SAFE LOAD
testing technologies

Step by step guide to **comply with EUMOS 40509**

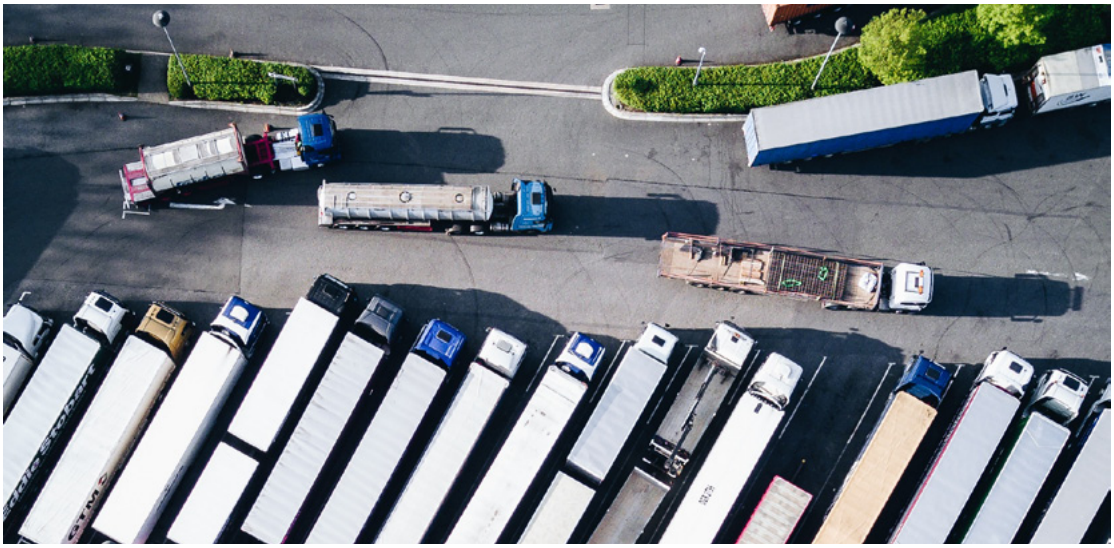
Index

1. Current situation in cargo securing during transport

The world of logistics and transportation has significantly changed during the last few years, which has resulted in the need to **establish new rules** that adequately govern **the current state of this industry.** There is a growing concern about **the conditions experienced by the cargo** throughout the distribution cycle, since during transportation packages face highly diverse factors that may **lead to major damage.** For example, humidity, temperature changes, accelerations and decelerations, etc.

This is why **maximizing cargo safety** has become a priority for the entire industry. With the firm intention of improving transport safety, EUMOS *(European Safe Logistics Association)* has created the **EUMOS 40509 method,** whose purpose is to **guaranty safety and rigidity of the cargo.** This system affects any company and industrial vehicle that **distributes products on the road,** as well as transportation companies that provide this service.

It is so established by **Directive 2014/47/EU** of the European Parliament and of the Council of 3 April 2014 on the **technical roadside inspection of the roadworthiness of commercial vehicles** circulating in the EU, which came into effect last May within the European territory. Its goal is to increase transport safety to accomplish the **zero fatalities objective** and its text contains the 'Roadmap to a Single European Transport Area — Toward a competitive and sustainable policy'.



Directive 2014/47/EU

In the face of the increasing number of **road accidents caused** by transport freight, the European Commission has established the goal of **reducing the number of fatalities to zero** by the year 2050. It is for this purpose that Directive 2014/47/EU was born, which guarantees that freight transports traveling on EU roads **are roadworthy** and, therefore, **safe.** This reduces the risk of accidents due to an **improper securing of the cargo.**

This regulation establishes a series of technical inspections to verify **that the vehicles are in good conditions** and to ensure that they have the necessary characteristics for the transport of the specific goods. Directive 2014/47/EU especially focuses on the **securing of cargo,** since it is considered to be essential to road safety. For this reason, the regulation indicates that the load should be packaged and secured in a way that **resists any acceleration or deceleration** caused while the vehicle is on the road.

This directive applies to any **transportation that takes place within the European territory,** and therefore affects any company that distributes its products on the road, as well as **transportation companies that offer this service** in the region. Directive 2014/47/EU establishes several regulations in this regard:

- **EN 12195-1 Calculation of lashing forces:** describes various terms and units to be used, as well as different reference tables for subsequent calculations. Among these we can mention the table of 'symbols, units and terms', acceleration coefficients and static slide factors.
- **EN 12640 Lashing points:** refers to the securing of the load in road vehicles. Lashing points in commercial vehicles for the transportation of goods. Minimum requirements and tests.
- **EN 12642 Strength of vehicle body structure:** cargo securing in road vehicles. Commercial vehicle body structure. Minimum requirements.

*"The regulation indicates that the load should be packaged and secured in a way that **resists any acceleration or deceleration** caused while the vehicle is on the road."*

- **EN 12195-2 Web lashings made from man-made fibers:** devices for securing lads in road vehicles. Safety. Part 2: Web lashings made from man-made fibers.
- **EN 12195-3 Lashing chains:** devices for the securing of cargo in road vehicles. Safety. Part 3: Lashing chains.
- **EN 12195-4 Lashing steel wire ropes:** devices for the securing of cargo in road vehicles. Safety. Part 4: Lashing steel wire ropes.
- **ISO 1161, ISO 1496 ISO Container:** establishes the base dimensions and operational and resistance requirements of the corner and mid-length fittings for series 1 freight containers. ISO 1496-1: 2013 establishes the base specifications and testing requirements for ISO series 1 freight containers for the totally enclosed general purpose type and certain specific-use types (enclosed, vented, ventilated or open top) which are adequate for international interchange and for road, railroad and sea transportation, including the interchange between these forms of transportation.
- **EN 283 Swap bodies:** these regulations directly affect the vehicle, container or swap body manufacturer. Since it is usually the transport company that buys the vehicle or container, this company will be responsible for keeping the lashing points, body, tarpaulins, posts, etc., in good conditions (vehicle maintenance obligation) and for informing the loader about their resistance for the purposes of calculating the load balancing and securing (safety information obligation), or to keep them in mind if the transport company itself is the one that will perform the load balancing and securing.
- **EN 12641 Tarpaulins:** minimum requirements for side curtains, Part 2.
- **EUMOS 40511 Poles – Stanchions:** testing method for posts or stanchions used for containing or securing the load in commercial vehicles and trailers.
- **EUMOS 40509 Transport Packaging:** this regulation describes a dynamic testing method to evaluate the rigidity of a cargo unit, including a detailed description of the testing conditions, the evaluation criteria for the cargo deformation of elastic and plastic pallets, and the specifications of the test certificate.

2. About the EUMOS test method

Main goals of EUMOS 40509

The EUMOS 40509:2012 testing method, included in directive 2014/47/EU, is a **dynamic testing system** that can be used to **evaluate the rigidity and safety of a load** that is subjected to **horizontal accelerations and decelerations** such as the ones experienced during road transportation. It is therefore a testing method that is aimed at various organizations within this industry:

- **Packaging laboratories:** the only way to inform its clients that its product-packaging system complies with the law. Directive 2014/47/EU specifies the testing values that need to be fulfilled while applying the EUMOS standard.
- **Palletized product manufacturers:** they are responsible for the transported product to comply with the law and may be penalized when they do not comply with it.
- **Cargo securing experts:** Directive 2014/47/EU takes the EUMOS standard as a reference when referring to cargo securing.
- **Roadside cargo safety inspectors:** government law enforcement members throughout Europe have the obligation of ensuring compliance with the law, including Directive 2014/47/EU, which relies on the EUMOS standard when defining many of its requirements.

Benefits of this test method

The EUMOS 40509 standard has many **advantages for freight transport companies,** which include:

- Evaluation of the **rigidity and safety of a load** that is subjected to horizontal accelerations and decelerations.
- Compliance with **European Directive 2014/47/EU.**
- **Cost reductions** resulting from package shrinkage.
- Contribution to a **higher road transport safety.**

For all of this, it is recommended for companies who intend to work across Europe transporting goods to have a **simulation machine that complies with the EUMOS 40509 standard,** or to hire the services of a laboratory that specializes in this type of test.

3. How to perform the EUMOS and get a safety load

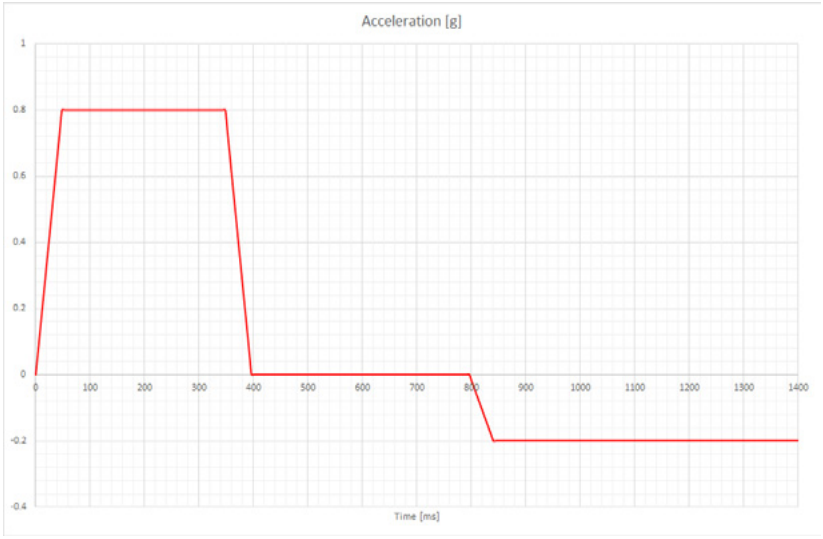
Tests you must perform

In order to comply with the EUMOS 40509 standard you need to perform a **stability test** that consist of the following testing method:

- Place the **cargo unit** to be tested on top of the testing platform.
- The platform accelerates until it reaches a preset acceleration. This acceleration must be reached within less than 50 ms.
- Once the target acceleration has been reached, it should be maintained for at least 300 ms.
- The platform's braking should be smooth, so that the cargo being tested is not affected.

The EUMOS standard also defines an alternative method that is inverse from the previous one, in which:

- The platform with the load smoothly accelerates until it reaches a preset speed.
- Once the desired speed is reached, the platform brakes at a constant deceleration (testing deceleration) for 300 ms until the platform is stopped.
- This deceleration must be attained within less than 50 ms.



EUMOS test for 0.8g - 300ms

4. Safe Load and its expertise with load security

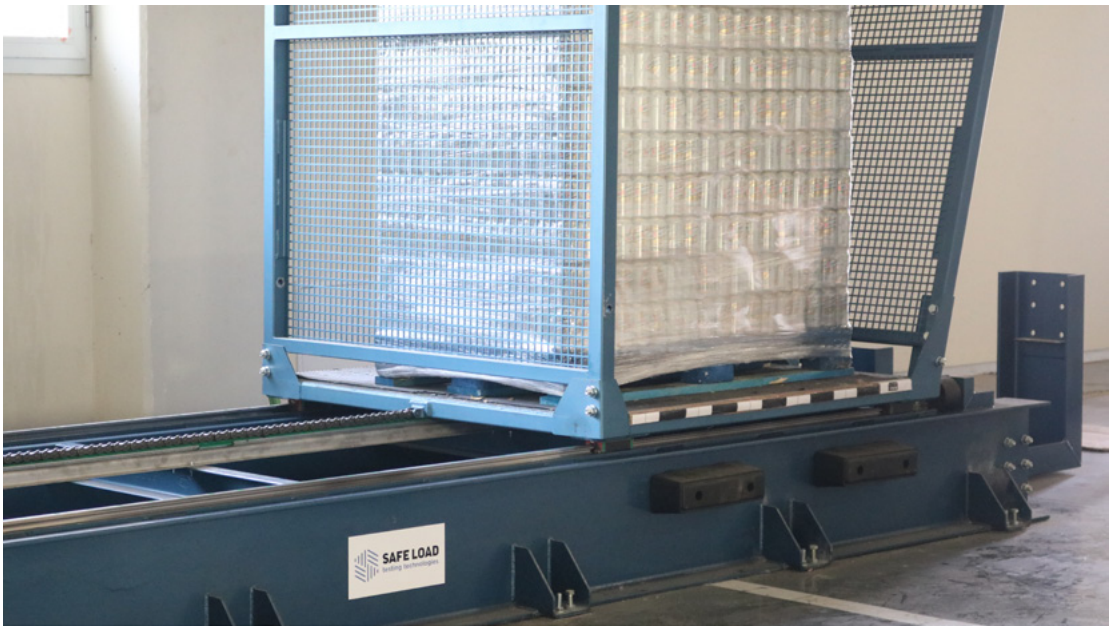
Our EUMOS 40509 testing machines

In order to perform the established tests and comply with this regulation, at Safe Load TT we have a special machine – **the Horizontal Stability Tester** – that complies with all of the requirements for this type of test.

The machine has a testing platform that is accelerated by an electric motor, reaching a **trapezoidal acceleration pulse with a duration of at least 300 ms,** and this acceleration is achieved in less than 50 ms. The load platform has front and back walls tilted at a 14° angle, as per the EUMOS standard.

The Horizontal Stability Tester system is an advanced solution that guarantees the load rigidity and safety. **It simulates the horizontal accelerations** (acceleration, deceleration and braking) as well as decelerations caused by various means of handling and transportation.

Safe Load TT's horizontal stability simulator enables **the horizontal stability** to be tested as per EUMOS with a single machine, leading to **cost savings for customers.** In addition, its **ability to handle heavy loads** offers a high reliability in the simulation of the transportation of palletized product packages.



This machine has a **sliding steel platform with an anti-slip floor** and side protectors to prevent the load from falling off. Furthermore, the steel basket, which is slanted on both sides, is designed to perform accelerations and decelerations with the purpose of **analyzing the load's behavior** during transportation.

This system has the ability to **modify the k acceleration value** with a two-decimal precision it allows for the **acceleration time** to be **modified.** Additionally, there is an optional **high-speed camera** to record the test for subsequent analysis.

Companies that have the Safe Load's Horizontal Stability Tester machine will enjoy **a number of advantages** that can't be found in competing systems, such as:

- **The ability to perform personalized tests:** the horizontal stability machine is capable of performing personalized tests, such as, for example, simulate the forces experienced by a load when the transport enters a roundabout. Safe Load TT can add other testing procedures at the client's request – not just trapezoidal tests.
- **Ability to design ad-hoc machines:** Safe Load TT can customize the machine to the size, weight and any other characteristic required by the samples to be tested.
- **Intuitive use:** Safe Load's know-how results from the background of its personnel as users of transport simulation machines, and from listening to customer needs, which means that it is well aware of the need to make the machines as intuitive as possible.
- **Easy maintenance system:** simplifying the machines' maintenance reduces the risk of damage, and is therefore always a part of the good engineering practices that guide our designs.
- **Control software developed by Real Vibrations:** always aiming for excellence in innovation, Safe Load works closely with Real Vibrations to obtain control systems for the machines.

In summary, with Safe Load TT's Horizontal Stability Tester it is possible to perform the **stability tests established in the EUMOS 40509 standard,** which means that this system is one of the **best options that exist on the market nowadays** for companies.

If you need more information about the Horizontal Stability Tester, **get in touch with us** and we will respond to your inquiries.

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Parque Tecnológico de Paterna
C/ Charles Robert Darwin, 20, of. 13
46980 Paterna – Valencia (Spain)

+34 963929595
contact@safeloadtesting.com