

Introduction

Seals are an important element of container and cargo security element that helps prevent theft during transport and facilitates the review of complaints.

The purpose of the learning material is to enable the identification of the need for cargo seals and their uses.

The objectives of the learning material are to:

- Study cargo seals and their various types;
- Learn the ways of using various sealing techniques on containers and specific types of cargo;
- Teach the preparation of a report on reading cargo seals and recording the information;
- Provide a summary of the drawbacks and benefits of cargo seals.

The learning material is divided into 4 sections. The first section covers the reasons for why seals exist, and their diversity. The other three sections review various applications of seals. Because much has been written about cargo seals, the preparation of this paper mainly involved the use of sufficiently in-depth and comprehensive online materials.

1. Cargo seals and their types

Seals are attached to container doors, such that the container cannot be opened without removing or breaking the seal. Every seal has a unique number carefully checked and indicated in all documents on various stages of shipping, until the final delivery of the container.

The same seal number is specified in the documents signed by both the parties involved in the transactions, i.e. road vehicle waybills, consignment exchange documents, and bills of lading.

Overall, there are some 20 different types of seals. They can be made of plastic, metal, combinations of metal and plastic, acryl, carbon steel, and can also be made as a complex electronic device.

For example:

- Medium-security plastic seals are available in different colours. A laser or a printer can be used to place a unique 7-digit number combination, company logo, name, as well as other information on the seal, as requested by the company in question.



Figure 1. Mediumseal security seals.

- A metal container seal is a high-quality product intended for all types of containers, meeting all requirements set by all customs zones globally. This seal is ISP/PAS 17025, it is laboratory-approved, and meets the ISI/PAS 17712:2010 HSS standards.

(Figure 2 shows the seal, and Figure 3 demonstrates an example of its use).



Figure 2. Forkseal New.



Figure 3. Application of Forkseal New.

- These plastic seals have a metal tightening mechanism, are self-locking, and can be used with a sealing wire. The seals are made and patented in the US.

They are made out of plastic with a stainless steel locking mechanism, and are easy to use.

These seals are versatile and can be used in any industry.



Figure 4. Self-locking plastic/metal seal.

- An electronic seal is a modern and innovative solution for providing better security in transporting cargo in containers and using road vehicles. Compared to traditional disposable sealing methods, this device is unique and can be reused for years. These seals are intended to withstand approximately 40,000 locking cycles, corresponding to a service life of at least 3 years.

Electronic seal concept:

There is a unique five-digit combination displayed and recorded when the cargo was sealed up. The combination read once the cargo reaches its destination or during transport must match the original one. If the numbers do not match, the seal was opened without authorisation!

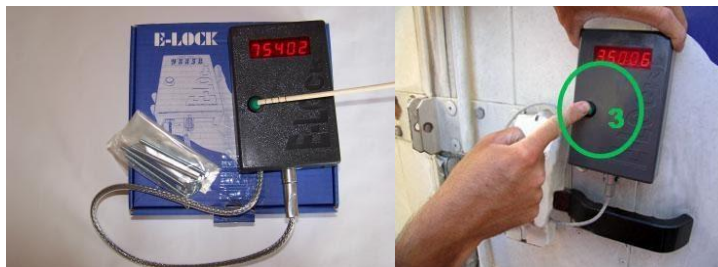


Figure 5. E-lock electronic seal

2. Methods for placing cargo seals

There are as many techniques for installing cargo seals as there are seal types.

For example:

E-lock electronic seal:

Using an E-lock is very easy:

1. Place the device and tie the security cable through the fastening elements of the door locks;
2. Record the unique combination numbers in the transport documents for the cargo. (The device's memory saves the last number, and it can be viewed by pressing the green button on the device);
3. Once the cargo reaches the destination, the party receiving it presses the green button again, and the number combination displayed must match that specified in the transport documents.

Acryl seals:

1. In order to identify the operator, a sealing device with a special operator ID insert is used.



Figure 6. Acryl seal with a metal wire, next to a sealing device.

2. No sealing device is necessary. The seal is locked using a special flap, which is broken off once the seal is in place.



Figure 7. Acryl seal with a flag.

The seal stamps are made out of magnesium and inserted into convenient pliers for making impressions in plastic and lead seals.



Figure 8. Sealing stamps and pliers used for pressing the seals.

The tail of a steel seal is inserted in its head, and a double steel spring inside locks the tail in. Once the seal is locked, it cannot be opened without breaking it or leaving obvious damage.



Figure 9. Steel seal and its parameters.



Figure 10. Locked steel seal.

3. Methods for placing cargo seals on different types of transport

Railway transport:

Article 9 Paragraph 8 of the Agreement on the International Goods Transport by Rail (SMGS) states the following:

‘For all loaded railway cars with facilities for placing seals, seals or locking seals must be used to seal the doors and all openings in the structures of the railway car, except for any ventilation or other openings that are obstructed from the inside with a grate or in other manner. For tank cars, all filling and draining devices must be sealed. It is not required to seal the lower draining devices of tanks if because of their structure they cannot be opened without opening the top loading hatch.

If a railway car has seals or locking seals remaining from prior deliveries, these seals are removed by the consignor or the railway, depending on who re-seals the railway car.

Seals or locking seals that cannot be removed without being damaged are used for sealing; seals or locking seals must be installed such that accessing the cargo without damaging them is impossible.’

Road transport:

Rules concerning the technical prerequisites for conducting international cargo transport with customs seals.

Article 1. *International cargo transport with customs seals may only be performed using vehicles designed and set up such that:*

- a) the cargo cannot be taken out of or placed into the sealed compartment of the vehicle without leaving clear signs of breaking or damaging the customs seals;*
- b) the customs seals can be placed using simple and safe methods;*
- c) there are no hidden cargo compartments in the vehicle;*
- d) all spaces that can be used to store cargo are easily accessible to customs inspections.*

4. Reading cargo seals and recording the information

The law prescribes that if the consignor seals railway cars or containers, the seals must have the following clearly legible markings:

- 1) station name (abbreviated if necessary);
- 2) date of placing the seal or control marks;
- 3) abbreviated name of the consignor.

The consignor's seals may also contain an abbreviated name of the dispatching railway company.

If a railway car or a container is sealed by the railway company, the seals must have the same markings; however, instead of the abbreviated name of the consignor, there must be an abbreviated name of the dispatching railway, as well as seal plier number, if the seals do not have control marks.

It is also possible to print or stamp an identification code, barcode, company name or other information (as requested) onto cargo seals.

5. Benefits and drawbacks of cargo seals

The purpose of cargo seals is to make the transport of cargo more secure, to protect cargo from possible theft, and to shorten long border control point waiting lines for food shippers.

However, there are also minor drawbacks.




+	-
Faster customs clearance	May increase the risk of theft if sealing the cargo elicits more interest in the contents of the cargo
Reduces the risk of theft	Higher risk of contraband
Vehicle driver exempted from responsibility for possible risks	Necessity to handle additional documents and to certify the vehicle


Sources and references

1. Security seals
https://www.jfhillebrand.com/Specialistservices/Documents/SpecialistServices/01_Latvian_Seal_procedure_for>Loading_location_shipper.pdf
2. AMRO: devices and solutions for growing your business
<http://www.amro.lv/produkti/paligiekartas-2/e-lock-eletktroniska-plomba>
3. 'Rīgas zīmogu fabrika' (Riga Seal Factory) <http://www.rzf.lv/?item=3>
4. Belateg <http://www.belateg.lv/lv/plombes/>
5. Metal seals http://koteka.lv/metala_plombas.htm
6. Likumi.lv <https://likumi.lv/ta/lv/starptautiskie-ligumi/id/547>

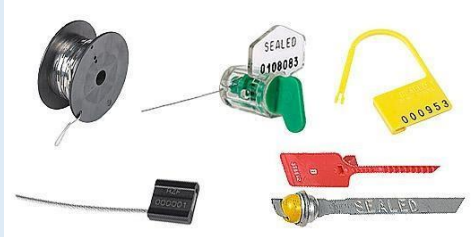
Sealing of cargo (this must be prepared as a separate document, and formatted as a table, with images next to the corresponding descriptions)




Sealing stamps and disposable seals help control and restrict the use of containers, safe boxes, doors, containers or machinery, and make it possible to detect any unauthorised access to them.



	<p>ROTO SEAL</p> <p>This is an easy-to-use acrylic lock seal. Unique operating principle of the locking mechanism. These seals are typically used to seal various goods, measuring instruments and valves, due to the conveniently unlimited length of the wire, as well as resistance to weather and chemicals. In order to identify the operator, a sealing device with a special operator ID insert is used.</p>
	<p>ROTO TOOLLESS</p> <p>This is an easy-to-use acrylic lock seal. Unique operating principle of the locking mechanism. These seals are typically used to seal various goods, measuring instruments and valves, due to the conveniently unlimited length of the wire, as well as resistance to weather and chemicals. No sealing device is necessary. The seal is locked using a special flap, which is broken off once the seal is in place.</p>
	<p>INTERMODAL II</p> <p>The main material of this seal is carbon steel with a special chrome/zinc coating whose properties make it possible to use this seal type in any weather. This is a very durable type of lock seals, and easy-to-use. Unique operating principle of the locking mechanism. These seals are typically used to seal containers and freight vehicles.</p>

	<p style="text-align: center;">MULTILOCK</p> <p>This is a very durable type of lock seals, and easy-to-use. Unique operating principle of the locking mechanism. These seals are typically used to seal tanks on ships, containers and freight vehicles, and it is convenient for use on slanted or deformed surfaces.</p>
	<p style="text-align: center;">NIFTILOK</p> <p>This is a durable type of lock seals, and easy-to-use. Unique operating principle of the locking mechanism. These seals are typically used to seal electrical equipment.</p>
	<p style="text-align: center;">PULLGRIP</p> <p>This is a disposable, easy-to-use, identification plastic seal with a zip tie that can easily be pulled through the plastic ratchet. A simple plastic ratchet secures the zip-tie in the flag of the seal.</p>
	<p style="text-align: center;">SECURGRIP</p> <p>The main material of this seal is a mixture of polyethylene and polypropylene whose properties make it possible to use it for sealing postal packages in extreme temperatures (-35 to +60 °C), without significant complications in its use.</p>
	<p style="text-align: center;">SECURPULL</p> <p>This is an identification seal that is cheap and easy to use. The operating principle of the locking mechanism is identical to that of the Secure-grip seal. These seals typically find use in the sealing of equipment (fire extinguishers, cabinets etc.) and monitoring the performance of work.</p>

	<p style="text-align: center;">POLY-CHECK</p> <p>This is an identification seal, and with a complex and easy-to-use design. The operating principle of the locking mechanism is unique and virtually impossible to reproduce outside factory conditions. These seals are typically used for ensuring the identity of high-value products, for sealing door handles, and to monitor the performance of work.</p>
	<p style="text-align: center;">Sealable document evacuation bag</p> <p>Height: 1000 mm Width: 540 mm Opening for information: 140 x 80 mm.</p> <p>The upper edge of the bag is provided with a reinforcement strip and an integrated polypropylene seal that:</p> <ul style="list-style-type: none"> - Prevents unauthorised removal of the seal; <p>The material of the bag is synthetic nylon (protects the documents inside from brief direct contact with water and moisture).</p>
	<p>The seal stamps are made out of magnesium and inserted into convenient pliers for making impressions in plastic and lead seals.</p>
	<p>A stamp with an engraved metal (brass or aluminium) plate must be used with sealing wax.</p>

	<p>We offer high-quality TYDEN BRAMMALL disposable seals that can be identified through markings, numbers or electronically-readable information, in order to prevent the production of duplicates. Buying a seal without markings is impossible. Security is also guaranteed by its self-destruction feature (it is not reusable) that unambiguously points at tampering attempts. Seals can be made out of plastic, various metals, have wires, or electronic components.</p>
---	---

	<p>Type: K (KR)</p> <p>If removed without authorisation, the special plastic material of this seal sticker highlights the words 'VOID/OPEN' on the surface. The unique composition of the adhesive surface opens up virtually unlimited possibilities for using the sticker and its versatility. The sticker must be placed on clean and degreased surfaces. Standard colour: RED.</p> <p>Dimensions: 85 x 25 mm</p>
	<p>Type: MRP-2</p> <p>Universal seal sticker. The surface material has a very thin polyester film coating that combined with a strong rubber-adhesive base creates virtually unlimited options for using the sealing sticker, while ensuring that the sticker breaks along the perforations at the slightest attempt of removing them without authorisation.</p> <p>Dimensions: 85 x 25 mm 120 x 30 mm</p>
	<p>Type: KTL</p> <p>If removed without authorisation, the cutting-edge special plastic material of this seal sticker/tape highlights the words 'VOID/OPEN' on the surface. The sticky tape is suitable for use on uneven, grainy clean and degreased surfaces. For ease of use, the sealing sticky tape is perforated at an interval of 150 mm, with each such section provided with its serial ID number. Standard colour: RED.</p> <p>Dimensions: Coil (150) x 45 mm</p>

	<p style="text-align: center;">Type: MVR</p> <p>Universal sealing sticker with hidden action. The surface material is a thin transparent plastic that in combination with a strong adhesive base creates virtually unlimited options for application, guaranteeing excellent separation of the stickers at perforation in the event of even the slightest attempt at unauthorised removal. The inscriptions on the sticker are made with a special paint only visible in UV light.</p> <p>Dimensions: 120 x 30 mm</p>
	<p style="text-align: center;">Type: SS</p> <p>If removed without authorisation, the special plastic material of this seal sticker shows the words 'STOP' on the surface. The unique composition of the adhesive surface opens up virtually unlimited possibilities for using the sticker and its versatility. The sticker must be placed on clean and degreased surfaces. Standard colour: BLUE.</p> <p>Dimensions: standard</p>

List of references

1. <http://www.belateg.lv/lv/plombes/>
2. <http://www.rzf.lv/?item=3>
3. <http://www.plombas.lv/index.php/sortiments/10>