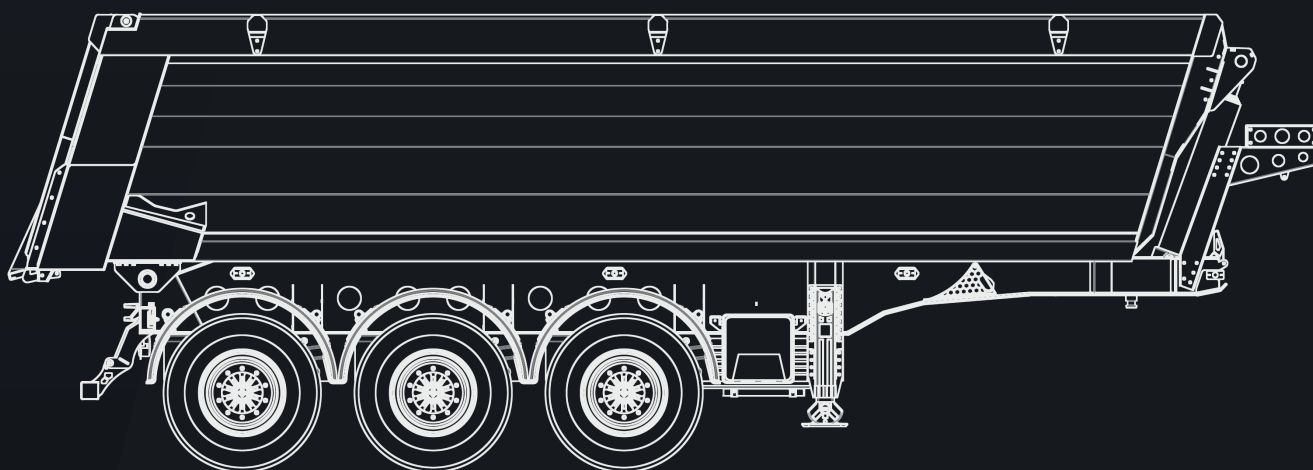


OPERATING & MAINTENANCE INSTRUCTIONS

3-AXLE SEMI-TRAILERS

TIPPER · TANKER · SILO · SIDE LIFTER
FLATBED · MIXER — TYPE STU3



FOREWORD

Thank you for choosing an STU 3-axle semi-trailer. It is built on a robust 3-axle chassis and fitted with the body that suits your work – tipper, tanker, silo, side lifter, flatbed or concrete mixer – to carry your goods safely and economically, day after day.

This manual is an integral part of the semi-trailer. It explains how the semi-trailer is built, how to couple, drive, load and operate it correctly, and how to keep it in a safe, roadworthy condition throughout its service life. Read it carefully before you use the semi-trailer for the first time and make sure that every driver, operator and workshop technician who works with it has read and understood the chapters that apply to them.

Your semi-trailer complies with the European whole-vehicle type-approval requirements of Regulation (EU) 2018/858 and the UN Regulations listed in its Certificate of Conformity (CoC). Safe operation, however, also depends on the people who use it. The instructions, warnings and limits in this manual exist to protect you, other road users and your investment.

If anything in this manual is unclear, or if your semi-trailer is fitted with equipment that is not described here, contact your STU dealer or STU directly before using it.

We wish you many safe and profitable kilometres.

STU Treyler Dorse İthalat İhracat Ltd. Şti.

Keep this manual with the semi-trailer. Store it in the document holder or in the cab of the towing vehicle so that it is always available. If the semi-trailer is sold, hired out or transferred, hand this manual over with it.

ABOUT THIS DOCUMENT

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DOCUMENT

Document number: UM-02
Title: User Manual – 3-Axle Semi-Trailers – Tipper, Tanker, Silo, Side Lifter, Flatbed and Mixer
Edition: 10/2026, Revision 00
Language: English (United Kingdom) – original instructions
Applies to: Type STU3 – tipper, tanker, silo, side-lifter, flatbed and mixer bodies

TABLE 0.1 – REVISION HISTORY

REVISION	DATE	DESCRIPTION OF CHANGE
00	10/2026	First edition of the restructured manual; supersedes UM-02 (Tipper), UM-03 (Tanker) and DA-15 (Mixer).

The information in this manual reflects the design of the semi-trailer at the date of publication. As part of continuous product development, STU reserves the right to change the design, equipment and specifications of its products without prior notice and without obligation to modify vehicles already delivered. Illustrations may show optional equipment or differ in detail from your semi-trailer; they are intended to explain principles.

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ABOUT THIS MANUAL

This chapter explains who this manual is written for, how it is organised and how the safety information in it is presented.

1.1 SCOPE

This manual applies to STU 3-axle semi-trailers of the following types and variants:

TABLE 1.1 – TYPES AND VARIANTS COVERED BY THIS MANUAL

TYPE	VARIANT	AXLES	TYPICAL USE
STU3	Tipper semi-trailer, 24 m ³	3	Earth, aggregates, demolition waste and other bulk goods
STU3	Tanker semi-trailer	3	Liquids – fuels, chemicals, food liquids – according to the tank code
STU3	Silo semi-trailer	3	Dry bulk powders and granules (cement, fly ash, lime, plastics) with pneumatic discharge
STU3	Side-lifter semi-trailer	3	Self-loading and unloading of ISO containers
STU3	Flatbed semi-trailer, 13.6 m	3	Palletised and general cargo, steel, timber, building materials
STU3	Concrete-mixer semi-trailer	3	Ready-mixed concrete; drum driven by an on-board engine

All bodies share the same type-approved 3-axle chassis (type STU3). Chapters 1 to 5 and 12 to the end apply to all bodies. Each body has its own operating chapter: tipper – Chapter 6; tanker – Chapter 7; silo – Chapter 8; side lifter – Chapter 9; flatbed – Chapter 10; mixer – Chapter 11. Optional equipment is marked (*if fitted*).

The semi-trailer may also be fitted with components from third-party suppliers – axles, braking system, landing legs, king pin, tipping cylinder, valves and fittings, cranes, mixer drum drive and engine. Their own operating and maintenance instructions are part of the semi-trailer documentation and must also be observed. If those instructions contradict this manual on a component-specific point, the component manufacturer's instructions take precedence.

1.2 TARGET GROUPS

TABLE 1.2 – TARGET GROUPS

TARGET GROUP	REQUIRED QUALIFICATION	RELEVANT CHAPTERS
Owner / operator (fleet owner)	Responsible for organising safe use, training and maintenance	All chapters
Driver	Valid driving licence for the vehicle combination (category C+E or national equivalent); instructed on this semi-trailer	2 to 11
Body operator	Instructed in the operation of the body (tipping, filling and discharging, crane operation, mixer operation) and its danger zones; for dangerous goods: ADR training certificate	2, 6 to 11
Workshop technician	Trained commercial-vehicle technician; brake, hydraulic and electrical work only by qualified specialists	2, 12 to 14

1.3 SIGNAL WORDS AND SYMBOLS

Safety information in this manual is graded according to ISO 3864-2. The signal word tells you how serious the hazard is. Always read the complete safety message, not only the signal word.

DANGER



DANGER indicates a hazardous situation which, if not avoided, **will** result in death or serious injury.

WARNING



WARNING indicates a hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION



CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE



NOTICE indicates information considered important but not hazard-related – for example a risk of damage to the semi-trailer, the load or the environment.



Information provides useful tips, cross-references and background that help you work more efficiently.



Environment marks instructions that help you prevent pollution and dispose of materials correctly.

Other conventions used in this manual:

- Numbered steps (1, 2, 3 ...) must be carried out in the order shown.
- Bullet points list items that do not need to follow a particular order.
- Boxes ☐ in checklists are intended to be ticked off during an inspection.
- Item numbers in illustrations are referenced in the text, for example (*Figure 3.1, item 4*).
- Values marked with a highlighted field such as **value** are specific to the individual semi-trailer and must be taken from its statutory plate or Certificate of Conformity.

1.4 UNITS AND ABBREVIATIONS

All dimensions are given in millimetres (mm), masses in kilograms (kg) or tonnes (t), pressures in bar (1 bar = 100 kPa) and torques in newton metres (N·m), unless stated otherwise.

TABLE 1.3 – ABBREVIATIONS

ABBREVIATION	MEANING
ABS	Anti-lock braking system
CoC	Certificate of Conformity
CoG	Centre of gravity
EBS	Electronic braking system
GVW	Gross vehicle weight (technically permissible maximum laden mass)
LC	Lashing capacity (EN 12195)
PPE	Personal protective equipment
PREV	Park release emergency valve
RSS	Roll stability support
VIN	Vehicle identification number
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
PTO	Power take-off
SWL	Safe working load
HLP	Hydraulic oil with anti-wear additives (ISO 6743-4 HM)

SAFETY

02

Most serious accidents with these semi-trailers happen during tipping, filling and discharging, crane operation and coupling – and when overhead power lines are overlooked. Read this chapter in full before you work with the semi-trailer.

2.1 INTENDED USE

The STU3 semi-trailer is intended exclusively for the road transport of the goods for which its body is designed, within the technically permissible masses and dimensions stated on the statutory plate and in the Certificate of Conformity, and for the loading and unloading functions of that body (tipping, pneumatic discharge, liquid discharge, container handling, concrete mixing and discharge) as described in this manual. Tankers and silos may only carry the substances permitted by their tank code, approval certificate and – for dangerous goods – the ADR certificate of approval.

Intended use also includes:

- coupling the semi-trailer only to a towing vehicle that is approved and suitable for the fifth-wheel load, the semi-trailer's gross vehicle weight and the king pin size fitted;
- complying with this manual and the instructions of the component suppliers;
- carrying out the inspections and maintenance described in Chapter 13 at the prescribed intervals;
- complying with the traffic, weights-and-dimensions, load-securing and dangerous-goods regulations of every country in which the semi-trailer is used.

2.2 FORESEEABLE MISUSE

Any use other than that described above is regarded as misuse. STU accepts no liability for damage resulting from misuse. Examples of foreseeable misuse are:

- exceeding the permissible payload, axle loads or fifth-wheel load, or loading in a way that does not respect the load-distribution limits;
- transporting persons or animals on the semi-trailer;
- tipping on sloping or soft ground, in strong wind or with a sticky load that does not slide out;
- driving with the tipping body raised or the tailgate open;
- exceeding the permissible working pressure of a silo, or filling a tank or compartment beyond its permissible degree of filling;
- lifting containers that exceed the rated capacity of the side-lifter cranes or lifting them with the stabiliser legs not deployed;

- carrying substances that are not compatible with the tank material, seals or tank code;
- driving with the air suspension raised or lowered out of the ride position;
- carrying out welding, drilling or other modifications to the chassis, running gear, braking system or superstructure without the written approval of STU;
- operating the semi-trailer under the influence of alcohol, drugs or medication that impairs the ability to drive or work safely.

2.3 RESPONSIBILITIES OF THE OWNER / OPERATOR

The owner or operator of the semi-trailer must ensure that:

- only trained, authorised and suitably licensed persons drive, operate, load or maintain the semi-trailer;
- every person working with the semi-trailer has access to this manual and has been instructed in its content — and that this instruction is documented;
- the semi-trailer is presented for statutory periodic roadworthiness tests and maintained as described in Chapter 13;
- tanks and silos are presented for the periodic pressure and leak-tightness inspections required by their approval (for ADR tanks according to ADR Chapter 6.8);
- the side-lifter cranes and their lifting accessories are inspected by a competent person as required by national lifting-equipment rules;
- defects that affect safety are rectified immediately and the semi-trailer is withdrawn from service until the repair has been completed;
- the required personal protective equipment is provided and worn;
- national accident-prevention and occupational-safety regulations are observed.

2.4 GENERAL SAFETY RULES

Apply the following rules every day:

- Inspect the semi-trailer before every journey (see Section 5.1). Do not use a semi-trailer with a safety-relevant defect.
- Never leave the semi-trailer unattended unless the parking brake is applied and, when uncoupled, wheel chocks are in place.
- Never drive with the tipping body raised, the tailgate open, manholes or valves open, or the side-lifter cranes and stabiliser legs out of their transport position.
- Do not stand or walk under a raised tipping body, a suspended container or a trailer that is only supported by a jack.
- Make sure that the brake air lines, the EBS connector and the electrical connectors are correctly connected and that the compressed-air system holds pressure.
- Check that the fifth-wheel lock of the towing vehicle has fully engaged around the king pin.
- Wear the prescribed PPE (see Section 2.6).
- Check that all safety labels are present and legible (see Section 2.7).
- Never climb onto the semi-trailer when surfaces are wet, icy, oily or covered in mud without suitable footwear and extra care. Use the access steps and handholds provided.

2.4.1 COMPRESSED-AIR SYSTEM

- The pneumatic system operates at high pressure. Before working on it, switch off the engine of the towing vehicle and release the pressure from the semi-trailer circuit.
- When connecting the air lines, make sure that the couplings are clean and that no pressure is present in the lines being connected.
- Replace air hoses at least every five years, and immediately if they are damaged, porous or kinked.
- Work on the braking system may only be performed by qualified specialists authorised by the brake-system manufacturer.

2.4.2 TYRES AND WHEELS

- Secure the semi-trailer against rolling before working on wheels or tyres.
- Tyres and wheels may only be repaired or fitted by trained personnel using suitable tools and inflation cages.
- Wherever possible, change wheels with the semi-trailer unladen.
- Protect the tyres from direct sunlight if the semi-trailer is parked for long periods.

2.4.3 MAINTENANCE AND REPAIR

- Switch off the engine of the towing vehicle and of the on-board power unit and remove the ignition key before any cleaning, maintenance or repair work.
- Support the chassis securely with axle stands of sufficient capacity before working underneath it. A jack alone is never sufficient.
- Lower all hydraulically operated parts to their rest position or support them mechanically, and depressurise the hydraulic system before working on it.
- Before welding on the semi-trailer, disconnect it from the towing vehicle, disconnect the EBS modulator and any on-board batteries or control units, and connect the welding earth as close as possible to the welding point.
- Replace bolts and nuts only with parts of the same size, property class and coating.
- Use only original STU spare parts or parts approved by STU.

2.5 DANGER ZONES

The following zones are danger zones in which persons may only be present when necessary and when the driver or operator can see them:

- **Between the towing vehicle and the semi-trailer** during coupling and uncoupling — risk of crushing.
- **Behind and beside a tipping body** while it is raised or lowered and while the load slides out — risk of being buried, crushed or struck by the tailgate.
- **The working area of the side-lifter cranes** and the area under a suspended container.
- **On the tank or silo top** — risk of falling; use the walkway and handrail.
- **At the mixer chute and drum opening** while the drum rotates.
- **Around the rear overhang** when the vehicle is turning — the rear of the semi-trailer swings out.
- **Under the semi-trailer** whenever the suspension or a hydraulic function is being operated.

DANGER

Crushing hazard between towing vehicle and semi-trailer. Nobody may stand between the towing vehicle and the semi-trailer while the towing vehicle is moving or while the suspension is being adjusted. Use a banksman with an agreed set of signals if the driver cannot see the coupling area.

2.5.1 WORKING IN OR ON TANKS AND SILOS**DANGER**

Confined spaces. Never enter a tank or silo compartment unless a confined-space permit has been issued, the compartment has been cleaned, ventilated and gas-tested, all valves are closed and locked out, and a second person is standing by outside with rescue equipment.

2.5.2 DANGEROUS GOODS (ADR)

When dangerous goods are carried, the provisions of the ADR apply in addition to this manual: the driver must hold an ADR training certificate; the transport unit must carry the transport documents, the instructions in writing, the ADR certificate of approval of the vehicle and the equipment required by ADR 8.1.5 (wheel chock, warning signs, eye-rinsing liquid, high-visibility vest, portable lighting without metal surfaces that can cause sparks, gloves and eye protection, and the equipment required for the danger labels concerned); and smoking and naked flames are prohibited near the vehicle during loading and unloading.

2.6 PERSONAL PROTECTIVE EQUIPMENT

Wear the following PPE when working with the semi-trailer, as required by the task and by the rules of the site:

TABLE 2.1 — PERSONAL PROTECTIVE EQUIPMENT

SYMBOL	PPE	REQUIRED FOR
	High-visibility vest	All work on public roads, on construction sites and at terminals
	Safety footwear	Coupling, loading, operation, maintenance
	Work gloves	Handling lashing equipment, couplings, hoses, maintenance
	Safety helmet	Crane operation, loading with cranes or forklifts, on construction sites and terminals
	Safety goggles	Working under the semi-trailer, cleaning, compressed-air and hydraulic work; filling and discharging tanks and silos



Hearing protection

Work in noisy environments, high-pressure cleaning



Face shield

Grinding and high-pressure cleaning



Respiratory protection

Silo discharge in dusty conditions, tank cleaning, painting and working with solvents



Welding helmet

Welding repairs (authorised workshops only)

2.7 SAFETY LABELS ON THE SEMI-TRAILER

Safety and information labels are attached at the relevant points of the semi-trailer. They must not be removed or painted over. Replace damaged or illegible labels immediately – replacement labels are available from STU. The labels fitted depend on the equipment of your semi-trailer.

TABLE 2.2 – SAFETY LABELS

NO.	LABEL	MEANING
1		General warning – observe the instructions in this manual
2		Danger of falling – do not walk on the tank or silo top, the body edge or the platform edge without using the walkway
3		Crushing hazard when turning – keep clear of the area between towing vehicle and semi-trailer
4		Danger from moving load or moving parts – keep clear during tipping, crane operation, filling and discharging
5		Electrical hazard – keep a safe distance from overhead power lines
6		Hand injury hazard – keep hands away from moving parts
7		Stop – function must be stopped before access
8		Emergency stop – location of the emergency stop button (side-lifter cranes, mixer)

9		Danger when turning – the rear overhang swings out
10		Keep a safe distance
11		Use wheel chocks when the semi-trailer is parked
12		Lubrication point – lubricate at the prescribed interval
13		Jacking point – place a jack only here
14		Check wheel-nut torque after the first 100 km and 200 km
15		Remove the ignition key of the towing vehicle before servicing

2.8 RESIDUAL RISKS

The semi-trailer has been designed and built according to the state of the art and the recognised safety rules. Nevertheless, some risks cannot be eliminated completely by design. They arise mainly from incorrect behaviour, lack of attention or lack of knowledge.

TABLE 2.3 – RESIDUAL RISKS AND PREVENTIVE MEASURES

RESIDUAL RISK	HOW TO AVOID IT
Crushing between towing vehicle and semi-trailer	Keep the coupling area clear; use a banksman; follow Section 4.3 exactly
Tipper overturning during tipping	Tip only on firm, level ground; never in strong cross-wind; stop and lower the body if the load sticks (Section 6.3)
Release of pressure or product (silo, tanker)	Depressurise the silo before opening; observe the earthing and filling rules; wear the prescribed PPE
Side lifter overturning	Deploy the stabiliser legs on firm ground; never exceed rated capacity and reach
Entanglement at the rotating mixer drum	Stop the drum and the engine before approaching the hopper, chute or drum opening
Overturning in bends	Keep the load centre of gravity as low and central as possible; adapt speed, especially with high, liquid or swinging loads
Contact with overhead structures or power lines	Know the total height of the laden vehicle; plan the route; keep at least the safety distance prescribed by the network operator

Hydraulic or pneumatic fluid under pressure

Depressurise before work; never search for leaks with your hand

Falling from the semi-trailer

Use the access steps, ladders and handholds; keep surfaces clean; do not jump down

PRODUCT DESCRIPTION

This chapter describes the common STU3 chassis and the six bodies built on it, with their main assemblies, identification and technical data.

3.1 OVERVIEW

All STU3 semi-trailers share the same type-approved 3-axle chassis with king pin, landing legs, air suspension and EBS. The body determines how the semi-trailer is loaded and unloaded. The following illustrations show the main assemblies of each body.

3.1.1 TIPPER

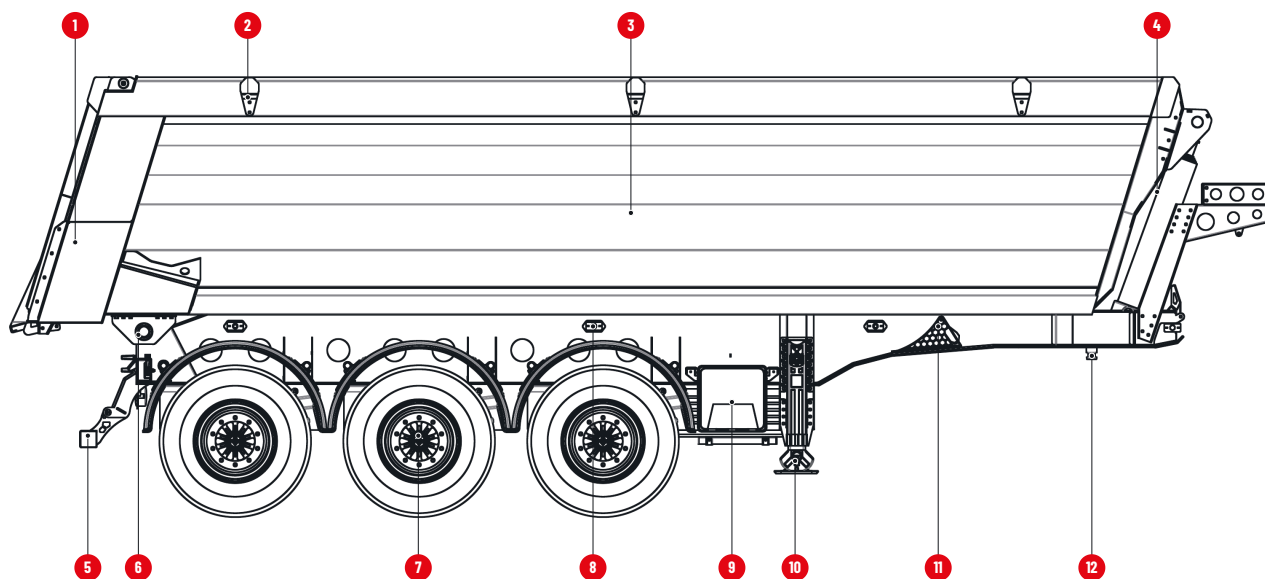


FIGURE 3.1 STU3 tipper semi-trailer, 24 m³ – main assemblies (front of the vehicle on the right)

- | | |
|--|---|
| 1 Hinged rear tailgate | 2 Tarpaulin bow brackets |
| 3 Tipping body, 24 m ³ | 4 Front-mounted telescopic tipping cylinder |
| 5 Rear underrun protection | 6 Tailgate locking mechanism |
| 7 Running gear – 3 axles with air suspension | 8 Side marker lamps |
| 9 Toolbox | 10 Landing legs |

11 Access step

12 King pin

3.1.2 FLATBED

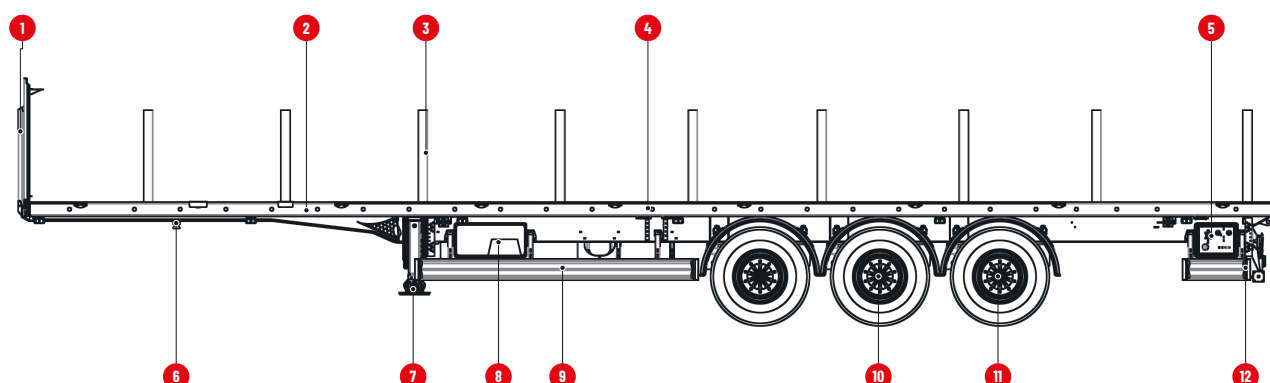


FIGURE 3.2 STU3 flatbed semi-trailer, 13.6 m – main assemblies

1 Headboard

3 Removable stakes

5 Rear control panel (lift / lower valve)

7 Landing legs

9 Lateral protection

11 Self-steering rear axle

2 Lashing points along the outer frame

4 Loading platform, 13,600 mm

6 King pin

8 Toolbox

10 Running gear

12 Rear lamp cluster and underrun protection

3.1.3 CONCRETE MIXER

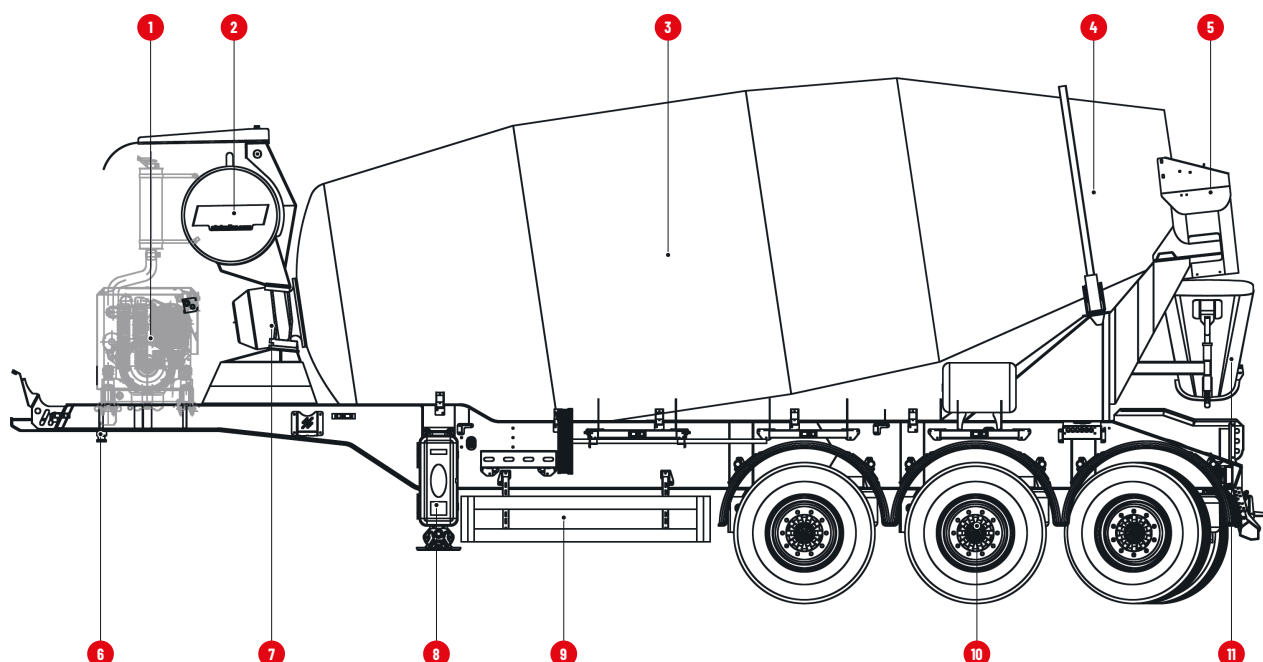


FIGURE 3.3 STU3 concrete-mixer semi-trailer – main assemblies

1 On-board diesel engine (drum drive power unit)

3 Mixer drum

2 Water tank

4 Access ladder to the hopper

- | | |
|---|------------------------|
| 5 Charging hopper | 6 King pin |
| 7 Drum drive (hydraulic motor and gearbox) | 8 Landing legs |
| 9 Lateral protection / storage | 10 Running gear |
| 11 Discharge chute | |

3.1.4 SIDE LIFTER

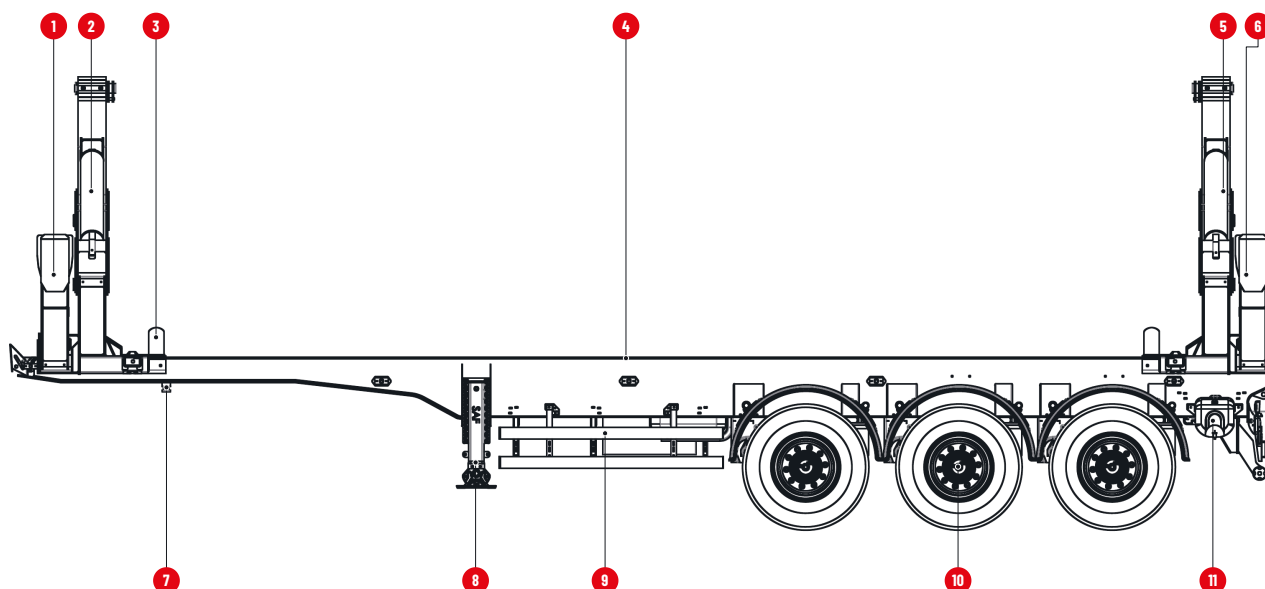


FIGURE 3.4 STU3 side-lifter semi-trailer – main assemblies (cranes in the transport position)

- | | |
|---|----------------------------------|
| 1 Front stabiliser leg | 2 Front crane |
| 3 Container locating guide / twistlock | 4 Container bed (chassis) |
| 5 Rear crane | 6 Rear stabiliser leg |
| 7 King pin | 8 Landing legs |
| 9 Lateral protection / storage | 10 Running gear |
| 11 Rear control station | |

3.1.5 TANKER AND SILO

The tanker and silo bodies are built on the same chassis. Their function principles are shown in Chapters 7 and 8. Technical drawings are supplied with each vehicle.

3.2 MAIN ASSEMBLIES

3.2.1 CHASSIS AND KING PIN

The main frame is a welded steel structure of high-strength longitudinal beams joined by cross-members, with longitudinal welds produced by submerged-arc welding. A bolted, exchangeable king pin to ISO 337 (2") or ISO 4086 (3½"), approved to UN Regulation No. 55, connects the semi-trailer to the towing vehicle.

3.2.2 RUNNING GEAR

Three axles with disc or drum brakes on air suspension. Depending on the specification, the first axle can be a lift axle and the last axle a self-steering axle. The axle make and type are shown on the axle type plates.

3.2.3 BRAKING SYSTEM

The semi-trailer has a dual-line compressed-air braking system with electronic brake control (EBS) including ABS and Roll Stability Support (RSS), designed in accordance with UN Regulation No. 13. Spring brake chambers act as the parking and emergency brake. See Section 5.4.

3.2.4 ELECTRICAL AND LIGHTING SYSTEM

The semi-trailer has a 24 V lighting installation according to UN Regulation No. 48 with rear lamp clusters, side marker lamps, front and rear position lamps, number-plate lamp and retro-reflective conspicuity marking. Power is supplied via the ISO 12098 15-pole or the ISO 1185 / ISO 3731 7-pole connectors.

3.2.5 PROTECTIVE DEVICES

A rear underrun protective device approved to UN Regulation No. 58 and, where required for the variant, lateral protection to UN Regulation No. 73 are fitted. Mudguards with spray-suppression flaps are fitted above every wheel.

3.3 IDENTIFICATION

3.3.1 VEHICLE IDENTIFICATION NUMBER (VIN)

The 17-character VIN begins with STU's world manufacturer identifier (WMI). It is stamped into the right-hand front side member of the chassis. The VIN identifies the semi-trailer throughout its life – quote it in every enquiry and spare-parts order.

3.3.2 STATUTORY PLATE

The statutory plate is riveted to the right-hand front of the chassis. It shows, among other data:

- manufacturer's name and EU type-approval number;
- VIN;
- technically permissible maximum laden mass of the semi-trailer;
- technically permissible maximum mass on the coupling point (king pin);
- technically permissible maximum mass on each axle or axle group.

NOTICE



Never remove or alter the statutory plate or the VIN. Doing so invalidates the type approval and the registration of the semi-trailer. If the plate is damaged, order a replacement from STU quoting the VIN.

3.3.3 TYPE, VARIANT AND VERSION

Under Regulation (EU) 2018/858, each semi-trailer belongs to a **type**, a **variant** and a **version**:

TABLE 3.1 – TYPE, VARIANT AND VERSION

LEVEL	DEFINED BY (EXAMPLES)
-------	-----------------------

Type	Manufacturer, vehicle category (04), concept of the trailer (semi-trailer), number of axles, essential chassis construction
Variant	Chassis design, stage of completion, bodywork code
Version	Number and position of lift and steering axles, technically permissible maximum laden mass

The type, variant and version of your semi-trailer are given in its Certificate of Conformity (CoC).

3.4 TECHNICAL DATA

The values below are the nominal values of the standard STU3 bodies, taken from the STU type drawings. The binding values for an individual semi-trailer are those on its statutory plate and in its Certificate of Conformity (CoC).

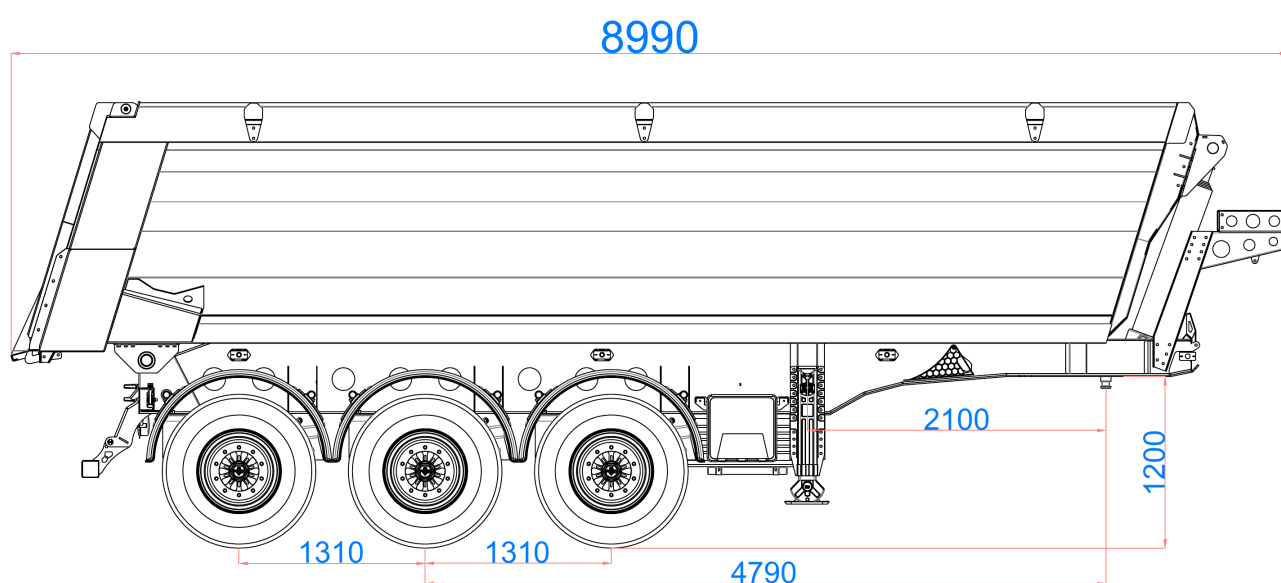


FIGURE 3.5 Tipper, 24 m³ – main dimensions (mm)

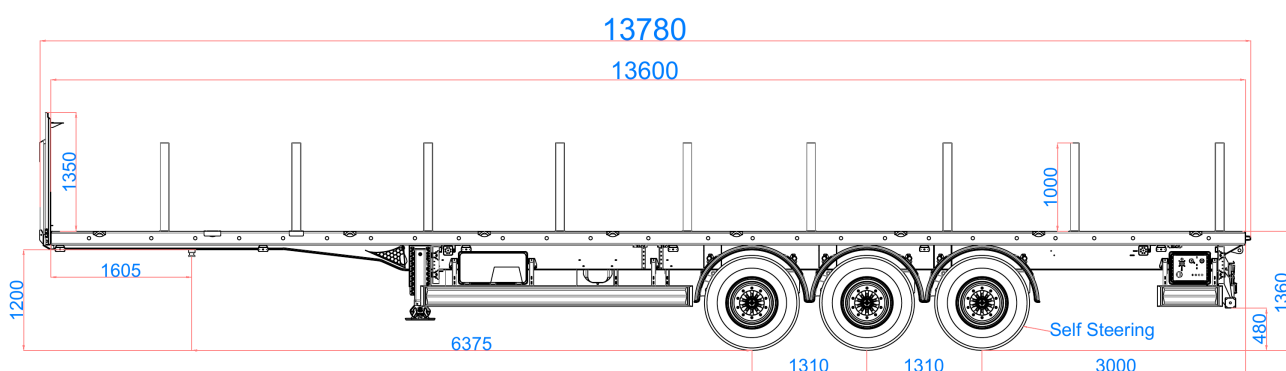


FIGURE 3.6 Flatbed, 13.6 m – main dimensions (mm)

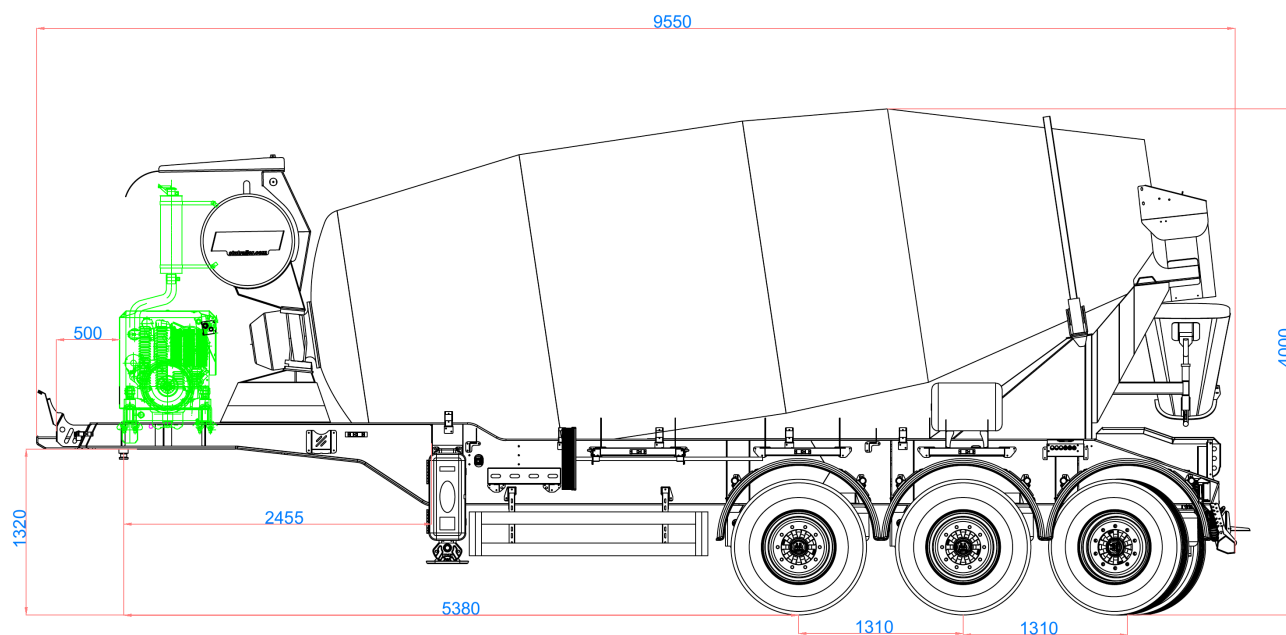
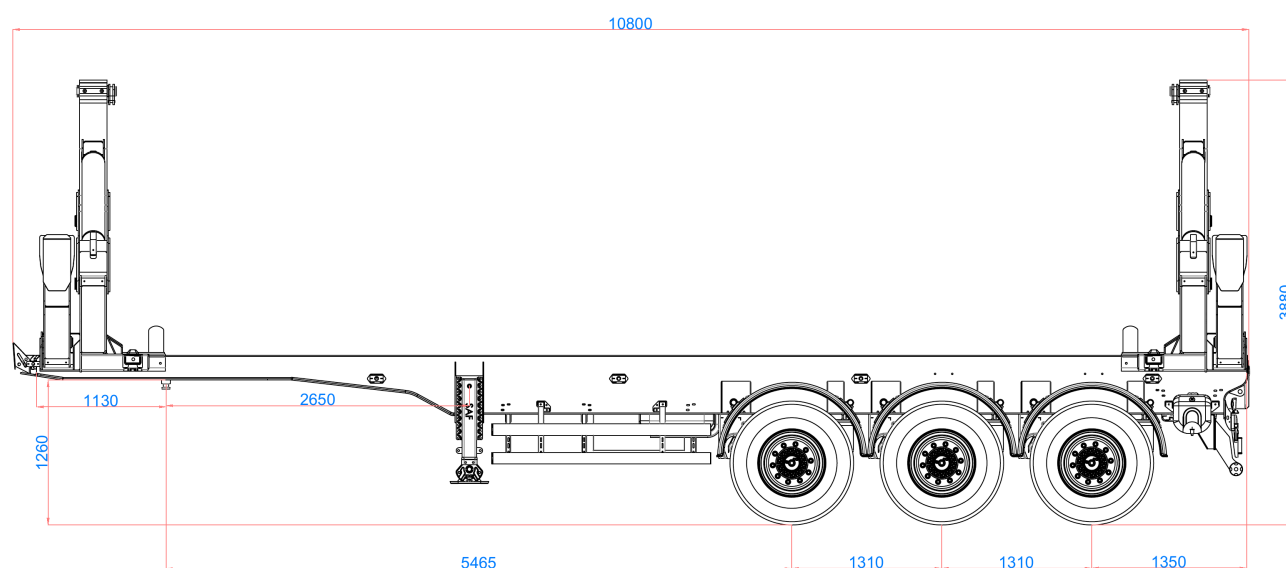

FIGURE 3.7 Concrete mixer – main dimensions (mm)

FIGURE 3.8 Side lifter – main dimensions (mm)

TABLE 3.2 – TECHNICAL DATA OF THE STU3 BODIES (NOMINAL VALUES)

SPECIFICATION (MM)	TIPPER	FLATBED	MIXER	SIDE LIFTER
Overall length	8,990	13,780	9,550	10,800
Load space length	24 m ³ body	13,600	Drum TBC m ³	20 ft container
King pin to front	—	1,605	500	1,130
King pin to first axle	—	6,375	5,380	5,465
King pin to centre axle	4,790	—	—	—

King pin to landing legs	2,100	—	2,455	2,650
Axle spacing	1,310	1,310	1,310	1,310
Last axle to rear	—	3,000	—	1,350
Coupling (king pin) height	1,200	1,200	1,320	1,260
Platform / bed height	—	1,360	—	—
Overall height (transport)	TBC	2,710 (headboard)	4,000	3,880
Stake height above platform	—	1,000	—	—
Overall width	2,550	2,550	2,550	2,550
Unladen / max. laden mass (kg)	TBC	TBC	TBC	TBC

The technical data of the tanker and silo bodies (capacity, number of compartments, tank code, test pressure) are given on the tank plate and in the approval documents of each vehicle.

3.5 STANDARD EQUIPMENT

- Welded steel chassis with king pin and two landing legs
- Air suspension with ride-height control and lift / lower valve
- EBS with ABS and RSS, spring-brake parking brake
- 24 V LED lighting with side marker lamps and conspicuity marking
- Rear underrun protection, lateral protection, mudguards with spray suppression
- Two wheel chocks, toolbox, user manual and warranty certificate
- Body with the equipment described in its chapter

3.6 OPTIONAL EQUIPMENT

- Lift axle and / or self-steering axle
- Electric tarpaulin system (tipper)
- Tipping stability monitoring / tilt alarm (tipper)
- Vapour recovery and overfill protection system (tanker)
- On-board compressor (silo)
- Radio remote control (side lifter)
- Twistlocks (flatbed)

COUPLING AND UNCOUPLING



Coupling and uncoupling are among the most hazardous everyday tasks with a semi-trailer. Follow the sequences in this chapter exactly, every time.

WARNING



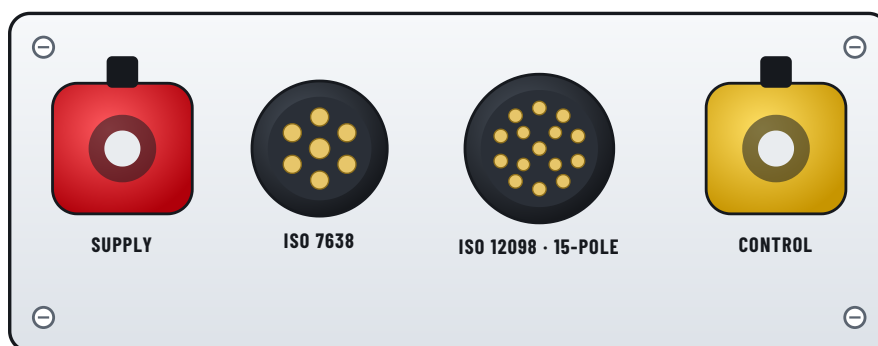
Risk of crushing. Make sure that nobody is between the towing vehicle and the semi-trailer during coupling and uncoupling. Apply the parking brake of the semi-trailer and place wheel chocks before you start.

4.1 REQUIREMENTS FOR THE TOWING VEHICLE

Only couple the semi-trailer to a towing vehicle that:

- is approved for the gross combination weight and for the fifth-wheel load of the semi-trailer;
- has a fifth wheel to UN Regulation No. 55 that matches the king pin size (2" or 3½") of the semi-trailer;
- has a fifth-wheel height that suits the coupling height of the semi-trailer (1,200 – 1,320 mm depending on the body – see the technical data) so that the semi-trailer is approximately level when coupled;
- provides a compressed-air supply of at least 6.5 bar at the supply coupling (red), and an ISO 7638 EBS connector;
- provides the electrical connections required by the semi-trailer (15-pole ISO 12098, or 7-pole ISO 1185 / ISO 3731); for tippers and side lifters without their own power unit, a hydraulic system (PTO) with the oil flow and pressure required by the cylinder or crane manufacturer;
- has sufficient clearance between the rear of the cab (or accessories) and the semi-trailer front at full articulation.

4.2 CONNECTIONS BETWEEN TOWING VEHICLE AND SEMI-TRAILER



FRONT VIEW · LAYOUT MAY VARY BY SPECIFICATION

FIGURE 4.1 Connection panel – front view (layout may vary with the specification)

TABLE 4.1 – CONNECTIONS BETWEEN TOWING VEHICLE AND SEMI-TRAILER

CONNECTION	COLOUR / STANDARD	FUNCTION
Supply line coupling	RED · ISO 1728	Compressed-air supply to the semi-trailer reservoir; emergency braking when disconnected
Control line coupling	YELLOW · ISO 1728	Pneumatic brake control signal
EBS connector	7-pin · ISO 7638	Power supply and CAN data for the EBS
Lighting connector	15-pole · ISO 12098	Lighting, reversing signal, lift-axle and diagnostic functions
7-pole connectors <i>(if fitted)</i>	BLACK 24N · ISO 1185 / WHITE 24S · ISO 3731	Alternative lighting supply for towing vehicles without a 15-pole socket
Hydraulic couplings <i>(if fitted)</i>	RED pressure / BLUE return	Tipping cylinder (tipper) or side-lifter hydraulics from the towing vehicle's PTO

4.2.1 EBS CONNECTOR ISO 7638 (7-PIN)

TABLE 4.2 – PIN ASSIGNMENT ISO 7638

PIN	WIRE COLOUR	FUNCTION
1	Red	+24 V permanent supply (solenoid valves)
2	Black	+24 V switched supply (ECU, via ignition)
3	Yellow	Earth for pin 2 (electronics)
4	Brown	Earth for pin 1 (solenoid valves)
5	White	Warning lamp
6	White / green	CAN High (ISO 11992)

4.2.2 LIGHTING CONNECTORS

TABLE 4.3 – PIN ASSIGNMENT OF THE LIGHTING CONNECTORS

FUNCTION	7-POLE BLACK ISO 1185 (24N)	7-POLE WHITE ISO 3731 (24S)	15-POLE ISO 12098
Direction indicator, left	3	—	1
Direction indicator, right	5	—	2
Rear fog lamp	—	7	3
Earth	1	1	4
Position / tail lamp, left	2	—	5
Position / tail lamp, right	6	—	6
Stop lamps	4	—	7
Reversing lamp	—	3	8
Permanent supply +24 V	—	4	9
Brake-lining wear indicator ¹	—	—	10
Spring-brake status ¹	—	—	11
Lift-axle control (<i>if fitted</i>)	—	6	12
Earth for pins 9 – 12	—	—	13
Trailer brake control / data ¹	7	—	14, 15
Free	—	2, 5	—

¹ Not available on every semi-trailer. Always check the wiring diagram supplied with your semi-trailer before making any changes to the electrical system.

4.2.3 HANDLING THE LINE COUPLINGS

- Before connecting, check that the coupling heads and seals are clean and undamaged.
- Connect the **yellow** control line first, then the **red** supply line. When disconnecting, disconnect the **red** line first.
- After disconnecting, close the coupling heads on the semi-trailer with their protective caps and hang the lines of the towing vehicle in their holders. Dirt entering the lines can damage the EBS modulator and valves.
- Route the lines and cables so that they cannot rub, kink or become trapped at full articulation.



FIGURE 4.2 Close the protective cap after disconnecting

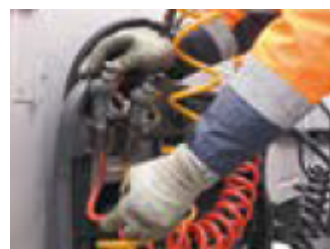


FIGURE 4.3 Connect lines without twisting or stretching them

4.3 COUPLING

Before coupling, check that the king pin, the king pin plate and the fifth wheel are clean, undamaged and lubricated, and that the locking mechanism of the fifth wheel is open.

- 1 Position the towing vehicle in a straight line in front of the semi-trailer, on firm and level ground.
- 2 Make sure that the semi-trailer's parking brake is applied and that wheel chocks are in place.
- 3 Adjust the height of the towing vehicle's air suspension (or the semi-trailer's landing legs) so that the fifth-wheel plate is slightly below the king pin plate – the semi-trailer should be lifted slightly as the tractor reverses under it, by approximately 20 – 50 mm.
- 4 Reverse slowly and in a straight line until the king pin engages in the fifth-wheel lock. Do not ram the semi-trailer.
- 5 Get out of the cab and check visually that the lock has fully closed around the king pin and that the safety device is engaged. Follow the instructions of the fifth-wheel manufacturer.
- 6 Perform a **pull test**: with the semi-trailer parking brake still applied, try to pull forward gently in a low gear. The semi-trailer must not separate.
- 7 Connect the air lines, the EBS connector and the electrical connectors (Section 4.2) and, where required, the hydraulic couplings.
- 8 Raise the landing legs fully using the crank in high-speed gear (Section 4.6) and stow the crank handle in its holder.
- 9 Remove the wheel chocks and stow them in their holders.
- 10 Release the parking brake of the semi-trailer (Section 4.5).
- 11 Carry out the pre-departure inspection (Section 5.1), including a lighting check and a brake test at low speed.



FIGURE 4.4 Raise the landing legs until the feet are clear of the ground (approx. 50 mm), then fully retract them before driving off

4.4 UNCOUPLING

WARNING



Risk of tipping. Only uncouple a laden semi-trailer if the load is positioned so that the semi-trailer cannot tip forwards or backwards, and only on firm, level ground that can carry the landing-leg loads. Never uncouple a laden semi-trailer on soft ground.

- 1 Park the combination in a straight line on firm, level ground.
- 2 Apply the parking brake of the towing vehicle and place the wheel chocks in front of and behind the semi-trailer wheels.
- 3 Lower the landing legs until the feet are approximately 50 mm above the ground, then switch to the low-speed gear and lower them until they carry part of the semi-trailer's weight.
- 4 Disconnect the red supply line first – the spring brakes are applied automatically. Then disconnect the yellow control line, the EBS connector and the electrical connectors and the hydraulic couplings. Fit the protective caps.
- 5 Lower the towing vehicle's air suspension until the fifth-wheel plate is free of the king pin plate.
- 6 Open the fifth-wheel lock according to the fifth-wheel manufacturer's instructions.
- 7 Drive the towing vehicle slowly forward out from under the semi-trailer, without touching it.

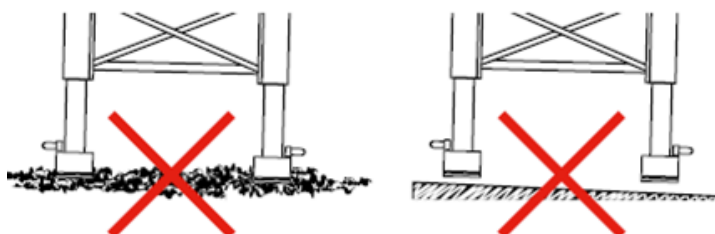


FIGURE 4.5 Do not land the legs on soft or uneven ground – use load-spreading plates if necessary

4.5 PARKING BRAKE AND PREV VALVE

The semi-trailer is fitted with a combined park-release emergency valve (PREV) on the front chassis. It has two push-buttons:

TABLE 4.4 – CONTROLS OF THE PREV VALVE

BUTTON	COLOUR	FUNCTION
Parking brake	Red	Pull out: parking brake applied (spring brakes exhausted). Push in: parking brake released — only possible when the reservoir pressure is sufficient.
Shunting / release	Black	Push in: releases the emergency brake after the supply line has been disconnected so that the semi-trailer can be shunted with a shunting vehicle. Pull out: normal operating position.



FIGURE 4.6 Park release emergency valve (PREV) — example

- When the **red supply line is disconnected**, the semi-trailer brakes are applied automatically (emergency braking function).
- To release the parking brake for driving, the reservoir pressure must be at least 6.5 bar; with less than approx. 4 bar the service brake cannot be released.
- Always pull out the red button before uncoupling and before leaving a coupled semi-trailer.

WARNING



Uncontrolled rolling. Pushing in the black button releases the brakes of an uncoupled semi-trailer. Only do this when the semi-trailer is coupled to a shunting vehicle with a working brake and nobody is near the wheels.

4.6 LANDING LEGS

The two landing legs support the front of the semi-trailer when it is uncoupled. They are connected by a cross-shaft and operated with a crank handle on one side. The gearbox has two speeds:

TABLE 4.5 – LANDING-LEG GEARS

GEAR	SELECTION	USE
High speed	Pull the crank handle out	Raising or lowering the legs without load (to bridge the gap to the ground)

Low speed

Push the crank handle **in**

Lifting or lowering the semi-trailer under load

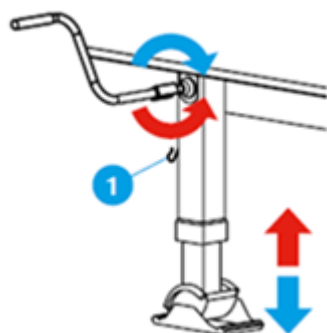


FIGURE 4.7 Remove the crank from its holder



FIGURE 4.8 High speed — pull out

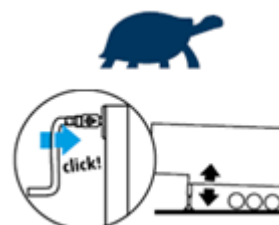


FIGURE 4.9 Low speed — push in

- Change gear only when the legs are not under load. Turning the crank slightly makes it easier to engage the gear.
- Beware of kick-back of the crank handle when the legs take up load.
- Do not drive with the legs partially extended. Always stow the crank in its holder before driving off.
- On soft ground, place load-spreading plates under the feet.

4.7 WHEEL CHOCKS

Two wheel chocks are supplied with the semi-trailer in holders on the chassis. Use them every time the semi-trailer is uncoupled, even on level ground, and whenever it is being loaded, unloaded or operated.



FIGURE 4.10 Wheel chocks in their holders



FIGURE 4.11 Place the chocks in the possible rolling direction

CAUTION



Do not forget the wheel chocks. After coupling, remove the chocks and return them to their holders before driving off. A chock left on the road is a serious hazard to other road users.

DRIVING AND OPERATION

05

This chapter covers the checks and driving practices that keep the STU3 semi-trailer safe on the road, whatever body is fitted. Body-specific driving notes are given in the body chapters.

5.1 PRE-DEPARTURE INSPECTION

Carry out this walk-round inspection before every journey and after every loading operation. Do not drive off until every item is in order.

- ☐ Fifth-wheel lock closed and secured; pull test carried out
- ☐ Landing legs fully raised; crank stowed
- ☐ Air lines, EBS connector and electrical connectors connected, routed without chafing
- ☐ No audible air leaks; reservoir pressure built up (at least 6.5 bar)
- ☐ Parking brake released; brake test at walking pace successful
- ☐ No EBS / ABS warning lamp lit in the cab after the system check
- ☐ Wheel chocks removed and stowed in their holders
- ☐ Air suspension at ride height (driving position)
- ☐ Tipper: body fully lowered on its rests; tailgate closed and locked; tarpaulin closed
- ☐ Tanker / silo: all manholes, valves and caps closed; hoses stowed; no leaks
- ☐ Side lifter: cranes folded and locked in the transport position; stabiliser legs retracted; container locked
- ☐ Mixer: chute folded and secured; drum rotating at agitating speed when laden
- ☐ All lamps, indicators, stop lamps and reflectors working, clean and undamaged
- ☐ Tyres: correct pressure, no visible damage, sufficient tread depth
- ☐ Wheel nuts present and tight; no rust streaks around the nuts
- ☐ Mudguards and spray-suppression flaps secure
- ☐ Number plate fitted, clean and legible
- ☐ Total height, width and length of the laden vehicle known and within the permitted limits

5.2 DRIVING BEHAVIOUR

5.2.1 GENERAL

- Adapt your speed to the load, the road, the weather and the traffic. A laden combination needs considerably longer braking distances than a solo vehicle.
- Accelerate and brake smoothly. Abrupt manoeuvres cause the load to shift and put extreme stress on the semi-trailer and on the load restraint.
- Reduce speed well before bends and roundabouts. Tankers, mixers and high loads have a high centre of gravity – the risk of overturning increases significantly.
- Liquid and part-filled loads surge when braking and cornering. Drive particularly smoothly with a part-filled tanker or a laden mixer.
- Stop and re-check the load restraint after the first few kilometres and at regular intervals afterwards (flatbed, side lifter).

5.2.2 TURNING AND MANOEUVRING

- The rear overhang of the semi-trailer swings out when turning. Watch both sides of the vehicle in your mirrors.
- Do not exceed the maximum articulation angle. The front of the semi-trailer and the cab can collide.
- On semi-trailers with self-steering axles, the steering is locked automatically when reversing (*if fitted*). If the steering is not locked, the semi-trailer will not reverse straight.

DANGER



Overhead power lines and structures. Contact with, or even approaching, an overhead power line can be fatal. Know the total height of the laden vehicle and plan the route accordingly. Observe all height restrictions for bridges, tunnels, gantries and overhead lines.

5.2.3 DIMENSIONS AND WEIGHTS

- The laden vehicle must comply with the maximum dimensions and weights applicable in each country of travel (within the EU, Directive 96/53/EC and the corresponding national rules).
- Mark loads that project beyond the sides or the rear of the vehicle in accordance with the applicable regulations.

5.3 AIR SUSPENSION

The air suspension keeps the semi-trailer at a constant ride height regardless of the load. A lift / lower valve on the side of the chassis allows the semi-trailer height to be adjusted for coupling and loading.

TABLE 5.1 – LIFT / LOWER VALVE POSITIONS

LEVER POSITION	FUNCTION
Raise	Raises the chassis above ride height
Stop	Holds the current height
Ride (driving position)	Automatic ride-height control – only position permitted while driving

Lower Lowers the chassis below ride height

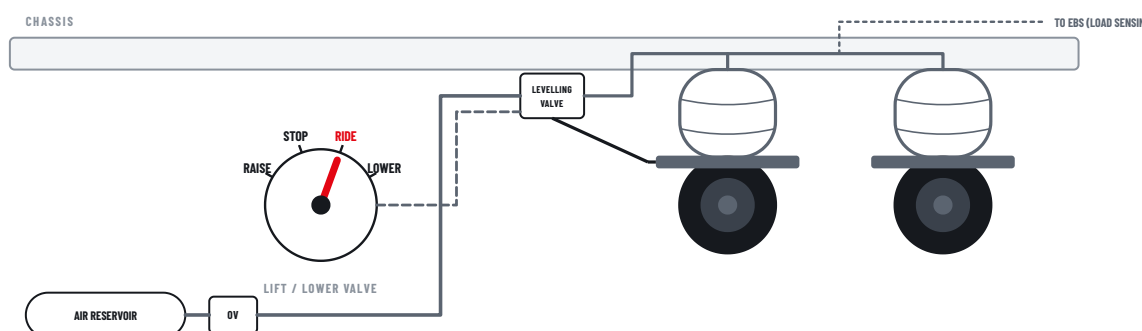


FIGURE 5.1 Air suspension – function principle: the levelling valve keeps the ride height constant; the lift / lower valve overrides it

- Always return the valve to the **ride** position before driving off. Depending on the specification, the EBS returns the suspension to ride height automatically above approximately 15 km/h (*if fitted*) – do not rely on this function.
- Before raising or lowering the semi-trailer, make sure that nobody is under or next to it.
- Driving with the air suspension fully raised or fully lowered damages the bellows, shock absorbers and axles and impairs the road holding of the semi-trailer.

5.4 BRAKING SYSTEM

The semi-trailer is braked by the towing vehicle's brake pedal via the dual-line compressed-air system and the EBS. The EBS:

- adjusts the brake pressure to the load (load-sensing) automatically;
- prevents the wheels from locking (ABS);
- applies the semi-trailer brakes automatically if there is a risk of the semi-trailer rolling over in a bend (RSS).

These systems support the driver but do not override the laws of physics. The driver remains fully responsible for driving at a speed appropriate to the conditions.

WARNING



Loss of braking performance. The EBS connector (ISO 7638) must be connected whenever the semi-trailer is driven. Without it, ABS and RSS do not work and the brake force may not be correctly distributed. If the EBS / ABS warning lamp in the cab stays on after the system check, or comes on while driving, drive carefully to the nearest suitable stopping place and have the fault rectified by a brake specialist.

- If the air pressure in the supply line drops, the semi-trailer brakes are applied automatically.
- Brake work may only be carried out by authorised specialists of the brake-system manufacturer.

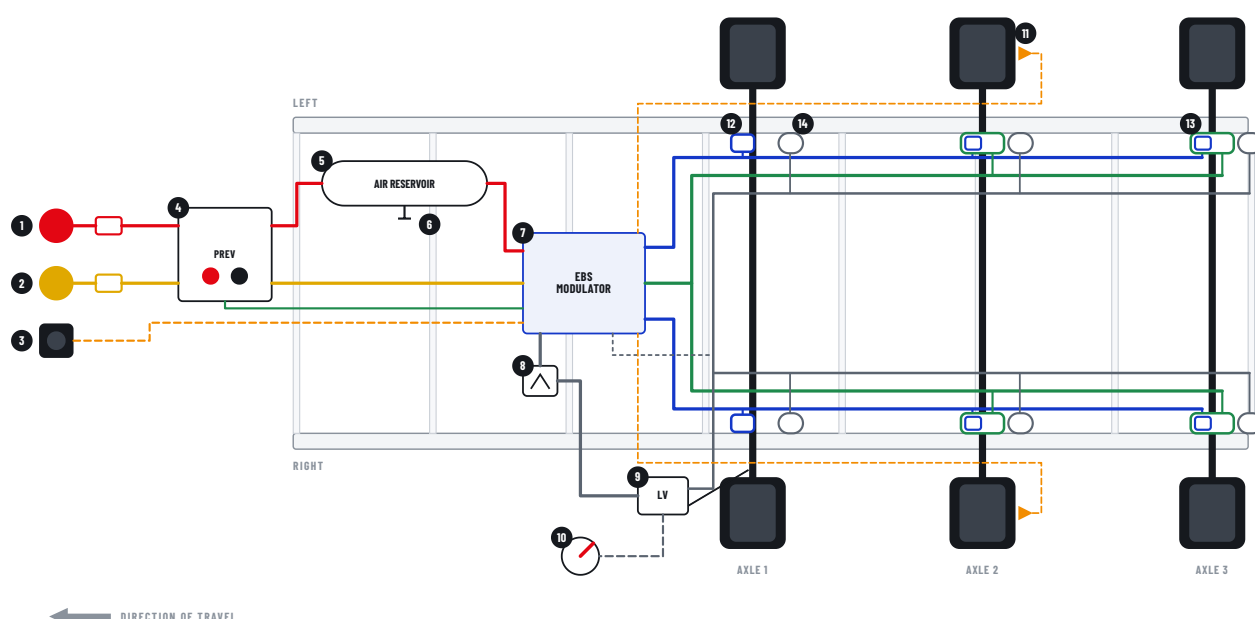


FIGURE 5.2 Braking and air-suspension system – STU3, 2S/2M EBS layout (schematic, top view). Red: supply · Yellow: control · Blue: service brake · Green: spring brake · Grey: air suspension · Orange: electrical

- | | |
|--|---|
| 1 Supply line coupling – RED, with line filter | 2 Control line coupling – YELLOW, with line filter |
| 3 ISO 7638 EBS connector (power and CAN data) | 4 Park release emergency valve (PREV) |
| 5 Air reservoir | 6 Drain valve |
| 7 EBS modulator with integrated ECU and pressure sensors | 8 Overflow valve (protects the brake circuit) |
| 9 Levelling valve (LV) with linkage to the axle | 10 Lift / lower valve (rotary slide valve) |
| 11 ABS wheel-speed sensors | 12 Service brake chamber |
| 13 Combination spring brake chamber (service and parking brake) | 14 Air suspension bellows |



System layout. The schematic follows the standard architecture of the WABCO TEBS E and Knorr-Bremse TEBS G2 trailer EBS families. The exact make, valve types, number of modulated channels and sensor positions of your semi-trailer are given in the brake-system documentation and on the EBS plate on the chassis.

5.5 LIFT AXLE (IF FITTED)

On semi-trailers with a lift axle, the first axle can be raised when the semi-trailer is unladen or partly laden to reduce tyre wear and improve manoeuvrability.

- In automatic mode the EBS raises and lowers the axle depending on the axle load. The axle is lowered automatically when the load exceeds the permissible value for the remaining axles.
- If a manual control is fitted, only raise the axle when the semi-trailer is unladen or the axle loads of the remaining axles are not exceeded.

- Raising the lift axle increases the load on the king pin and on the remaining axles. Never raise it to improve traction on a slippery surface unless the towing vehicle manufacturer and national rules allow this traction-help function.

5.6 SELF-STEERING AXLE *(IF FITTED)*

Self-steering axles follow the curve of the semi-trailer and reduce tyre wear and swept path.

- When reversing, the steering is locked automatically via the reversing-lamp signal. Make sure that the reversing-lamp circuit of the towing vehicle works (15-pole pin 8 or 24S pin 3).
- Check regularly that the steering axle returns to the straight-ahead position and that the locking cylinder works.
- Lubricate the steering knuckles at the intervals specified by the axle manufacturer.

TIPPER — LOADING AND TIPPING

A raised tipping body moves the centre of gravity of up to 30 tonnes several metres upwards. Most tipper overturns happen on uneven or soft ground, in cross-wind or when the load sticks in the body. Follow this chapter every time you tip.

DANGER



Overturning and crushing. Never tip on a side slope, on soft or uneven ground, or in strong cross-wind. Never stand behind, beside or under a raised body. Keep at least the length of the raised body plus a safety margin clear of people. Watch for overhead power lines — a raised body can reach well over 10 m.

6.1 TIPPING SYSTEM

The body is raised by a front-mounted, multi-stage telescopic hydraulic cylinder. Hydraulic power is supplied by the towing vehicle's PTO-driven pump and the tipping valve in the cab, connected via the hydraulic couplings at the front of the semi-trailer. A limit valve (tipping stop) stops the cylinder before its maximum stroke. The tailgate is hinged at the top and can be locked or released pneumatically or mechanically, depending on the specification.

TABLE 6.1 — MAIN COMPONENTS OF THE TIPPING SYSTEM

COMPONENT	FUNCTION
PTO and tipping pump (towing vehicle)	Supplies hydraulic oil to the cylinder
Tipping valve (cab)	Raise — hold — lower
Telescopic tipping cylinder	Raises the body at the front
Limit valve / tipping stop	Prevents overextension of the cylinder
Tailgate lock	Holds the tailgate closed during transport; releases it for discharge
Body prop (if fitted)	Mechanical support for maintenance under the raised body

6.2 LOADING

- Load on firm, level ground with the semi-trailer coupled and the parking brake applied.

- Distribute the load evenly over the length and width of the body. A load concentrated at the rear increases the risk of overturning when tipping; a load concentrated at the front overloads the king pin.
- Do not drop heavy rocks from a great height – damage to the floor and the body is not covered by the warranty. Place a cushion layer of fine material first.
- Do not exceed the permissible payload and axle loads; weigh the vehicle if in doubt.
- Close the tarpaulin before driving to prevent material from falling onto the road.

6.3 BEFORE TIPPING

- ☐ Ground firm, level (side slope max. 2° unless the tipping-stability system allows more) and able to carry the wheel loads
- ☐ Towing vehicle and semi-trailer in a straight line – never tip with the combination articulated
- ☐ Wind speed acceptable (do not tip in gusty cross-wind)
- ☐ No overhead power lines, structures or trees within reach of the raised body
- ☐ Danger zone behind and beside the vehicle clear of people and vehicles
- ☐ Air suspension of the semi-trailer lowered or set to the tipping position (if specified)
- ☐ Tarpaulin opened fully
- ☐ Tailgate lock released (or tailgate secured if the load is to be discharged through a hatch)

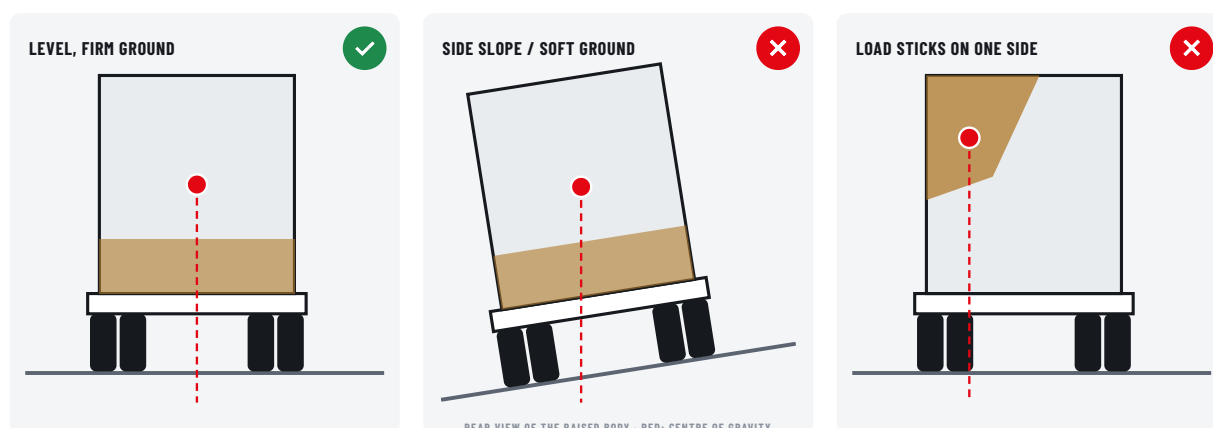


FIGURE 6.1 Tip only on firm, level ground with the combination straight

6.4 TIPPING

- 1 Stay in the cab. Engage the PTO with the engine at idle speed.
- 2 Raise the body slowly with the tipping valve. Watch the body and the load in the mirrors throughout.
- 3 Release the tailgate when the load begins to slide (if not released automatically).
- 4 If the load does not slide out or slides out only on one side, **stop tipping immediately**, lower the body and loosen the load before trying again.
- 5 If the vehicle starts to lean, **lower the body immediately**.
- 6 When the body is empty, drive forward slowly a few metres only if necessary to clear the heap – never drive more than a few metres with the body raised and never at more than walking pace.
- 7 Lower the body completely. Close and lock the tailgate.

- 8 Disengage the PTO.

WARNING

Sticky or frozen loads. Wet clay, frozen material or asphalt can stick to the front of the body while the rear is empty. The raised body then becomes extremely top-heavy. Never “shake” the load by jerky raising and lowering or by driving with the body raised.

6.5 AFTER TIPPING

- ☐ Body fully lowered onto its rests
- ☐ Tailgate closed and locked
- ☐ PTO disengaged
- ☐ Body and tailgate seals free of residues; tarpaulin closed
- ☐ Air suspension back at ride height

6.6 WORKING UNDER THE RAISED BODY

Never work under a raised body that is held only by the hydraulic cylinder. Empty the body, raise it, fit the body prop or a suitable mechanical support, then lower the body onto the support before starting work.

TANKER – FILLING AND DISCHARGING

Tankers carry liquids – often flammable or hazardous – in one or more compartments. Static electricity, overfilling and surging liquid are the main hazards. When dangerous goods are carried, the ADR applies in addition to this chapter.

7.1 TANK AND EQUIPMENT

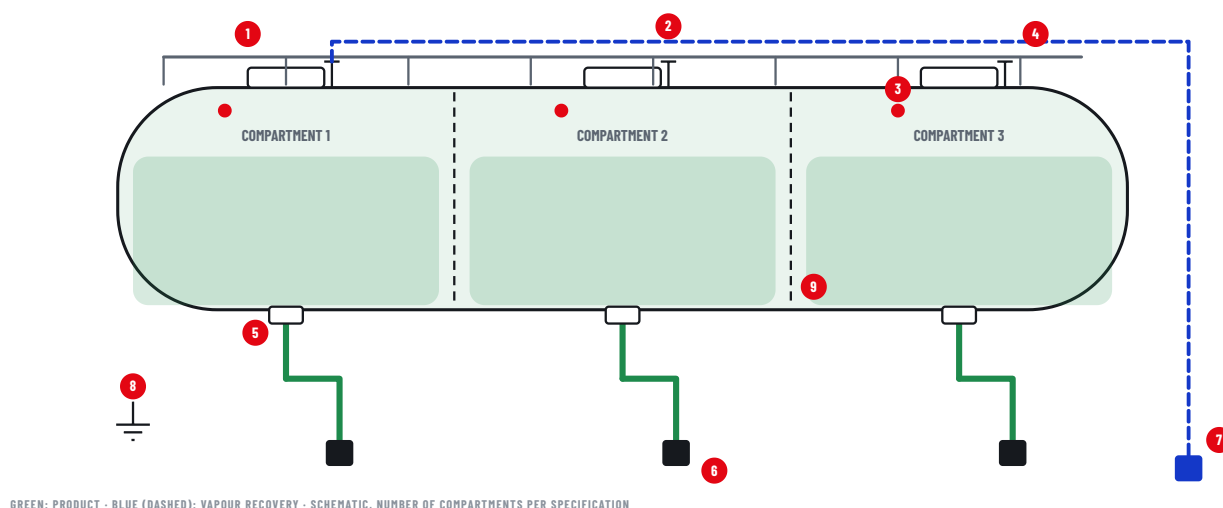


FIGURE 7.1 Tanker – function principle (schematic)

- | | |
|---|---|
| 1 Manhole with filling dome | 2 Pressure / vacuum vent valve |
| 3 Overfill sensor (bottom loading) | 4 Walkway with handrail |
| 5 Bottom valve (internal emergency valve) | 6 Discharge coupling (API adaptor or hose coupling) |
| 7 Vapour-recovery coupling | 8 Earthing (bonding) point |
| 9 Compartment bulkhead | |

The tank code, capacity of each compartment, permissible degree of filling, test pressure and the dates of the last and next inspection are shown on the tank plate. Only substances permitted by the tank code and the approval may be carried.

7.2 GENERAL RULES

- Park on level ground, apply the parking brakes and place the wheel chocks. Switch off the engine unless it is needed for a pump.
- **Earth the tanker** before opening any manhole or valve: connect the earthing cable to the earthing point of the loading or discharge installation. Disconnect it only after all hoses have been removed and all openings closed.
- No smoking, naked flames, mobile phones or other ignition sources in the loading area.
- Keep at least the fire extinguishers required by ADR ready for use.
- The driver must remain at the vehicle throughout filling and discharging.
- Wear the PPE required by the safety data sheet of the product.

7.3 FILLING

7.3.1 BOTTOM LOADING (PREFERRED)

- 1 Connect the earthing cable and the overfill-protection plug of the installation (sensor 3).
- 2 Connect the vapour-recovery hose to coupling 7.
- 3 Connect the loading arm to the API adaptor of the compartment to be filled. Fill one compartment at a time unless the installation is designed otherwise.
- 4 Open the bottom valve. The installation stops automatically when the overfill sensor is reached.
- 5 After filling, close the bottom valve, disconnect the loading arm, then the vapour hose, then the overfill plug and finally the earthing cable.

7.3.2 TOP LOADING

- 1 Earth the tanker. Climb onto the walkway using the ladder; keep the handrail raised.
- 2 Open the manhole of the compartment only when instructed by the installation. Insert the loading arm to the bottom of the compartment to avoid splashing and static charge.
- 3 Start with a reduced filling rate until the outlet of the arm is submerged.
- 4 Never exceed the permissible degree of filling (see the tank plate and ADR 4.3.2.2) – leave the expansion space required for the product's temperature range.
- 5 Close and lock the manhole before leaving the walkway.

WARNING



Overfilling and part-filling. An overfilled compartment can leak or burst when the product warms up. A compartment filled between approx. 20 % and 80 % causes strong surge forces when braking and cornering – tanks without baffles must be filled to at least 80 % or be practically empty, unless the tank is subdivided into sections of max. 7,500 l (ADR 4.3.2.2.4).

7.4 DISCHARGING

- 1 Check the receiving tank's free capacity before connecting.
- 2 Earth the tanker and connect the vapour-recovery hose if required.
- 3 Connect the discharge hose to the discharge coupling and check that it is secure.
- 4 Open the receiving installation, then the bottom valve and the discharge valve. Discharge one compartment at a time.
- 5 Watch the discharge throughout. In an emergency, close the bottom valves with the emergency-closing device.
- 6 After discharging, close all valves, drain the hose into the receiving tank, disconnect it, fit the caps and disconnect the earthing cable last.

7.5 CLEANING AND CHANGE OF PRODUCT

- When changing to a product that is not compatible with the previous one, have the tank cleaned and certified by an approved tank-cleaning station.
- Never enter a compartment without a confined-space permit (see Chapter 2).

7.6 ON THE ROAD

- Close all manholes, valves and caps; stow the hoses.
- Drive particularly smoothly with part-filled compartments; brake early and take bends slowly.
- With dangerous goods: display the orange-coloured plates and placards, carry the documents and equipment required by ADR, and observe tunnel restrictions.

SILO – FILLING AND PNEUMATIC DISCHARGE

The silo is a pressure vessel. During discharge it is pressurised with compressed air, which fluidises the product in the discharge cones and conveys it through the discharge pipe into the receiving silo. Operated correctly it is clean and fast; operated incorrectly it can block, damage the receiving silo or release product and pressure suddenly.

DANGER



Stored pressure. Never open a manhole, a valve or a hose coupling while the silo is under pressure. Always check the pressure gauge reads 0 bar and open the vent valve before opening anything. Never exceed the maximum working pressure shown on the tank plate (typically 2.0 bar).

8.1 SILO AND EQUIPMENT

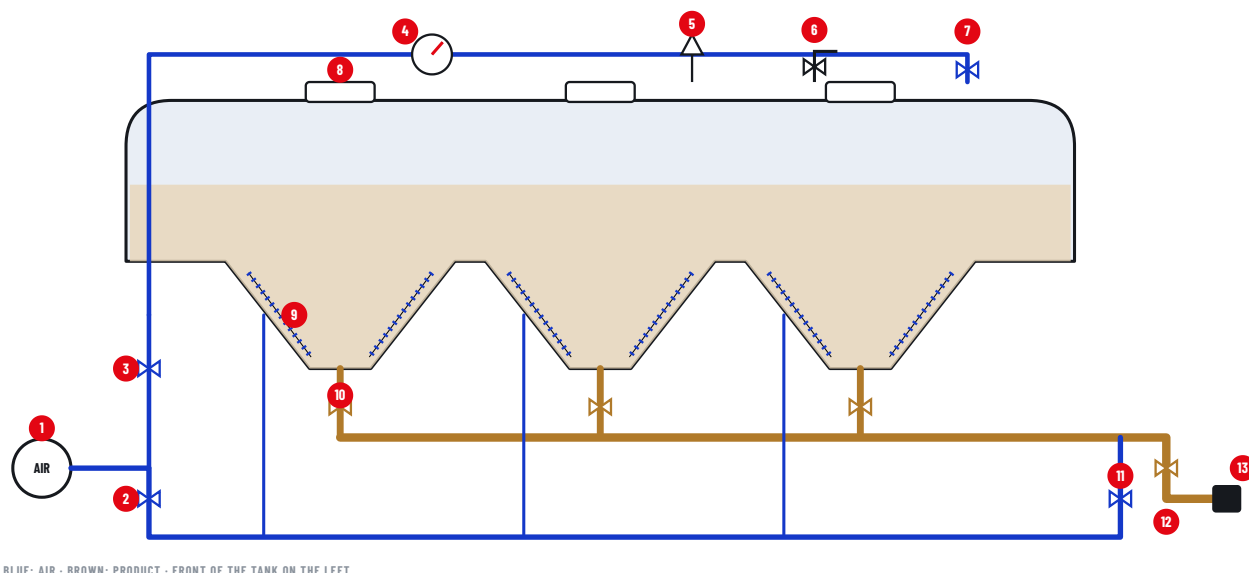


FIGURE 8.1 Silo – function principle of the pneumatic discharge system (schematic)

- | | |
|--|----------------------------------|
| 1 Air supply (compressor of the towing vehicle or on-board compressor) with non-return valve | 2 Main air valve – cone aeration |
| 3 Top-air valve (tank pressurisation) | 4 Pressure gauge |

- | | |
|---|---------------------------------|
| 5 Safety valve | 6 Vent (blow-off) valve |
| 7 Top-air inlet | 8 Filling manholes |
| 9 Aeration pads in the discharge cones | 10 Cone discharge valves |
| 11 Pipe-air (booster) valve | 12 Main discharge valve |
| 13 Discharge coupling | |

8.2 FILLING

- 1** Park on level ground under the filling station, apply the parking brakes and place the chocks. Earth the vehicle.
- 2** Check that the silo is depressurised (gauge 0 bar) and that all discharge valves are closed.
- 3** Open the manholes using the walkway and handrail. Check the seals.
- 4** Fill each compartment evenly; observe the permissible payload and axle loads.
- 5** Clean the manhole seats, close and lock all manholes before leaving the walkway.

8.3 DISCHARGING

- 1** Park close to the receiving silo with the shortest possible, straight hose run. Apply the parking brakes, chock the wheels and earth the vehicle.
- 2** Connect the discharge hose (normally 100 mm nominal size, as short as possible, max. approx. 4 – 5 m of flexible hose, without kinks or S-bends) to the discharge coupling and to the filling pipe of the receiving silo. Make sure the receiving silo has enough free capacity and that its filter and vent are working.
- 3** Connect the air supply. Start the compressor with all valves closed.
- 4** Open the top-air valve and pressurise the silo. Watch the gauge.
- 5** Open the pipe-air valve to clear and pre-fill the discharge pipe with air.
- 6** When the working pressure is reached (typically 1.5 – 2.0 bar), open the main air valve for cone aeration, then open the first cone discharge valve slowly.
- 7** Adjust the discharge valve so that the pressure remains stable. If the pressure rises and the flow stops, the pipe is overfilled: close the cone valve and increase the pipe air until the pipe is clear.
- 8** Empty the cones one after another, from the rear to the front unless the specification states otherwise.
- 9** When the silo is empty, keep the air flowing until the pipe is clear, then close all product valves.
- 10** Switch off the compressor and open the vent valve until the gauge reads 0 bar. Disconnect the hose only after the pressure has been released.

WARNING



Safety valve. The safety valve protects the silo from overpressure. Never block, adjust or remove it. If it blows off during discharge, stop the compressor and find the cause. Have the safety valve checked at the intervals in Section 13.2.

NOTICE

Overheating of the product. Compressed air leaves the compressor hot. Long discharge times with a fully throttled discharge can overheat sensitive products (plastics, foodstuffs). Follow the product supplier's limits.

8.4 AFTER DISCHARGING

- Check that the gauge reads 0 bar; close all valves and fit the caps.
- Open a manhole briefly to check that the silo is empty (only when depressurised).
- Drain condensed water from the air system.
- Clean the discharge coupling and stow the hoses.

SIDE LIFTER – CONTAINER HANDLING

The side lifter loads and unloads ISO containers with its own two hydraulic cranes – from the ground, from another vehicle or from a rail wagon – without external lifting equipment. The main hazards are overturning, falling containers and contact with overhead power lines.

DANGER



Overturning – falling container – power lines. Never lift without both stabiliser legs fully deployed on firm ground. Never exceed the rated capacity and reach shown on the crane plate. Never lift near overhead power lines. Nobody may stand under a suspended container or within the working area of the cranes.

9.1 CRANES AND CONTROLS

The side lifter has a front and a rear crane, each with a hydraulically extending and folding arm, a stabiliser leg and lifting chains that are attached to the bottom corner castings of the container. The cranes are powered by **an on-board diesel power unit / the towing vehicle's PTO** and controlled from the control station at the rear or with the remote control (if fitted).

TABLE 9.1 – SIDE-LIFTER EQUIPMENT

ITEM	FUNCTION
Rated capacity plate	Maximum container mass and reach for each crane position: TBC
Control station / remote control	Hold-to-run controls for stabiliser legs, crane arms and chains
Emergency stop	On the control station and on the remote control – stops all movements
Stabiliser legs	Transfer the lifting forces into the ground; interlocked with the crane functions
Locating guides / twistlocks	Position and lock the container on the bed for transport
Load-moment / overload protection (if fitted)	Stops movements that would increase the overturning moment

9.2 BEFORE LIFTING

- ☐ Combination parked on firm, level ground; towing vehicle coupled, parking brakes applied, wheel chocks in place
- ☐ Container mass known (container plate / documents) and within the rated capacity
- ☐ No overhead power lines, structures or obstacles within the working area
- ☐ Ground under the stabiliser feet able to carry the loads; load-spreading plates placed on soft ground
- ☐ Working area cordoned off; nobody within the swing area
- ☐ Wind speed within the limit stated by the crane manufacturer
- ☐ Chains, shackles and hooks undamaged; container corner castings undamaged
- ☐ Container doors closed and secured; load inside the container secured

9.3 LIFTING A CONTAINER ONTO THE SEMI-TRAILER

- 1 Position the semi-trailer parallel to the container, at the distance shown on the reach plate.
- 2 Switch on the power unit and the control system.
- 3 Deploy both stabiliser legs until the feet are firmly on the ground and the semi-trailer is level. Do not lift the wheels off the ground unless the crane manufacturer specifies it.
- 4 Extend the crane arms over the container and lower the chains.
- 5 Attach the chains to the bottom corner castings of the container with the approved lifting hooks; check that each hook is fully engaged and locked.
- 6 Lift the container slowly and evenly with both cranes until it is clear of the ground. Stop and check the stability and the chains.
- 7 Bring the container over the bed, keeping it level, and lower it onto the locating guides.
- 8 Lock all twistlocks / locating devices.
- 9 Remove the chains, fold the crane arms into the transport position and lock them.
- 10 Retract the stabiliser legs fully and lock them. Switch off the power unit.

9.4 UNLOADING A CONTAINER

Unloading follows the reverse sequence. Release the twistlocks only after the stabiliser legs have been deployed and the chains attached and tensioned. Place the container on firm, level ground or on the receiving vehicle; never set it down on uneven ground where it could tilt.

9.5 STACKING AND TRANSFER *(IF PERMITTED BY THE CRANE SPECIFICATION)*

- Stacking a container on top of another or transferring it to and from another vehicle or a rail wagon is only permitted within the reach and height limits shown on the reach plate.
- When transferring to another vehicle, that vehicle must be braked, and its twistlocks open.

9.6 TRANSPORT

- Transport only containers that are locked on all four corners.
- Drive with cranes folded and locked and stabiliser legs fully retracted and locked.
- The laden side lifter has a high centre of gravity; reduce speed in bends.

FLATBED — LOADING AND LOAD SECURING

10

The 13.6 m flatbed carries palletised and general cargo on a flat platform with removable stakes and a headboard. Correct load distribution and load securing are the driver's and the loader's joint responsibility.

10.1 BEFORE LOADING

- ☐ Semi-trailer coupled, parking brake applied, wheel chocks in place, on firm and level ground
- ☐ Air suspension at ride height
- ☐ Platform clean, dry and free of oil, ice and loose material
- ☐ Stakes and headboard undamaged; stakes removed or fitted as required for the loading method
- ☐ Lashing equipment ready, labelled and in good condition
- ☐ Load weight and centre of gravity known

10.2 LOADING AND LOAD DISTRIBUTION

- Load from the side or the rear with a forklift or crane. Keep everyone else out of the loading zone.
- Distribute the load so that the permissible axle loads and king pin load are not exceeded. Place heavy items close to the longitudinal centre line.
- Place the load against the headboard wherever possible (form-fit blocking).
- Use load-spreading timbers under concentrated loads so that the platform and cross-members are not overloaded locally.

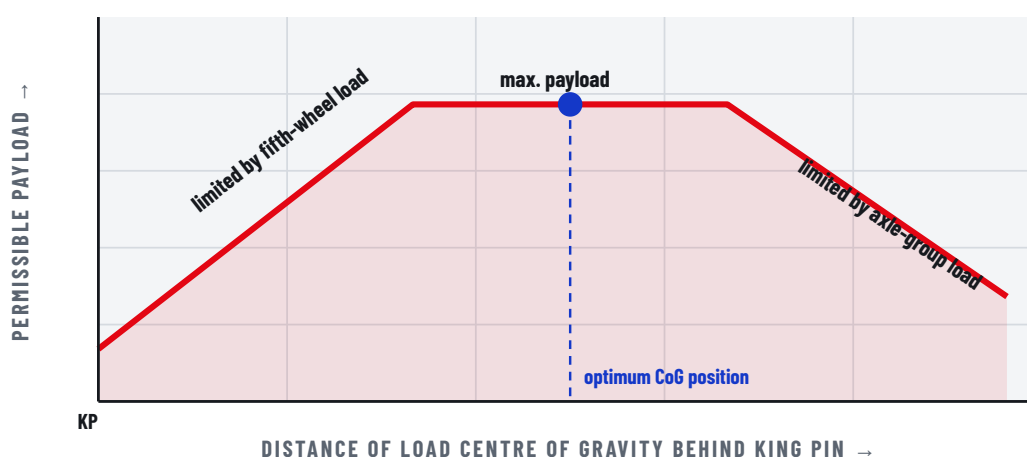


FIGURE 10.1 Principle of a load-distribution diagram — the permissible payload depends on the position of the load's centre of gravity (illustration)

10.3 LOAD SECURING

The load restraint must withstand the inertia forces of EN 12195-1: 0.8 g forwards, 0.5 g rearwards and 0.5 g sideways (0.7 g for loads at risk of tipping).

- Combine blocking (headboard, stakes, wedges), friction (anti-slip mats) and lashing (top-over or direct lashing).
- Use only marked lashing equipment to EN 12195-2 (web lashings), -3 (chains) or -4 (wire ropes).
- Attach lashings only to the lashing points of the semi-trailer. Lashing-point capacity: **LC = ... daN per point** (EN 12640).
- Protect lashings from sharp edges with edge protectors.
- Stakes provide lateral blocking only up to their rated strength; they do not replace lashings.
- Re-check the tension of all lashings after the first kilometres and after heavy braking.

10.4 STAKES

- Insert each stake fully into its pocket and secure it with the locking pin or bolt.
- Fit and remove stakes only when the platform is not being loaded; handle long stakes with two people.
- Store removed stakes in the stake rack or secure them on the platform.

10.5 SELF-STEERING AXLE

The last axle of the flatbed is a self-steering axle. It is locked automatically when reversing (via the reversing-lamp signal). See Section 5.6.

10.6 UNLOADING

- 1 Park on firm, level ground; apply the parking brake and place the wheel chocks.

- 2 Check that the load has not shifted and that it cannot fall when the lashings are released.
- 3 Release the lashings one at a time, standing clear of the load.
- 4 Unload with suitable lifting equipment; keep the loading zone clear.
- 5 Clean the platform; inspect and stow the lashing equipment and stakes.

CONCRETE MIXER – OPERATION

11

The mixer semi-trailer carries ready-mixed concrete in a rotating drum. The drum is driven hydraulically by its own diesel engine at the front of the semi-trailer, so it can keep turning independently of the towing vehicle. Concrete is a perishable load: it must be kept agitated and discharged within the time specified by the concrete supplier.

DANGER



Entanglement and crushing at the rotating drum. Never reach into the hopper, the drum opening or the chute while the drum is turning. Never climb the ladder to the hopper while the drum is turning. Stop the drum and the engine and remove the key before any cleaning or maintenance on the drum.

11.1 MIXER EQUIPMENT

TABLE 11.1 – MIXER EQUIPMENT

ITEM	FUNCTION
On-board diesel engine	Drives the hydraulic pump of the drum drive
Hydraulic pump, motor and drum gearbox	Rotate the drum in both directions at variable speed
Drum controls (rear and / or front)	Direction (charge / discharge), speed, emergency stop
Water tank and pump	Water for washing the hopper, chute and drum
Charging hopper	Receives the concrete from the batching plant
Discharge chute with extensions	Directs the concrete; swivels and is adjustable in height
Ladder and platform	Access to the hopper for inspection and cleaning

11.2 STARTING THE ENGINE

- 1 Check the engine oil, coolant and fuel levels and the hydraulic oil level of the drum drive.
- 2 Check that the drum controls are in the neutral (stop) position.
- 3 Start the engine according to the engine manufacturer's instructions and let it warm up.

- 4 Check the drum function at low speed in both directions.

11.3 CHARGING (LOADING)

- 1 Position the semi-trailer under the batching plant outlet so that the concrete falls centrally into the hopper.
- 2 Set the drum to **charging** direction at the charging speed specified by the drum manufacturer.
- 3 Do not exceed the nominal drum volume or the permissible payload. A full drum must not overflow at the hopper when the semi-trailer is driven on gradients.
- 4 After charging, rinse the hopper and the hopper edges with water to remove residues.

11.4 TRANSPORT

- Keep the drum turning at **agitating speed** in the charging direction during the whole journey.
- Fold and secure the chute and its extensions before driving.
- A full drum has a high centre of gravity and the rotating load acts sideways. Take bends slowly and avoid sudden steering.
- Observe the maximum time between batching and discharge specified by the concrete supplier.

11.5 DISCHARGING

- 1 Park on firm, level ground; apply the parking brakes. Set the drum to mixing speed for a short time to homogenise the concrete.
- 2 Unfold the chute, fit the extensions and secure them. Position the chute over the placing point.
- 3 Set the drum to **discharge** direction. Control the flow with the drum speed.
- 4 Keep everyone except the operator away from the chute. Do not move the semi-trailer while discharging unless guided by a banksman and at walking pace.
- 5 After discharging, set the drum to charging direction and wash out the drum with a small amount of water (see below).

11.6 WASHING OUT AND CLEANING

- Wash the hopper, the chute and the drum opening immediately after every discharge — hardened concrete is very difficult to remove and adds weight.
- Rinse the drum with water while it rotates in the charging direction, then discharge the washing water at the place designated by the site or plant. Never discharge washing water into drains or open ground.
- Clean the drum interior regularly. Never enter the drum without a confined-space permit, with the engine stopped, the key removed and the drum secured against rotation.
- In frost, drain the water tank, the pump and the hoses after use.



Washing water and residual concrete. Washing water from concrete is highly alkaline. Dispose of it and of residual concrete only at the facilities provided by the concrete plant or the site.

11.7 EMERGENCY: DRUM STOPS WHILE LADEN

If the drum stops with concrete inside (engine or hydraulic failure), the concrete starts to set. Contact the service immediately. Depending on the drum drive, an emergency drive can be connected from another mixer or a hydraulic power source (*if fitted*). Never attempt to empty the drum by hand.

DELIVERY AND COMMISSIONING

12

A correct handover and a careful first few hundred kilometres lay the foundations for a long and trouble-free service life.

12.1 HANDOVER

The semi-trailer is delivered fully assembled and ready for operation, with the standard equipment listed in Section 3.5. Optional equipment is supplied as ordered.

At handover, the dealer or STU representative will introduce the new owner to the design and operation of the semi-trailer, its safety devices, the maintenance requirements and the warranty conditions. The owner should check that:

- ☐ The semi-trailer is complete and undamaged and all standard and ordered equipment is present
- ☐ The VIN on the chassis and on the statutory plate matches the VIN in the CoC and the warranty certificate
- ☐ The Certificate of Conformity, this user manual and the component manufacturers' documentation have been handed over
- ☐ The warranty certificate has been completed and signed (Appendix D)
- ☐ The handover and the instruction of the driver(s) and operator(s) have been recorded (Appendix C)

12.2 COMMISSIONING

Before the first journey, and before every use after a long period out of service:

- 1 Familiarise yourself with the names and positions of the main assemblies (Section 3.1).
- 2 Check the tyre pressures (Section 13.6).
- 3 Couple the semi-trailer to a suitable towing vehicle (Chapter 4).
- 4 With the engine of the towing vehicle switched off and the parking brake applied, check the electrical and pneumatic connections for correct function and leaks.
- 5 Check that all lamps work.
- 6 Check the function of the air suspension and of the body equipment: tipping and lowering (tipper), valves and seals (tanker, silo), cranes and stabiliser legs (side lifter), engine, drum and water system (mixer).
- 7 Release the parking brake and carry out a brake test at low speed.

12.3 RUNNING-IN

During the first operating period, components settle and must be checked:

TABLE 12.1 – RUNNING-IN CHECKS

WHEN	CHECK
After the first 100 km (laden)	Re-tighten the wheel nuts to the specified torque (Section 13.6)
After 200 km	Re-tighten the wheel nuts again
After the first 1,000 km	Check the wheel-bearing play; check the brake adjustment; check the U-bolts / axle fixings to the axle manufacturer's specification
After the first 10 tipping / lifting cycles	Check the cylinder and crane fixings and the body pivots; re-tighten as specified
After 1 month	Check all bolted joints on the running gear, the king pin and the landing legs

NOTICE



Wheel nuts settle. New wheels, and wheels that have been refitted, settle on the hub during the first kilometres. Re-tightening the wheel nuts after 100 km and 200 km is essential – loose wheel nuts can lead to the loss of a wheel. This also applies after every wheel change.

New brake linings and pads reach their full performance only after they have bedded in. Brake gently and progressively during the first 1,000 km where traffic allows, and avoid long periods of continuous braking.

MAINTENANCE AND SERVICING

13

Regular inspection and maintenance keep the semi-trailer safe, roadworthy and in compliance with the type approval – and they are a condition of the warranty. Small defects found early are quick and inexpensive to correct.

13.1 SAFETY DURING MAINTENANCE

WARNING



Risk of injury from moving parts and stored energy. Before any maintenance work: park the semi-trailer on firm, level ground; apply the parking brake and place the wheel chocks; switch off the engine of the towing vehicle and the on-board power unit and remove the key; lower the tipping body onto its rests or prop it with the body prop; fold the side-lifter cranes; stop the mixer drum; depressurise the pneumatic and hydraulic systems before opening them. Never work under a semi-trailer that is supported only by its suspension or a jack – always use axle stands of sufficient capacity.

- Wear the PPE listed in Section 2.6: at least safety footwear, gloves and safety goggles.
- Work on brakes, hydraulics and electronics may only be carried out by qualified specialists.
- Use only original STU spare parts or parts approved by STU. Order spare parts quoting the VIN.
- Dispose of used oils, greases, filters, batteries and cleaning agents in accordance with environmental regulations.
- Record every maintenance operation in the maintenance log (Appendix B).

13.2 MAINTENANCE SCHEDULE

The intervals below apply to normal operating conditions. Under severe conditions – construction sites, off-road use, high-pressure cleaning, de-icing salt, extreme temperatures – shorten the intervals. Where a component manufacturer specifies shorter intervals, those apply.

TABLE 13.1 – MAINTENANCE SCHEDULE (● = CARRY OUT)

ASSEMBLY / TASK	DAILY	WEEKLY	MONTHLY	3 MONTHS OR 25,000 KM	ANNUALLY
COUPLING AND CONNECTIONS					

Air couplings: clean, seals intact, protective caps present	●			
Electrical and hydraulic connectors: damage, corrosion, leaks	●			
King pin and king pin plate: clean, lubricate, check for damage		●		
King pin wear check (Section 13.11)				●
RUNNING GEAR AND BRAKES				
Tyres: visual check for damage	●			
Tyre pressure		●		
Wheel nuts: check for tightness and rust streaks	●			
Wheel hubs: heating and grease leakage after a journey	●			
Air bellows and shock absorbers: damage, leaks	●			
Lift-axle and steering-axle function (<i>if fitted</i>)		●		
Brake linings / pads: wear			●	
Brake adjustment (slack adjusters)				●
Wheel-bearing play				●
Axle fixings, U-bolts, suspension pivots				●
Wheel-bearing grease change (or per axle manufacturer)				●
Brake test on roller dynamometer				●
PNEUMATIC SYSTEM				
Air leaks (listen)	●			
Drain the compressed-air reservoir		●		
Air lines and hoses: chafing, porosity			●	
Clean the line filters in the couplings				●
TIPPER				
Tailgate hinges and locks: function	●			
Tipping cylinder: leaks, damage, chrome surface		●		
Cylinder pivots, body pivots and tailgate hinges: lubricate			●	
Body rests, stabilisers and tipping stop / limit valve: function			●	
Tarpaulin and roll mechanism			●	
TANKER AND SILO				
Manholes, seals, valves and caps: leaks, function	●			
Earthing cable and clamp: condition		●		
Safety valve and pressure gauge (silo): function check			●	

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13.3 LUBRICATION

Proper lubrication is one of the most important factors for the service life of the semi-trailer's moving parts.

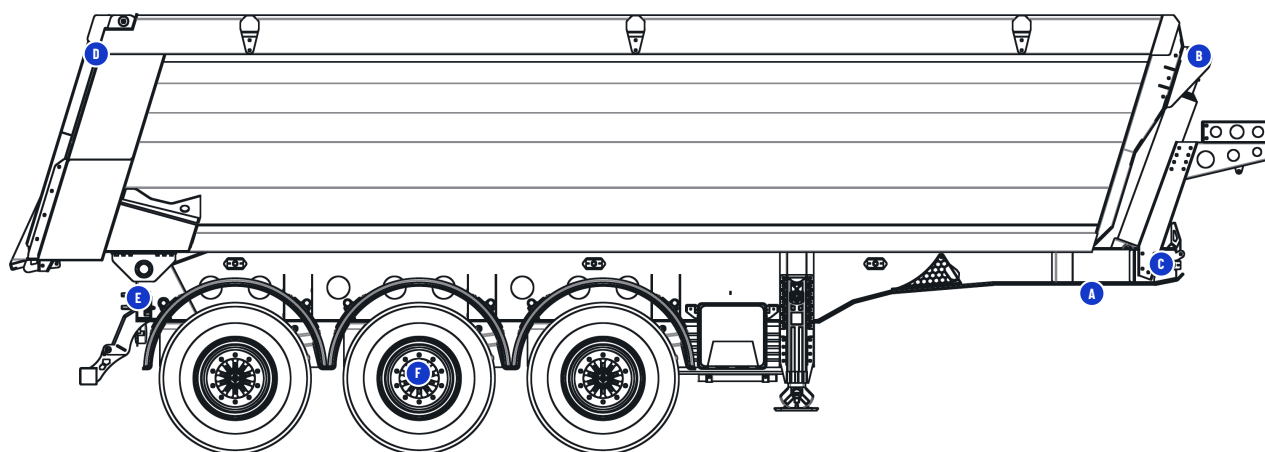

FIGURE 13.1 Lubrication points – tipper shown; points A and F apply to all bodies

TABLE 13.2 – LUBRICATION CHART

POINT	LOCATION	LUBRICANT	INTERVAL
A	King pin and king pin plate	Fifth-wheel grease or graphite grease	Weekly / after cleaning
B	Tipping cylinder upper pivot (tipper)	Multi-purpose lithium grease (NLGI 2)	Weekly
C	Tipping cylinder lower pivot / cradle (tipper)	Multi-purpose lithium grease (NLGI 2)	Weekly
D	Tailgate hinges and locks (tipper)	Multi-purpose lithium grease (NLGI 2)	Weekly
E	Body rear tipping pivots (tipper)	Multi-purpose lithium grease (NLGI 2)	Weekly
F	Brake camshaft bearings and slack adjusters (drum brakes)	Per axle manufacturer	Per axle manufacturer, at least 3-monthly
—	Side-lifter crane pivots, slides and stabiliser legs	Per crane manufacturer	Per crane manufacturer, at least monthly
—	Mixer drum rollers, chute pivots	Multi-purpose lithium grease (NLGI 2)	Weekly
—	Landing-leg gearbox and spindles	Multi-purpose lithium grease (NLGI 2)	Monthly
—	Wheel bearings	High-temperature wheel-bearing grease per axle manufacturer	Annually or per axle manufacturer
—	Locks, hinges, toolbox, manhole hinges, stake pockets	Multi-purpose grease or spray lubricant	Monthly

Rules for lubricating:

- Clean grease nipples before applying the grease gun.

- Pump in grease until fresh grease emerges from the bearing gap; wipe off the old grease that is pushed out.
- Leave a small amount of grease on the nipple head as protection.
- Do not over-lubricate brake components — grease on linings or discs severely reduces braking performance.
- Never drive without hub caps. Dirt and water entering the hub will destroy the wheel bearings.

13.4 RUNNING GEAR

13.4.1 WHEEL-BEARING PLAY

Check the wheel-bearing play after the first 1,000 km and then at the intervals in Section 13.2. Many modern axles have maintenance-free, pre-adjusted hub units — in that case follow the axle manufacturer's instructions and do not attempt to adjust them.

For adjustable taper-roller bearings:

- 1 Couple the semi-trailer, apply the towing vehicle's parking brake and chock the wheels on the opposite side.
- 2 Raise the axle with a jack placed under the axle beam close to the wheel until the tyre is clear of the ground. Support the axle securely on an axle stand.
- 3 Check for play by rocking the wheel at the top and bottom. If the play is excessive, remove the hub cap and the axle-nut locking device.
- 4 Turn the wheel and at the same time tighten the axle nut until the wheel just begins to drag.
- 5 Back off the axle nut to the next locking position (typically $\frac{1}{6}$ to $\frac{1}{3}$ of a turn), as specified by the axle manufacturer.
- 6 Secure the nut with a new locking device; refit the hub cap with a new seal.
- 7 Check that the wheel turns freely without noticeable drag, apart from light contact of the brake linings.
- 8 After a short test drive, check the hub temperature by hand. A hub that is clearly hotter than the others indicates incorrect adjustment, contaminated grease or bearing damage.

13.4.2 SUSPENSION

- Check air bellows for cracks, chafing and leaks; check that the ride height is correct.
- Check shock absorbers for leaks and secure mounting.
- Check suspension arms, pivot bushes and U-bolts for wear and tightness. Tighten U-bolts only to the axle manufacturer's specified torque, with the vehicle standing on its wheels.

13.5 BRAKES

13.5.1 PNEUMATIC SYSTEM

- Drain condensed water from the compressed-air reservoir weekly — pull or tilt the drain valve while the reservoir is under pressure. Clean the drain valve before winter.
- If oil or a large quantity of water comes out, the air supply from the towing vehicle is not clean and dry; have the towing vehicle's air dryer checked. Damage caused by contaminated compressed air is not covered by the warranty.
- Find leaks by listening for hissing, or by applying soapy water to the connections. Replace leaking seals, lines and components.

- The operating pressure of the dual-line system is approximately 6.5 – 8.5 bar.

13.5.2 BRAKE ADJUSTMENT AND WEAR

- Check the brake linings / pads for wear monthly and replace them in axle sets when the wear limit is reached.
- The semi-trailer is normally fitted with automatic slack adjusters. Check their function every 3 months: the stroke of the brake chamber push rod must stay within the axle manufacturer's limits. Do not use automatic slack adjusters to adjust the brakes manually except during brake re-lining.
- After new linings or pads have been fitted, bed them in and re-check the adjustment.
- Have the brakes checked annually on a roller brake tester. Under UN Regulation No. 13, the service brake of a semi-trailer must achieve a braking rate of at least 45 % of the permissible load, and the parking brake must be able to hold the laden semi-trailer on an 18 % gradient. The difference in braking force between the left and right wheels of an axle must not exceed the limit set by the periodic-inspection rules in force.

WARNING



Brake failure. Work on the braking system – including the EBS – may only be carried out by trained specialists using the brake manufacturer's diagnostic equipment. Never cage a spring brake chamber or open a brake valve without following the manufacturer's instructions.

13.6 WHEELS AND TYRES

13.6.1 TYRES

Use only tyres of the size, load index, speed category and type approved for the semi-trailer (see the CoC). Do not mix tyres of different sizes or construction on one axle.

TABLE 13.3 – APPROVED TYRE SIZES AND RECOMMENDED INFLATION PRESSURES (COLD TYRES, MAXIMUM LOAD) – THE SIZES APPROVED FOR YOUR SEMI-TRAILER ARE LISTED IN ITS COC

TYRE SIZE	LOAD INDEX	SPEED SYMBOL	INFLATION PRESSURE
385/65 R22.5	160	J / K / L	8.5 – 9.0 bar
385/55 R22.5	160	K / L / M	8.5 – 9.0 bar
445/45 R19.5	160	J	9.0 bar
435/50 R19.5	160	J	8.5 – 9.0 bar
315/80 R22.5	156/150	K / L / M	8.5 – 9.0 bar

- Check the tyre pressure weekly with a calibrated gauge, with the tyres cold. Observe the tyre manufacturer's recommendations.
- Correct tyre pressure prevents irregular wear and tyre failure, and reduces fuel consumption.
- Check tyres daily for cuts, bulges, embedded objects and exposed cords. Minimum tread depth: as required by national law (in the EU generally 1.6 mm; national rules may be stricter).



FIGURE 13.2 Check the pressure with a calibrated gauge



FIGURE 13.3 Gauge in good condition (left) – damaged gauge (right)

13.6.2 WHEEL NUTS

TABLE 13.4 – WHEEL-NUT TIGHTENING TORQUES – ALWAYS CHECK THE VALUE SPECIFIED BY THE AXLE MANUFACTURER

THREAD	TIGHTENING TORQUE
M18 × 1.5	330 – 370 N·m
M20 × 1.5	450 – 550 N·m
M22 × 1.5	600 – 660 N·m
M24 × 1.5	820 – 960 N·m

- Tighten wheel nuts diagonally in several stages using a calibrated torque wrench.
- Re-tighten after 100 km and again after 200 km following every wheel change.
- Do not lubricate the threads unless the axle manufacturer specifies it.

13.6.3 WHEEL ALIGNMENT

Correct axle alignment ensures that the semi-trailer follows the towing vehicle in a straight line, minimises tyre wear and rolling resistance and saves fuel. Have the axle alignment checked whenever uneven tyre wear is found, after an accident and after work on the suspension.

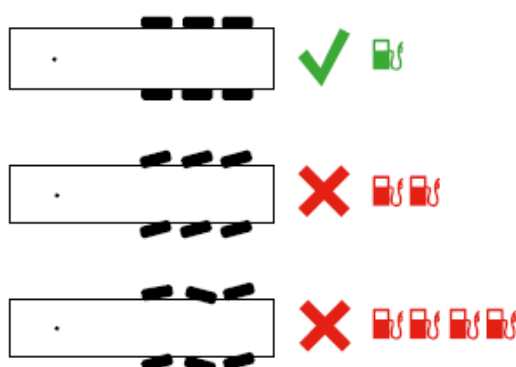


FIGURE 13.4 Correct and incorrect axle alignment

13.7 HYDRAULIC SYSTEM

- Check the hydraulic oil level of the tipping system (oil tank on the towing vehicle or on the semi-trailer), of the side-lifter power unit and of the mixer drum drive as specified by the respective manufacturer. Top up only with the oil type specified on the unit.
- Change hydraulic oil and filters at the intervals given by the cylinder, crane or drum-drive manufacturer — at least annually.
- Keep the chrome surface of the tipping cylinder clean; never paint or weld near it.
- Check hoses and cylinders for leaks and damage. Replace hydraulic hoses at the latest six years after their date of manufacture, including a maximum of two years' storage, or immediately if they are damaged.
- Keep hydraulic couplings clean and closed with their dust caps when not in use.

WARNING



Hydraulic oil under pressure. Escaping hydraulic oil can penetrate the skin and cause serious injury. Never feel for leaks with your hand. Lower all hydraulically operated parts and depressurise the system before opening any hydraulic connection. If oil penetrates the skin, seek medical help immediately.

13.8 TANKS AND SILOS — PERIODIC INSPECTION

- Tanks and silos are pressure or transport vessels that must be inspected periodically by an approved inspection body — for ADR tanks according to ADR Chapter 6.8 (intermediate inspection at least every 3 years and periodic inspection at least every 6 years for tank-vehicles). The dates are shown on the tank plate.
- Never weld on a tank or silo shell. Repairs to the shell may only be carried out by a workshop approved for tank repairs.
- Replace manhole and valve seals with seals of the approved material only.

13.9 ON-BOARD ENGINE (MIXER)

Service the on-board engine according to the engine manufacturer's handbook: oil and filter changes, fuel filter, air filter, coolant and belt checks. Use only the specified fuel and oil grades. Drain water separators regularly. Keep the engine compartment clean and free of concrete residue.

13.10 ELECTRICAL SYSTEM

- Check all lamps daily. Replace defective lamps and lenses at once.
- When replacing lamps or lighting components, check that the connections and lens seals are watertight.
- Keep connectors clean and protect the contacts with a suitable contact spray.
- Before welding, disconnect the EBS modulator, control units and the batteries.

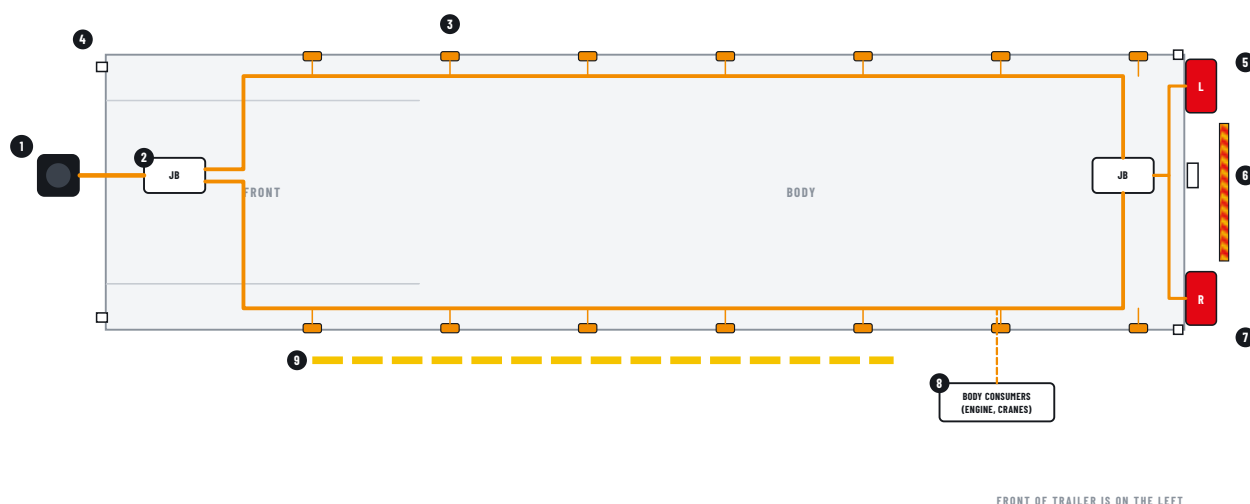


FIGURE 13.5 Lighting installation – schematic top view

- | | |
|--|---|
| 1 15-pole socket ISO 12098 (7-pole sockets optional) | 2 Junction boxes (front and rear) |
| 3 Side marker lamps – amber, at intervals of max. 3 m | 4 Front position lamps – white |
| 5 Rear lamp clusters, left and right | 6 Number-plate lamp |
| 7 End-outline marker lamps | 8 Body consumers – on-board engine, crane control, beacons (if fitted) |
| 9 Retro-reflective conspicuity marking (UN R104) | |



FIGURE 13.6 Rear lamp cluster – typical function layout

13.11 KING PIN

The king pin is a safety-critical component approved under UN Regulation No. 55.

- Keep the king pin and the king pin plate clean and lubricated.
- Check the king pin every 3 months with a king pin gauge. Replace the king pin if its diameter at the locking zone falls below **49.0 mm** (2" king pin) or **86.0 mm** (3½" king pin), or if it is cracked, bent or otherwise damaged – or earlier if the king pin manufacturer specifies stricter limits.
- Check the tightness of the king pin fixing bolts to the manufacturer's specified torque.

- Only replace the king pin with an approved king pin of the same type and fix it with new bolts.


FIGURE 13.7 King pin (example)

13.12 BOLT TIGHTENING TORQUES

Check bolted joints regularly and re-tighten if necessary. Unless a different value is specified for a particular joint, use the following torques for metric coarse-thread bolts:

TABLE 13.5 – GENERAL TIGHTENING TORQUES

THREAD	PROPERTY CLASS 8.8	PROPERTY CLASS 10.9	PROPERTY CLASS 12.9
M6	9.9 N·m	14 N·m	17 N·m
M8	24 N·m	34 N·m	41 N·m
M10	48 N·m	68 N·m	81 N·m
M12	85 N·m	120 N·m	145 N·m
M14	135 N·m	190 N·m	225 N·m
M16	210 N·m	290 N·m	350 N·m
M18	290 N·m	400 N·m	480 N·m
M20	400 N·m	570 N·m	680 N·m
M22	550 N·m	770 N·m	920 N·m

13.13 CLEANING AND CORROSION PROTECTION

- Clean the semi-trailer regularly, particularly after use on construction sites and in winter when de-icing salt is used.
- When using a high-pressure washer, keep a distance of at least 30 cm and do not aim the jet directly at bearings, seals, air bellows, valves, electrical connectors, the EBS modulator, the tipping cylinder rod, crane slides, the mixer engine or labels.
- Use only cleaning agents that are suitable for painted steel and plastic components.
- Repair paint damage promptly: clean and degrease the damaged area, apply primer and top coat of the same colour and film thickness.



Protect the environment. Clean the semi-trailer only at washing bays with an oil separator. Collect used oils, greases, hydraulic fluid and contaminated cleaning materials and dispose of them through an authorised waste-disposal company.

TROUBLESHOOTING

14

The table below lists common faults, their likely causes and the remedy. If a fault cannot be clearly identified or rectified, or if it affects the brakes, the coupling, the hydraulic system or the structure of the semi-trailer, contact an authorised workshop or STU.

TABLE 14.1 – FAULT-FINDING TABLE

FAULT	POSSIBLE CAUSE	REMEDY
Brake drums / discs overheat	Brakes incorrectly adjusted; slack adjuster faulty; brake sticking	Check the adjustment and the slack adjusters; have the brake overhauled
Wheel hub overheats	Wheel-bearing play too small; grease contaminated or insufficient; bearing damaged	Adjust the bearing play; renew the grease; replace damaged bearings
Grease on brake linings	Hub seal damaged, worn or incorrectly fitted	Replace the seal; clean the brake; replace contaminated linings; adjust the bearings
Uneven braking, semi-trailer pulls to one side	Linings contaminated or worn; brakes incorrectly adjusted; brake chamber faulty	Inspect and clean or replace the linings; adjust; replace faulty components
Insufficient braking performance	Brakes out of adjustment; linings glazed or worn; low air pressure; EBS fault	Check the air supply (≥ 6.5 bar); have the brakes and EBS checked by a specialist
Parking brake cannot be released	Insufficient reservoir pressure; supply line not connected; red PREV button pulled out	Connect the supply line; build up pressure; push in the red button (Section 4.5)
EBS / ABS warning lamp lit	ISO 7638 connector not connected or damaged; sensor or modulator fault	Check the connector and cable; have the fault memory read by a brake specialist
Air leak at couplings or connections	Loose connection; damaged seal	Tighten or replace the connection or seal
Air leak at a valve or brake chamber	Worn seals; mechanical damage	Replace the seals or the complete component
Semi-trailer not level / air suspension does not reach ride height	Lift / lower valve not in ride position; levelling valve linkage damaged; bellows leaking	Set the valve to ride; check the linkage and the bellows

Lights do not work	Bulb or LED unit defective; fuse; connector corroded; cable damaged	Replace the lamp; check the fuse; clean the connector; repair the cable
Tipping body does not rise	PTO not engaged; oil level too low; hydraulic coupling not connected; load too heavy	Engage the PTO; top up oil; connect couplings; do not overload
Body lowers on its own	Internal leak in the tipping cylinder or valve	Lower and prop the body; have the hydraulics repaired
Silo does not build pressure	Manhole or valve open or leaking; compressor fault	Close and check seals; check the compressor and the non-return valve
Silo discharge blocks	Air / product ratio wrong; aeration pads blocked; damp product	Reduce product valve opening; increase pipe air; clean aeration pads
Side-lifter crane does not move	Stabiliser legs not deployed (interlock); emergency stop pressed; low oil	Deploy the legs; reset the emergency stop; check the power unit
Mixer drum does not turn	Engine not running; hydraulic fault; overload	Check the engine and the drum-drive hydraulics; contact service
Uneven tyre wear	Incorrect tyre pressure; axle misalignment; overloading	Correct the pressure; have the alignment checked; observe the axle loads
Landing legs hard to operate	Lack of lubrication; bent spindle; gear not fully engaged	Lubricate; check for damage; engage the gear correctly

STORAGE, DECOMMISSIONING AND DISPOSAL

15

15.1 TEMPORARY STORAGE

If the semi-trailer is taken out of service for a longer period:

- 1 Clean the semi-trailer thoroughly and repair any paint damage.
- 2 Park it on firm, level, well-drained ground — preferably under cover.
- 3 Lower the tipping body; fold the cranes; empty, clean and close tanks and silos; empty and flush the mixer drum and drain the water system.
- 4 Support the chassis so that the tyres are relieved of load, or check the tyre pressure monthly. Protect the tyres from direct sunlight.
- 5 Drain the compressed-air reservoir.
- 6 Lubricate all lubrication points and protect bright metal parts and exposed cylinder rods with a corrosion inhibitor.
- 7 Disconnect on-board batteries (*if fitted*) and keep them charged.
- 8 Secure the semi-trailer against unauthorised use and against access by children.
- 9 Mixer: drain the water system and the engine cooling system if no antifreeze is used; disconnect the engine battery.

Before putting the semi-trailer back into service, carry out the commissioning procedure in Chapter 12.

15.2 DISPOSAL

At the end of its service life, the semi-trailer must be disposed of in an environmentally responsible manner.

- Hand the semi-trailer over to an authorised end-of-life vehicle treatment facility.
- The certificate of destruction issued by the facility is required to de-register the semi-trailer.
- Drain hydraulic oil, lubricants and other fluids beforehand and dispose of them separately.
- Steel, aluminium, timber, rubber and plastic components can be recycled.



Recycling. Most of the semi-trailer's mass is steel and can be recycled almost completely. Usable components may be reconditioned and reused, provided they are inspected and approved for further use.

WARRANTY

16

16.1 WARRANTY PERIOD

TABLE 16.1 – WARRANTY PERIODS

WARRANTY	SCOPE	PERIOD
Standard warranty	Defects in material and workmanship of the semi-trailer	12 months from the date of delivery
Production (structural) warranty	Chassis and welded structure	24 months or 250,000 km from the date of delivery, whichever comes first
Paint warranty	Coating system (provided by the paint supplier)	24 months from the date of delivery

16.2 WARRANTY PROCEDURE

- Warranty claims must be notified to STU **before** any repair is carried out. Repairs that have not been notified and approved in advance will not be accepted.
- Warranty repairs must be carried out by an STU-authorised service partner or a workshop approved by STU in writing.
- Only original STU parts or parts from STU-approved suppliers may be used.
- Replaced parts must be kept by the authorised service partner for 180 days and made available to STU on request. Parts replaced under warranty must then be scrapped so that they cannot be re-used.
- STU reserves the right to inspect the semi-trailer before and during the repair.
- A warranty repair does not extend or renew the warranty period of the semi-trailer.
- Warranty claims can only be made by the owner of the semi-trailer or by a party acting on the owner's behalf.
- Invoices for approved warranty work must quote the STU authorisation number and the VIN.
- The general terms and conditions of STU apply. The full warranty terms are available from STU and at www.stutrailer.com.

16.3 EXCLUSIONS

The following are **not** covered by the warranty:

- wear parts and consumables, such as tyres, brake linings and pads, brake drums and discs, air bellows, bulbs, timber flooring, filters, oils and greases;
- damage caused by improper use, overloading, accidents, abnormal driving behaviour or operation under abnormal conditions;
- damage caused by inadequate or incorrect maintenance, or by contaminated compressed air from the towing vehicle;
- damage caused by modifications or repairs not approved by STU;
- consequential and indirect costs, including recovery, towing, replacement vehicles, semi-trailer hire, transport costs, call-out charges, subsistence, loss of revenue and damage to the load;
- routine maintenance costs.

STU may refuse a warranty claim if the warranty conditions or the general terms and conditions have not been observed.

APPENDICES

17

17.1 APPENDIX A – TRAILER DATA SHEET

Complete this sheet at handover from the statutory plate and the Certificate of Conformity.

TABLE 17.1 – TRAILER DATA

ITEM	VALUE
VIN	
Type / variant / version	
EU type-approval number	
Number of axles / lift axle / steering axle	
Technically permissible max. laden mass	kg
Permissible mass on the king pin	kg
Permissible axle / axle-group load	kg
Unladen mass	kg
King pin size	2" ☐ 3½" ☐
Tyre size	
Axle make and type	
Brake system make and type	
Date of first registration	
Registration number	

17.2 APPENDIX B – MAINTENANCE LOG

TABLE 17.2 – MAINTENANCE LOG

DATE	KM READING	WORK CARRIED OUT	WORKSHOP / NAME	SIGNATURE

17.3 APPENDIX C – HANDOVER AND INSTRUCTION RECORD

The undersigned confirm that the semi-trailer identified below has been handed over complete and in working order, and that the persons named have been instructed in its safe operation, loading, load securing and maintenance on the basis of this user manual.

TABLE 17.3 – HANDOVER DATA

ITEM	DETAILS
VIN	
Date of handover	
Dealer / STU representative	
Customer	
Persons instructed	

Signature – dealer / STU

Signature – customer

17.4 APPENDIX D – WARRANTY CERTIFICATE

TABLE 17.4 – MANUFACTURER

MANUFACTURER	
Name	STU Treyler Dorse İthalat İhracat Ltd. Şti.
Address	Fevzi Çakmak Mah. 10664 Sk. No: 30 / 1, Karatay / Konya, Türkiye
Telephone	+90 541 336 63 77
E-mail	info@stutrailer.com
Website	www.stutrailer.com

TABLE 17.5 – AUTHORISED PARTNER

AUTHORISED PARTNER / DEALER	
Name	
Address	

Telephone

E-mail

TABLE 17.6 – PRODUCT

PRODUCT	
Trade name	STU 3-axle semi-trailer
VIN	
Date of delivery	
Customer name	

Stamp and signature — authorised partner

Signature — customer

**READ THIS MANUAL BEFORE USE.
KEEP IT WITH THE SEMI-TRAILER
AT ALL TIMES.**



STU TREYLER DORSE İTHALAT İHRACAT LTD. ŞTİ.

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