# QUALITY PACK ZRT.

## PRODUCT REFERENCE MANUAL

**Version: AE**
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## Contents

*The information and guidance provided in this document is general and may not apply to specific situations. QualityPack does not warrant the accuracy of the information contained in the Manual and specific advice should be taken before taking any action based on the information provided.*
*QualityPack accepts no responsibility for any liability loss or damage incurred by any person, firm or company arising as a result of reliance on the information or guidance contained in the Manual.*

# I. General part

## 1. Document confidentiality

The user of this document shall treat the content of the document in a confidential manner and use it only as intended.

The use of the procedures, methods, solutions and documentations of the Product User Manual and their passage to external persons is only allowed with the written consent of QUALITY PACK Zrt., as such documentation is the intellectual property of QUALITY PACK Zrt.

The infringer shall be liable for any damage (including collateral damage) incurred in breach of copyright of QUALITY PACK Zrt.

The preparation, amendment, handling, continuous improvement and distribution of the Product reference manual is the duty of QUALITY PACK Zrt. QUALITY PACK Zrt. reserves the right to update this document.

## 2. Introduction:

The quality compliance of our products shall meet increasingly higher requirements, among others those of the effective legal regulations, **Customer requirements**, food safety requirements and the rules and regulations concerning the materials and objects getting into contact with the food during their intended use. In each stage of preparing and producing the products, we strive to meet the requirements set for us at all times. Beyond undertaking and adhering to the above, the management of QUALITY PACK Zrt. strives to establish a policy with an added value that will globally unify all expectations concerning proper product (can and end) handling.

In order to implement the above, we feel it is necessary to issue and enforce the **Product reference manual.** This manual includes the steps related to the handover, transport, reception, warehousing, quality, complaint management and scrapping management of the products distributed by QUALITY PACK Zrt., which become effective on the day this documentation is issued.

QUALITY PACK Zrt. performs its work in view of the regulations in its quality management system, and the food safety and environmental provisions concerning the materials and objects getting in contact with the food during their intended use, in order to continuously ensure the safety of our

products, meeting our Customers' requirements. Our products are produced under regulated conditions and regular inspection. Safe and legal production is ensured by the **HACCP and FSSC 22000** Food safety management system.

The Product reference manual is compulsory for the following persons:

- employees of QUALITY PACK Zrt.,
- employees engaged in warehousing products produced by QUALITY PACK Zrt.,
- employees of enterprises engaged in shipping products produced by QUALITY PACK Zrt.,
- employees of business partners of QUALITY PACK Zrt.,
- users of the products produced by QUALITY PACK Zrt.,
- and is furthermore obligatory for all employees having an influence on the security of the products produced.

## 3. Applicability:

### 3.1. Contact details of QUALITY PACK ZRT.:

| | |
|---|---|
| Name: | QUALITY PACK Zrt. |
| Invoicing address: | H-1062 Budapest, Andrássy út 126.,Hungary |
| Plant address: | H-3800. Szikszó, Hell utca 2., Hungary |
| Mailing address: | H-3550 Miskolc, Pf.: 300 |
| Central phone/fax: | +36205411071 |
| E-mail: | info@qpack.hu |

### 3.2. Documentation accessibility:

The original remains with the producer, i.e. QUALITY PACK Zrt. The Customers, Suppliers and warehouse managers are informed of the existence and electronic accessibility of the documentation.

### 3.3. Scope of personal responsibility:

It applies to everyone who gets in contact with or affects the products of QUALITY PACK Zrt.

### 3.4. Scope of temporal responsibility:

The first edition of the documentation is valid from 02/04/2018. The current release of version 5 (AE) is valid from 24 Jun 2024 until revoked

### 3.5. Scope of geographical responsibility:

The entire premises of the Szikszó plant of QUALITY PACK Zrt. H-3800. Szikszó, Hell utca 2., Hungary

The delivery routes of the products manufactured by QUALITY PACK Zrt.

The storage, use and distribution locations of the products manufactured by QUALITY PACK Zrt (worldwide)

## 4. Terms and definitions:

The interpretation of the general terms of transportation, warehousing, quality and food safety in the Product Reference Manual are understood as defined in the effective legal regulations.

***Supplier contract:*** A business arrangement, created by mutual manifestation of will, establishing a legal effect between the Customer and the Seller, concluded on handing over materials or providing a service, being custom or a framework agreement by type.

***Warrant:*** A report or form with which a quality test result or statement data are officially communicated.

***Document:*** The instructions or requirements in hard or soft copy, providing the instructional environment of the quality management system.

***Primary packaging material:*** The cover material of the food, in direct contact with it, being its direct and indirect “part”.

***food safety:*** Ensuring, throughout the entire production and distribution process, that the food in question does not endanger the health of the consumer, if prepared and consumed in accordance with the intended purpose.

***food safety risk:*** The presence of a material of biological, chemical or physical effect in the food/packaging material, or the state of the food/packaging material that may have harmful effects on health.

***Sales contract/agreement:*** A business agreement, created by mutual written manifestation of will, establishing a legal effect between the Customer and the Seller, concluded on handing over products or providing a service. The case whereby an affirmative response is received for the contents of the confirmation is to be understood as a sales contract as well, or if, following confirmation, the Customer fails to express its opposite will within the period of time in accordance with the relevant provisions of the Civil Code.

***Note:*** A document providing objective evidence on activities or results achieved.

***Monitoring:*** Observations or measures executed in planned order to evaluate whether regulatory measures are being implemented as intended.

***Production documentation:*** All written documents required for the production of the products (technological instruction, product sheet, etc.).

***HACCP****:* A system determining, evaluating and regulating the significant hazards from the perspective of food safety.

***On-site audit:*** The on-site inspection of the plant at the Suppliers, based on the requirements set by the plant.

***Defective or non-compliant product:*** A product that does not meet the predefined requirements.

***Verification:*** The confirmation, by providing objective evidence, that the specified requirements have been met.

***Approved Supplier:*** A Supplier or subcontractor qualified by QUALITY PACK Zrt., meeting the requirements set for Suppliers.

***Finished product:*** the product produced by the plant that complies with the parameters determined in the product sheet or specifications or other specifications set by the authorities and may be released for commercial circulation or further processing.

***Preventive activity:*** An activity introduced to eliminate possible non-compliance, defect cause or other undesirable situation, in order to prevent it from occurring.

***purchase order:*** A notification sent by the Customer for the use of a product or service, on an individual or recurring basis.

***Quality:*** The complex entirety of features and attributes of a product or service, affecting the ability of the product or service to satisfy expressed or expectable requirements.

***Quality reservation:*** A report of qualitative or quantitative discrepancies of the product or a problem related to the service connected to the product, submitted to the plant.

***Qualification (process control):*** A process to verify that the plant is able to meet the specified requirements.

***Non-compliance:*** Any specified requirement not being met.

***Traceability:*** The possibility that the history, application or storage of the product or the constituents of the product can be established with the help of recorded identification data.

***Scrap:*** Product unsuitable for use.

***Supplier:*** An organisation or person that provides a product or service.

***Regulatory measure:*** Any food safety measure or activity that may be applied to prevent or eliminate a food safety risk or reduce it to an acceptable level.

***Service:*** The production process or any external activity, directly influencing the product produced (e.g. maintenance, delivery, etc.).

***Instruction:*** The document containing the description of the quality control tasks and the methods of their execution.

***Manufacturer:*** Quality Pack Zrt., Aluminium beverage Can and End manufacturer

***Customer:*** Our commercial partners.

***Customer satisfaction:*** A comprehensive quality approach, focusing on the sentiments, needs and expectations of the Customer vis-à-vis the Supplier.

***Customer complaint:*** A negative observation coming from the Customer.

***Hazard:*** The presence of a material of biological, chemical or physical effect in the product that may have harmful effects on health.

***CTS:*** Customer Technical Service, The primary technical contact person for the Customer

***ADR:*** *European Agreement concerning the International Carriage of Dangerous Goods by Road (derived from the French name for the treaty -**A**ccord **D**angereuses par **R**oute)*

# II. Delivery

## 1. Rules of reception of goods:

**(In case of inbound delivery to QUALITY PACK Zrt.)**

### 1.1. Requirements concerning the freight forwarder:

Possesses the appropriate licences for operation and valid insurance up to the total value of goods, with the appropriate documents to evidence this.

Uses specialised delivery vehicles compliant with the specifications, also meeting the other hygienic requirements concerning delivery.

A transport vehicle shall be provided which, resulting from its design, can be well cleaned, free of contaminating, infectious and possibly injury causing materials (e.g. protruding nails, etc.), with a closed or tarpaulin-covered body.

Secures the products against displacement in the course of delivery, capable of protecting the product in terms of quality and quantity.

No material is shipped together with the incoming goods (especially raw materials and packaging materials) that may contaminate the food or damage or render it inconsumable in any other way.

### 1.2. Rules to be observed by the freight forwarder (at sites of QUALITY PACK Zrt.):

The freight forwarder shall acknowledge the valid order and times of reception and dispatch of goods. If it should arrive outside these times, the next reception time window shall be awaited.

The freight forwarder is responsible for the proper fixation of the pallets to prevent them from falling over or sliding on the way.

Empty pallets shall not be used to fill cargo spaces of transport vehicles as sharp edges may damage incoming goods (especially varnishes delivered in IBC tote, raw materials and packaging materials).

In case of sealed deliveries, only the receiving clerk is authorised to remove the seal. The freight forwarder is not allowed to manipulate the seal and is responsible for its integrity throughout the shipment.

If the seal is broken due to reasons outside its scope of responsibility, it shall be photographed and a report shall be prepared immediately of the event, informing the dispatcher without delay, who will then determine the further course of action.

The driver shall respect the valid goods reception and traffic regulations. No traffic jam may be caused; the driver shall help the regular flow of traffic with his behaviour!

The driver may not enter any room other than the warehouse office. The visibility vest shall be worn at all times. The driver shall await his turn inside the vehicle.

The driver shall respect with the applicable occupational safety (eg use of safety shoes, etc.), hygiene (eg use of washbasins, meals, waste disposal, etc.) and current official regulations, current virus protection (mask) , covid test, hand washing, disinfection, etc.).

The freight forwarder shall present the shipping documents to the receiving clerk.

The receiving clerk will compare the delivery documents with the Purchase order. In case of a match, it shall be checked if the product bears the markings and specifications according to the effective legal regulations (pallet label, batch number, name of producer, place of production, shelf life, quality certificate, CLP labelling, if available, etc.).

Compliance shall be verified together by the receiving clerk and the driver, and documented on the Goods reception report (item 2 of the Annex) or on other document with the same content.

In case of non-compliance, the cause of reservation shall be photographed (if possible) and this fact shall be indicated on the delivery documents, and both parties shall sign it (according to item 1 of the Annex).

The driver, upon request by the receiving clerk, shall fold up the tarpaulin covering the side of the vehicle and fold the sidewall down to enable loading the truck from the side. If the truck has a closed body, movement of goods may take place from the back.

The truck shall be closed, clean, hygienic, capable of preserving the qualitative and quantitative parameters of the food industry packaging material. No foreign deliveries may be present on the truck. If this is not met, the warehouse may refuse the unloading of the goods. The cause of the refusal shall be photographed (if possible) and this fact shall be indicated on the delivery documents, and both parties shall sign it (according to point 1 of the Annex). If a chemical enters the loading area during loading, an on-site incident report must be filed with the assistance of the EHS team.

The goods shall be free of damage and humidity. Damaged products and the cause of the defect shall be photographed (if possible) and this fact shall be indicated on the delivery documents, and both parties shall sign it (according to point 1 of the Annex).

If the goods are received, damaged products shall immediately be separated and the Quality reservation shall be indicated.

The driver shall be present during loading.

The driver shall indicate any reservations concerning loading immediately. If the driver raises reservations concerning the loading, photographs shall be taken and the reservations shall be entered on the delivery documents, and both parties shall sign it (according to point 1 of the Annex).

The receiving clerk shall check before and after loading if the quality and quantity of the goods are appropriate. If no discrepancies are found, this is documented on the Goods reception report (item 2 of the Annex).

If any pallet is not packed properly or is damaged or any disorder is visible on it, it shall be photographed and the reservations shall be entered on the delivery documents, and both parties shall sign it (according to item 1 of the Annex).

The tarpaulin should be left open all the way until the gate to allow the gatekeepers to check the truck, unless the weather conditions do not allow this.

Before and during return transportation of returned goods and during loading them back, care shall be taken to ensure the proper strapping (e.g. the use of intermediate boards) and fixation of the shipment to avoid contamination and damage.

The freight forwarder is responsible for cleaning and disinfecting the transport vehicles according to the hygiene requirements. The suitability and cleanliness of the food industry packaging material transport vehicle (including odourlessness, etc.) shall be verified before loading. In case of non-compliance, the goods should not be loaded!

The driver and the operator of the vehicle are responsible for executing the specifications concerning delivery.

During reception of the goods, arrangements shall be made to preserve their value and quality, keeping them safe from infections and contamination.

Incoming goods (especially raw and packaging materials) shall be protected during unloading against the environmentally damaging and contaminating effects of weather.

### 1.3. Quantitative reception:

The materials in various product groups shall be received, measured and stored separately to prevent them from contaminating one another.

Incoming materials shall be measured or counted in each case, depending on their nature, and compared with the figures stated in the delivery documents and the Purchase order. In case of identity, the delivery documents are signed by the receiving clerk who enters the quantity into the warehouse management system.

In case of non-compliance, the product may not be received. Defects shall be indicated to the procurement, who will contact the Supplier and settle the quantity problem (According to point 1 of the Annex).

### 1.4. Qualitative reception:

At the time of goods reception, the integrity of the packing, the required markings (name, batch number, country of origin, producer, etc.), material safety data sheets, quality certificates, product accompanying documents and shelf-life data shall be checked. These must be recorded by the recipient in QP-QC-10-0003 Goods Receipt Checklist

The compliance of the goods is verified by the deliverer by signing the delivery documents.

Compliance with the ADR is certified in the goods receipt report.

In case of non-compliance, the Goods reception report shall be filled (point 2 of the Annex) in 3 originals. Both the driver and the receiving clerk shall sign it. 1 copy shall be provided (sent) to the dispatcher of the goods, 1 copy to the receiver and 1 copy to the deliverer.

The products delivered shall be subjected to site laboratory testing (if possible), whose results shall be compared to the results of the specifications provided by the Supplier.

In case of non-compliance, the product may not be used. Defects shall be indicated to the procurement, who will contact the Supplier and settle the quality problem.

### 1.5. Return of packaging:

Due to multiple use and to avoid damage or destruction to the packaging (e.g. pallets, frames and cardboard sheets), we will describe our returning proposals and preferences for packaging, loading and shipping.

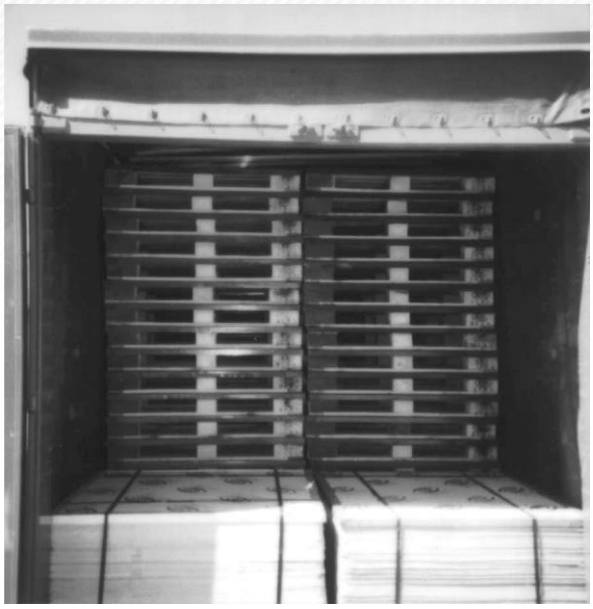
Pallets with frames shall be built into stacks. e.g. pallet - frame - pallet - frame, etc.
Each properly built stack shall contain 15 sets of properly prepared frames and pallets.

Plastic frames must be returned on a separate pallet (max. 50 pieces / stack)!

Cardboard and plastic sheets, since packaging is particularly vulnerable to damage during storage and transport, should be placed on a pallet per 500 pieces. They must be secured from above and covered with a foil. Each pallet with intermediate boards shall also be strapped and shrink wrapped, to avoid damage to the shipment during transport. The intermediate board should not be more than 1.5-1.5 cm larger than the pallet.

All packaging materials (intermediate boards, pallets - both plastic and wooden pallets - metal frames and intermediate boards) returned to our factory should have the QUALITY PACK Zrt. logo on it that facilitates the identification of the owner. In case of pallets, frames and intermediate boards all packaging has a permanent mark. (This may be waived by agreement between the parties.)

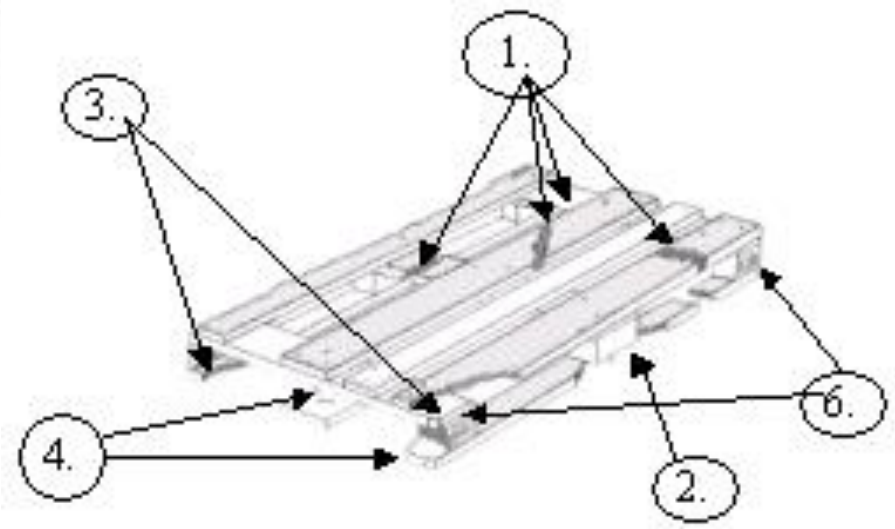
During loading, each packaging material shipment, irrespective of its type, shall fill the whole surface.



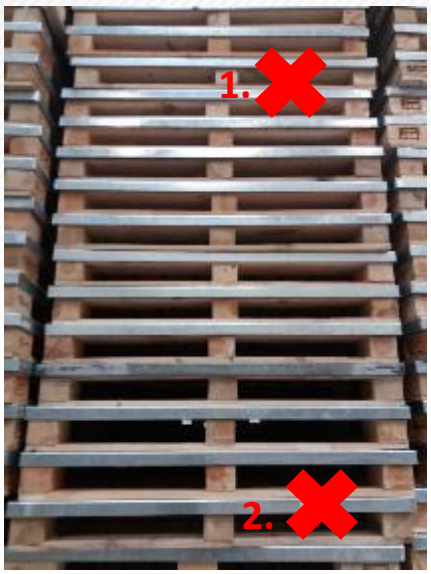
**Any type of return pallet are not acceptable for replacement if:**

1. **At least one board is missing, or broken across or diagonally** (applies to all planks).
2. **The top and bottom planks have been broken off to an extent that two or more, or in case of two or more planks, one or more nails are visible.**
3. **One pallet block is missing or has been broken to reveal one or more nails.**
4. **Important markings are missing or illegible** (along one longer side of the pallet, at least the marking of the railway company or the pallet company and the EUR sign and the QUALITY PACK Zrt. logo shall be visible (the latter is not necessary for German pallets)
5. **Visibly impermissible elements have been used in the production or repair** (too thin, too narrow, too short planks or blocks) **of the pallet.** Impermissible elements are easily recognisable by comparing them with the original elements.
6. **The general condition of the pallet is so deteriorated that**
   - its load bearing capacity is no longer guaranteed (rotten or broken planks or blocks),
   - the goods may be contaminated,

- the compressed wood particle pallet blocks are missing (or crumbling apart),
- protruding fasteners (nails) or splinters represent a risk of injury,
- note: the 6 items above can be seen on the figure below, and serve as a guideline to preserve the conditions of German pallets.




7. **The pallets are not returned in compliance with the following:**
   - pallets are stacked higher than 15 lines,
   - German pallets are returned without their corresponding frames,
   - they are stacked in a curved (marked 1 x) or overlapping (marked 2 x) way,
   - as a recommendation, the appropriate example of pallet handling in the picture on the right below (strapping bands shall be used, with which the displacement and possible damage during transportation can be completely avoided).




**A plastic pallet is not replaceable if:**

- it is broken (as shown on the picture on the left below),
- it is cracked,
- it is so contaminated that it renders any further use impossible,
- it does not have the factory logo on it (Quality Pack).

The appropriate example of proper return is visible on the picture on the right (strapping bands shall be used, with which the displacement and possible damage during transportation can be completely avoided).

**An intermediate board may not be received if:**

- it is on a contaminated pallet,
- it is torn, damaged,
- it is wet, mouldy or visibly contaminated,
- it is not put on a can pallet, or not in the required packaging (frame, strapping band, side and top foil)
- more than 500 pieces are stacked on a pallet, or they are in an irregular fashion,
- it does not have the Manufacturer's logo on it (Quality Pack),
- pallets are stacked on one another, according to the photograph below, without metal frame (the element marked with 1. x), that would prevent the direct contact of the intermediate board with the bottom of the pallet,
- the intermediate boards are stacked on one another in an irregular fashion (the element marked with 2. x),
- they are not strapped as in the picture below (the element marked with 3. x),

A recommendation for returning the appropriate intermediate boards, as shown in the picture on the right below, is that the intermediate boards be properly arranged (green check mark 1), and that the

metal frame is in direct contact with the pallet (green check mark 2), and the pallet is strapped (green check mark 3) and it shall be shrink wrapped.


**A metal frame may not be received if:**

- it is returned without the corresponding German pallet,
- it is broken, cracked and rusted,
- it is not strapped or is in an irregular fashion (collapsed),
- it is visibly contaminated (mouldy, damp, or any other form of contamination is visible on it)
- it does not have the Manufacturer's logo on it (Quality Pack).

## 2. Rules of loading goods:

**(In case of outbound delivery from QUALITY PACK Zrt.)**

The freight forwarder is responsible for cleaning and disinfecting the transport vehicles according to the hygiene requirements, in accordance with the corresponding legal regulations. The suitability and cleanliness of the food industry packaging material transport vehicle (including odourlessness, etc.) shall be verified before loading. In case of non-compliance, QualityPack may refuse to load the goods!

The driver and the operator of the vehicle are responsible for executing the specifications concerning delivery.

During reception of the materials, arrangements shall be made to preserve the products (quantitatively and qualitatively), keeping them safe from infections and contamination.

During loading, the food industry's packaging materials shall be protected from the adverse effects of weather and environmental damaging and contaminating effects, from direct sunlight, heat and especially, water and high humidity.

The freight forwarder must have a proper operating licence and it has to be properly evidenced.

The freight forwarder shall acknowledge the valid order at the site and the times of reception and dispatch of goods. (Workdays 7am – 4pm) If it should arrive outside these times, the driver shall wait outside the gate. The date and time of arrival of the shipment must be agreed in advance by the carrier with the QualityPack contact person specified in the contract.

Upon arrival, the driver shall report at the gate. The gatekeepers notify the dispatcher, who will determine the time of loading.

Based on the calling system in place at the freight reception, the gatekeepers notify the driver, when he may enter the site, and proceed to the specified loading gate.

The driver shall respect the traffic regulations valid on the site. No traffic jam may be caused; the driver shall help the regular flow of traffic with his behaviour!

The driver may not enter any room other than the warehouse office (except for the ramp where his truck is being loaded). The visibility vest shall be worn at all times. The driver shall await his turn inside the vehicle.

The driver shall respect the work safety (e.g. safety boots shall be worn at all times, etc.), hygiene (e.g. use of conveniences, eating, waste treatment, etc.) and other (appropriate clothing, clean and proper appearance, prohibition of smoking and alcohol consumption, etc.) regulations valid on the plant's premises as well as the official regulations in force, current virus protection rules (mask, covid test, hand wash, disinfection, etc.) if such a provision is in force at the QP site.

The driver shall provide the license plate number of the transport vehicle in advance. The warehouse will identify the vehicle according to license plate number, to enable handing the goods over.

The driver shall keep CMR or delivery documents with the company's stamp available at all times.

The driver, upon request by the deliverer, shall fold up the tarpaulin covering the side of the vehicle and fold the sidewall down to enable loading the truck from the side.

The delivery and reception of pallets (on the form found in item 5 of the Annex) shall be recorded in each case.

The truck shall be closed, clean, hygienic, capable of preserving the qualitative and quantitative parameters of the food industry packaging material. No foreign deliveries may be present on the truck.

The suitability of the transport vehicle shall be checked and documented in each case on QP-QC-10-0119 Shipping Checklist or in a document relating to the control of the same parameters existing in the Customer's own system and which document is traceable back.

If the result of the check is unsatisfactory, the warehouse may refuse loading of the goods and request a new vehicle. The cause of the refusal shall be photographed and this fact shall be indicated on the CMR or delivery note, and both parties shall sign it.

The driver shall be present during loading.

The driver shall indicate any reservations concerning loading immediately. If the driver raises reservations concerning the loading, photographs shall be taken and the reservations entered on the CMR or the delivery note, and both parties shall sign it.

The driver shall check before and after loading if the packaging of the pallets is intact and appropriate. Optimally, no disorder should be detected.

Mechanical damage shall be avoided, pallets can only be transported vertically, and pallets loaded in the cargo area should be placed close to each other in such a way that they fill the entire cargo area.

If any pallet is not properly packed, or damaged or any other disorder is present, another (well packaged, intact, etc.) pallet may be requested, or in lack of a replacement pallet, the driver may request that the pallet in question be repackaged.

The freight forwarder is responsible for the proper fixation of the pallets to prevent them from falling over or sliding on the way.

The use of product fastening devices that have or may have physical effects on incoming products (e.g. ratchet straps, end plank) is shall be used in a way that ensures no negative effects on the quality of the product.

The pallets must be placed as close as possible to each other, preventing damage due to the displacement of the pallets during transport.

For standard trailers (13.6m x 2.45m), the number of pallets that can be transported per truck is:
- German pallet: 20 pallets
- Spanish pallet: 18 pallets
- End (plastic) pallet (1000x1200mm): 21 pallets

In case the shipment is sealed, the seal number shall be reconciled with the number indicated on the shipment documents. If the shipment is not sealed, the gatekeepers shall check the shipment based on the delivery note.

## 3. Rules of transporting goods:

When the goods are loaded and the freight forwarder has left, the following shall be observed and acknowledged:

After loading, the freight forwarder is responsible for the goods. No quality or quantity claims raised after the vehicle has left the loading bay will be entertained!

The driver and the keeper of the vehicle are responsible for executing the specifications concerning delivery (road safety, work safety, hygiene, etc.).

During transport, the food industry's packaging materials shall be protected from the adverse effects of weather and any environmentally damaging and contaminating effects.

The transport vehicle shall be able to protect it from the adverse effects of weather (dry cargo hold, at a temperature of 5-35 $^{O}$C max. 75% relative humidity, short-term temperature fluctuations may not exceed 10 $^{O}$C) or materials that help keep adverse effects at bay (insulation, use of humidity absorbents, fans, etc.).

In case of sealed deliveries, only the dispatcher or the receiving clerk or the person commissioned by them is authorised to remove the seal. The freight forwarder is not allowed to manipulate the seal and is responsible for its integrity throughout the shipment.

If the seal is broken due to reasons outside its scope of responsibility, it shall be photographed and a report shall be prepared immediately of the event, informing the dispatcher without delay, who will then determine the further course of action.

The driver is requested to drive carefully! Sudden accelerations and powerful braking should be avoided, as well as taking turns of short radius at relatively high speeds!

Before beginning rest hours, the driver shall check the load (if possible). All products shall be free from damage, clean and dry.

Products damaged during shipment shall also be delivered. The receiving clerk is responsible for the further management of such products!

If the freight forwarder finds out that there are defective products in the shipment, it shall immediately be indicated to the party handing it over (or receiving it), who will inform the freight forwarder of the appropriate course of action. Instructions received shall be followed strictly!

## 4. Rules of reception and inspection of incoming goods:

## (at the Customer's premises)

### 4.1. General rules:

The truck shall be closed, clean, hygienic, capable of preserving the qualitative and quantitative parameters of the food industry packaging material. No foreign deliveries may be present on the truck.

If this is not met, the warehouse may refuse the unloading of the goods. The cause of the refusal shall be photographed (if possible) and this fact shall be indicated on the delivery documents, and both parties shall sign it (according to point 1 of the Annex).

The goods shall be free of damage and humidity. Damaged products and the cause of the defect shall be photographed (if possible) and this fact shall be indicated on the delivery documents, and both parties shall sign it (according to point 1 of the Annex).

The freight forwarder is responsible for the proper fixation of the pallets to prevent them from falling over or sliding on the way. If it is detected upon receipt of goods that this event has occurred this fact shall be indicated on the delivery documents, and both parties shall sign it (according to point 1 of the Annex).

Empty pallets shall not be used to fill cargo spaces of transport vehicles as sharp edges may damage incoming goods (especially raw and packaging materials).

In case of sealed deliveries, only the receiving clerk is authorised to remove the seal. The freight forwarder is not allowed to manipulate the seal and is responsible for its integrity throughout the shipment.

If the seal is broken due to reasons outside its scope of responsibility, it shall be photographed and a report shall be prepared immediately of the event, informing the dispatcher without delay, who will then determine the further course of action.

Products damaged during shipment shall also be delivered. The further management of such products is the responsibility of the receiving clerk! Products received damaged must be properly documented (photo, video, protocol signed by the receiver and by the driver) and make it available without delay to both parties for investigation. The further fate of the goods is agreed between the Customer and QualityPack.

The receiving clerk will compare the delivery documents with the Purchase order. In case of a match, it shall be checked if the product bears the markings and specifications according to the effective legal regulations (pallet label, batch number, name of producer, place of production, shelf life, quality certificate, if available, etc.).

The compliance of the goods is verified by the deliverer by signing the delivery documents.

Compliance shall be verified and documented together by the receiving clerk and the driver.

In case of non-compliance, the cause of reservation shall be photographed (if possible) and this fact shall be indicated on the delivery documents, and both parties shall sign it (according to item 1 of the Annex).

The driver shall be present during unloading.

The driver shall indicate any reservations concerning unloading immediately. If the driver raises reservations concerning the unloading, photographs shall be taken and the reservations shall be entered on the delivery documents, and both parties shall sign it (according to point 1 of the Annex).

The receiving clerk shall check before and after loading if the quality and quantity of the goods are appropriate. If no discrepancies are found, this shall be documented.

If any pallet is not packed properly or is damaged or any disorder is visible on it, it shall be photographed and the reservations shall be entered on the delivery documents, and both parties shall sign it (according to item 1 of the Annex).

The driver and the operator of the vehicle are responsible for executing the specifications concerning delivery.

During reception of the goods, arrangements shall be made to preserve their value and quality, keeping them safe from infections and contamination.

Pallets containing aluminium cans and ends shall always be transported, loaded and stored vertically.

### 4.2. Procedure if a defective product is detected (reception of empty cans):

The deliverer (Seller or Supplier) and the receiver of the goods (Customer) shall examine the products under their care.

Important: Only products of flawless quality, free from quality defects may be transported, received and stored, as in the opposite case the resulting corrosion or external damage may cause significant material damage to the owner of the products.

If you encounter a product that you are not sure about, you should contact the Manufacturer!

If there is any discrepancy or damage to the product or the product itself or the packaging is damp due to improper delivery, proceed as follows:

- if the damage does not affect the quality of the further production process or less than 0,2% of the cans are damaged per shipment, all protruding or damaged cans shall be removed to record the true difference or the extent of the actual damage in the delivery document.
- if the shipped products are excluded due to the injury from the further process or because more than 0,2% of the cans are damaged in a shipment, a complaint report shall be filled out (see Annexes item 3) and follow the guidelines in Annexes item 1, within 24 hours of the occurrence of the event.
- you shall also send us a photo of the injury or the product damage so that the real cause of the injury can be determined (see Annex 1, item 1).
- if there is no documentation on transport damages, the goods sent shall be deemed to be accepted without reservation.

The information on the label shall be checked and reconciled with the purchase order. Take extra care of the following:

- quantity,
- name and
- article number of product,

The pallet shall be visually inspected. Check that the pallet is free from the following damages:

- damaged packaging,
- mechanical damage of the cans or ends,
- damage of the pallet that makes unloading impossible.

By precisely adhering to the rules of delivery and reception, the volume of products of defective quality can be reduced to zero. This can avoid significant material damage and saves tremendous amount of annoyance for the owner of the products.

### 4.3. Quality control of incoming goods:

#### 4.3.1. For beverage cans:

Sampling: Every second Can to be inspected from the left corner of the longer side of the pallet, from the fifth row from the ground.

If the number of defective cans is equal to or less than the limit value, the batch shall be considered as meeting the requirements and suitable for production. In the event of an error exceeding the limit value, a complaint must be initiated against the batch concerned in accordance with point 3 of the Annex!

Visual inspection - sample quantity: 32 pcs.

First, place the cans next to each other in a well illuminated place to avoid the shadow effect. Natural daylight is recommended.

Then, from a distance of 1 m, determine, whether any inconsistency or non-conformance exists in the printing of the cans, which may influence marketability.
A “Master product” (printed can signed by the Customer’s representative during the first production) is used as a reference for inspection. In disputed cases, illumination of 5000 K temperature shall be used.
Damage that is not visible to the naked eye from a distance of 1 m shall not to be regarded as non-conformance or defect.

Geometric dimensions - sample quantity: 13 pcs.

Check through the pallets for possible mechanical damage. It is forbidden to subject damaged cans to geometric testing.

Measure the following:
- can height,
- flange width and
- inner diameter.

The measurement of the can height and flange width shall be carried out in point 4.
Measuring the inner diameter is a simple measurement.
The can is deemed not compliant with requirements, if the measurement results fall outside the tolerance limits.
The dimensions of the cans shall comply with the technical parameters (outlined in the technical specifications) provided by the producer.

Integrity of the inside coating - sample quantity: 13 pcs.

In order to be sure of the accuracy of the testing, we recommend using fresh samples which were not used for other tests before. Only intact cans can be used for testing.

The measurement results shall be compared to the specifications of the corresponding beverage type. A batch will not be deemed compliant with the requirements, if the internal lacquer layer exceeds all permissible factors for more than one can, or if the average of the sample is higher than the value given in the table below.

| **Product** | **Acceptable factors with respect to the inner lacquer layer (mA) average value** | **Acceptable factors with respect to the inner lacquer layer (mA) individual max. value** |
|---|---|---|
| standard beer (≤6% alcohol content) | 10 | 50 |
| soft drinks (excluding tonic), non-alcoholic beers, strong beer, ice tea drinks | 2 | 17 |
| energy drinks, isotonic drinks, juices, low-alcohol carbonated drinks, carbonated mineral water, tonic, dairy products, Hard Seltzer | 2 | 15 |

Bar code - sample quantity: 13 pcs.

Use laser bar code reader. Check the 13 cans. If the bar code is completely illegible in case of more than one can, the entire batch shall be regarded as non-compliant with the requirements.

Can inspection:

**Critical defects - completely unacceptable**

Completely unacceptable defects are the following:

a) harmful to human health

- heavy contamination or foreign material originating from the production process, which is harmful to human health or life.

b) if the products are not suitable for their intended use

c) use of materials which do not meet specifications,

d) total lack of or serious errors in declarations required by the law.

**Important notice!**

**Mechanical failure of the pallet packaging, any contamination or soaking of the cans or end pallets is unacceptable as it carries a microbiological hazard!**

**Can defects, Category I**

Absolutely undesirable defects, which:

- impact the quality of the packaged products
- cause large numbers of interruptions in the production process, significantly reducing production efficiency - below normal production levels.

| | |
|---|---|
| **1. Pin Hole** | A perforation in the metal which will allow the passage of product or CO2 through it. |
| **2. Defective Text** | Where there is a critical text defect on the printed design. Missing or unreadable text or bar codes, required by the law |
| **3. Split Pleats** | Where the neck of the can shows a fold in the metal which has split. |
| **4. Trim on Flange** | When slivers of metal from the trimming operation are left on the flange. |
| **5. Split Flange** | A fracture of the metal around the periphery of the flange parallel to the radius of the open end. Where the depth of the split exceeds half the flange width. |
| **6. Spraying failure** | Incomplete internal lacquer or missing areas of lacquer. |

| | |
|---|---|
| **7. Contamination** | Foreign matter, dust or liquid inside the can, microbiological contamination. |
| **8. Wrong Specification** | Mixed designs on same pallet. |
| **9. Serious Damage** | Buckling, denting or fracture. Where the can would cause hold–ups or leakage on a Customer's filling line. |

**Can defects, Category II**

Defects that reduce the capacity of the production line below normal level, reducing the value of the packaging or the product.

| | |
|---|---|
| **1. Can profile defects** | Significant deviation from the base profile, that may reduce the structural strength parameters of the can, a dent, the main axis of which is longer than 30 mm. |
| **2. Spots/lacquer drops** | Too abundant lacquer, that sticks to the inner wall of the can in the form of droplets or spots. |
| **3. Inappropriate printing quality** | Missing primer, colour or weak printing quality, visible at least from a distance of 1 m, rendering the identifying letters of the product illegible. |
| **4. External soiling** | Noticeable oil or grease contamination forms on the outer surface of the product in the course of the production process, visible from at least a distance of 1 m. (lubricant on the neck area which is part of the necking process does not qualify as a defect) |
| **5. Scratches on printing** | Scratches on printing, over a total area greater than 50 $mm^2$. |
| **7. Narrow/wide flange** | The non-compliant width of the flange on a part or the whole of the flange circumference results in inappropriate sealing parameters. |
| **8. Inappropriate colour** | Visible deviations from the colour defined as standard. |
| **9. Illegible barcode** | Product identification is not possible with the help of barcode readers. |

**Can defects, Category III**

Defects resulting in non-compliant parameters with the specification provisions will not reduce the capacity of the production line, and will not cause loss of material, neither significant deterioration of quality in the package or the product.

| | |
|---|---|
| **1. Internal printing** | "Carry over" of the primer or the printing to the inner wall of the can. |
| **2. Quality flaws in printing** | Minor printing defects visible from a distance of 1 m, not deteriorating the quality of printing, the letters remaining legible. |
| **3. External scratches** | Scratches on printing, down to the metal surface over a total area greater than 10 $mm^2$. |
| **4. Narrow/wide flange** | A flange width not compliant with the specifications, not influencing the quality of the tab. |
| **5. Indentations** | A dent the main axis of which is 13-30 mm long. |
| **6. Neck deformation** | The deformation of the neck results in a certain degree of flange damage, which will not result in product leakage. |

**Batch qualification assessment:**

Visual inspection of the pallets

1. Damaged pallets 0
2. Damage of cans resulting from transport
- acceptable number of cans per delivery 0.2%

Can inspection

1. Visual inspection - sample quantity: 32 pcs
    - Critical defects 0
- Can defects, category I 0
- Can defects, category II 2
- Can defects, category III 3

2. Geometric parameters not compliant with
the specification's provisions - sample quantity: 13 pcs. 1

3. The integrity of internal lacquer
- according to specification - sample quantity: 13 pcs. 1

4. Barcode - sample quantity: 13 pcs. 1

The numbers given here may be deviated from by agreement between the Customer and the Manufacturer.

**4.3.2. In case of Ends:**

Sampling: any rolls at the top of the pallet.

If the number of defective Ends is equal to or less than the limit value, the batch shall be considered as meeting the requirements and suitable for production. In case of defective Ends exceeding the limit, the batch is not adequate; cannot be used in production!

Visual inspection - sample quantity: 32 pcs.

The inspection checks the presence of the following defects:
- mechanical damage,
- lacquer layer damage,
- sealing compound damage,

Geometric dimensions - sample quantity: 13 pcs.

Check through the ends for possible mechanical damage. It is forbidden to subject damaged ends to geometric inspection. Measure the following:

- outer diameter,
- curl height,
- countersink depth.

The measurement of the flange height and countersink depth shall be carried out in four points.
Measuring the outer diameter of ends is a single measurement. The end is deemed not compliant with requirements, if the measurement results fall outside the tolerance limits.
The dimensions of the ends shall comply with the technical specification provided by the Manufacturer.

Integrity of the inside lacquer layer - sample quantity: 13 pcs.

In order to ensure accuracy of the inspection it is advisable to take a new sample set, which are not yet damaged by other inspection. Only undamaged ends should be subject to inspection.
The measurement results shall be compared to the specifications of the corresponding beverage type in the table below. A series will not be deemed compliant with the requirements, if more than one end exceeds permissible value in the inner layer (individual value), or if the average of the sample batch is higher than the value given in the table below (average value).

| Product | Acceptable value with respect to the inner lacquer layer (mA) average | Acceptable value with respect to the inner lacquer layer (mA) individual |
|---|---|---|
| beer | 10 | 50 |
| other | 2 | 20 |

End opening test - sample set quantity: 13 pcs.

Select 13 Ends and check the opening mechanism. All ends shall open-up properly, without breaking off the opening tab.

**Critical defects - completely unacceptable**

Completely unacceptable defects are the following:

a) harmful to human health

- serious contamination or foreign material originating from the production process, which is harmful to human health or life.
- sensible solvent odour that may affect the product or human health or human life

b) use of the ends not compliant with the appropriate practice, not for the intended purpose

c) use of materials that do not comply with the requirements

d) complete lack of or serious defects in the statutory declarations.

**Important notice!**

**Mechanical failure of the pallet packaging, any contamination or soaking of the cans or end pallets is unacceptable as it carries a microbiological hazard!**

**End defects, Category I**

Absolutely undesirable defects, which:

- impact the quality of the packaged products
- cause excessive downtime in the production process, significantly reducing production efficiency - below normal production levels.

| | |
|---|---|
| **1. Pin Hole** | A pin hole in any part of the end due to defective material. |
| **2. Curl Damage, Failed Geometry of the End** | Damage, geometric deviation that prevents double seaming or results in insufficient sealing.<br>Damaged outer (foil) and inner packaging (sleeve) of end pallet. |

| | |
|---|---|
| **3. Excess of compound** | Excess lining compound over 2.5 mm length which prevents proper seaming |
| **4. Gaps in/or missing Compound Lining** | Breaks over 2,5mm in the continuity or completely missing of the lining compound |
| **5. End (curl, Score, Rivet) Fracture** | Damaged end or condition of end where score/rivet/curl are cracked which results leaks in the final product. |
| **6. Tab Failure/Missing** | Where the tab damaged, improperly shaped or missing |
| **7. Non-converted end (shell).** | The end without scoring and tab. |
| **8. Contamination** | Grease, oil or other foreign matters related to the end production, noticeable with a naked eye Damaged mill packaging (sleeve) on a pallet. |
| **9. Wrong Specification** | Mixed colors or type on the same pallet. |
| **10. Internal varnish coat missing.** | Partial or total internal varnish coat missing. Integrity of internal varnish coat out of specification range. |

**End defects, Category II**

Defects that reduce the capacity of the production line below normal capacity, reducing the value of the packaging or the product.

| | |
|---|---|
| **1. Excess of compound** | Excess lining compound up to 2.5 mm length |
| **2. Lining compound inconsistency** | Break in compound continuity up to 2,5 mm length |
| **3. Blow mark on countersink** | Visible blow mark at the countersink area where internal coating integrity is maintained |
| **4. Sticking ends** | Ends sticking together and do not detach from each other under their own weight. |
| **5. Deformed end** | Slightly deformed end visible the extent of which does not prevent proper seaming, and doesn't cause the container to lose its seal. |
| **6. Tab defect** | The tab breaks before opening the end. |
| **7. Color discrepancy** | Color discrepancy of end / tab, which is visible to the naked eye when examined from a distance of more than 1 m |

**End defects, Category III**

Defects resulting in non-compliance with the specification parameters will not reduce the capacity of the production line, and will not cause loss of material, neither significant deterioration of quality in the package or the product.

| | |
|---|---|
| **1. Color discrepancy** | slight discrepancy on end / tab surface, which is visible to the naked eye when examined from a distance of 1 m |
| **2. Compound stainage** | Stainage with compound to an extent which does not cause end adhesion. |
| **3. Bent tab** | tab bent more than 10° from its normal position. |
| **4. End surface deformation** | End deformation caused by metal imprint or action of external force not resulting in loss of package tightness. |
| **5. Low amount of sealing compound.** | Less than the specified amount of compound applied over 2,5mm length (not missing!) Very low risk of leakage |

**Assessment:**

**VISUAL INSPECTION OF THE PALLET**

1. Damaged pallets 0
2. Damage of Ends resulting from transport
   - Acceptable number of End per pallet 4

**End INSPECTION**

1. **Vision inspection - sample quantity: 32 pcs**

| | |
|---|---|
| - Critical defects | 0 |
| - End defects, category I | 0 |
| - End defects, category II | 1 |
| - End defects, category III | 3 |

**2. Geometric parameters not compliant with the specification - sample quantity: 13 pcs.**

| | |
|---|---|
| - The outer diameter exceeds tolerance limit | 1 |
| - The curl height exceeds tolerance limit | 1 |
| - The countersink depth exceeds the tolerance limit | 1 |

**3. The integrity of internal lacquer - sample quantity: 13 pcs.** 0

**4. End opening test - sample quantity 13 pcs.**

| | |
|---|---|
| - The End does not open | 0 |
| - The opening tab breaks off the End | 0 |

## III. Warehousing

### 1. Requirements concerning the warehouse:

It shall have an operating licence, functioning at a location established and licensed for the purpose, in observance of the public health, food hygiene, environment protection, fire protection, work safety and safety provisions.

Its construction allows protection of the product from contamination and environment damaging effects.

Its transport routes are well separated and can be kept clean and free.

Where the FIFO (first in, first out) principle and the rules of placing goods in storage can be implemented.

It is equipped with automatically operated gapless (fast) gates and tightly closing, shaded (UV foil protected) windows equipped with insect net.

It is protected against pests (rodents, flying and crawling insects and birds).

It is kept appropriately tidy and clean and receives regular cleaning.

It ensures the storage conditions necessary for maintaining the quality of food industry packaging materials and ensures preservation of the value of the products and protection against infection and contamination.

### 2. Rules of placing goods in storage:

The goods received shall immediately be transported to the appropriate warehouse to prevent it from getting contaminated and exposed to environment damaging effects. It is forbidden to store the products in humid places, exposed to rain and direct sunlight.

They may not be stored in the proximity of chemical constituents that may induce corrosion if left near other materials, that may contaminate the product (glass, chemicals, materials prone to crumbling, incendiary materials, materials of strong odour or those attracting insects, packed animal food and cereals).

The transport routes shall be kept free and clean. Enough space shall be left between stacks to ensure safe passage between them.

Doors and windows shall be free of gaps, closing tightly. The entry of pests into the warehouse shall be prohibited.

It is strictly forbidden to store poisonous pest baits and other materials harmful to human health in the same space as the product.

Prevention of access of unauthorised persons and access to products shall be ensured on the entire premises.

Products subject to other Quality reservations shall be well separated from perfect products and shall be appropriately labelled.

It is forbidden to store products without a pallet (on the ground).

The pallets shall be placed close to one another without touching each other.

Pallets containing cans should not be stacked higher than three pallets, but those containing Ends are FORBIDDEN to be stacked. Other products are also forbidden to be placed on top of the pallets, as they may contaminate or damage the packaging.

Stacks should be placed to enable walking around them. Enough space shall be provided between the pallets and the wall (one man should safely pass behind it).

The goods shall be placed according to the FEFO (first expire, first out) principle. This means the products with shelf life closer to expiry are placed in the front, so they would be used first.

The products shall be placed in the warehouse, separated by batch, so they can be accessed, controlled, identified and easily loaded out.

Identifiability of the products shall be ensured until they are completely used. In case they are repacked, the appropriate markings shall be carried over to the new packaging. Pallets shall be placed so that their markings are legible.

Packaging may only be stored in designated areas and their removal as soon as possible shall be arranged.

In warehouses, the hygienic conditions shall be continuously ensured, care shall be taken to arrange regular cleaning, maintenance and removal of wastes and tools not in use.

If inappropriate storage conditions are observed upon execution of the products' inspection, restoration of proper storage conditions shall be arranged without delay.

## 3. Rules for moving goods:

For moving the goods, the following rules shall be respected:

The forklift operators shall always be trained for the practice of good handling of products written in this document, and their attention shall be directed to the significance of cautious handling of products. This shall be continuously controlled by the warehouse manager (as well as the deliverer and the receiving clerk).

Prior to moving the goods, the integrity of the pallets shall be ascertained. It is strictly forbidden to move damaged pallets. Such activity is very dangerous and may also cause significant material damage.

Before moving goods, the stability of the goods on the pallet shall be ensured. It is strictly forbidden to move visibly shifted pallets.

The products shall be completely placed on pallets. It is forbidden to move pallets with extending products on it. If the product visibly hangs off the pallet, it cannot be moved.

While loading aluminium packaging material, only forklifts whose forks do not reach beyond the pallet may be used, as extending forks may cause significant damage.

Forklifts shall always pick up the pallets at right angles, with the forks levelled and centred, in order to protect the pallet and the products on it from damage.

When picking up goods, the pallet shall be approached carefully with the forklifts' lifting towers. The tower may not touch the products, as it may damage them.

It is recommended to use electric or gas-operated forklifts (diesel forklifts shall be avoided due to flying particles in the exhaust gas).

Pushing pallets against each other with the forklift shall be avoided.

A total of two stacked pallets may be moved by the forklift in a single move.

It is forbidden to push or drag the pallet on the ground, as the pallets or the goods may be damaged.

## 4. Warehousing rules (filled products):

The avoidance of primary corrosion is primarily the task of the can producer. It ensures, by continuous control, that only impeccably lacquered cans and ends are delivered to the Customer.

Subsequently, the formation of secondary corrosion of the filled cans and ends may be reduced to a minimum, by taking into consideration of the following guidelines for storage of empty cans and ends:

- Care shall be taken to ensure prevention of the conditions of primary and stress corrosion;
- It shall be ensured that only impeccable products may be delivered and received;
- Care shall be taken not to allow wet or not sufficiently dry products enter the warehouse;
- The product shall be continuously controlled, and identified and separated in case of signs of physical damage or stress corrosion are detected upon visual inspection;
- The warehouse personnel shall be properly trained on handling defective products;
- Caution shall be exercised during delivery, unloading and storage of the products.

Preventing stress corrosion

The factors below greatly help the formation of stress corrosion:

- high humidity;
- cans and ends kept under wrapping foil in moist conditions;
- large temperature fluctuations;
- high storage temperature;
- the direct presence of chemical constituents that may cause corrosion.

Therefore, the following rules shall be observed and actions to be taken:

- The warehouse shall be continuously checked, with at least a weekly frequency;
- Care shall be taken not to receive wet or not sufficiently dry cans and ends;
- wet pallets shall be identified and removed;
- corroded products shall be removed;
- the warehouse space should be free from materials that may react with the surface of the can;
- do not store the cans in an area exposed to direct sunlight and weather conditions (rain, snow);
- the warehouse space shall be dry with less than 75% humidity, the temperature fluctuation should not exceed 10 $C^0$while the constant temperature should be 5 to 30 $C^0$;
- temperatures higher than the prescribed storage temperature range are only allowed for a short time (during transport).
- The storage surface shall be clean and dirt (gravel, foreign materials) shall be prevented from sticking to pallets;
- The personnel shall receive appropriate training on preventing stress corrosion;
- Caution shall be exercised during delivery, unloading and storage of Finished products.
- The products must be protected from direct sunlight during storage periode

The stored products (the can and the end considered primary food industry packaging material) shall be reviewed for shelf life expiry and other quality defects regularly (weekly). Damaged products or those of expired shelf life shall be immediately removed from the storage area and shall be kept completely separated from the other products and clearly marked. Arrangements shall be made for their proper disposal.

## IV. Product specification

In all cases, the latest version of product specification (QP-QC-40-0035 Product specification) attached to the contract signed by the Manufacturer and the Customer as well must be observed.

The mobility of empty cans on the filling line can be affected by the roughness of the outer lacquered surface of the can.
During the first test run on filling line the Manufacturer's representative (CTS) and the Customer's technical representative make sure that the delivered cans run without problem on the Customer's filling line. Based on the result, they can determine change in the surface roughness of the can, if necessary. In this case, the Customer should provide reference can samples for the Manufacturer's CTS to test the surface roughness and facilitate proper adjustment.

Since the related parameter can be measured (surface roughness) and can be quantified, if the Customer does not specify a specific value for the required maximum surface roughness of the can, than Manufacturer apply 0.130 uS as a maximum value measured with CanNeed CMT 300 EU Mobility gauge.

## V. Use of aluminum packaging material (production)

### 1. Product with quality defects:

There are four possible origins of a quality defect:

- Manufacturer;
- Supplier;
- warehouse;
- filling.

Consequence of quality defect (aluminum cans and ends):

1, **Primary corrosion** occurs when the product is improperly packaged (the internal lacquer coating is imperfect), begins to corrode and the **product begins to leak from the can or at the end.**

2, **Secondary corrosion** takes place when **the product leaked due to primary or stress corrosion and external damage begins to corrode the cans and ends of the neighbouring products**, causing their eventual leakage as well but from outside.

3, **Stress corrosion** is said to occur when the can and/or the can end **begins to corrode from outside**, as a result of external effects, eventually causing the product to leak.

Even a single leaking can on a pallet can be the cause of secondary corrosion and perforation that can damage adjacent cans as well as those located on the lower levels of the pallet. If the secondary corrosion is not identified on time or is completely ignored, the corrosion can spread throughout the warehouse in a short time and eventually lead to high material and financial losses.

Therefore, the causes of stress corrosion and external damage must be prevented in all possible ways during the production, transport and storage process of trays and pallets loaded with filled products!

Corrosion may form during and after production and may cause leakage.

## 2. The factors below facilitate the formation of stress corrosion the most:

- high humidity, improper drying of the sealed cans;
- Wet cans kept under wrapping foil;
- Temperature fluctuations that may cause pressure changes;
- Presence of salts remaining after drying;
- high storage temperature.

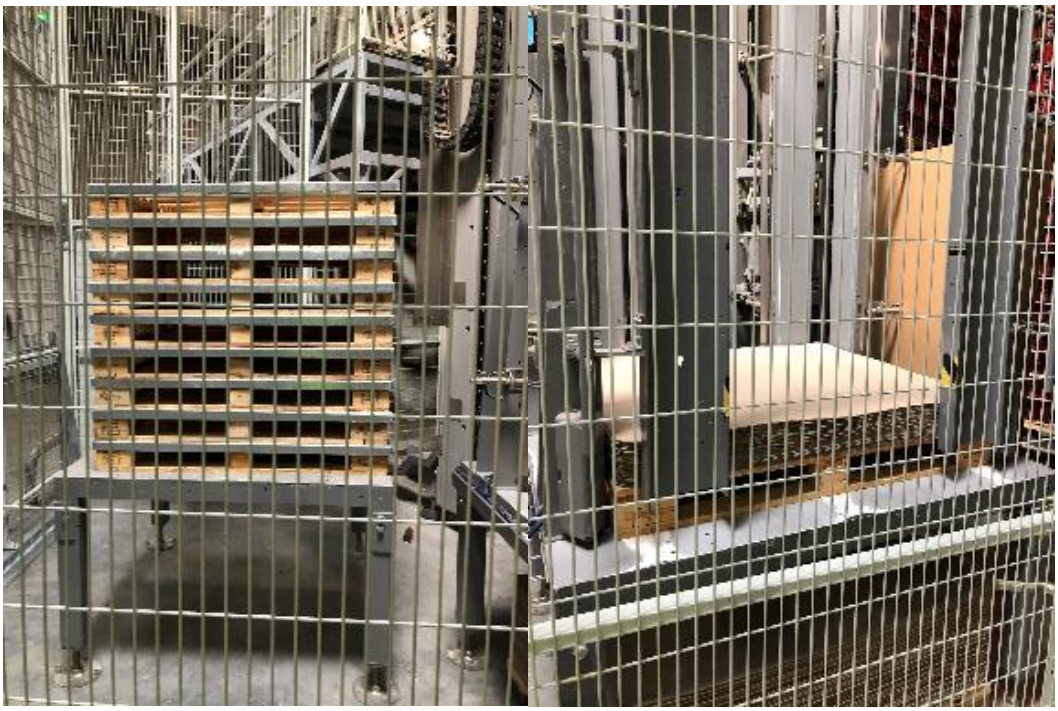
## 3. How to avoid can damage during filling and subsequent failures of product:

The requirements of Product reference manual document for transport, unloading, receipt and storage of empty can shall be observed.

During depalletizing the requirements of goods receipt shall be observed, i.e. any cans that are not properly placed on the pallet shall be removed from the palette as they may cause damage to other cans.

Depalletizing shall be performed with care. The gripping arms shall avoid damaging the neck of the cans and shall grab the frames at empty places. The loading structure shall push the cans to the track in a smooth way.

It is recommended to collect intermediate boards in a designated intermediate board collector cell, which is designed to guide intermediate pages at their four corners. It is important to have the possible smallest gap between the guide and the intermediate boards. The intermediate boards shall not fall from a distance exceeding 1 m.



The side of the conveyor belts shall support the cans at the height of the cans' center of gravity, a two-level support is recommended (at the bottom and shoulder of the cans). Side guides should be as flat as possible and should seamlessly fit together (see pictures on side guides). These side guides should not damage the cans (either because of their design or wear, or because of the limescale developed).

In order to allow the overturned cans to leave the conveyor and avoid their damaging the other cans, the gap between the side guides should be big enough for the cans to be able to fall out (see photo). It is recommended to equip such places with a can collecting tray.

When choosing material for the conveyor, copper and brass should be avoided due to corrosion. It is advisable to cover all surfaces with hard plastic, which protects the cans from damage, and facilitates the progress of the cans on the conveyor. This is true for turner guide as well (see photo). Turner

guides shall incline due to the progress of the cans and shall be self-cleaning so that the scratching of the product can be avoided.

Where conveyor belt sensors are used, the sensors shall be motion sensors and not pressure sensors. They shall be placed in such a way as to avoid any damage to the cans. Conveyor management is designed to ensure that the effect (pressure) that cans put on each other is only of the necessary extent, and the belts do not move under the cans unnecessarily. Antistatic materials shall be used.

The vacuum conveyor, the empty can control station and the can rinser may not expose the cans to either mechanical or hygiene risks.

The can rinser shall be of a gravity system and use purified product water. In order for the water to completely disappear from the can after rinsing, the rinser shall have an at least 35-degree slope and the can shall be tilted at 135 degrees in the rinsing and at 225 degrees in the emptying phase. The rinsing phase shall last for at least 2 seconds. The tracks shall be of suitable material, shall be free from injury and shall be slippery. The distance between cans at the bottom and at the top shall not exceed 5 millimetres.

The auger, the sprockets, the gripping arms, the transfer disks shall be set accurately, because they can easily cause a large-scale damage.

The conveyor belt shall be lubricated and the transfer sheets shall be kept continuously clean (it should not stick).

In the seamer, headspace air shall be removed by the use of inert gas The air content must not exceed 2ml per can (or an equivalent volume of oxygen; 0.4ml).The pressure in the can should not be less than 1.5 bar and it must not exceed 6.2 bar at any point in the manufacturing process or during storage.

The seamer shall be set exactly in accordance with the regulations (see chapter on the double seam).

The surface of the post-seam conveyors shall also be lubricated in such a way that the cans are not damaged. The conveyor belt lubricant should not be corrosive. The inclination of the conveyors shall not exceed 5 degrees.

Additionally, a level meter and sampler may be incorporated into the system, but they shall also be installed and operated in such a way that they are no sources of damage.

Then the cans are turned (in 180 degrees) to control leakage.

Pasteurization is recommended to ensure the sterility of the product. Check seam and can damage, and make sure that the product temperature is above dew point during packaging in order to avoid damaging condensation. This helps prevent condensation on the cans and ends during the storage process. The presence of salts such as, for example, chlorates and sulphates, accelerates the process of stress corrosion and therefore the management and analysis of water quality is indispensable. The pH of the rinsing water is ideally between 6.5 and 7.5. The chloride level is <10 ppm while sulfate and nitrate <15 ppm.

It is very important that during the pasteurisation, the internal pressure of the product should not exceed the specification value (max. 6.2 bar)

After the pasteurisation, both the can body and the end should be rinsed thoroughly before the secondary packaging, in order to remove any salts and lubricants, etc.

It is very important that no moisture remains on the can or the end after the drying process and before the secondary packaging. This applies in particular to the end and its dotted area.

Cans and ends shall always be dried in single lines. It's far more effective than bulk drying.

It is highly recommended that the efficiency of the dryers is routinely inspected (see section 3 of this chapter). It is also recommended that the dryer is included in an effective maintenance program so that its optimum performance can be maintained.

It is recommended that the packaging plates are made of plastic or acid-resistant steel.

Conveyor management shall be designed and set so that the belts do not move under the standing cans.

In case of packaging materials, it is worth revising the following:

- the perforated shrink foil promotes evaporation of moisture as ‘ventilation’ openings are located at the end of each package.
- cardboard packaging helps absorb residual moisture, further reducing the risk of stress corrosion.
- plastic packaging without cardboard increases the risk of stress corrosion.

Shrink wrapping shall be performed in a way that cans can’t move and there are openings at the two edges of the tray.

Tray requirements:

- the tray should be free from materials hazardous for aluminum or which may cause corrosion (i.e., it should not contain more than 0,05% NaCl and 0,2% Na2SO4);

- the trays and the tray construction shall be such as to prevent packed cans from moving during transport;

- the material of the tray should not damage the lithography;

- the formed trays shall be glued;

- the trays shall be made of corrugated cardboard, which well absorbs the vibration during storage and transport of the cans.

The palletizing speed shall not be exaggerated and its movement shall be appropriate.

Pallet requirements that shall be checked before use:

- only intact pallets can be used;

- the dimensions of the pallet shall ensure that the trays do not extend the sides of the pallet;

- products shall not be on pallets with protruding nails;

- the surface of the pallet shall be flat.

Storage of pallets of full cans shall be carried out in such a way as to allow adequate air flow.

If any products on the pallet show signs of leakage, leaking products shall be removed as soon as possible before touching other products.

Do not attempt to save damp cans, as there is a high risk of future leakage due to product contamination leading to secondary corrosion.

The Customer is responsible for the formation of stress corrosion that resulted from the non-observance of the aforementioned conditions.

If the stress corrosion has occurred, the contents of chapter Handling of products with quality defects shall be applied, as it may subsequently lead to further secondary corrosion.

Concerning external damage, the contents of chapter Warehousing, shall be observed. If the provisions described therein are respected, the number of quality complaints regarding external damage can be significantly reduced.

If an external damage has occurred, the contents of chapter Handling of products with quality defects shall be applied, as it may subsequently lead to further secondary corrosion.

The Customer is responsible for ensuring coding on the container to allow traceability of the date of filling

The Customer is responsible for full compliance with industry-accepted good practices for filling, seaming, handling, storage and distribution conditions of products.

Customer undertakes to provide the Manufacturer's CTS with the opportunity at least twice a year if requested (but not mandatory to conduct) in the relevant filling plants and warehouses of the Customer to check the conditions of storage, handling and use of the products, as well as compliance with the general rules applicable to them.

## 4. Humidity measurement on ends:

From the point of view of prevention, it is extremely important that the cans and lids are perfectly dry and free from salt before applying secondary packaging (shrink foiling trays and pallets, or wrapping of pallets)!

The goal of this inspection is to ensure the proper condition of the can during storage and to prevent stress corrosion.

**Necessary equipment:**

1 analytical balance;

2 sterile container or leakproof polyethylene bag;

3 tweezers;

4 cotton wool or filter paper, hereinafter referred to as cotton wool.

**Process:**

1 Place cotton wool in 4 leakproof containers and weigh them with an accuracy of 0.001 g. Record the results.

2. Select 4 cans after the coding or drying process.

3. Collect humidity from the top of a filled can on the part of the opening tab and under the necks using the cotton wool removed from the container. Make sure that the cotton wool does not become contaminated.

4. Place the cotton wool in the leakproof containers and immediately weigh it again (the least possible time should go by between sampling and measurement). Record the results.

5. Calculate the difference between the weight of dry and wet cotton wool (after absorbing the water from this end). **This difference equals to the weight of the water taken from the end.**

The maximum quantity of authorized water residue is shown in Table 1.

Table 1 The authorized quantity of water residue on the top of the tested ends

| **Parameter** | **maximum authorized water quantity in the sample** |
|---|---|
| test average | 3 mg |
| individual value | 9 mg |

6. Measurements should be carried out on a daily or regular basis depending on the operation of the production line and the results of the checks must be recorded in a traceable manner.

**Can and end drying is a critical element of the beverage filling operation which is the most effective way to prevent stress corrosion!**
**The filling plant is responsible for proper Can and End drying!**

## 5. STRESS CORROSION

Stress corrosion can be avoided with regular and thorough inspection. Continuous checks should be made immediately after the dryer to determine the level of residual moisture.

The phenomenon is called Transgranular Stress Corrosion Cracking (TGSCC)

Aluminum alloys are susceptible to water-induced hydrogen corrosion, which can manifest as intergranular cracking. The cracks originate at the bottom of the aluminum Easy Open End score area and propagate towards the inner surface of the End. When the residual material thickness is reduced to the point where the stress exceeds the strength of the alloy, the remaining portion will fracture due to overload and the panel will open along the score.

These failures typically occur during storage in warehouses or during transport in warm, humid periods of the year, and can occur even 1 week after filling.

The reason for this phenomenon is that water (from water vapor condensing from the environment) in the presence of oxygen is corrosive to uncoated aluminum (in the score area of end). This corrosive effect is intensified if all this happens at a sufficiently high ambient temperature. The last necessary condition is the tensile stress arising in the score area, which is the result of increased internal pressure due to the high ambient temperature. In other words, high carbonation and high temperature both increase the level of stress.

In summary, three factors are necessary for the phenomenon to develop:

- moisture (humidity)
- increased temperature
- high internal pressure

The rate of corrosion is accelerated by salts or other corrosive substances that enter the water in a natural or added way, as well as other contaminants (e.g. track lubricants)

If any of the three factors mentioned above is eliminated, the error cannot occur.

Therefore, the most effective way of prevention is to rinse the cans at the end of the filling process and dry them thoroughly before the secondary packaging!

When storing and distributing filled products, it is also very important to ensure properly dry and cool conditions!

## 6. Compatibility tests

Depending on the ingredients of the beverage to be canned, its chemical effect and its degree, as well as its aggressiveness towards the inner coating of the can, during storage, the stored beverage may damage the inner coating of the packaging, and may have a negative effect on the taste, visual appearance, and integrity of the packaging (leakage), which case refers to the incompatibility of the inner coating and the beverage.
The compatibility of the inner coating of can in contact with food and the drink to be stored in it and its control is a primary requirement from the point of view of food safety and quality preservation.

Therefore, QualityPack draws the Customer's attention to the fact that the compatibility test (QuickTest or TestPack) of the beverage and the inside coating of can/end and the evaluation of the result (with regard to the desired quality retention time) must generally be carried out for all beverages before the first can and/or end is produced or in the below indicated cases.

Main reasons that require the completion of compatibility test (and who is responsible for carrying out the test and bears its costs):

- NPI - New Product Introduction (Customer)
- Changes in the composition/formulation of current beverage (Customer)
- Changes to the agreed warranty period (Customer)
- Introduction of new plants, new lines, materials or process changes (Manufacturer, unless the Customer changes the requirements)
- introduction and qualification of alternative raw materials (Manufacturer, unless the Customer changes the requirements)

The list is not exhausted

**Quick test**

As a standard procedure, QualityPack requests from the Customer to share the beverage for the Quick test and to provide information about the beverage formulation with filling out the "New beverage

form" document. The required quantity of beverage is minimum 3 liters (for 250ml can) or 5 liters (for 500ml can) and the packaging type for test is to be defined by QualityPack.

The QuickTest is an accelerated test where the received beverage sample (delivered in PET or glass containers but possibly not in aluminium cans) is tested against unlacquered material to define the aggressiveness of the beverage and it must be performed prior any decision made about adequate can and end coating for the tested beverage.

After receipt of the Customer's beverage and completed form, the test and evaluation takes 2-5 weeks. A standard beverage is used as the ‘Control’ to compare the result of ‘Test’ beverage from Customer. Potential risk parameters which may be responsible for increased aggressiveness of the beverage and therefore to be taken into account in the evaluation: acidity, pH, alcohol, CO2, sugar, SO2, copper, chlorides, dye content, etc.
Based on the result of QuickTest and theoretical review of beverage composition a report will be created and send from the Manufacturer to the Customer on the type of interior coating recommended and a reasonably achievable warranty period for filled product.

The result of the QuickTest can be the following:
a. the beverage passed the test, therefore approval for further production with the tested coating type and application parameters can be given. The Manufacturer and the Customer must agree on the warranty period of final product.
b. the test result is inconclusive and an additional test (PackTest) is required.
Until the result of the Pack Test arrives, in the knowledge of the result of the QuickTest and under the responsibility of the Customer (assumed in writing), cans and ends can only be produced with HTH (Hard to Hold) internal varnishing, unless the Manufacturer assumes responsibility for the application of the varnish with other parameters and then for the integrity of the final product.
c. The result is negative and the Manufacturer informs the Customer that the beverage must be reformulated or PackTested with a different type of coating recommended by the Manufacturer.

Note: Depending on the aggressiveness of the drink, it may be necessary to recommend and test different types of coatings. The application of coatings other than the standard interior varnish may affect the pricing.

**PackTest**

Manufacturer produces cans with proposed internal coating type and send to Customer for filling with beverage to be tested. The required quantity of final product needed to be defined by Manufacturer. (Usual quantity is 70 pcs filled cans)  Filled samples have to send back to Manufacturer for PackTest.
The following parameters are examined during the test:

- aluminium pick-up according to legislation
- discoloration of internal coating
- visible or measureable degradation of internal coating
- final product perforation/leakage
- colour/odour and taste of beverage compared to original state

The test as a standard to be done at ambient temperature with the timing up to 12 months. But in some cases, it can be accelerated and done at increased temperatures (37 °C) with the timing up to 4-6 months. The possibility of acceleration to be defined by Manufacturer.

The result of the Pack test can be the following:
a. the beverage passed the test, therefore approval for further production with the tested coating type and application parameters can be given. The Manufacturer and the Customer must agree on the warranty period of final product.
b. The result is negative, and Manufacturer informs Customer that the beverage needs to be reformulated or PackTest need to be repeated using different type of internal coating.
The Manufacturer and the Customer must agree on which further modifications and tests are necessary.

Notes:
If the above mentioned beverage information form isn't completed or missing, or tests are necessary but cannot be performed and evaluate for any reason, Quality Pack is not responsible for failures during lifetime of final product (leakage, internal corrosion, exceeding of specific or total migration limits prescribed by law) - the list is not exhaustive - resulting from the incompatibility of the product internal coating and the beverage.

Any change in the product composition that was not notified to QualityPack in advance, as well as the lack of approval of the change by the can Manufacturer, may invalidate the warranty.

## 7. PRODUCT WARRANTY

The product performance after filling can be guaranteed for a maximum of 12 months, provided that the packaging is inspected and the requirements for the filling, testing, storage/handling of the filled products are complied with (as prescribed in Chapters II, III, and V of this document). Unless test data is incomplete or testing has been completed but indicates that 12 month lifetime is not available. In such a case, the warranty period is determined and communicated to the Customer based on the evaluation of test results and previous experiences with similar beverages.

The condition of the guarantee is the existence of a readable code of the filling date and compliance with the limits listed below during and after filling and seaming process:

- For carbonated products <2ml of air and/or 0.42ml of oxygen in the headspace, or 0.6mg/l Total Package Oxygen
- For non-carbonated products <1% oxygen
- copper (Cu) in beverages <0.2 ppm
- <250ppm of Chloride (for soft drinks) or <300ppm of Chloride (for beer)

Manufacturer of cans and ends shall not be responsible for the performance of the can and end at any time the filled product is exposed to any condition that creates an internal pressure in excess of 6,2 bar (90 psi)

Exceeding these limits could invalidate the warranty.

QP does not offer warranties for can and ends exported by the Customer or any third party, whether in empty or filled condition, beyond the EU and MENA region. Nevertheless, this warranty could potentially be expanded to other regions through explicit agreement between QP and the Customer.

QualityPack recommends the consumption of empty cans for filling within 6 months of delivery date. However the warranty period for empty cans and ends is 12 months of the manufacturing date stated in the quality certificate issued for a batch of cans and/or ends. This warranty is valid if the general transport, storage and handling rules are followed during the lifetime of product

IMPORTANT!
It is the responsibility of the Customer to satisfy themselves that desirable product qualities, such as aroma, taste and desired foaming remain acceptable for the intended lifetime of the canned beverage.

Any changes in the product formulation (compared to the beverage sent for compatibility testing) not advised in writing to QualityPack in advance to allow for evaluation could invalidate the warranty.

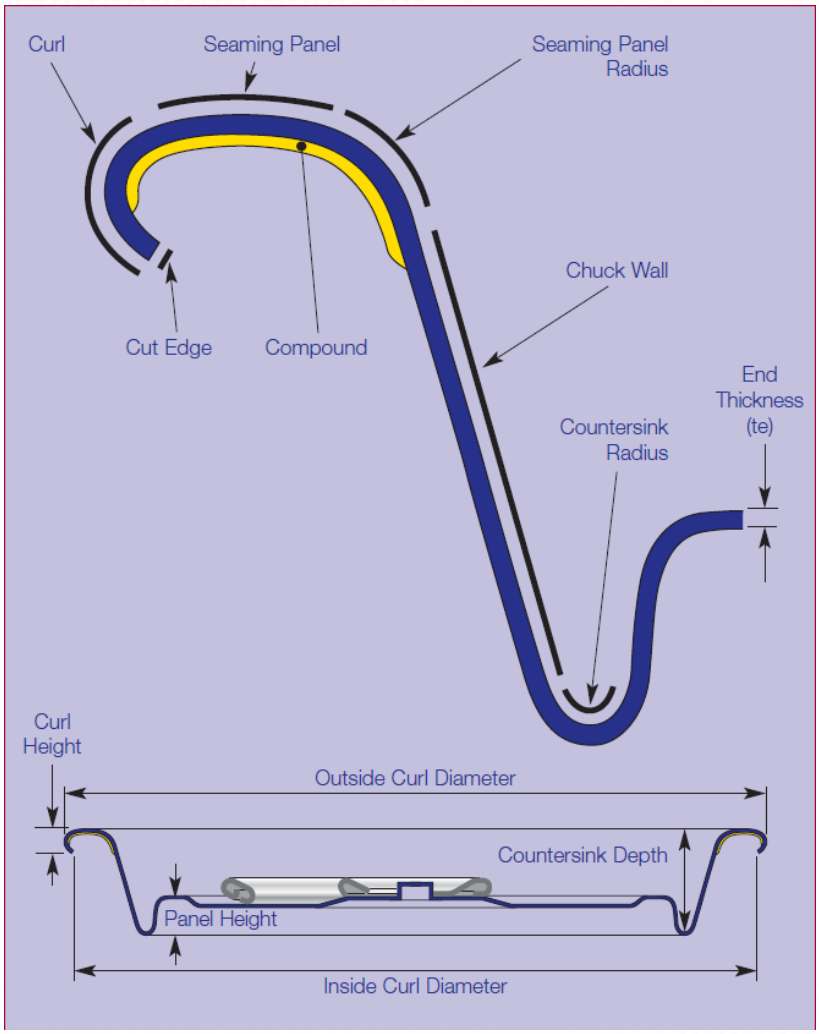
It is the Customer's responsibility to ensure filling in accordance with good manufacturing practices and industry standards accepted in the industry

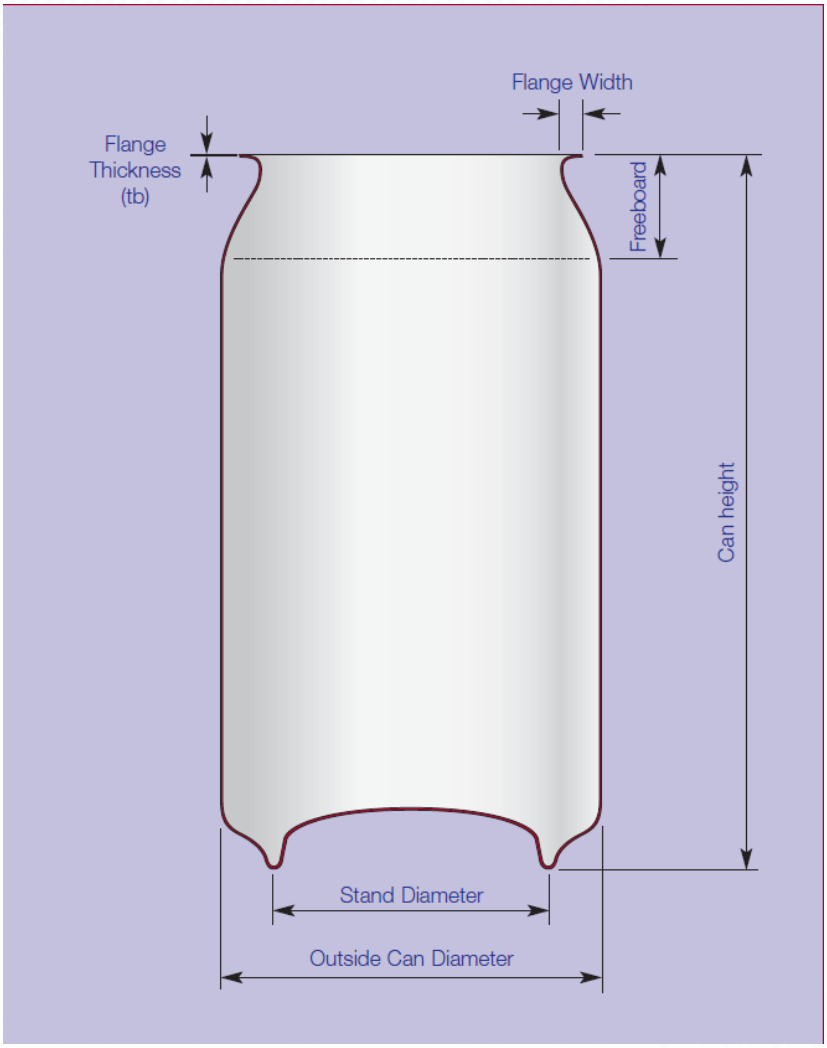
# VI. Double seam description:

## 1. Definitions:

**Definitions: End**

cut edge
curl
seaming panel
seaming panel radius
chuck wall
countersink radius
end thickness (te)
curl height
outside curl parameter
countersink depth
panel height
inside curl diameter



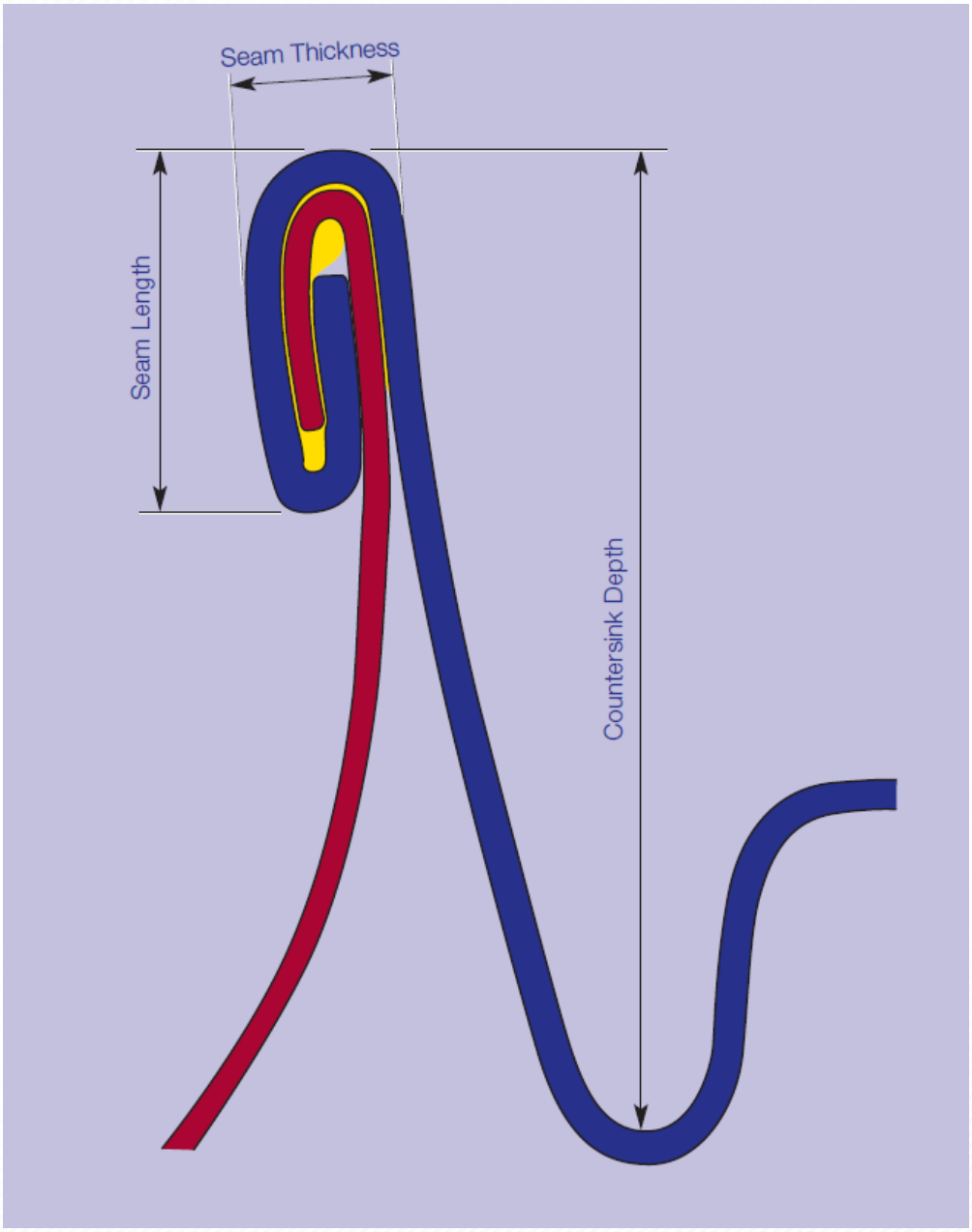



**Definitions: Can**

flange thickness (tb)
flange width
freeboard
can height
stand diameter
outside can diameter

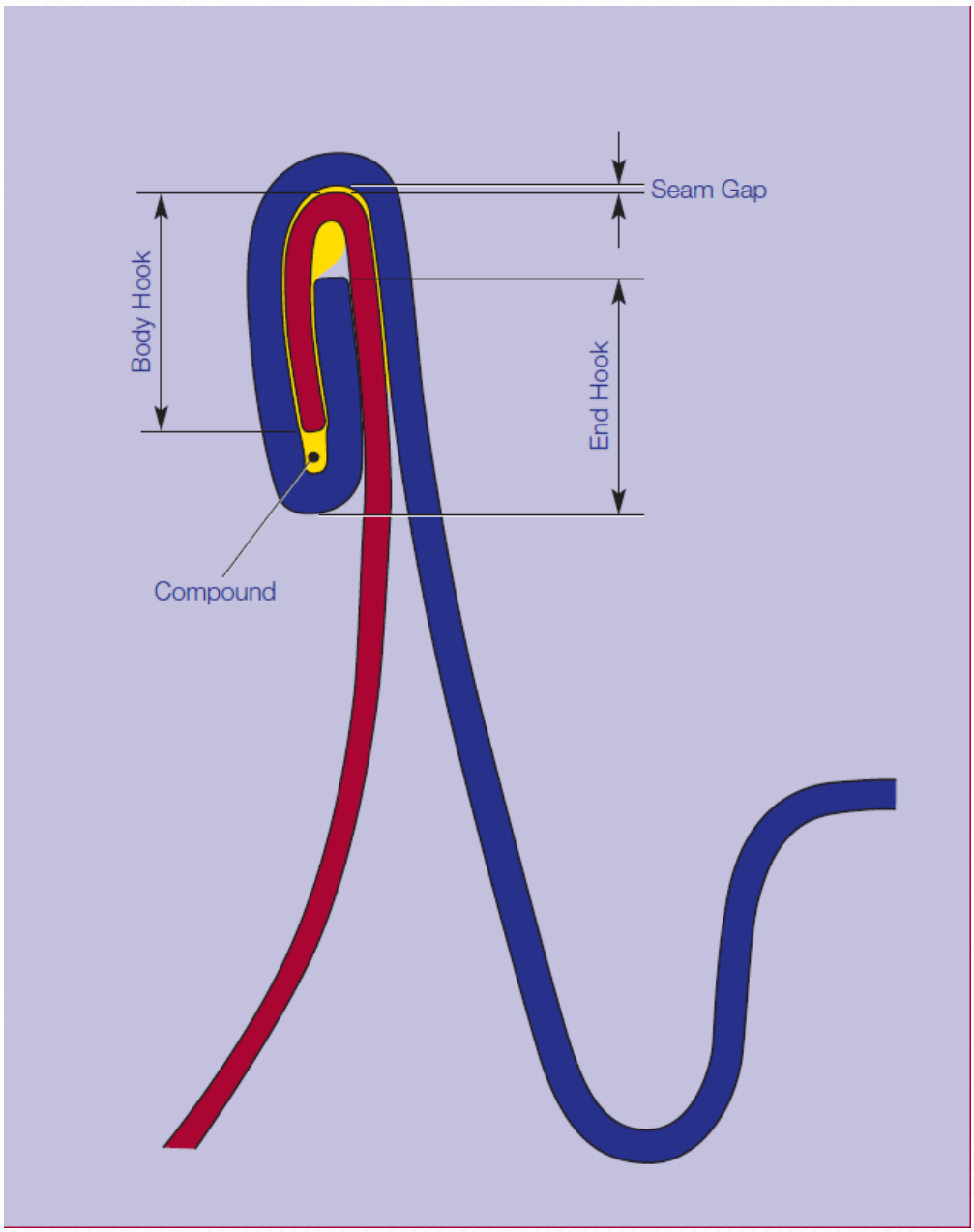
**Definitions: External seam parameters**

seam thickness
seam length
countersink depth



**Definitions: Internal seam parameters**

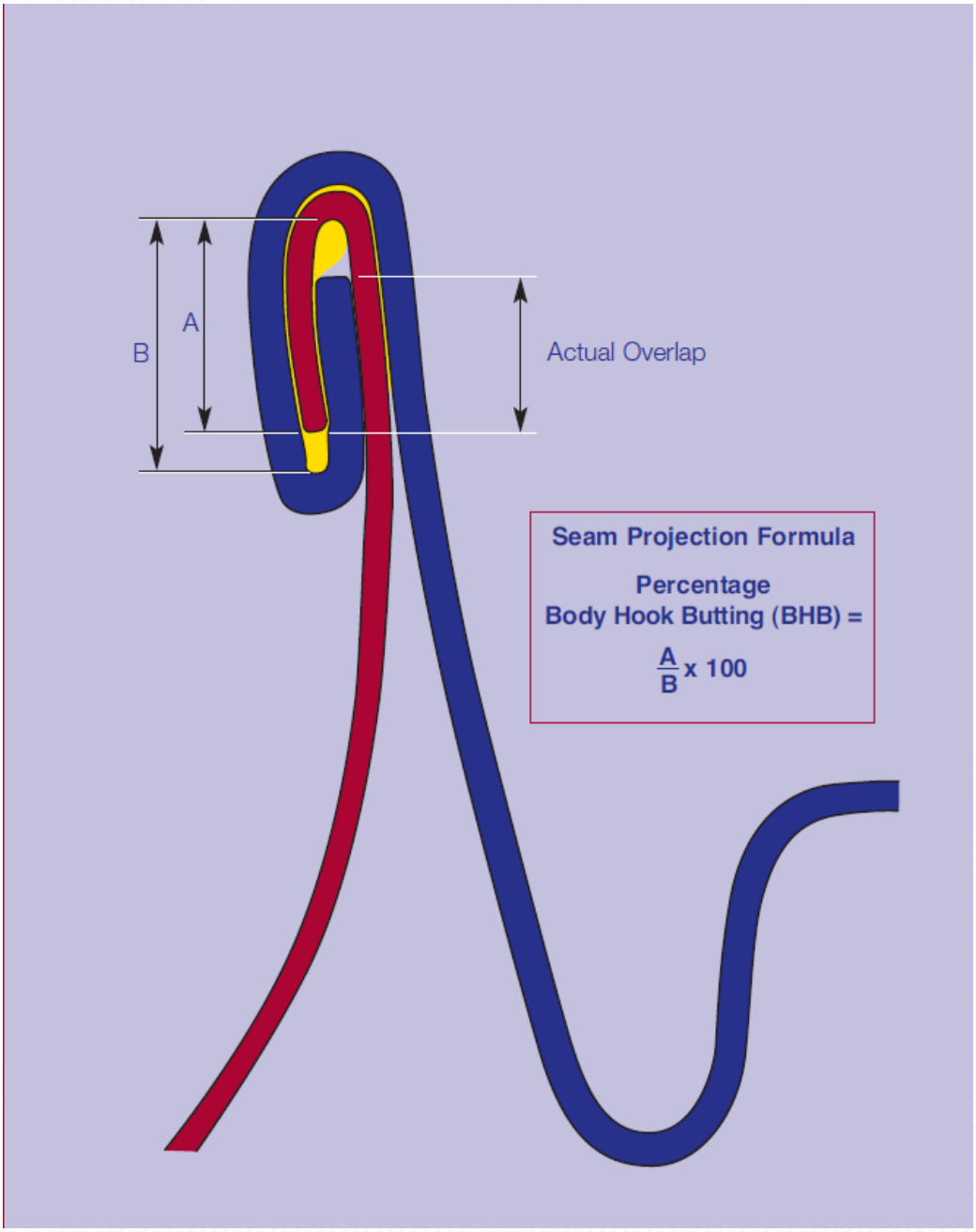
body hook
seam gap
end hook
compound



**Definitions: Internal seam parameters**

actual overlap

Seam projection formula:
Body hook butting percentage (BHB) = A/B x 100

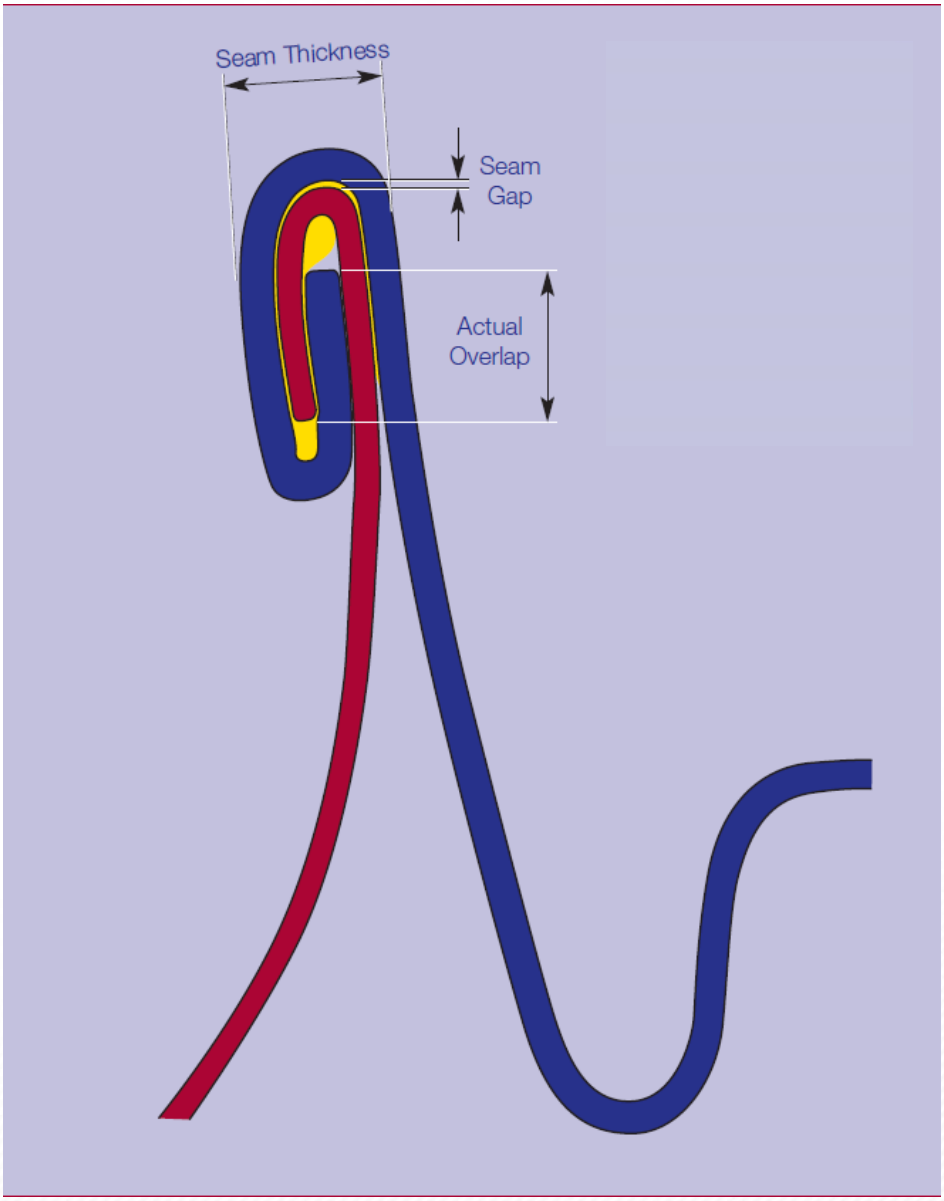


**Definitions: Critical parameters of seam**

seam thickness
seam gap
actual overlap

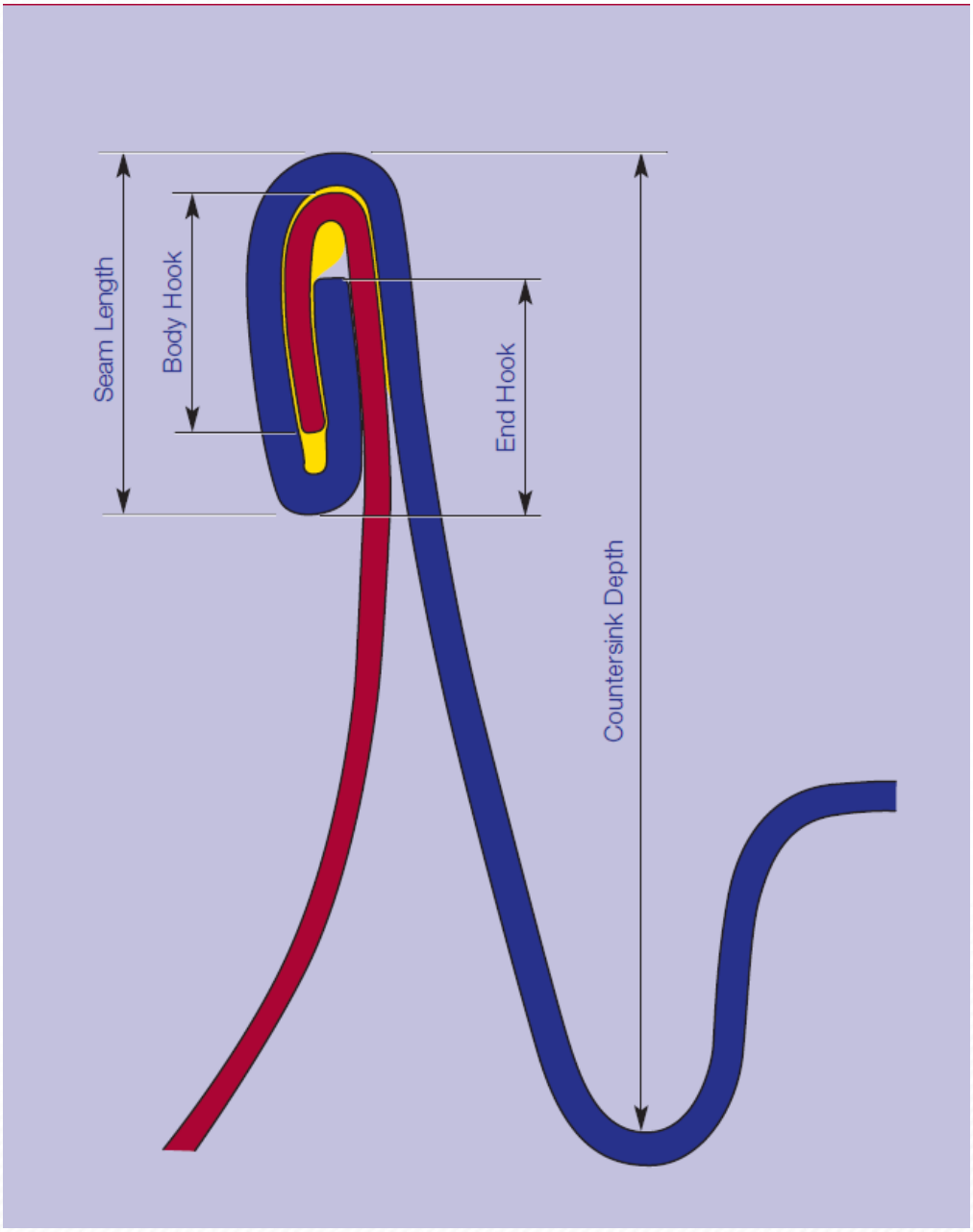
body hook butting (by calculation) see below

tightness (by visual examination) see below



**Definitions: Operational seam parameters**

seam length
body hook
end hook
countersink depth



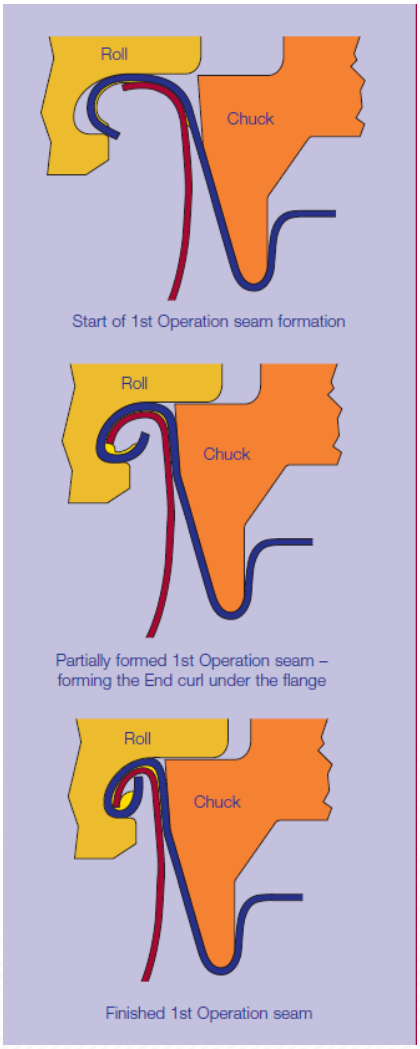
## 2. Seam construction:

**First operation**

The sealing roll of the first operation forms the bending of the end beneath the flange of the can, as shown in the pictures. The sealing is 90% performed during the first operation.

Figure 1 Beginning of the first operation sealing.
Figure 2 Partially formed first operation sealing - forming the end bending beneath the flange.
Figure 3 Finished first operation sealing.

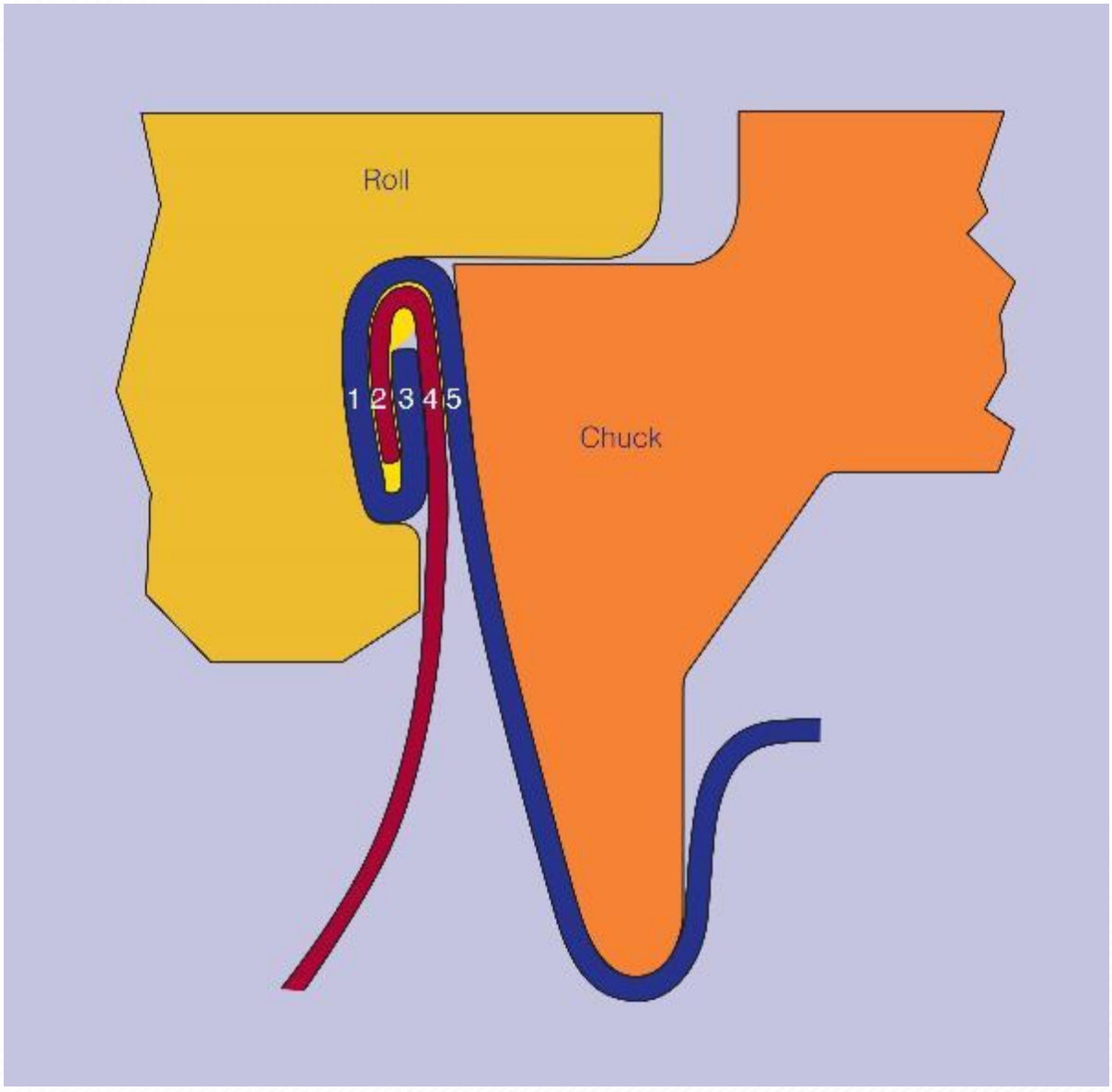
roll
chuck



**Second operation**

The sealing is finished by the second operation roll. This process irons the 5 thickness - formed during the first operation - and provides hermetic sealing.

roll
chuck



# 3. Seam measurement:

## 3.1. General information:

**Frequency:**

The frequency and evaluation of measurements:
● The first operation sealing shall be checked at least once a week.
● The second operation sealing shall be checked every 8 hours by destructive analysis at a rate of up to 1500 cpm and every four hours above 1500 cpm.

Minimum requirement for sealing measurement:
● It is recommended to measure the cans at least two diagonally opposite points.
● Further sealing analysis is required when the height of the can or the can quality changes.

**Types:**

3 types of sealing measurements are distinguished.
1. visual inspection of destruction-free seam
2. mechanical measurement of destruction-free seam
3. electronic measurement of destruction-free seam.

Each measurement type shall be performed at the recommended intervals.

**Requirements for the cans to be measured:**

● After sealing, remove the cans from each chuck.
● the sealer shall operate at operating temperature.
● the cans shall be emptied before measurement.
● it is recommended to measure the cans at least two diagonally opposite points.

### 3.2. Visual inspection:

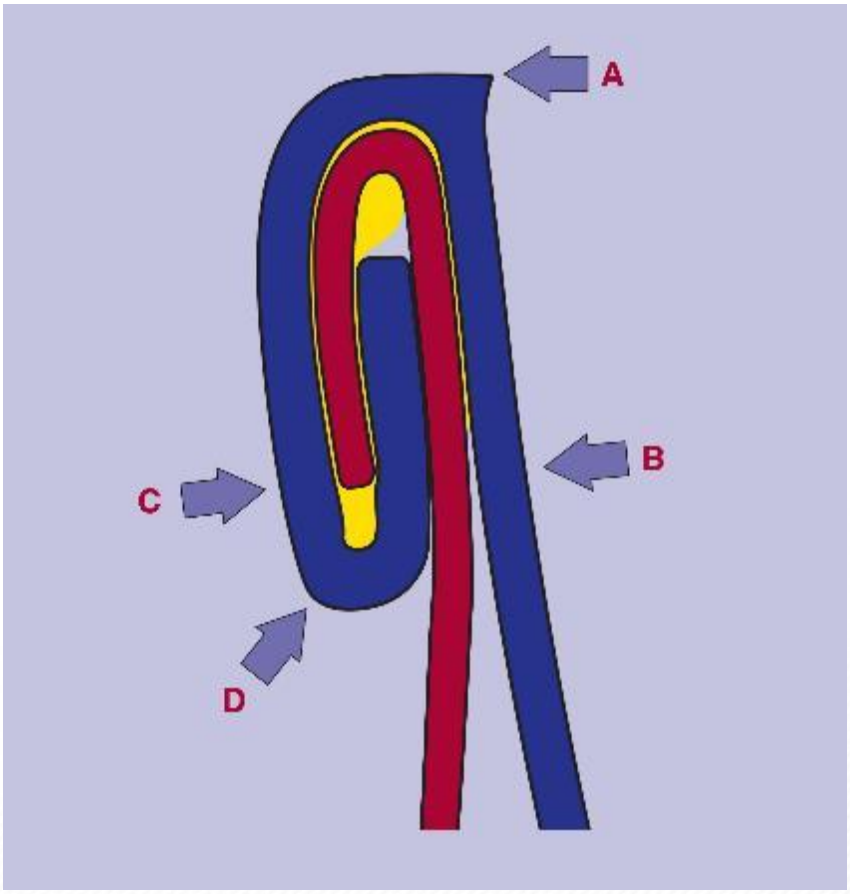
● Hourly visual inspections are suggested during production. These checks allow for early detection of wear and tear, or damage to or rough missettings in the sealer.

● It is recommended to check the following points several times a day and to record the results. Possible mistakes can be classified into groups A, B, C and D:

**A** upper inner flange of seam - sharp or rough flange

**B** drag wall sealing are - dented or protruding

**C&D** the bottom of the seam outside the can - the metal is either cut or cracked, splintery or has fine ‘hairs’ on it



### 3.3. External mechanical measurement:

**End thickness (te)**

End panel shall be measured before the inspection of the entire end.
Plate thickness measuring instrument or a suitable micrometer shall be used.

**● Can flange thickness (tb)**

Can flange thickness is based on the information provided by the Manufacturer.


The below-mentioned two parameters shall be acquired to determine seam thickness.

● End thickness (te)
● Flange thickness (tb)

Seam thickness = 3 x **te** + 2 x **tb** + 0.13mm (0.05mm)

● nominal center 0.13 = composition allowance (free space)

## Seam Thickness Matrix

te – Actual End Material Thickness mm (with lacquer)

tb – Nominal Can Flange Thickness/Body Thickness

| tb \ te | 0.295 | 0.290 | 0.285 | 0.280 | 0.275 | 0.270 | 0.265 | 0.260 | 0.255 | 0.250 | 0.245 | 0.240 | 0.235 | 0.230 | 0.225 | 0.220 | 0.215 | 0.210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.200 | 1.41 | 1.40 | 1.38 | 1.37 | 1.36 | 1.34 | 1.33 | 1.31 | 1.30 | 1.28 | 1.26 | 1.25 | 1.24 | 1.22 | 1.21 | 1.19 | 1.18 | 1.16 |
| 0.195 | 1.40 | 1.39 | 1.37 | 1.36 | 1.35 | 1.33 | 1.32 | 1.30 | 1.29 | 1.27 | 1.25 | 1.24 | 1.23 | 1.21 | 1.20 | 1.18 | 1.17 | 1.15 |
| 0.190 | 1.39 | 1.38 | 1.36 | 1.35 | 1.34 | 1.32 | 1.31 | 1.29 | 1.27 | 1.26 | 1.24 | 1.23 | 1.22 | 1.20 | 1.19 | 1.17 | 1.16 | 1.14 |
| 0.185 | 1.38 | 1.37 | 1.35 | 1.34 | 1.33 | 1.31 | 1.30 | 1.28 | 1.26 | 1.25 | 1.24 | 1.22 | 1.21 | 1.19 | 1.18 | 1.16 | 1.15 | 1.13 |
| 0.180 | 1.37 | 1.36 | 1.34 | 1.33 | 1.32 | 1.30 | 1.29 | 1.27 | 1.25 | 1.24 | 1.23 | 1.21 | 1.20 | 1.18 | 1.17 | 1.15 | 1.14 | 1.12 |
| 0.175 | 1.36 | 1.35 | 1.33 | 1.32 | 1.31 | 1.29 | 1.27 | 1.26 | 1.24 | 1.23 | 1.22 | 1.20 | 1.19 | 1.17 | 1.16 | 1.14 | 1.13 | 1.11 |
| 0.170 | 1.35 | 1.34 | 1.32 | 1.31 | 1.30 | 1.28 | 1.26 | 1.25 | 1.24 | 1.22 | 1.21 | 1.19 | 1.18 | 1.16 | 1.15 | 1.13 | 1.12 | 1.10 |
| 0.165 | 1.34 | 1.33 | 1.31 | 1.30 | 1.29 | 1.27 | 1.25 | 1.24 | 1.23 | 1.21 | 1.20 | 1.18 | 1.17 | 1.15 | 1.14 | 1.12 | 1.11 | 1.09 |
| 0.160 | 1.33 | 1.32 | 1.30 | 1.29 | 1.27 | 1.26 | 1.24 | 1.23 | 1.22 | 1.20 | 1.19 | 1.17 | 1.16 | 1.14 | 1.13 | 1.11 | 1.10 | 1.08 |
| 0.155 | 1.32 | 1.31 | 1.29 | 1.28 | 1.26 | 1.25 | 1.24 | 1.22 | 1.21 | 1.19 | 1.18 | 1.16 | 1.15 | 1.13 | 1.12 | 1.10 | 1.09 | 1.07 |
| 0.150 | 1.31 | 1.30 | 1.28 | 1.27 | 1.25 | 1.24 | 1.23 | 1.21 | 1.20 | 1.18 | 1.17 | 1.15 | 1.14 | 1.12 | 1.11 | 1.09 | 1.08 | 1.06 |
| 0.145 | 1.30 | 1.29 | 1.27 | 1.26 | 1.24 | 1.23 | 1.22 | 1.20 | 1.19 | 1.17 | 1.16 | 1.14 | 1.13 | 1.11 | 1.10 | 1.08 | 1.07 | 1.05 |
| 0.140 | 1.29 | 1.28 | 1.26 | 1.25 | 1.24 | 1.22 | 1.21 | 1.19 | 1.18 | 1.16 | 1.15 | 1.13 | 1.12 | 1.10 | 1.09 | 1.07 | 1.06 | 1.04 |
| 0.135 | 1.28 | 1.27 | 1.25 | 1.24 | 1.23 | 1.21 | 1.20 | 1.18 | 1.17 | 1.15 | 1.14 | 1.12 | 1.11 | 1.09 | 1.08 | 1.06 | 1.05 | 1.03 |
| 0.130 | | | | 1.23 | 1.22 | 1.20 | 1.19 | 1.17 | 1.16 | 1.14 | 1.13 | 1.11 | 1.10 | 1.08 | 1.07 | 1.05 | 1.04 | 1.02 |
| 0.125 | | | | | 1.20 | 1.19 | 1.17 | 1.16 | 1.14 | 1.13 | 1.11 | 1.10 | 1.08 | 1.07 | 1.05 | 1.04 | 1.03 | 1.01 |

**Countersink depth**
(Operating parameter)



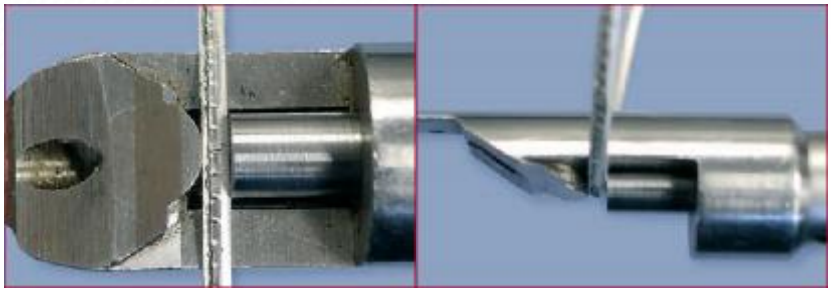
**Seam thickness**
(Critical parameter)



**Seam height**
(Operating parameter)


**End hook**
(Operating parameter)

The end hook is measured using a micrometer, where it is necessary to ensure that the hook and an anvil of the
micrometer are perpendicular to each other, as shown in the picture.

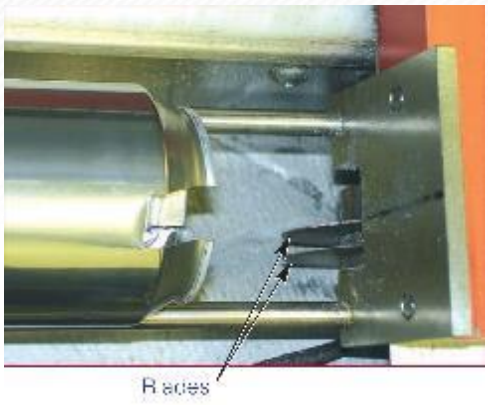


**Body hook**
(Operating parameter)

The body hook is measured as shown in the picture.

### 3.4. Electronic measurement:

**Can cutting (saw)**




**Two cans cut at diagonal points.**


**Sawed cross section of double seam**

**The seam parameters are measured on a screen using the cursor lines.**


The software allows you to perform various calculations to fully measure the seam.
This measurement method is the industry standard for measuring and analysing the seam and is the only method by which we get a response to the size of the critical parameter, the seam gap.

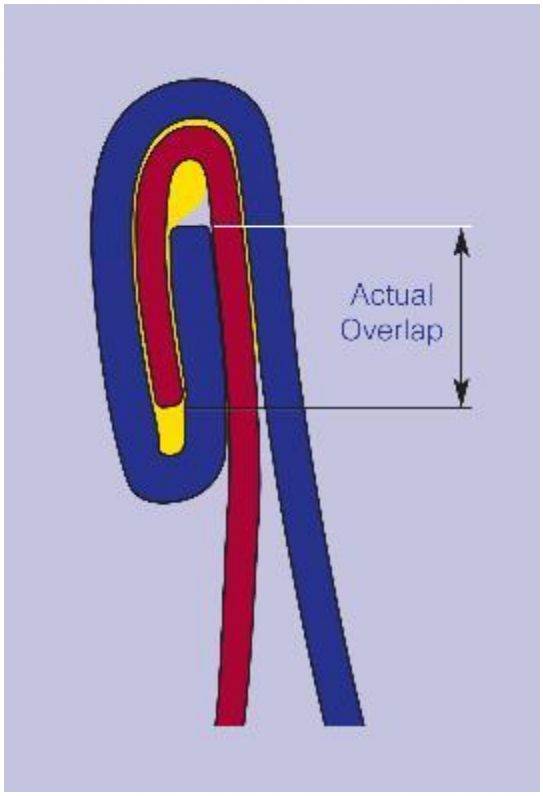

**In order to keep the seam intact, critical parameters shall always be reached!**

### 3.4.1. Critical parameters

The following dimensions are either calculated using the formula already presented or pre-programmed computer software.

**Actual overlap**

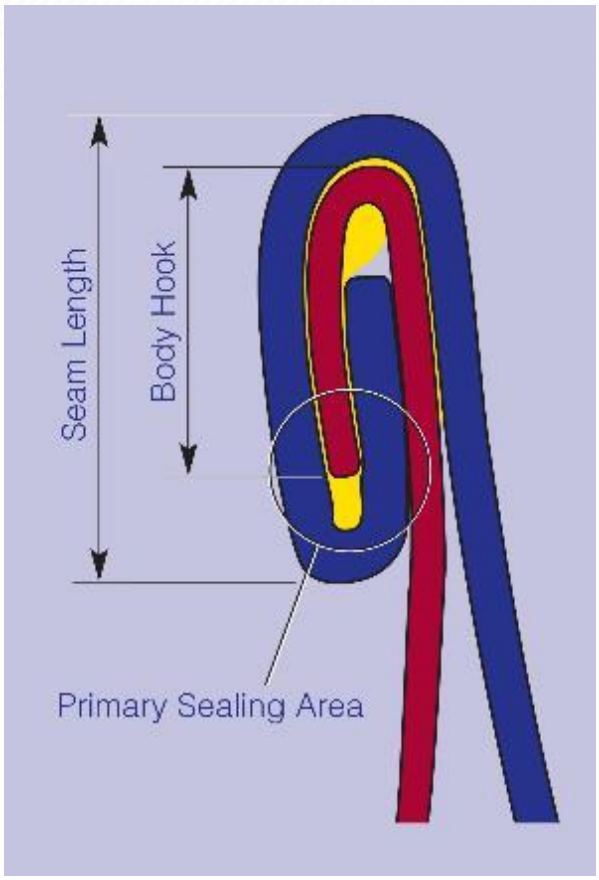
The actual overlap shows the size by which the body hook and the end hook overlap each other within the double seam.




The actual overlap can be calculated by the following formula:
Actual Overlap = EH + BH + (1.1 X te) - SL, in which
EH = End hook
BH= Body hook
SL = Seam length
te = End thickness

**Body hook butting (BHB)**

The height of the body hook shall be appropriate to the interior height of the seam to ensure butting in the lining composition. This can be calculated by the following formula and this is the primary sealing area.



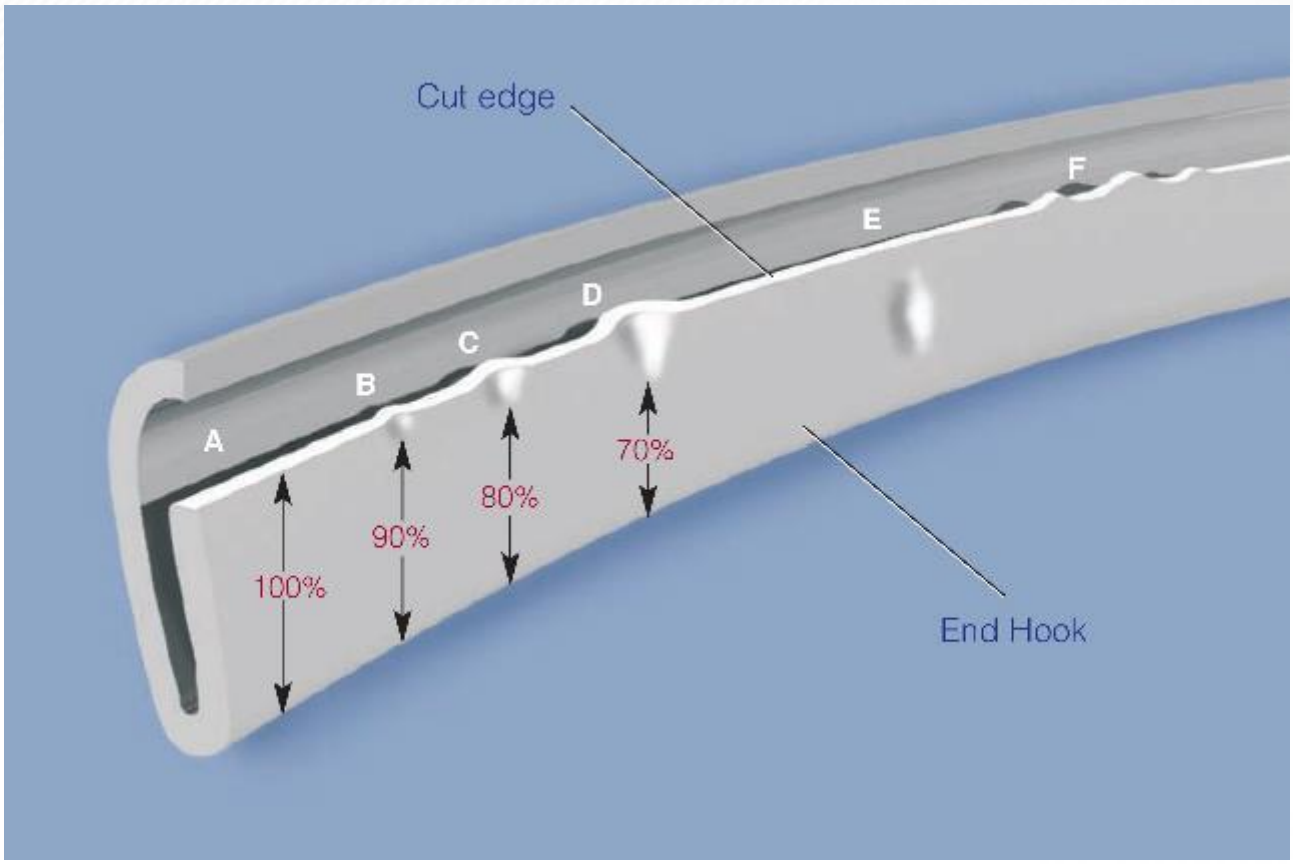

Body hook butting = (((BH - 1.1 tb): (SL - 1.1(2te + tb)) x 100, in which
BH= Body hook
SL = Seam length
tb = Body thickness
te = End thickness

Seam length
Body Hook
Primary Sealing Area

**Tension value**

The tension value is the percentage of the flattened end hook under the largest crease.

cut edge
end hook

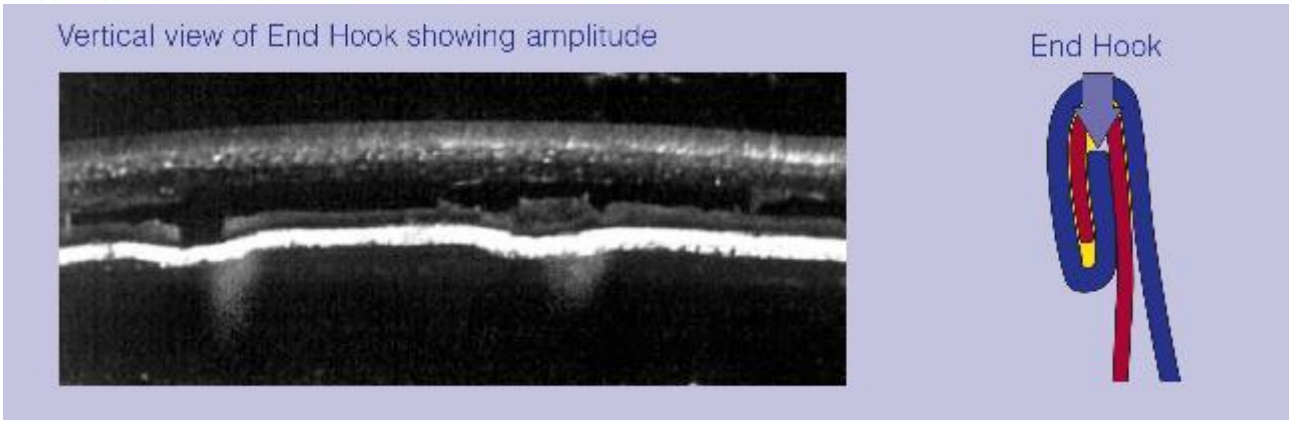



**A** Tension value is 100% crease-free, smooth end hook, regular cutting edge
**B** Tension value 90% The end hook is deformed by creases The cutting edge is irregular
**C** Tension value 80% The end hook is deformed by creases The cutting edge is irregular
**D** Tension value 70%The end hook is deformed by creases The cutting edge is irregular
**E** Creases caused by composition, the end hook is deformed, the cutting edge is straight
**F** Seam is too tight, smooth end hook, cutting edge is too flattened

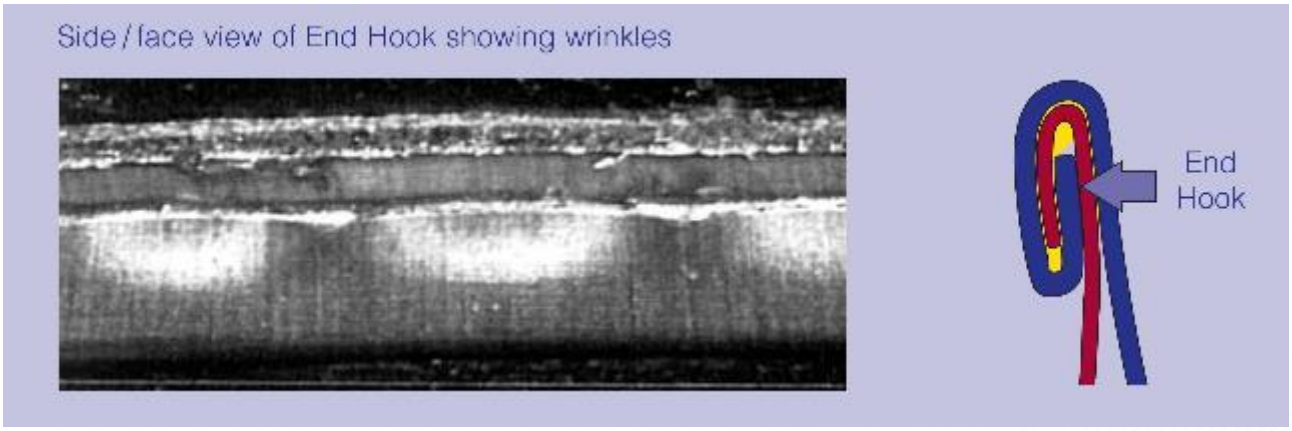
**Tension value**

Examples of creases in the end hook.

The vertical view of the end hook shows a swing.




The lateral/profile view of the end hook shows creases.




### 3.4.2. Quality control of the seam

● The quality of the seam depends on the seam evaluation check performed during filling and seam.

● Final approval of seam quality is based on both visual and dimensional full evaluation of all parameters.

● Staff training is most important to sustain good seam control.

● The key is the adequacy of the critical parameters to maintain a good seam.

● In order to maintain a good seam, the operating parameters shall be set to the average of the sealing characteristics.

● If the operating parameters can move within the entire specification, it is not necessary to maintain all the parameters.

● To further control double sealing, an SPC-based trend analysis can be used.

● If settings are to be made, at least three can sealings shall be performed per chunks.

● A second operation roll setting will never compensate for an incorrectly set first operation.

● All measuring instruments shall be calibrated before each seam check.

● Body hook butting (BHB) compared to the seam gap is more relevant for metal cans.

● The low-value body hook butting combined with a high seam gap value and/or a loose sealing design, this may result in a seam displacement under the storage conditions on the pallet that may cause metal dissolving.

● High-value body hook butting may increase the number of cracked seams.

● Much of the metal dissolution issues are directly attributable to the weak sealer settings.

### 3.4.3. Metal dissolution

Metal dissolution is the process when metal is dissolved either from the end or from the can and penetrates the product after filling and the subsequent can storage. This may be iron or aluminum, depending on the raw material used for the production of the can and the end.

**Incurrence**

The metal dissolution can be formed on a metal surface that contacts the product. If the good sealing quality is not maintained, metal dissolving can occur anywhere on the can or on the end. Experience or test can monitoring (under variable double sealing conditions) shows that the most likely source thereof is the angle of the inner body hook of the double-seam can.

**Cause**

The reason for metal dissolution is that the product gets into contact with the raw material of the metal in the exposed area. In particular, the formation of the body hook during the sealing may cause a certain degree of lacquer cracking in this area, which may facilitate a possible contact with the raw material of the metal.

**Effect**

The amount of dissolved metal is decisive when flavour-related observations and subsequent consumer complaints emerge. There are adopted industry guidelines for iron and aluminum levels. In many cases, the client is making his own specifications that may be more stringent, especially if their products are infectious. Dissolved iron is likely to be noticeable as these are felt by an average consumer at a much lower limit.

**Duration**

If the product is in contact with the metal, the metal dissolution begins immediately. The dissolved metal level increases with increasing storage time. The number of levels generated during a given time depends on the metal surface exposed and the temperature/storage conditions. Cans that are stored upside down or horizontally are more affected than vertically stored ones over the same period.

**Preventive measures to avoid metal dissolution**

It is essential to regularly inspect correct sealing and maintain the industry specifications for sealing. The primary purpose of the composition within the double seam is to provide hermetic closure at all points of the seam.

The composition effectively protects the metal exposed to the contact during the seam in the angle of the body hook, if the sealing thickness values are centralized and the sealing gap is minimized.

When the sealing thickness is centralized, the composition prevents the product from reaching the angle of the can body hook.

If the sealing gap is high and/or is combined with loose double seam, it allows the product to contact the metal.

The inspection of correct sealing (especially the sealing gap and seam thickness) prevents the product from entering the angle of the body hook, which is the most common starting point for metal

dissolving. In addition, adequate control of filling conditions, especially the air content in the upper area, may help to reduce the risk of taste loss due to metal dissolution.

The rate of corrosion is accelerated when there is a greater amount of oxygen present. The gasification at the sealing point under the case is applied by most of the fillers to reduce air/oxygen levels in the upper area.

**Practices**

In order to maintain good double seam and to minimize the risk of contamination, we recommend the following points.

○ Never exchange the sealing machine devices.

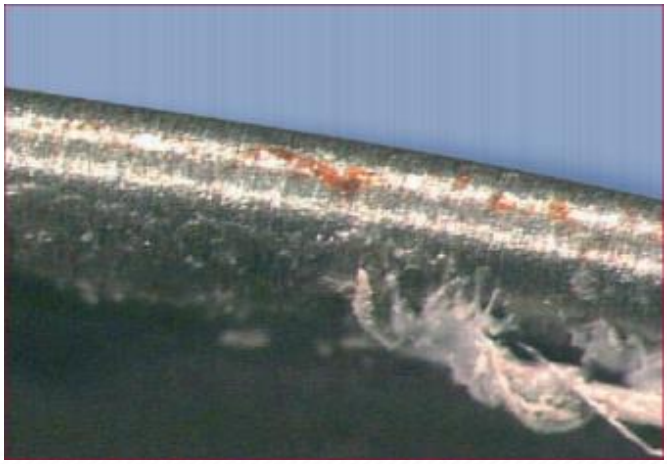
○ Make sure the surface of the chuck is rough.

○ The sealing machine shall be maintained regularly in accordance with the manufacturer's recommendations.

○ Do not clean the hot sealing machine with cold water.

○ Contamination of filled cans can be avoided by regular cleaning of the sealing machine, in accordance with the manufacturer's recommendations.

Typical corrosion at the angle of the body hook on a steel can which shows sedimentary composition:

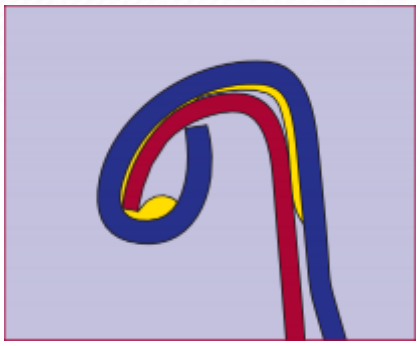


### 3.5. Sealing defects:

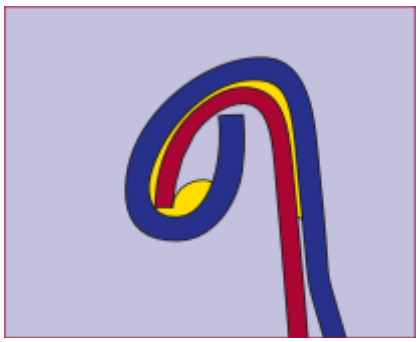
The following guidelines help you avoid the most common sealing defects.

**Operation setting**

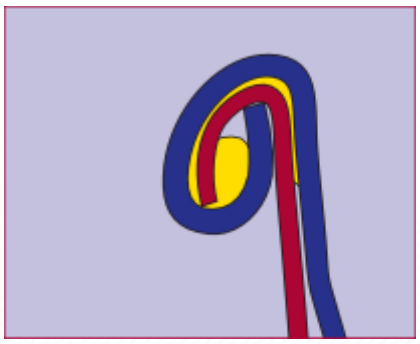
Loose first operation



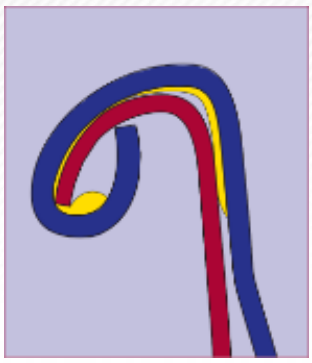
Intended first operation



Tight first operation



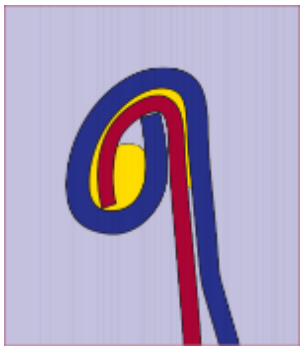
**Operation too loose**



**Possible causes:**
- first operation roll is set too loose
- worn roll profile in first operation
- incorrect roll profile in first operation

**Consequences:**
- end hook is too short
- high sealing gap
- actual overlap is too short
- sealing height is too long

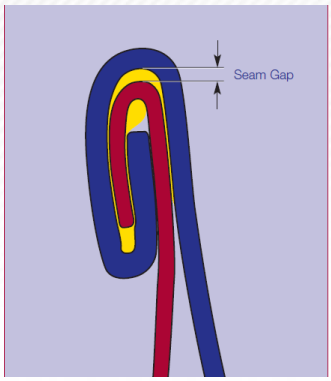
**Operation too tight**



**Possible causes:**
- first operation roll is set too tight
- incorrect roll profile in first operation

**Consequences:**
- sealing height is too short
- body hook is too short
- destroyed side wall
- reverse creases or V shape

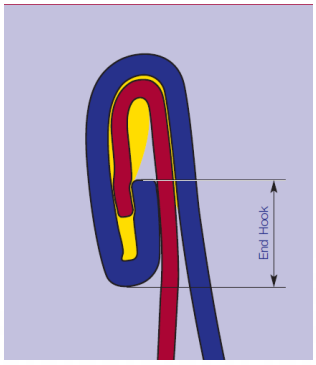
**High sealing gap**




**Possible causes:**
- the rolls are high compared to the chuck
- incorrect chuck
- incorrect nail value height
- lever (spring) power is set too low
- second operation is too loose
- BHB value is too low

**Consequences:**
- possible metal dissolution
- product and gas leak
- seam displacement during storage on the pallet

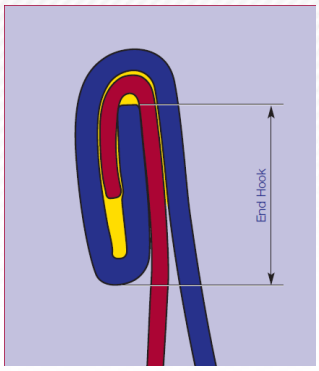
**End hook is too short**




**Possible causes:**
- first operation roll is set too loose
- incorrect roll profile in first operation
- second operation roll is set too tight

**Consequences:**
- actual overlap is too short
- BHB value is too low
- product and gas leak

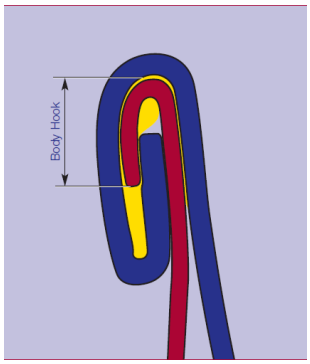
**End hook is too long**




**Possible causes:**
- first operation roll is too tight
- incorrect roll profile in first operation

**Consequences:**
- actual overlap is too short
- BHB value is too low

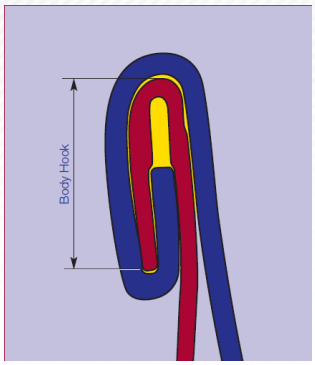
**Body hook is too short**




**Possible causes:**
- nail value is too high
- lever (spring) power is too low
- first operation roll is too tight

**Consequences:**
- actual overlap is too short
- BHB value is too low
- high sealing gap
- product and gas leak

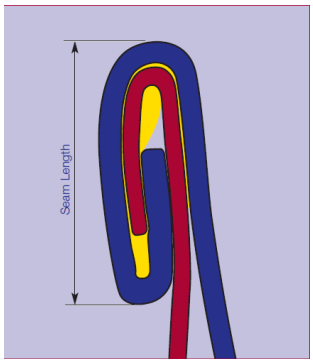
**Body hook is too long**




**Possible causes:**
- nail value is too low
- lever (spring) power is too high

**Consequences:**
- BHB value is too high
- destroyed seam
- composition is pressed

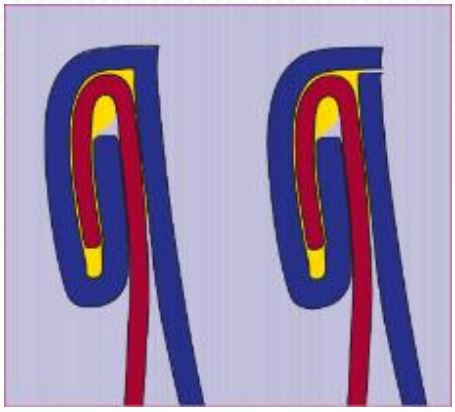
**Long sealing length**




**Possible causes:**
- first operation roll is too loose
- second operation roll is too tight
- worn rolls in first and/or second operation

**Consequences:**
- seam is too tight
- actual overlap is too short
- possible metal dissolution
- product and gas leak

**Sharp seam/cut or destroyed seam**

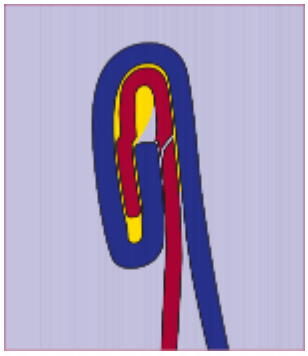


**Possible causes:**
- first operation roll is too tight
- second operation roll is too tight
- worn chuck
- incorrect sealing roll profile
- incorrect roll - chuck height setting

**Consequences:**
- in extreme cases this may lead to breakage of the seam or formation of a chip

**This situation occurs where the seam has a sharp edge on the inner angle.**

**Side wall destruction (aluminum can)**

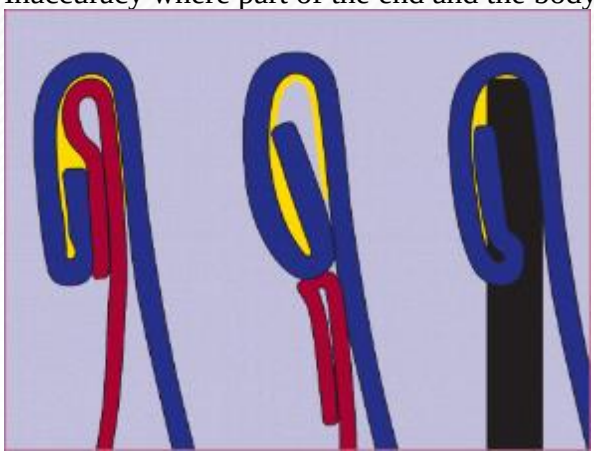


**Possible causes:**
- incorrect roll setting in operation 1
- worn roll profile in operation 1

**Consequences:**
- product and gas leak
- destroyed side wall

**Inaccurate seam**

Inaccuracy where part of the end and the body hook are unrelated.



**Possible causes:**
- damaged can flange
- damaged or deformed ends
- incorrect filler/sealing settings

**Consequences:**
- sending of the end (opening of the seam)
- product and gas leak

**Slided seams**

Slided seams may result in the displacement of the ends as visible in the pictures below.

**Possible causes:**
- second operation roll is too tight
- second operation is too high compared to the chuck
- exaggerated composition
- Lever (spring) power is too high

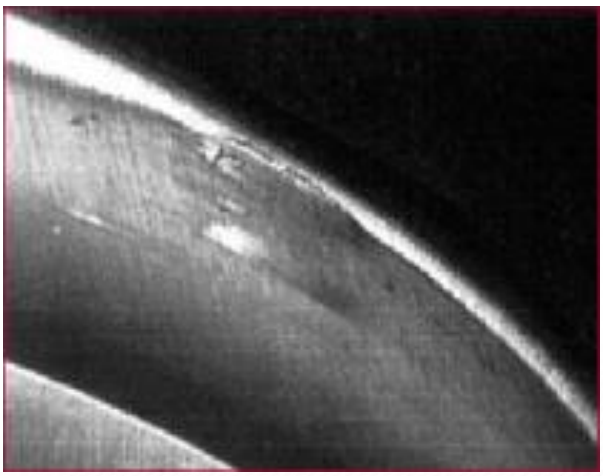
**Consequences:**
- sliding of the end (opening of the seam)
- product and gas leak

**Slipping**

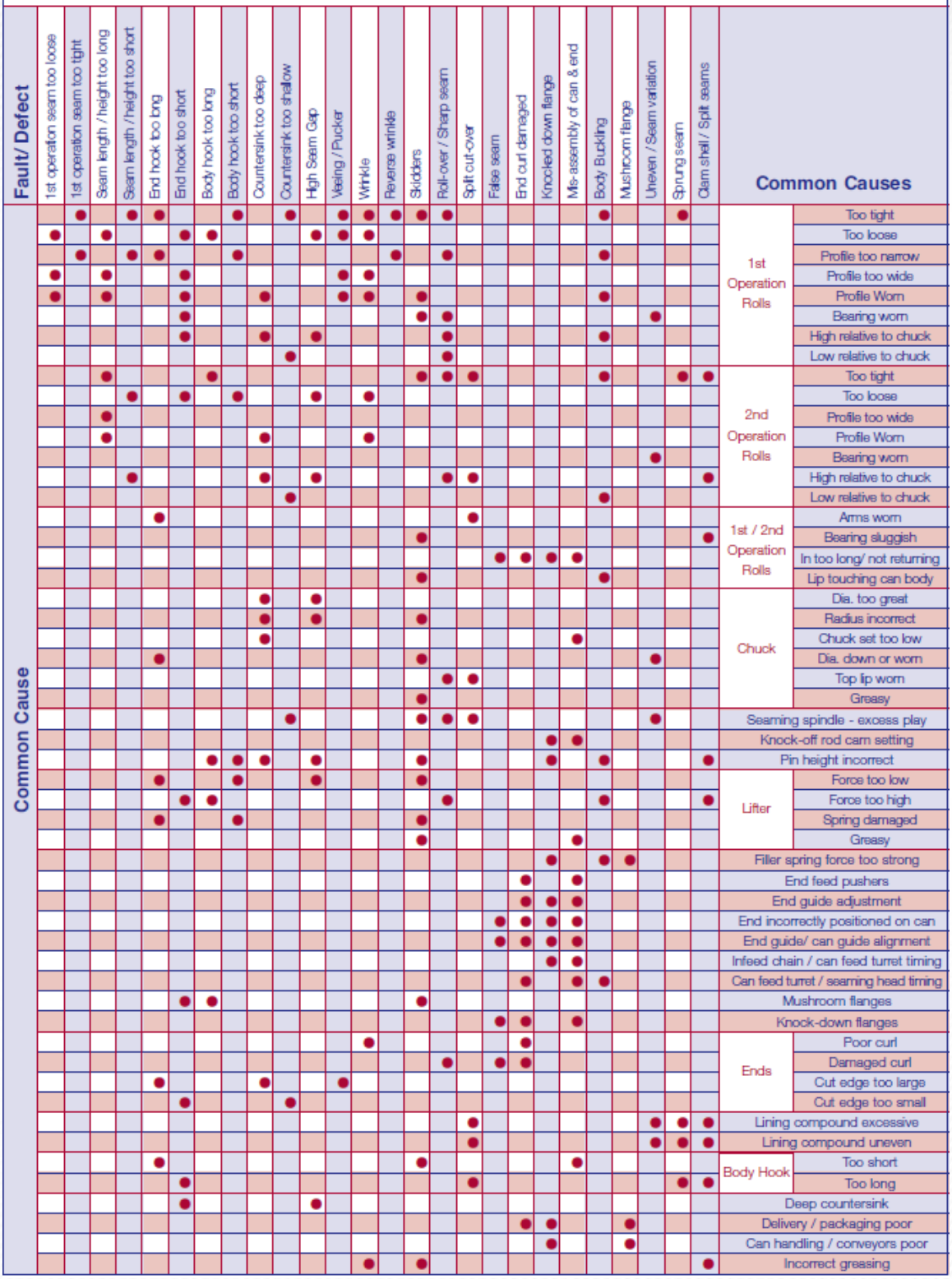
An inaccurate second operation sealing occurs when the can does not rotate during the sealing process.

**Possible causes:**
- inaccurate chuck
- inaccurate chuck surface
- lever (spring) power is too low
- incorrect standard value height
- worn chuck

**Consequences:**
- inaccurate seam
- product and gas leak

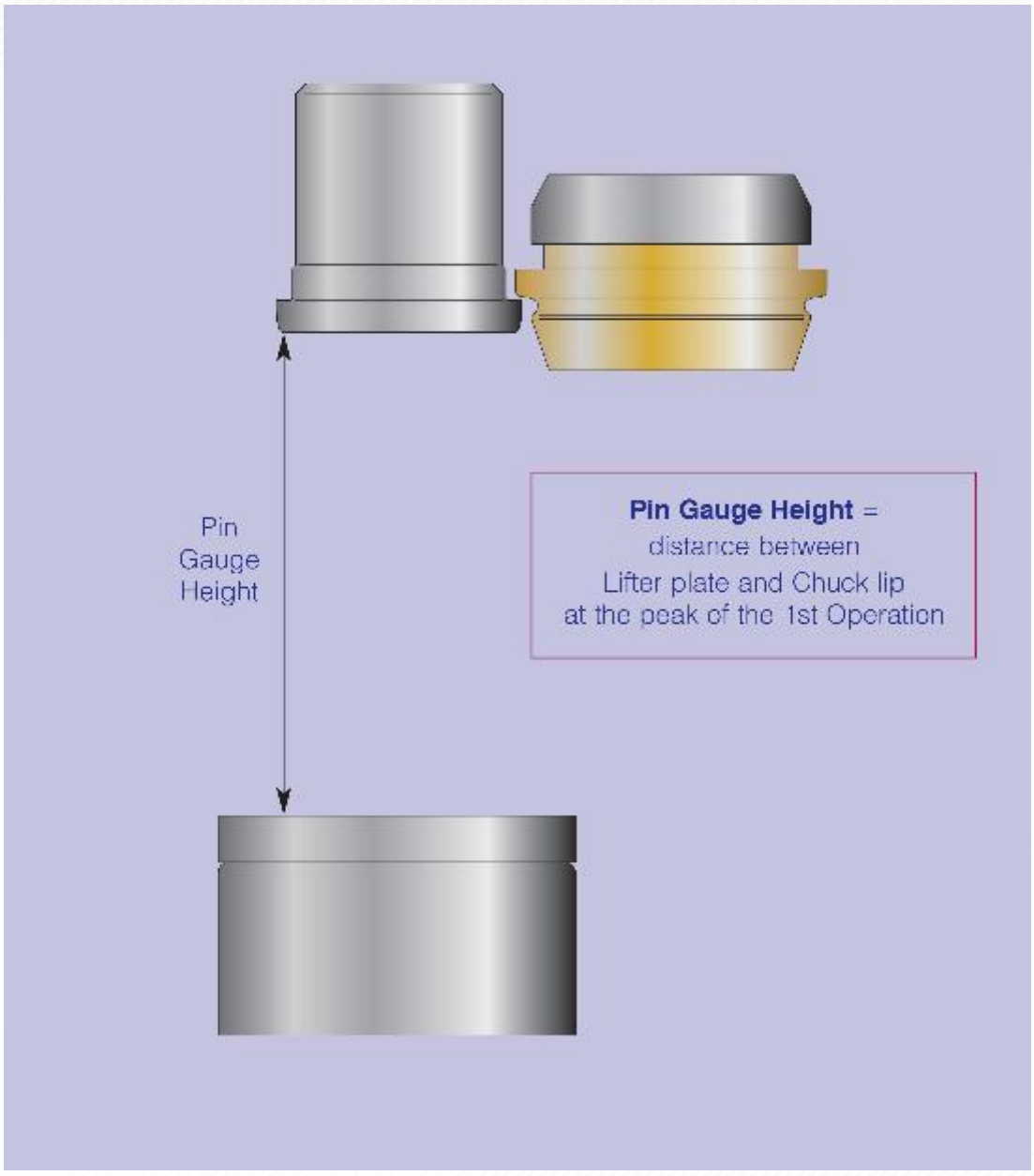


## Double Seam Defects: Troubleshooting Guide



### 3.6. Sealing machine setting:

**Set the standard height**




In order to set the standard height, please contact your system Supplier.

**Roll height setting device**

It is used to make sure that the height of the first and second operation rolls is set according to the specification.

**Lever spring power setting (cell pressure)**

It is used to make sure that all levers are set to the proper spring value.

**Inner micrometer**

It is used to make sure that the standard height is set to the proper dimension.

**Standard can**

It is used to make sure that the bearings (sprockets) are set correctly.

**Above suggestions in this chapter serve solely as a reference and general guide. The Manufacturer is not liable for any damages resulting from actions taken based on the contents of this document.**

**The quality of the double seam is the responsibility of the filler!**

## VII. Steps of excuses concerning defective goods (Complaint):

In order to validate the producer's warranty, the following rules shall be strictly observed:

1. It is forbidden to open damaged pallets and shall be kept in their original state (unless the Manufacturer's representative requests otherwise).
2. It shall be separated immediately from the other intact pallets, but it shall be stored under identical conditions.
3. Its warehousing status shall be distinctly and well visibly marked.
4. Sharp, well visible photographs shall be made of the pallets and the quality observations. The photograph should include the entire pallet from all four sides, as well as distant and zoomed photographs of the quality observation as well. These photographs should be attached to the letter of complaint.
5. The quality observation shall be indicated within 24 hours to its commercial point of contact via e-mail, with the following attached:
   - The complaint report issued by the producer (item 3 of the Annex);
   - The photographs taken;
   - The copy of the handover - takeover report (item 2 of the Annex);
   - The copy of the delivery note;
   - Possibly a photograph of the can or the can end, or the quality observation visible on the can or the end, but only in case the defect is detected after the pallet has been opened. The pallet should not be opened because of this!

The Manufacturer will reply to this:

- If possible to establish from the photographs, the producer will indicate the defect, its possible formation and will describe the further things to do;
- If the defect is not possible to identify from the pictures, the Manufacturer may request further information (e.g. new photo, ) from the Customer, or request an on-site inspection in the

presence of both parties to investigate the cause of the defect and recommendations will be made regarding the further steps.

When the investigation has been completed, the contents of the chapter “Handling of products with quality defects” shall be applied immediately, as it may subsequently lead to further secondary corrosion.

It is the responsibility of the Customer or its subcontractor (warehouse, distributor) to prevent any additional damage arising after the discovery and reporting of the problem through the appropriate measures (previously agreed with the Manufacturer)

## VIII. Product codes and lithography (product marking):

### 1. Product coding:

**END CODE**

e.g.: **QP 1A**
QP – Quality Pack
1 – production line number
A – tool/conveyor ID (A – D)

**CAN CODE**

e.g.: **M1A251AA**
M – location (Szikszó)
1 – year (0 → 2017, 1→ 2018, 2 → 2019, etc.)
A – month (A=January…..M=December)
25 – day of the month
1 – production line ID (1 or 2)
A – BackEnd line ID (A, B)
A – shift ID (A or B)

Codes on the product:



**Lower number and letter combination**

**1- number of production line**

**A- bodymaker ID**


**Dotted code**

**Serial number of the can machine tool (e.g. 10)**

**Reverse batch number**

**Reverse cylinder identifies the two cylinders inside the decorator**


**Dots**

**Coloured dots - identify the lacquering station**

# IX. Annexes

## 1. Steps of the correct procedure concerning defective deliveries:

The steps listed in the following contain the minimum requirements, allowing the Customer to assert its quality complaints in connection with the products distributed by QUALITY PACK Zrt.

1) When the transport vehicle is opened, the **shipment shall be thoroughly inspected** (before unloading).
2) If the problem is visible (damaged packaging, displaced product, etc.), it shall be immediately **photographed** (IMPORTANT: while the product is still on the transport vehicle).

   Good quality photographs shall be taken of the following:

   - The truck and trailer, on which the goods are loaded,
   - The license plate number,
   - The defective products.

   The defective products and if possible, the cause of the defect shall be well recognisable on the photographs.
3) **The defect**, its cause, the quantity of defective goods **shall be written on the delivery documents** (CMR, waybill, etc.) and the deliverer (driver, Supplier) shall also sign it.

   Then, the **Goods reception report shall be filled** in 3 copies. Both the deliverer and the receiving clerk shall sign this, too. 1 copy shall be provided (sent) to the dispatcher of the goods, 1 copy to the receiver and 1 copy to the deliverer.
4) Only then should the **goods be unloaded**.

   If the defects are detected during unloading, it shall be suspended immediately and the procedure described in points 2 and 3 shall be followed.

**These steps shall be followed accurately and strictly!**

The receiving clerk shall acknowledge that if any of the items are omitted or executed in the wrong order, the complaint shall not be accepted.

## 2. Goods reception report:

**Location of goods reception:**

**Date of issuance of report:**

**Delivery note/CMR number:**

**The places of departure and arrival:**

---

**Persons present:**

| | |
|---|---|
| **On behalf of the freight forwarder:** | **On behalf of the recipient:** |
| **Name of freight forwarder:** | **Name of recipient company:** |
| **Name of driver** | **Name of receiving clerk:** |

**ID number:**

**License plate number of truck:**

**License plate number of trailer:**

| |
|---|
| **The following declaration is made upon receiving the goods (receiving clerk):** |

| |
|---|
| **The following declaration is made upon receiving the goods (deliverer):** |

_____ _____

**on behalf of the freight forwarder signature of deliverer** **signature of receiving clerk**

## 3. Customer complaint form

| | |
|---|---|
| Name of enterprise/company rising the complaint: | |
| Name and contact data of person raising the complaint: | |
| Date of submission (date this filled form was sent): | |
| Name of claimed product: | |
| Article number of claimed product: | |
| Batch number,<br>date code (can),<br>pallet ID (end),<br>of claimed product: | |
| Circumstances making up grounds for claim (description): | |
| | |
| Evidence confirming the circumstances stated in the claim: | |
| | |
| References to relevant regulatory Acts (if applicable): | |
| | |

Together with the complaint, the Purchaser must provide the following documents:
1. Acts of acceptance of the Products by quantity and quality as per the established form confirming the fact, quantity and reason for rejecting the Products for each particular case, description of visible damage. The Act of acceptance shall contain the signature of the driver of the vehicle that delivered the Products.
2. Photo and/or video of damaged Products.
3. Photo of pallet label
3. Copy of delivery note with the note on damage.
4. Report on defects and / or sorting.
5. Any other evidence that substantiates the validity of the complaint or helps to establish the cause of the alleged error

date: _____ _____

signature

## 4. Vehicle control sheet:

Control date:

Date of delivery:

Vehicle registration plate number:

Name of shipment:

Inspector:

Signature:

Note:

- Interventions contradictory to the designated use of the vehicle, such as the use of deodorant materials and extra-long periods of ventilation are not permitted.
- Trace odours are not permitted in the cargo hold area, especially those remaining from previous shipments, such as cocoa, coffee, fish, onions, paints, thinners, chemicals, oil, and damp, mouldy smells.
- Due to possible dye/wood scents, the new or improved cargo space can only be used after a third party has already used it several times.
- If possible, vehicles used exclusively for the transport of foodstuff should be used.

| Vehicle checklist | Result | Remarks |
|---|---|---|
| *A- The vehicle shall have a closed body.* | | |
| 1. No holes on its roof and sides. | ☐ | |
| 2. No temporarily repaired holes on its roof and sides. | ☐ | |
| 3. Light test (light may not penetrate into the cargo hold after closing the doors from inside) | ☐ | |
| 4. The ventilation holes shall be covered with aluminum tape. | ☐ | |
| 5. The door locks function appropriately. | ☐ | |
| 6. The doors provide watertight closure. | ☐ | |
| *B- The vehicle shall be dry.* | | |
| 7. No wet spots. | ☐ | |
| 8. No humidity spots. | ☐ | |
| 9. No condensate. | ☐ | |
| *C- The vehicle shall be clean.* | | |
| 10. If steam is used to clean the vehicle, it shall be dried first. | ☐ | |
| 11. Sweeping with broom | ☐ | |
| 12. The vehicles may not be treated/cleaned with chlorophenol-containing materials. | ☐ | |
| 13. All surfaces shall be clean and dry. | ☐ | |
| 14. No residual materials may remain from the previous use. | ☐ | |
| *D- The vehicle shall be odourless.* | | |
| 15. After a period of closure of 15 minutes, the vehicle shall have a natural, fresh odour. | ☐ | |
| *E- The floor of the vehicle shall be in appropriate state.* | | |
| 16. No internal painting took place in the 30 days before loading. | ☐ | |
| 17. The vehicle floor shall be dry. | ☐ | |
| 18. The vehicle floor shall be free from damage. | ☐ | |
| 19. The vehicle walls cannot be covered with wood. | ☐ | |
| 20. The vehicles shall be well maintained, to prevent damage and contamination of the products during transport (e.g. holes, protruding and torn off parts, improper repairs, etc.). | ☐ | |

## 5. Handover and acceptance of pallets, metal frames and intermediate layerpads:

| | | | |
|---|---|---|---|
| **Date of delivery:** | | | |
| **Vehicle driver:** | | | |
| **License plate number:** | | | |
| **Recipient:** | | | |
| **Partner:** | | | |
| **Bill of delivery:** | | | |
| **Handed down at:** | | | |
| **Good pallets (pcs)** | **Good plastic pallets (pcs)** | **Good metal frames (pcs)** | **Good intermediate boards (pcs)** |
| | | | |
| **Scrap pallets (pcs)** | **Scrap plastic pallets (pcs)** | **Scrap metal frames (pcs)** | **Scrap intermediate boards (pcs)** |
| | | | |
| **Cause of scrapping:** | | | |

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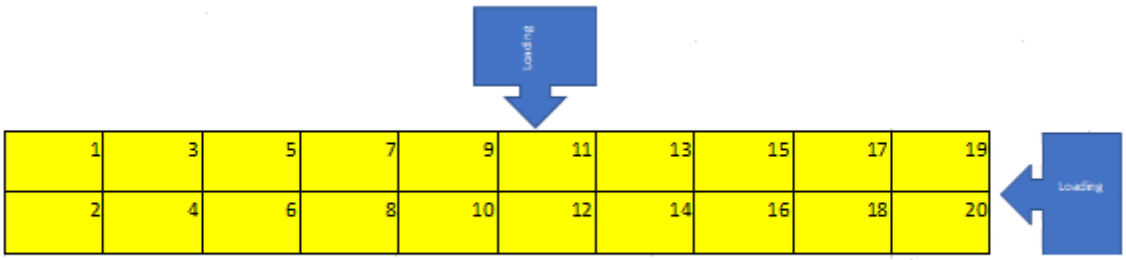
Deliverer Receiving clerk

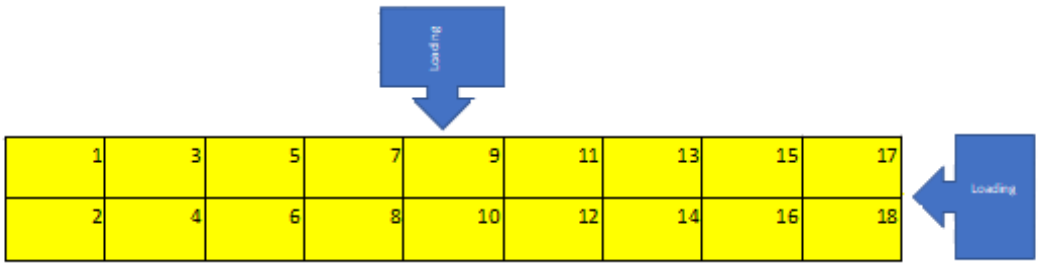
## 6. Correct modes of placing pallets in case of EUR and German pallets:

**German pallets (20 pallets)**




10 pallets are placed in 2 lines

**Spanish pallets (18 pallets)**




8 pallets are placed in 2 lines