

Environmental Product Declaration

Compliant with ISO 14025:2006 for:



Tinplate Closures Twist-Lug closures ref. 63 RTS

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Produced by:

TECNOCAP SPA
CAVA DE' TIRRENI (SA)
ITALIA



Program:

Program operator:

EPD registration number:

Registration date:

Valid until:

Revision date :

The International EPD® System, www.environdec.com

EPD International AB

S-P-02312

2021-02-03

2026-02-02

2023-4-21

An EPD must provide current information and can be updated if conditions change. The declared validity is therefore subject to continued registration and publication on www.environdec.com

Programme information

Programme:	<p>The International EPD® System</p> <p>EPD International AB Box 210 60 SE-100 31 Stockholm Sweden</p> <p>www.environdec.com info@environdec.com</p>
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Accountabilities for PCR, LCA and independent, third-party verification
Product category rule (PCR)
PCR: PACKAGING PRODUCT - CATEGORY CLASSIFICATION: MULTIPLE CPC PCR 2019:13 VERSION 1.1 VALID UNTIL: 2023-11-08
PCR revision was conducted by: Anna Bortoluzzi on 17-12-2020, Università degli Studi di Milano – Dipartimento di chimica – anna.bortoluzzi@unimi.it
Life cycle assessment (LCA)
LCA accountability:: Tecnocap Spa – Via Starza, 4 bis – 84013 - Cava de'Tirreni (SA)
Third party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier: Dr.Ugo Pretato – Studio Fieschi & Soci srl – Torino (Italy) Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier: <input type="checkbox"/> yes <input checked="" type="checkbox"/> No

Company information

Description of the organisation:

Tecnocap Group is a worldwide metal packaging manufacturer, specialized in tinplate metal closures for glass jars and plastic containers as well as in producing aluminum monobloc aerosol cans and aluminum bottles for some of the world's best known consumer brands.

In Italy, the plant considered in this EPD located in Cava de'Tirreni (SA) specializes in producing tinplate closures whilst the other Italian plant of Tecnocap Group, located in Lecco, is specialized in producing aluminum monobloc aerosol cans and aluminum bottles.

Tecnocap commitment goes beyond providing the best quality product. The company helps its clients succeed by enhancing the identity of their brand and preserving the safety of their product working as a partner and advisor, improving existing products and developing new designs & engineering solutions.

Constantly evolving technologies and tailored engineering projects are key factors which drive the Tecnocap market reputation and business growth. The group heavily invests in improving production performance, total quality management and lean manufacturing principles.

Sustainability is a key point for all Tecnocap activities and strategic decisions. Tecnocap works closely with its customers to support them in reaching their sustainability targets by providing "responsible packaging solutions".



Tab.1 – Tecnocap Cava de'Tirreni plant (Italy)

Tecnocap plant in Cava de' Tirreni (Italy) produces a wide range of tinplate metal closures with diameters ranging from 38 to 86 mm and which find application in various industrial sectors: Food and beverage, Cosmetics, Personal Care, Industrial and Pharmaceutical.

TECNOCAP SPA – Metal closures manufactured in Cava de'Tirreni plant		
<p>BRP Closures are metal vacuum closures designed for press-on application and twist-off removal to ensure easy open and easy reseal. It is a high quality closure with the best oxygen barrier properties</p>		
<p>The Continuous Thread (CT) is a metal closure characterised by uninterrupted spiraling thread. CT Closures are widely used for food, cosmetics and personal care. They are compatible with vacuum and non-vacuum packing applications and available in a wide range of diameters, heights and profiles.</p>		
<p>Made of tinplate, the Twist/Lug Closure is the most popular metal closure for food and beverages. It provides the best oxygen barrier technology for a long shelf life.</p>		
<p>The Classic Canner is a special deep Twist/Lug closure technically designed as a Continuous Thread to give packaging a classic home-made style.</p>		

Tab.2 – Metal closures produced in Tecnocap Cava de'Tirreni plant (Italy)

Manufacturing process

Metal closures are stamped out of sheets of tinplate, sheets that generally have a thickness from 0,10 to 0,25 mm. The production process begins with the production of tinplated steel rolls which are subsequently transformed into flat sheets, painted, enameled and finally cut and sent to the packaging manufacturer where the capsule shaping process takes place.

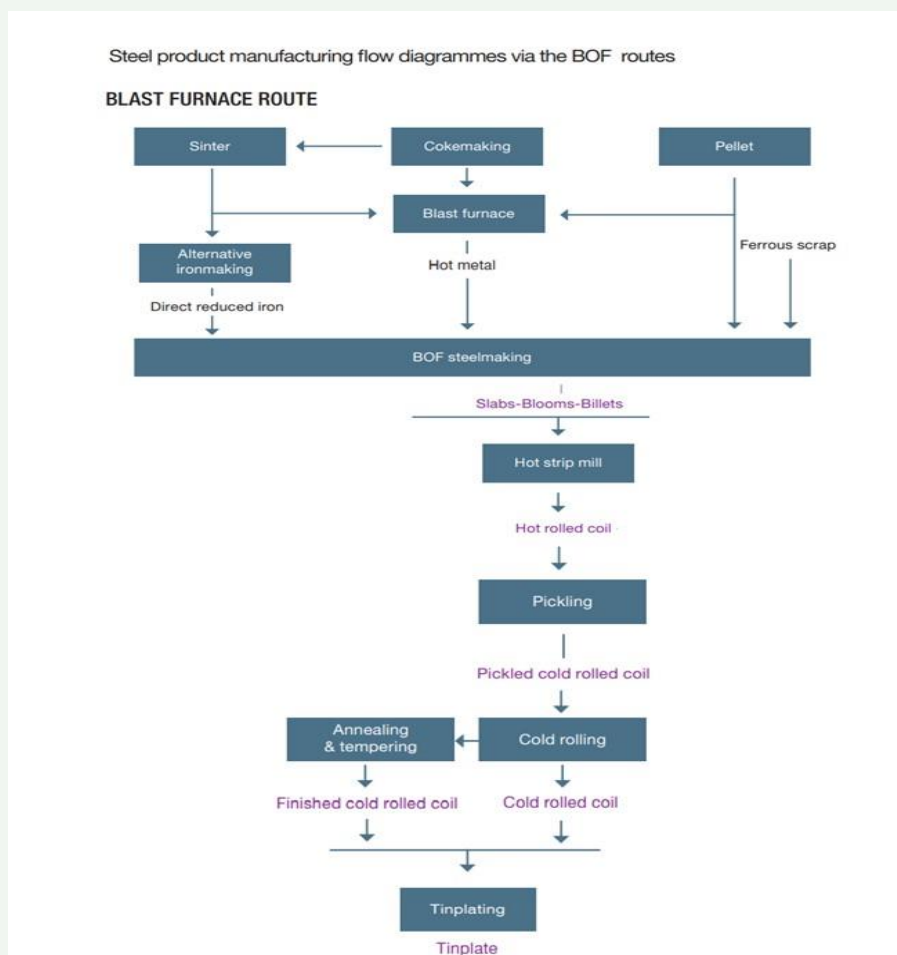
Steel production

The production of blast furnace steel takes place via a chemical reduction reaction. The heart of the cycle is the blast furnace, in which iron ore, coke and limestone and a variable percentage (depending on the type of steel to be produced) of scrap are loaded. After suitable heating, the production of cast iron takes place.

Subsequently, the cast iron is refined in special oxygen converters, obtaining liquid steel, which is shaped through the continuous casting plant or in special ingot molds. The semi-finished products obtained can be marketed or further processed in rolling mills.

From the production of integral cycle steel is possible to obtain flat rolled products, semi-finished products used to produce metal sheets for vehicles and ships, furniture, household appliances, packaging and pipes.

The semi-finished product used for the production of steel packaging is a laminate that is marketed in the form of a coil.



Tab. 3 – Steel manufacturing process

Tinning

Tinning is the process of thinly coating sheets of wrought iron or steel with tin, and the resulting product is known as tinplate. It is most often used to prevent rust and the most common process is electroplating.

In electroplating, the item to be coated is placed into a container containing a solution of one or more tin salts. The item is connected to an electrical circuit, forming the cathode (negative) of the circuit while an electrode typically of the same metal to be plated forms the anode (positive). When an electric current is passed through the circuit, metal ions in the solution are attracted to the item. To produce a smooth, shiny surface, the electroplated sheet is then briefly heated above the melting point of tin. Most of the tin-plated steel made today is then further electroplated with a very thin layer of chromium to prevent dulling of the surface from oxidation of the tin.

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Metal decoration

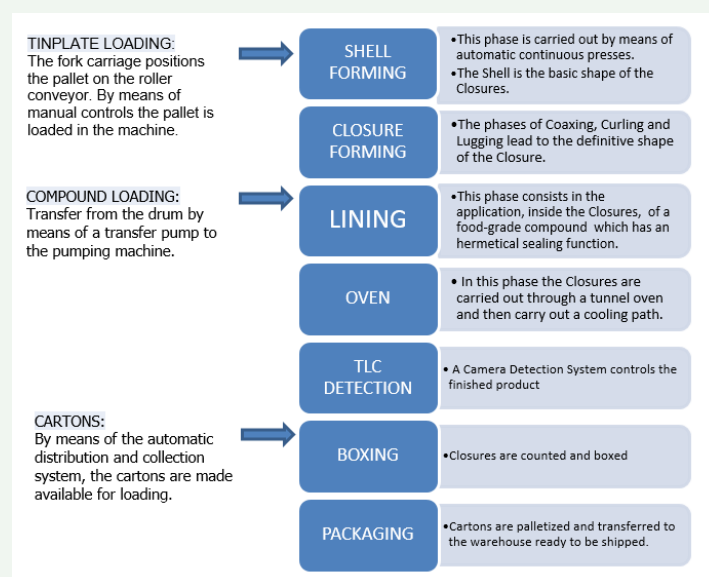
Tinplate coils are then sent to a metal decoration plant where they proceed to their opening and to the operations of painting /enamelling and cutting them in sheets according to the indications of the packaging manufacturer.

Metal closures shaping

Tinplate sheets, intended for the production of the closures, are cut to size by guillotine shears and then sent to the presses for the next steps of the production cycle.

The following table represents the production processes of twist-lug closures at Tecnocap Spa in Cava de' Tirreni.

All the sequence phases take place with automatic transportation of the closures and without human intervention. The loading activities of the materials necessary for the production are shown on the left.



Tab 4 – Metal closures packaging shaping

Certifications

Tecnocap has developed and implemented an Integrated Management System related to workplace safety and the environment and has acquired recognition of compliance with relevant international standards



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Tab.5 – Tecnocap certifications – Cava de’Tirreni plant -

To download certificates and quality policy: <https://www.tecnocapclosures.com/it/capsule-metallo-qualita/>

Owner of the EPD:

Tecnocap Spa

Via Starza, 4 – 84013 - Cava de’Tirreni (SA) – Italy – VAT 02865960658

Company contacts:

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a.violante@tecnocapgroup.com

Dr. Vittorio D’amore

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Name and location of production site:

Tecnocap Spa

Stabilimento di Cava de’Tirreni - Via Starza, 4 – 84013 – Cava de’Tirreni (SA) – Italy

Product information

Product name: Tinplate Twist-Lug Closure

Product identification: The product under study is identified by alphanumeric codes corresponding to its technical data sheet

UN CPC code: 42932

Geographical scope: global

Product description

Twist/Lug Closure is the most popular metal closure for food and beverages. It provides the best oxygen barrier technology for a long shelf life.

The inside bottom of the capsule is lined with a plastisol seal: a plastisol is a colloidal dispersion of small polymer particles, usually polyvinyl chloride, in a liquid plasticizer. When heated to around 180 °C, the plastic particles absorb the plasticizer, causing them to swell and fuse together forming a viscous gel. Once this is cooled to below 60 °C it becomes a flexible, permanently plasticized solid product. This process is called 'curing'.

Made of tinplate, Twist/Lug Closures are 100% recyclable and suitable for hot and cold filling and compatible with pasteurization or sterilization processes. Customers can further enhance their own packaging appeal by customizing this closure with a huge range of coatings, designs, colors and profiles.



Tab.6 – twist-lug closures

LCA information

Declared Unit: the Declared Unit is a unit of packaging - Ref. RTS 63 - belonging to the product category considered in the study (Twist-Lug closures) .

Reference service life: not applicable

Time representativeness: data used in the LCA study relate to the productions made in 2021

Database and LCA software used: Ecoinvent® 3.8 - Simapro® 9.4.0.2

System diagram: table below shows processes included in the LCA study, divided into life cycle stages and into life cycle modules:

LIFE CYCLE STAGE	LIFE CYCLE MODULE		
CORE	A1	Raw material supply	X
	A2	Transport	X
	A3	Manufacturing	X
DOWNSTREAM	A4	Transport to forming or filling	MND
	A5	Forming	MND
	B1	Filling operations	MND
	B2	Distribution of filled packaging	MND
	B3	Transport to reconditioning	MND
	B4	Reconditioning	MND
	B5	Transport to re-filling point	MND
	C1	Disassembling/sorting	MND
	C2	Transport to recovery/disposal of distribution packaging	X
	C3	Final disposal of distribution packaging	X
MND= module not declared X= module declared			

Tab.7 – System diagram of the processes included in the study

Description of system boundaries

System boundaries are “cradle to gate with options” as they include the production of tinned steel coils, their subsequent cutting into sheets and painting operations, the forming of the capsules and the application of plastisol as well as the packaging operations for product’s shipping. Taking in account the relevant quantity of packaging associated with products’ shipping, an end-of-life scenario for packaging materials was also modeled and included in the study. That scenario was modeled and based on Italian data on EOL of packaging materials released by Fondazione per lo Sviluppo Sostenibile in the report “Italy of recycling 2021”. The Italian scenario was preferred as it prevails over the total of the other destinations of Tecnocap's customers.

The following table shows the reference scenario adopted:

Packaging end of life scenario		
Corrugated paper packaging	Recycling	87%
	Incineration	7,50%
	Landfill	5,50%
Plastic packaging	Recycling	49%
	Incineration	44,60%
	Landfill	6,40%
End of life scenario based on the report “L’Italia del Riciclo 2021” – Fondazione per lo sviluppo sostenibile -		

Excluded lifecycle stages

Modules from A4 to C1 of the “packaging” PCR system diagram have been excluded; modules C2 and C3 have been included only for end of life scenario of the distribution packaging of metal closures (plastic bags and corrugated boxes).

Environmental performance indicators


Below are the environmental performance indicators represented, according to the default list v. 2.0 (updated 03/29/2022) of the International EPD System:

- 1. Climate Change (kg CO₂eq)**
Fossil – biogenic - land use and land use change (luluc), and total
- 2. Acidification potential (AP) (mol H⁺ eq);**
- 3. Eutrophication potential (EP);**
EP, aquatic freshwater, (kg P eq.)
EP, aquatic marine (kg N eq)
EP, terrestrial, (mol N eq)
- 4. Photochemical ozone creation potential (POCP) (kg NMVOC eq.);**
- 5. Ozone depletion potential (ODP) (kg CFC-11 eq)**
- 6. Abiotic depletion potential (ADP) for minerals/metals (non-fossil resources) (kg Sb eq)**
- 7. Abiotic depletion potential (ADP) for fossil resources (MJ)**
- 8. Water deprivation potential (WDP) (m³ eq)**

For the results of the impact indicators, the characterization factors of the EF v.1.01 method were used

For data processing, the SimaPro software version 9.4.0.2 and the Ecoinvent database were used

Environmental performance

Ref: 63 RTS – "Twist -Lug closure" Kind of packaging: component Material: Tinplated steel Diameter cm: 6,3 Weight g: 8,58 Number of uses: 01	
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Content declaration

Materials per unit of packaging 63 rts	ref.	weight (g)	%	Environmental / hazardous properties
Tinplate steel		7,452	86,85%	100% recyclable
Paint, enamel and ink		0,211	2,46%	food contact compliant
Compound		0,917	10,69%	food contact compliant
Distribution packaging		100% recycled corrugated board 0,727g - Plastic bag 0,033g - Plastic top 0,005g - Stretch plastic film 0,0017g		
Consumer packaging		NA		
Recycled material		30,22% recycled steel from post manufacturing scrap		
REACH declaration		Declaration on the registration, evaluation, authorization and restriction of chemical substances - REACH - Regulation (EC) No. 1907/2006 of the European Parliament: metal closures produced by Tecnocap Spa do not contain substances subject to registration and therefore, as required by the standard, it will be Tecnocap Spa to ask its suppliers, in the supply chain, to fully comply with all obligations relating to pre-registration, registration, authorisation, preparation of the scenario for the disclosure of security practices, as required by articles 6,31,95 of the aforementioned regulation.		

Potential environmental impacts - Ref. 63 RTS

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO ₂ eq.	3,344E-02	4,231E-03	4,669E-04	3,813E-02
	Biogenic	kg CO ₂ eq.	3,905E-05	1,946E-05	7,036E-08	5,858E-05
	Land use and land transformation	kg CO ₂ eq.	3,256E-04	8,967E-07	5,094E-08	3,266E-04
	TOTAL	kg CO ₂ eq.	3,380E-02	4,251E-03	4,670E-04	3,852E-02
Acidification potential (AP)		kg mol H ⁺ eq.	1,093E-04	1,550E-05	3,454E-06	1,282E-04
Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	1,827E-06	3,935E-07	1,149E-08	2,232E-06
	Aquatic marine	kg N eq.	2,379E-05	3,816E-06	1,387E-06	2,900E-05
	Aquatic terrestrial	mol N eq.	2,372E-04	4,089E-05	1,518E-05	2,933E-04
Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	8,214E-05	1,250E-05	5,369E-06	1,000E-04
Ozone layer depletion (ODP)		kg CFC 11 eq.	1,257E-09	7,990E-10	1,196E-10	2,176E-09
Abiotic depletion potential (ADP)	Metals and minerals	kg Sb eq.	1,081E-07	6,300E-08	3,264E-09	1,744E-07
	Fossil resources	MJ, net calorific value	4,052E-01	6,381E-02	7,443E-03	4,764E-01
Water deprivation potential (WDP)		m ³ world eq.	4,530E-05	3,630E-06	-1,599E-07	4,878E-05

Use of resources - Ref. 63 RTS

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	2,523E-02	1,435E-03	3,168E-05	2,670E-02
	Used as raw materials	MJ, net calorific value	0,000E+00	0,000E+00	0,000E+00	0,000E+00
	TOTAL	MJ, net calorific value	2,523E-02	1,435E-03	3,168E-05	2,670E-02
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	4,302E-01	6,847E-02	7,902E-03	5,066E-01
	Used as raw materials	MJ, net calorific value	1,800E-03	0,000E+00	0,000E+00	1,800E-03
	TOTAL	MJ, net calorific value	4,320E-01	6,847E-02	7,902E-03	5,084E-01
Secondary material		kg	3,288E-03	0,000E+00	0,000E+00	3,288E-03

Main differences from the previous EPD

Compared to the first LCA study relating to 2019 Tecnocap Spa productions, the following factors were considered/integrated/modified in this study:

1. In accordance with the version 1.1 of the "packaging" PCR, all impacts were related to a packaging unit and not to the ton of product.
2. Adopted the Ecoinvent 3.8 dataset "**Steel tinplated (GLO)***" to associate the impacts of tinplated steel production. This dataset was not present in the 2019 database and therefore the impacts relating to the production of steel were added with those relating to a generic tin plating process obtaining a considerably higher impact value than that obtained from this LCA which, however, is today perfectly aligned with the impact results made available to the public by steel producers and/or their associations.
3. A better and more detailed allocation of the weights of the individual materials making up the metal closure (metal, paint, compound) has been carried out.
4. All data have been updated and recalculated on the basis of the production results for the year 2021
5. Updated Simapro software version (9.4.0.2) and Ecoinvent v. 3.8 were used to calculate the environmental impacts along with the EF v.1.01 method as it is more in line with the environmental performance indicators of the list v. 2.0 (updated 03/29/2022) of the International EPD System.
6. Adopted GPI 3.1 for the international EPD System instead of version 3.0

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*DATASET DOCUMENTATION

Steel tinplated {GLO} | blast furnace route and electric arc furnace route | production mix, at plant | 1kg, typical thickness between 0.13 - 0.49 mm. typical width between 600 - 1100 mm | LCI result

Version: 00.00.001 - Reference year: 2021 - Dataset valid until: 2026

Description: Based on annual data from a 12 month period between 2016 and 2020 provided by each participating site from which an annual average is calculated. High data quality. Data collected on site by steel industry experts in accordance with the worldsteel methodology and ISO 14040 standards, and consistency-checked by worldsteel LCA-experts, ref. *Life cycle inventory (LCI) study 2020 data release – World Steel Association*

Description and included processes: This dataset includes raw material extraction (e.g. coal, iron, ore, etc.) and processing, e.g. scrap, coke making, sinter, blast furnace, basic oxygen furnace, electric arc furnace, hot strip mill and further processing. Inputs included in the Life Cycle Inventory relate to all raw material inputs, including steel scrap, energy, water, and transport.

Outputs include steel and other co-products, emissions to air, water and land. Further information is given in the 2017 worldsteel LCA Methodology Report.

Applicability: Obtained by electro plating a thin finished cold rolled coil with a thin layer of tin. It can be found on the market in coil or in sheets and is further processed into finished products by the manufacturers. Electrolytic tin plated steel is used primarily in food cans, industrial packaging (e.g. small drums)

This LCI does not include a credit for recycling of steel at end of life: this is the preferred approach adopted by Worldsteel, detailed in the 2017 methodology report (Appendix 2).

More information

The study was commissioned by:

Tecnocap Spa
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84013 - Cava de'Tirreni (SA)
Italy – VAT 02865960658

Contact persons for the study are:

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Dr. Vittorio D'amore
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The LCA study was carried out by:
Valore Sostenibile Srls
Dr. Massimo Lombardi – LCA Pratictioner
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References

PCR (Product Category Rules) del sistema EPD: PACKAGING PRODUCT - CATEGORY CLASSIFICATION: MULTIPLE CPC PCR 2019:13 VERSION 1.1 VALID UNTIL: 2023-11-08

*GENERAL PROGRAMME INSTRUCTIONS FOR THE INTERNATIONAL EPD® SYSTEM
Version 3.1 del 2019-09-18*

ISO14040: 1997 - Environmental management - Life cycle assessment - Principles and framework

ISO 14044: 2006 - Environmental Management — Life Cycle Assessment — Requirements and Guidelines

Life cycle inventory (LCI) study - 2020 data release - WorldSteel Association

IPCC-Intergovernmental Panel On Climate Change- 2021.

L'Italia del Riciclo 2021 – Fondazione per lo sviluppo sostenibile

Scrap use in the steel industry 2020- WorldSteel Association

Raccomandazione 2021/9332/UE, relativa all'uso di metodologie comuni per misurare e comunicare le prestazioni ambientali nel corso del ciclo di vita dei prodotti

Pré (Product Ecology), "SimaPro 9.4.0.2 – Reference Manual

Life cycle assessment Tecnocap Spa 2021 - Tinplate Closures Twist-Lug closures ref. 63 RTS

