



# Environmental Product Declaration

in compliance with ISO 14025



**Door Closer TS 93 EN 2-5**







**DORMA GmbH + Co. KG**

Declaration Number  
EPD-DOR-2011111-9

Institut Bauen und Umwelt e.V.  
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	<p style="text-align: right;"><b>Environmental Product Declaration</b></p>	
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<p>DORMA GmbH &amp; Co. KG Dorma Platz 1 D-58256 Ennepetal</p> 	<p style="text-align: right;"><b>Declaration Holder</b></p>	
<p>EPD-DOR-2011111-E</p>	<p style="text-align: right;"><b>Declaration Number</b></p>	
<p><b>DORMA TS 93 EN 2-5 Slide-Channel Door Closer</b></p> <p>This Environmental Product Declaration complies with ISO 14025 and describes the building product named here. It is intended to promote the development of construction which is compatible with the environment and human health. All relevant environmental data are disclosed in this validated declaration.</p> <p>The declaration is based on the Product Category Rules document <i>Schlösser und Beschläge</i> (locks and fittings), 2010-10.</p>	<p style="text-align: right;"><b>Declared Building Product</b></p>	
<p>This validated declaration gives the owner the right to use the seal of the Institut Bauen und Umwelt e.V. exclusively for the designated product for a period of three years from the issue date. The declaration owner is liable for the data and documentation upon which the declaration is based.</p>	<p style="text-align: right;"><b>Validity</b></p>	
<p>The <b>Declaration</b> is complete and contains information regarding:</p> <ul style="list-style-type: none"> <li>- Product definition and construction physics data</li> <li>- Information on base materials and their origin</li> <li>- Description of product manufacture</li> <li>- Information on product processing</li> <li>- Information on usage, singular effects and end-of-life phase</li> <li>- Results of life-cycle assessment</li> <li>- Documentation and tests</li> </ul>	<p style="text-align: right;"><b>Content of Declaration</b></p>	
<p>24 March 2011</p>	<p style="text-align: right;"><b>Date of Issue</b></p>	
 <p>Prof. Dr.-Ing. Horst J. Bossenmayer (President of the Institut Bauen und Umwelt)</p>	<p style="text-align: right;"><b>Signatures</b></p>	
<p>This declaration and the rules on which it is based were examined by the SVA (Advisory Board) in accordance with /ISO 14025/.</p>		<p style="text-align: right;"><b>Declaration Examination</b></p>
 <p>Prof. Dr.-Ing. Hans-Wolf Reinhardt (Chairman of SVA)</p>	 <p>Dr. Frank Werner (Auditor contracted by SVA)</p> <p style="text-align: right;"><b>Signatures</b></p>	



**Summary**

**Environmental Product Declaration**

<p>The DORMA product known as TS 93 EN 2-5 is a slide-channel door closer in the company's <i>Contur Design</i>. The TS 93 System stands for a multifunctional slide-channel door-closing system with a modular design. The TS 93 bears the CE sign.</p>	<p><b>Product Description</b></p>
<p>The purpose of use for the declared product: Overhead door closer (slide-channel door-closing system) for interior use: either door leaf fixing or lintel fixing on the push or pull side.</p>	<p><b>Range of Application</b></p>
<p>The Life Cycle Assessment was made in accordance with DIN EN ISO 14040/ and /DIN EN ISO 14044, requirements of the IBU guidelines for Type-III declarations and the specific regulations for locks and fittings. Specific data from the examined product and from the "Ecoinvent 2.2" database were used. The Life Cycle Assessment covers raw material extraction and energy production, transport of raw materials, the actual manufacturing phase and end-of-life phase, including material recycling and energy recovery processes. The declaration applies to TS 93 EN 2-5.</p>	<p><b>Scope of Life Cycle Assessment</b></p>

**Life Cycle Assessment Results**

TS 93 EN 2-5 Slide-Channel Door Closer				
Environmental Impact Indicator	Unit per declared unit	Σ (Manufacture + Disposal)	Manufacture	Disposal
Primary energy, non-renewable	[MJ]	167.5	186.0	-18.6
Primary energy, renewable	[MJ]	13.8	20.6	-6.77
Global Warming Potential (GWP 100a)	[kg CO <sub>2</sub> - equiv.]	12.83	14.82	-1.98
Ozone Depletion Potential (ODP)	[kg CFC11 - equiv.]	1.01E-06	1.01E-06	4.03E-09
Acidification Potential (AP)	[kg SO <sub>2</sub> - equiv.]	0.055	0.065	-0.009
Eutrophication Potential (EP)	[kg PO <sub>4</sub> - equiv.]	0.035	0.037	-0.002
Photochem. Oxidant Potential (POCP)	[kg Ethylene - equiv.]	0.004	0.005	-0.001

The results apply to the totals in the functional or "declared" unit made up of the closer, slide channel and packaging of the TS 93 EN2-5.

Written by: brands & values GmbH, Bremen  
in cooperation with DORMA Holding GmbH & Co. KG,  
Ennepetal



According to Product Category Rules, no verification is required.

**Verification and Tests**



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## **Scope**

This environmental product declaration applies to the slide-channel door closer TS93 EN 2-5 in *Contur Design* manufactured by DORMA in Ennepetal, Germany. The product includes the door-closer TS93, the slide channel GN and their packaging units.

## **1 Product Definition**

### **Product Description**

The TS 93 EN 2-5 is a DORMA door-closing device with controlled closing mechanism. The system stands for a multifunctional slide channel door-closing system with a modular design, which fulfills practically all the functional requirements of modern doors. Equipped with a linear mechanism and heart-shaped cam, the door closer in the DORMA TS 93 System is distinctive in that it reduces the resistance encountered when the door is opened. With its standard backcheck [BC] feature, the product restrains a door which has been flung open or blown open by a gust of wind. The backcheck protects both door and wall from damage. Moreover, the TS 93 has a standard delayed-action closing [DC] feature which slows the door's closing cycle between 120° and 70°.

### **Application**

The DORMA TS 93 overhead door closer is available with hold-open function for single-leaf fire and smoke check doors or for double-leaf doors (fire and smoke check doors) too.

### **Placing on the market/ Codes of practice**

DIN EN 16001:2009 for the Energy Management System of DORMA Holding GmbH + Co. KGaA and DORMA GmbH + Co. KG for the design and production of door-closing devices, locks and related products, powered pedestrian door drives and door systems, emergency/panic exit devices and electrically controlled emergency/panic exit systems (Register-Nr.: KLN4001256-13, currently valid certificate was issued on 21 October 2010).

ISO 14001:2004 for Environmental Management System of DORMA Holding GmbH + Co. KGaA and DORMA GmbH + Co. KG for the design and production of door-closing devices, locks and related products, powered pedestrian door drives and door systems, emergency/panic exit devices and electrically controlled emergency/panic exit systems (Register-Nr.:



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KLN4001256-02, currently valid certificate issued on 21 October 2010).

**Quality control**

DORMA TS 93 was tested and inspected by MPA NRW, Dortmund, to EN 1154. The TS 93 carries the **CE** sign.

**Delivery Condition, properties**

**Constructional data**

**Table 1: Technical Specifications**

		<b>TS 93 B/G</b>
Closing Force infinitely adjustable	Size	EN 2-5
Standard doors and	≤ 1250 mm	•
fire and smoke check doors	≤ 1600 mm	-
Exterior doors	≤ 1250 mm	•
Outward opening	≤ 1600 mm	-
Non handed		•
Slide Channel		•
Closing force infinitely adjustable by screw		•
Latching speed adjustable by valve		•
Backcheck (BC/ÖD) adjustable by valve		•
Delayed action (DC/SV) adjustable by valve		•
Hold-open (not for fire and smoke check doors)		o
Dimensions in mm	Length (L)	275
	Depth (B)	53
	Height (H)	60
<b>CE - mark for building products</b>		•
<b>Door-closing system compliant with EN 1154, EN 1155 and EN 1158</b>		
• Yes - No o Optional		

**2 Base Materials**

**Base materials and primary products**

*A. For the closing mechanism:*

At least 48% gray cast iron, 37% steel, 10% aluminum (incl. non-ferrous metals)

*B. For the slide channel:*

At least 48% steel, 41% aluminum, 8% zinc diecasting

*C. For the packaging:*

At least 87% chipboard, 11% paper



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**Auxiliary substances / additives**

The following auxiliary substances and additives result from the internal manufacturing processes for both components, door-closer and slide channels. They are shown in relation to the complete TS 93 product.

**Table 2: Utilized Auxiliary Substances and Additives**

	Absolute share in grams	Relative share in percent
<b>Door Closer TS93</b>		
Electroplating	7.39	0.22%
Paint, varnish	26.9	0.81%
Alloys	5.08	0.15%
Hydraulic oil	96	2.89%
<b>Total share</b>	<b>135.37</b>	<b>4.07%</b>
<b>Total weight of door-closer</b>	<b>3323.35</b>	<b>100%</b>
<b>Slide-Channel GN</b>		
Electroplating	11.77	1.43%
Painting	36.11	4.39%
Alloys	17.2	2.09%
<b>Total share</b>	<b>65.07</b>	<b>7.92%</b>
<b>Total weight of slide channel</b>	<b>821.88</b>	<b>100%</b>

**3 Product Manufacture**

**Manufacturing of the product**

*A. Closer*

Upon receipt of the housing's blank, the first processing steps (milling, drilling, cutting, washing, degreasing, inspection of finished blank) take place in the DORMA factory in Ennepetal. The assembly of housing components (pivot, axle bearing, compression spring, piston, valves, oil) follows. Once the finished and assembled housing components have passed inspection, the door closer is painted, polished and printed.

*B. Slide Channel*

Delivery of slide channel section; sawing and assembly of slide channel components (slider, fastener, screws).

*C. Slide Channel Lever*

After delivery of the lug, the slide channel lever is degreased, stamped, perforated, grinded, welded, galvanized and painted.

*D. Packaging*

- Pack closer (chipboard)
- Pack slide channel (chipboard)
- Pack screws (PE sleeve)



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**Health protection  
Production**

Given the manufacturing conditions, no measures beyond the legal regulations and other rules for protection of health are required. The Minimum Acceptable Concentrations (Germany) are far below the specified limits at each point in the production process.

**Environmental protection  
Production**

*Air:* Exhaust air from production is cleaned in compliance with legal requirements. The emissions are significantly below the limits specified for air quality by the German Federal Emissions Control Act.

*Water/Soil:* There is no impact on water and soil. Waste water resulting from the manufacturing process is reconditioned in the facilities and reused in production.

*Noise exposure measurements* have shown that noise levels inside and outside the production facilities are significantly below the German federal technical guidelines for noise levels.

**4 Product Processing**

**Installation**

The TS 93 EN 2-5 is installed exclusively by experts or authorized dealers and service partners of DORMA GmbH & Co. KG. Product maintenance is not planned and, with proper usage, not required. Standard safety regulations and trade associations' rules are to be observed during the installation of the TS 93 EN 2-5.

**Residual material**

No residual materials result from the installation.

**Packaging**

Packaging is collected at the installation site and separated according to waste type. Disposal is handled in accordance with the regulations of the local disposal authorities and the instructions mentioned under "subsequent use" in Section 7. Chipboard, paper (EAK 15 01 01) and recyclable polyethylene film (EAK 15 01 02) are used.

**5 Condition when in use**

**Effects on environment**

Based on current knowledge, no danger to water, air and soil can arise with proper use of the product described.



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**Effects on human health**

With normal usage in accordance with the intended purpose of door-closers, no health-related damage or impairment is to be expected. Relevant emissions of harmful substances cannot be determined.

**Useful life**

The useful life of the TS 93 EN 2-5 is about one million closing cycles. In regular endurance tests the door closer fulfills all aspects of EN 1154 requirements. After 500,000 load alternations the endurance test was continued and regular measurements were taken. The final measurement took place after 1,007,900 load alternations, resulting in findings that always conformed to standards. Signs of wear and tear were first observed after 1,086,400 load alternations.

**6 Singular effects**

**Fire**

The overhead door closer fulfills the requirements for door-closing devices as per EN 1154, Annex A, which applies to fire and smoke doors. An ift Rosenheim certification scheme provided proof that the sliding channel door closer TS 93 fulfills the requirements for fire spread prevention as specified in EN 13501-2 with consideration given to EN 14600 in fire class EI<sub>2</sub> 90.

**Water**

Given the metallurgic product properties, any unintended water penetration, e.g., through the activation of a sprinkler system or as the result of flooding, has no effect on the functionality and usage or on the durability of the overhead door closer.

**7 End-of-life phase**

**Re-use and subsequent use**

Door closers can be easily removed for renovation or taken out of service and used again for the same application. The product properties (very long product life without material fatigue) allow for such re-use.

**Recycling**

The metals used in the overhead door closer are 100% recyclable. All the synthetic materials built into the product can be used to generate energy. During the subsequent use phase, preference should be given to re-use over disposal of the product.



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## **Disposal**

The metals (EAK 17 04 07) and plastics (EAK 17 02 03) used in the overhead door closer are completely suitable for disposal in a landfill.

During the subsequent use phase the user should take into account the goal of sustainability and, when possible, recycle the product instead of scrapping it. Disposal should take place only if no other use or regional recycling options are available.

## **8 Life Cycle Assessment**

### **8.1. Information on system definition and modeling of the life cycle**

#### **Declared unit**

This declaration applies to one unit of a packaged slide channel overhead door closer TS 93 EN 2-5 (4.41 kg/unit).

#### **System boundaries**

The selected system boundaries cover the life phases from cradle to gate with consideration given to all upstream processes and the entire infrastructure. For the Life Cycle Assessment referred to here, the following life phases are divided as follows:

- *Manufacturing phase:* Raw material extraction, material and product manufacture, including resource recovery of the packaging materials for the generation of energy.
- *End of Life (or disposal) phase:* Disassembly of product and feeding of product components into different disposal processes. Disposal takes one of two routes: thermal energy conversion (for synthetics) and material recycling (for metals).

Considerations in more detail:

- Metallurgical processes;
- Production of all fabricated products and auxiliary substances, including related transport and packaging;
- Relevant transport and packaging of raw materials and fabricated products;
- TS 93 EN 2-5 production processes (energy, waste, water, energy and material utilization, emissions);
- Utilization of product-specific materials.



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**Assumptions and estimations**

Beyond the specifications provided for allocations, no other assumptions and estimations are required for the interpretation of this Life Cycle Assessment.

**Cut-off criteria**

All data from production data acquisition have been taken into account. That includes materials used, energy consumed and direct production waste related to the manufacture of the product. Actual transport expenditures were calculated for material and energy flows. All available emission data were used.

The infrastructure of the machines and facilities required for production were considered.

It can be assumed that consideration was given to all material flows leading into or out of the system whose environmental impact exceeds 1% of the specified impact categories. It can also be assumed that the sum of the neglected material flows does not exceed 5% of the total impact.

**Transport**

Transport distances and means are adequately accounted for in all the background data sets.

**Period under consideration**

The applied data are based on the actual production processes during the financial year 2009/2010. The Life Cycle Assessment was made for the reference area Germany (Ennepetal). Consequently, in addition to the production processes, the LCA also used preliminary stages relevant to Germany, such as electrical power supply and energy sources.

**Background data**

The life cycle modeling was created for the manufacture and utilization of DORMA TS 93 EN 2-5 by the software system UMBERTO, a development of ifu (*Institut für Umweltinformatik*) Hamburg GmbH, in its current Version 5.5 in connection with data sets from the ecoinvent database, developed for LCA by the Swiss ecoinvent Centre, in its current Version 2.2.

The life cycle modeling over the entire product life and the related impact analysis were done with data and analysis modules in the ecoinvent database.



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### **Data Quality**

For modeling purposes, only data sets from the ecoinvent database were used which could be confirmed with production operation data. The data sets used – particularly for extraction or further processing of metals, the regional supply of energy (electricity mix per region) and transport expenditures – were updated and expanded within the past five to 10 years.

Where actual required data sets were unavailable, data from comparable processes or materials were used.

Production data used in combination with selected software modules date from the financial year 2010.

### **Allocation**

An allocation for by-products does not exist as the production processes yield one single product. Product-specific measurements were made of energy, auxiliary substances were taken from parts lists and fuels from the ecoinvent database. In the end-of-life phase the allocation is made on secondary materials according to PCR rules.

### **End-of-Life Scenario**

In addition to production, the LCA for the TS 93 EN 2-5 takes into account the recycling potential and the potential for material reuse and energy generation from waste.

In Germany a collection rate for the metal fraction is presumed to be above 95%. The product components, door closer and slide channel, contain both metals and synthetics. In order to be able to separate the different material fractions again in the disposal process, the materials are generally taken to a shredder facility. The resulting residue goes into a waste incineration plant, where waste materials are reprocessed. It is presumed that 95% of the product can be collected and recycled. Of the remaining 5%, some 80% will take a detour through the incinerator to end up in recycling.

The DORMA production processes yield residual materials in the form of metal shavings, primarily from drilling and milling operations. The shavings go directly into the recycling process, outside the collection and shredder quota.

Product recycling includes the sorting of the individual metal fractions and the mono-fraction recycling in the smelting furnace.

As in the production phase, all aspects of the environmental impact from upstream processes and the infrastructure of the recycling facilities in the end-of-life phase are taken into account in the LCA.



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## Credits

Credits were calculated on the basis of general IBU guidelines and the specific Product Category Rules (PCR) for locks and fittings. The calculation specifies the ecological value of the "accumulation" of a material in the "techno sphere" and shows the extent of the environmental impact prevented as compared to primary production of a material. Varying routes were specified for the utilized materials.

**Table 3: Primary routes used per type of material**

Material	Offset Route
Steel	Converter steel
Iron	Raw iron
Aluminum	Primary aluminum
Zinc	Primary zinc
Brass	Primary brass
Synthetics	<ul style="list-style-type: none"><li>• Electricity corresponding to country-specific mix and</li><li>• Useful heat from natural gas-industrial combustion plants</li></ul>

A collection rate of 95 % is presumed (cf. Section "End-of-Life Scenario"). Credit assumptions are based on this collection rate and today's technologies for metal recycling. Secondary materials with varying fractions of saved primary production for each material listed are excluded. Owing to resource recovery of synthetics, secondary materials are not considered here.

Since the recycling potential represents savings in the manufacturing of the product, the savings per material consist of a complete data set with several environmentally relevant parameters. The broad scope of the data set permits the calculation of negative expenditure (credits) across all categories within the impact assessment for the final determination of product-related environmental damage potential.

If the recycling potential of a material is exploited, the initial value for production is reduced in a subsequent life cycle. The recycling processes are depicted in the end-of-life phase and the related environmental effects are correspondingly accounted for. Therefore, the recycling potential thus determined is offset in the end-of-life phase.



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## 8.2. Description of the assessment results and analysis

### Life Cycle Assessment

In the following sub-sections the analysis of the LCA is presented in terms of primary energy consumption, waste, water consumption and the results of the impact assessment.

In addition to the actual product "Slide-Channel Door Closer TS 93 EN 2-5", the analysis contains the calculation for the packaging materials used by DORMA.

### Primary energy

Primary energy consumption is shown in Diagram 1.

**Diagram 1: Primary energy consumption per life cycle phase in MJ-equivalent/declared unit**

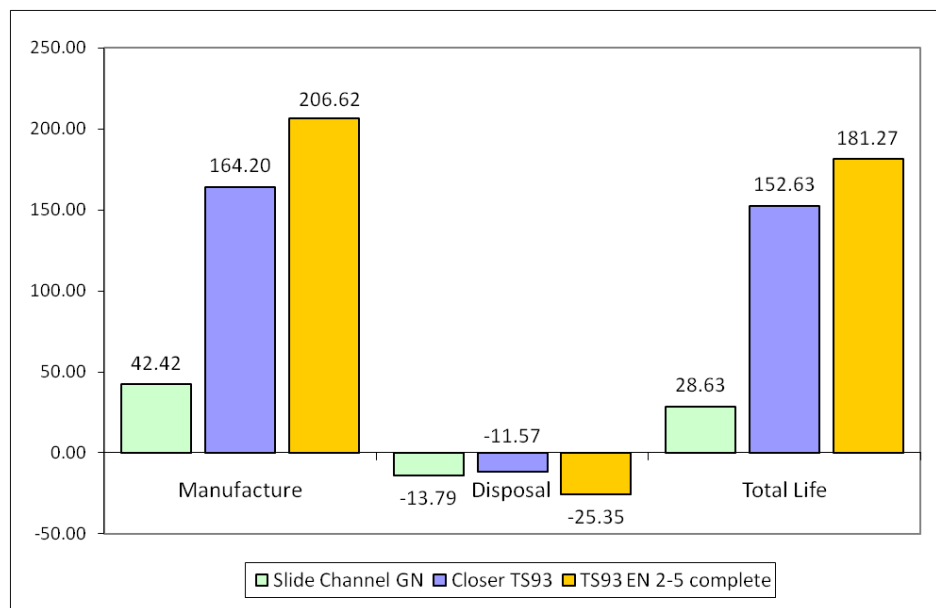


Table 4 shows the primary energy usage calculated (on the basis of the net calorific value  $H_u$ ) for one unit of a packed overhead door closer, divided into renewable and non-renewable energy sources for the production and end-of-life phases and for the total sum.

The total consumption of non-renewable primary energy is at about 167.4 MJ-equivalents (92.4%) per declared unit. An additional 14 MJ-equivalents (7.6%) is consumed from renewable energies.



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**Table 4: Primary energy use per life cycle phase and product components in MJ-equivalent/declared unit**

Analysis Factor	Manufacture	Disposal	Total Life
Primary energy, non-renewable	186.0	-18.6	<b>167.4</b>
Primary energy, renewable	20.6	-6.77	<b>13.8</b>
<b>Primary energy, total</b>	<b>206.6</b>	<b>-25.4</b>	<b>181.2</b>

Renewable sources of energy (about 8%) in primary energy are divided into the following types:

- 74.50% hydro power
- 20.20% solar energy stored in biomass
- 5.22% wind power
- 0.09% solar energy

The non-renewable sources of energy (about 92%) are divided as follows:

- 27.42% uranium
- 25.11% lignite
- 22.52% bituminous coal
- 10.20% natural gas
- 14.75% other (including fossil oil)

The relatively high portion of uranium at 27.5% in primary energy usage is based on the high cost of purchasing electricity from German's public grid.

## **Water utilization**

Water usage is depicted in Diagram 2.

The analysis of water utilization of the TS 93 EN 2-5 in Diagram 2 shows that the production of a declared unit, including packaging materials, requires about 165 liters of water.

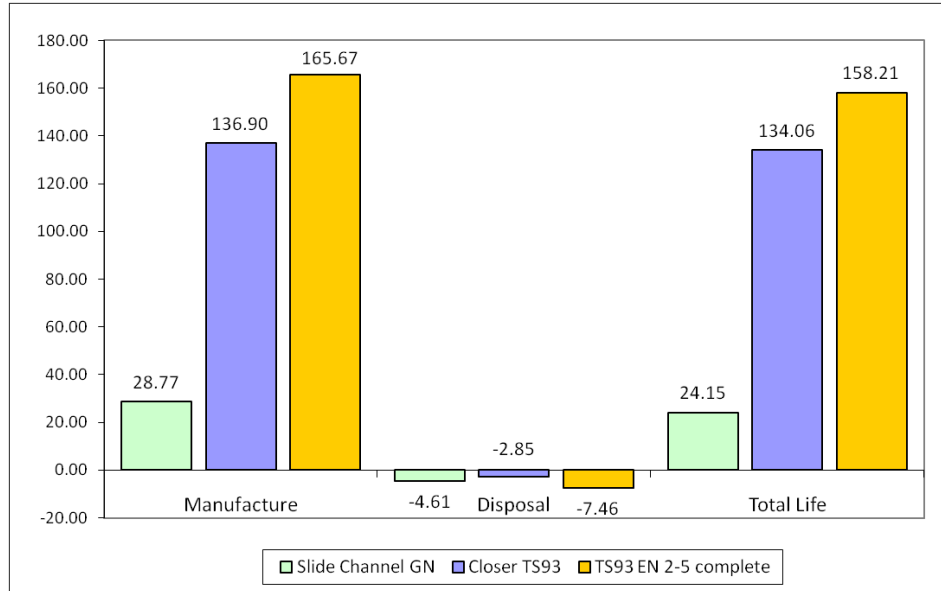
Total consumption decreases to just about 158 liters of water over the product life when the credits realized from recycling during the disposal processes are taken into account. When the end-of-life phase, with its high gains from product recovery, is included, total water consumption is reduced by 4.7%.



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**Diagram 2: Water usage per life cycle phase in liters/declared unit**



**Table 5: Water usage per life cycle phase and product component in liter/declared unit**

Analysis Factor	Manufacture	Disposal	Total Life
Slide channel GN	28.8	-4.6	24.1
Closer TS93	136.9	-2.8	134.1
TS93 EN 2-5 complete	165.7	-7.5	158.2

The high water volume of 134 liters (nearly 5% over the mass percentage of approximately 80%) for the product component Closer is attributed to primary production (main material use: gray cast iron, steel) in the manufacturing phase. About 15% (about 24 liters) is assigned to the manufacture of the slide channel (5% below the mass percentage of about 20%). The low water usage in comparison to the Closer is explained by the high recycling rate of 80% for utilized aluminum.

Water consumption is highest in the production phase due to the use of metals, of which the product is almost exclusively made.

**Waste**

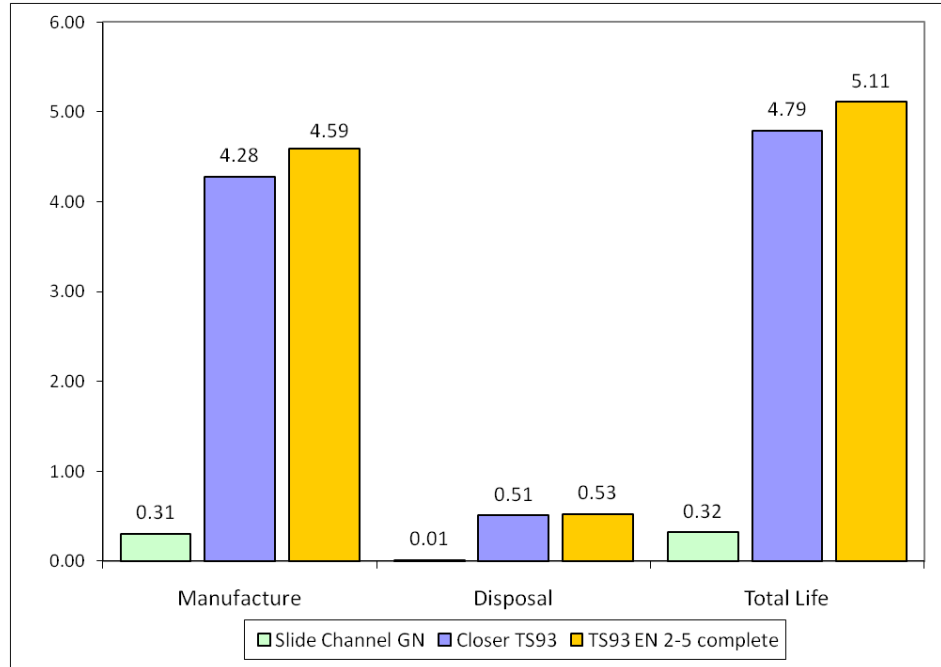
As with water consumption, it is obvious here that the slide-channel product component makes up a very small portion of the waste volume. This can be attributed to the high proportion of recycled aluminum, which in turn reduces the need to mine bauxite for the production of primary aluminum (about 20%).



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**Diagram 3: Quantity of waste per life cycle phases in kg/declared unit**



Furthermore, the analysis of waste levels from the TS 93 EN 2-5 is conducted on the following four segments:

- mining waste (overburden/stockpile dump) (landfilled),
- household-type commercial waste (landfilled),
- hazardous waste (landfilled) and
- radioactive waste (landfilled).

**Table 6: Waste levels per type of waste and components in kg/declared unit**

	Slide Channel GN		Closer TS 93		TS 93 EN 2-5	
	Absolute	Relative	Absolute	Relative	Absolute	Relative
Hazardous waste (landfilled)	0.066	20.66%	0.056	1.16%	0.122	2.38%
Mining waste (e.g. overburden) (landfilled)	0.043	13.36%	0.106	2.20%	0.148	2.90%
Radioactive waste (landfilled)	6.2E-05	0.02%	4.3E-04	0.01%	4.9E-04	0.01%
Household-type commercial waste (landfilled)	0.21	65.96%	4.63	96.63%	4.84	94.71%
<b>TOTAL</b>	<b>0.32</b>	<b>100%</b>	<b>4.79</b>	<b>100%</b>	<b>5.11</b>	<b>100%</b>

Non-hazardous waste, particularly the waste from upstream processes, represents by far the greatest quantity in the total waste level for the TS 93 EN 2-5 (approximately. 4.8 kg/declared unit, or nearly 94%).



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Mining waste at 2.9% arose primarily from the extraction of mineral raw materials and coal for the production of electric energy. Overburden/stockpile waste was likewise generated in the upstream processes through the involvement of the infrastructure.

Furthermore, hazardous waste (e.g., spent oil, heavy metals, acids, leaching) amounts to almost 2.4%. Besides their occurrence in the maintenance of production facilities, these wastes arise mainly in alloying, galvanizing and painting steps in the manufacturing process for the TS 93 EN 2-5.

Radioactive waste arises from power consumption (atomic energy in the electricity mix in Germany).

### Impact assessment

The environmental impact assessment of the TS 93 EN 2-5 was conducted using the methods CML 2001 (CML at the Institute of Environmental Sciences, Leiden University, the Netherlands) with the following factors (as of December 2007):

- Abiotic Resource Depletion (ADP)
- Global Warming Potential (GWP)
- Ozone Depletion Potential (ODP)
- Acidification Potential (AP)
- Eutrophication Potential (EP)
- Photochemical Ozone Creation Potential (POCP)

The following table contains the results of the impact assessment for one unit of TS93 EN 2-5 including packaging materials.

**Table 7: Results of Impact Assessment as per CML2001**

TS 93 EN 2-5				
Indicator	Factor Unit	Manufacture	Disposal	TOTAL
Abiotic Depletion Potential	kg Sb-Equiv.	0.107	-0.011	<b>0.096</b>
Global Warming Potential	kg CO2-Equ.	14.8	-1.98	<b>12.8</b>
Ozone Depletion Potential	kg CFC-11-Equiv.	1.01E-06	4.03E-09	<b>1.01E-06</b>
Acidification Potential	kg SO2-Equ.	0.065	-0.009	<b>0.055</b>
Eutrophication Potential	kg PO4-Equ.	0.037	-0.003	<b>0.035</b>
Photochemical Ozone Creation Potential	kg Ethylene	0.005	-0.001	<b>0.004</b>



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Except for Ozone Depletion Potential (ODP), all impact categories receive a credit in the end-of-life phase. Measured across the total product life cycle, however, the ODP amounts to a small share of only 0.4% for the disposal phase.

## **9 Evidence**

No evidence is required for this product.

## **10 PCR document and verification**

This declaration is based on the PCR document *Schlösser und Beschläge*, (locks and fittings) 10-2010.

Review of PCR document conducted by Advisory Board (SVA).

SVA Chairman: Prof. Dr.-Ing. Hans-Wolf Reinhardt (Universität Stuttgart, IWB)

Independent audit of declaration in accordance with ISO 14025:

internal

external

Validation of Declaration: Dr. Frank Werner



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## **Standards and Laws**

- /ISO 14025/ ISO DIS 14025:2005, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
- /ISO 14040/ ISO/ DIS 14040:2005, Environmental management - Life cycle assessment - Principles and framework.
- /ISO 14044/ ISO/ DIS 14044:2005, Environmental management - Life cycle assessment – Requirements and guidelines.
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