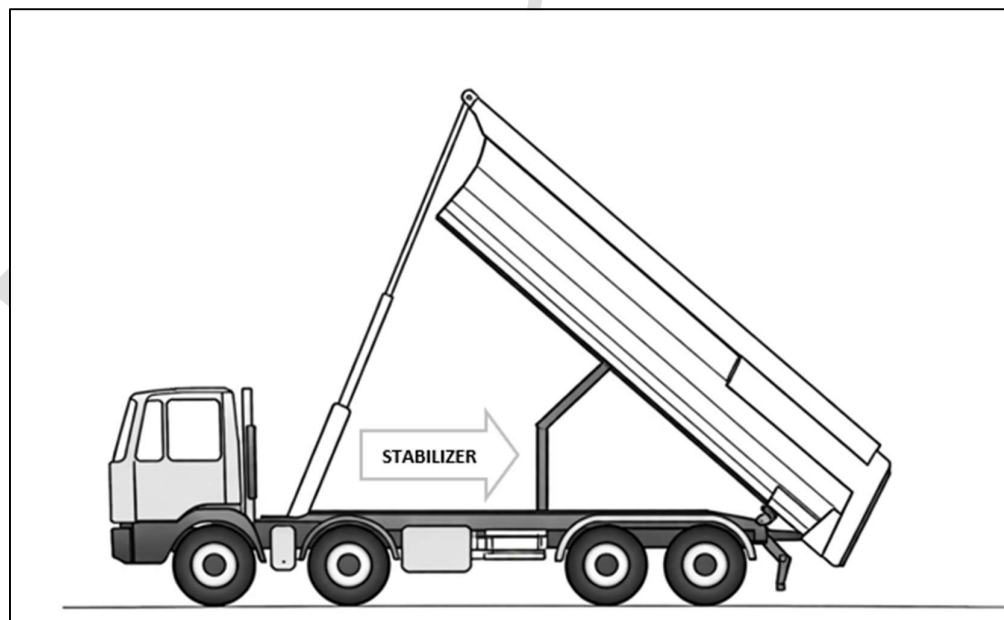
- 11.6 All warning labels and safety signs shall be in both Arabic and English languages.
- 11.7 A complete instruction manual shall be provided with the tipper body. It shall include at minimum:
- Safe operating conditions, including maximum payload, intended materials, and road travel requirements.
 - Instructions for safe use of the control station.
 - Requirement to tip on firm level ground only, with all wheels in contact with the ground.
 - Requirement to stay at the controls throughout tipping and stop immediately if instability is observed.
 - Requirement to ensure no person is in the danger zone before tipping.
 - Prohibition of carrying persons on the body or vehicle.
 - Load securing methods.
 - Maintenance and servicing procedures, to be carried out with the body empty and stationary.
 - Required personal protective equipment.
 - Required access means for maintenance.
 - Warning that unauthorised modifications may create additional hazards.

ANNEX A

(Normative)

Requirements for Structural Stabilizer

- A.1 constructed from heavy-duty steel, incorporating moving joints made of high-tensile steel shafts and bushes, and provided with appropriate greasing provisions (See Annex A).
- A.2 The stabilizer pivot spacing shall be as wide as possible to improve the vehicle's resistance to sideways tipping.
- A.3 The stabilizer mounting points on both the body and the chassis shall be reinforced to carry the loads imposed during tipping and transit.
- A.3 The location and number of stabilizers shall be determined by the body manufacturer based on the intended use of the tipper, the body length, the body weight, and the expected operating conditions. The manufacturer shall document the design basis for stabilizer placement.
- A.4 A stabilizer is not required for tipper trucks fitted to category N1 vehicles

**Figure A.1 — illustration for stabilizer**

ANNEX B

(normative)

Guideline for warning labels and safety signs

- B.1 Table A.1 lists the minimum required safety signs and warning labels for tipper bodies. All signs shall comply with clause 11 and shall be in Arabic and English in accordance
- B.2 Any residual risk or hazard identified by the manufacturer that is not covered by this standard shall be communicated to the user by a suitable warning sign or label. The manufacturer shall determine the appropriate signal word, label text, and location based on the nature and severity of the risk.

Table B.1 — Minimum Required Safety Signs and Warning Labels

#	Risk	Suggested Label Text (English)	Suggested Label Text (Arabic)	Location
1	Working under raised body	DANGER: DO NOT WORK UNDER RAISED BODY UNLESS MAINTENANCE PROP IS ENGAGED	خطر: لا تعمل تحت الهيكل المرفوع إلا بعد تثبيت دعامة الصيانة	Both sides of body near prop
2	Overhead obstructions including power lines	WARNING: CHECK FOR OVERHEAD OBSTRUCTIONS BEFORE RAISING BODY	تحذير: تحقق من خلو المنطقة العلوية من العوائق قبل رفع الهيكل	Control station
3	Persons in danger zone during tipping	WARNING: ENSURE AREA AROUND VEHICLE IS CLEAR BEFORE TIPPING	تحذير: تأكد من خلو المنطقة المحيطة بالمركبة قبل بدء عملية التفريغ	Control station
4	Impact and trapping during opening and closing of rear door or side panels	WARNING: KEEP CLEAR OF DOOR DURING OPENING AND CLOSING	تحذير: ابتعد عن الباب أثناء الفتح والإغلاق	Unloading gate
5	Crushing upon lowering of the tipper body	DANGER: KEEP CLEAR — BODY LOWERING	خطر: ابتعد — الهيكل في حالة هبوط	On both sides of body
6	Unloading on inclined or uneven ground.	WARNING: TIP ON LEVEL GROUND ONLY	تحذير: قم بعملية التفريغ على أرض مستوية	Control station
7	Operating tipper body during high wind	WARNING: DO NOT TIP IN HIGH WIND CONDITIONS	تحذير: لا تقم بعملية التفريغ في حالة الرياح الشديدة	Control station

REFERENCES

- Vehicle Standards Bulletin 6 (VSB6) V3.2: National Code of Practice Heavy Vehicle Modifications
- NF R17-109:2020 “Road vehicles - Hydraulically actuated dump trucks - General requirements and safety measures”
- QC/T 222:2025 “Dump truck”
- 29 CFR Part 1926 Subpart O “Motor Vehicles, Mechanized Equipment, and Marine Operations”

FOR STUDY