



ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT NAME:

1. GTS 9000+
2. GTS 9010+
3. ZVEI Probe with USB-A
4. ZVEI Probe with USB-C

PRODUCTION SITE:

Via Pindaro, 19, 20128
Milano (MI)

in compliance with ISO 14025 and EN 50693

Program operator	EPDItaly
Publisher	EPDItaly
Declaration number	COL-TW-GTSZVEI
Registration number	EPDITALY1004
Issue date	22.07.2025
Valid to	22.07.2030



1. GENERAL INFORMATION

EPD owner	Col Giovanni Paolo S.p.A. (www.colgp.it) Via Antonio Chiribiri, 1, 10028 Trofarello (TO)
Reference production site	TW-TeamWare S.r.l. (www.teamware.it) Via Pindaro, 19, 20128 Milano (MI)
Scope of application	This is a product-specific EPD referring to four products i.e., GTS 9000+, GTS 9010+, Zvei Probe with USB-A, and Zvei Probe with USB-C connectors, that were manufactured in 2021 by TW-Teamware SRL in Milan and supplied to clients for use within Italy. The GTS9000+ and GTS9010+ are GPS receivers with simultaneous tracking of up to 22 channels, capable of operating at L1 frequency in Standard Position Service, Coarse Acquisition code. The Zvei Probe is an optical interface used to connect PCs and PDAs to electricity and gas tariff meters, with a galvanically isolated connection. It allows bidirectional communication between devices, using an infrared LED for transmission and a phototransistor for reception; the device is powered directly from the PC's serial/USB port. The USB probe is produced in two versions: one equipped with a USB type A connector; typically used on PCs, and the other USB type C connector; typically used on Tablets and Smartphones.
Programme operator	EPDItaly – info@epditaly.it Via Gaetano De Castillia, 10, 20124 Milano (MI)
Independent verification	This declaration has been developed in accordance with the regulations of EPDItaly; further information and the same regulations are available at: www.epditaly.it Independent verification of the declaration and data carried out in accordance with ISO 14025: 2010 ☐ Internal ☒ External Third party verification done by: ICMQ S.p.A. (www.icmq.it), Via Gaetano De Castillia, 10, 20124 Milano (MI) – Italia. Accredited by ACCREDIA, Accreditation number 0004VV REV. 000
CPC code	4621 “Electricity distribution or control apparatus”
Company contact	Roberto CONTI, BU Monitoring Manager, TW-TeamWare SRL e-mail: roberto.conti@teamware.it
Technical support	Emmanuel NYERO, Environmental Engineer, TW-TeamWare SRL e-mail: emmanuel.nyero@teamware.it
PCR – Product Category Rules	Core PCR: EPDItaly007 – PCR for Electronic and Electrical Products and Systems, REV 3.1, Issue date 12/11/2024

Reference documents	EN ISO 14025:2010, Environmental labels and declarations – Type III environmental declarations – Principles and procedures EN 50693:2019 - Product category rules for life cycle assessments of electronic and electrical products and systems. Regulations of the EPDIItaly Programme. Revision 6.0. Issue date 30/10/2023
Comparability	EPDs published within the same product category though originating from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.
Liability	The EPD owner relieves EPDIItaly from any non-compliance with the environmental legislations. The holder of the declaration will be liable for the supporting information and evidence. EPDIItaly declines all responsibility regarding the information, data and results provided by the EPD Owner for life cycle assessment.

2. THE COMPANY

Col Giovanni Paolo S.p.A. (COL GROUP) is a leading Italian company owned by Oaktree Capital Management, L.P. in the fast-growing global energy transmission and distribution market. It specializes in the development and production of critical components and advanced solutions for smart grid applications in medium and high voltage electrical infrastructure with sustainability at the heart of all its activities. COL GROUP has been working to support the sustainable future of our planet and the long-term success of its customers as well as the company's own business. Testament to that are the ambitions embodied in two of COL GROUP's Strategy 2030 goals i.e., to lead with low-carbon circular economy solutions, and to enhance sustainability across the value chain. The company possesses numerous certifications according to international standards, among which are UNI EN ISO 9001:2015, UNI EN ISO 14001:2015, UNI ISO 45001:2018, UNI EN ISO 50001:2018, and ISO 27001: 2013. Established in 1920, COL GROUP has over 100 years of leadership experience in the electro-technical and plant engineering market, and multi-year relationships with its customers thanks to the reliability and quality of its products and services, and it is one of the few authorized suppliers for major utility companies in Europe, Middle East, South America, and Southeast Asia. The company has developed a highly innovative technology portfolio in medium voltage switchgear, substation automation, battery control systems and several other smart grid and high-voltage applications in collaboration with other dominant global utilities and industrial players. COL GROUP is an ever-expanding company through various M&A, and it acquired TW-TeamWare SRL to accelerate its progress towards power quality, cyber security, and electric distribution remote control. The company now has production sites in Torino, Catania, Milano, Cremona, and most recently

in Bergamo, with over 500 highly skilled, specialized, and efficient employees supervised by a competent management team.

3. THE PRODUCTS

GTS 9000+ and GTS 9010+

The GTS9000+ (**top left photograph**) is a GPS receiver with simultaneous tracking of up to 22 channels, capable of operating at L1 frequency in Standard Position Service, Coarse Acquisition code. Operating on a Condor C2626 GPS™ 1 core from Trimble Navigation Ltd, the receiver is equipped with an RS422 serial port and an open-collector pulse-per-second (PPS) output for timing applications or as a general-purpose synchronization signal. The GTS9000+ can operate with three different protocols: Trimble Standard Interface Protocol (TSIP™ 1), Trimble ASCII Interface Protocol (TAIP™ 1), and NMEA 0183. The module also supports the standard RTCM SC-104 protocol for differential GPS. Operator settings, including communication parameters and receiver processing options, are stored in non-volatile electrically erasable memory (EEPROM) that requires no battery backup. The GTS9000+ Kit comprises of a GTS9000+ Receiver, 10-pin female removable terminal block, magnetically attached GPS antenna with 5m cable, and the Antenna fixing bracket. The GTS9010+ (**top right photograph**) is a GPS receiver with simultaneous tracking of up to 22 channels, capable of operating with L1 frequency in Standard Position Service, Coarse Acquisition code. Operating on a Trimble Navigation Ltd. Condor C2626 core, the receiver is specifically designed to provide the synchronization signal to up to 10 cabin devices, which can be other Wally A RTU analyzers or devices for which the synchronization signal is essential. The GTS9010+ is equipped with 10 ports on RJ12 connector on which are certified: RS485 serial connection with NMEA 0813 protocol, the opto-isolated open-collector pulse-per-second (PPS) sync signal, and External power input for GPS receiver (option). The power input can be supplied indiscriminately by each of the 10 devices connected to the receiver, without the need to assign the power source function to a single cabin device and exclude it from all the others. This standardization allows for the simplification of interconnections in the field, without the possibility of errors or the need to use different cables between the various devices. Additionally, an optional separate power input may be available for an external power supply, if the cabin equipment is not capable of supplying power to the GTS9010+ receiver. The GTS9010+ receiver kit is composed of the following: GTS9010+ Receiver, 10 m cable for connection to Wally A RTU, Magnetic Mount GPS Antenna with 5m Cable, with L-Bracket, and Wall fixing brackets. **Table 1** summarizes the identification details and technical features showing similarities and differences between the GTS 9000+ and GTS 9010+ from the product datasheets.

Table 1. Technical features of the GTS 9000+ and GTS 9010+

Product	GTS 9000+	GTS 9010+
TEAMWARE Product Code	TW074-PFEL-0044-00	TW107-PFEL-0050-00
Product net weight	0,328 kg	0,485 kg
Channels	22 in parallel	22
Protocols	TSIP™ 1, TAIP™ 1, NMEA (default), RTCM	NMEA 0813

Operating modes	GPS, DGPS	GPS, DGPS
PPS accuracy	±100 ns PPS	Periodic 1 second
Duration	0.5 seconds	(Duty cycle 350/650 ms)
PPS output	Vmax=24Vdc; Imax=5mA	Vmax=24Vdc; Imax=30mA
Antenna	Active with 26dB gain, 5m cable, magnetic fixing.	Active with 26dB gain, 5m cable, magnetic fixing.
Serial interface	RS422 terminal block	RS485 connector
Serial port signals	TX+, TX-, RX+, RX-, COM	Connector signals: RS485 TX+, RS485 TX-, PPS+, PPS-, Vcc, GND
Device supply voltage	5-12 Vdc, 2 VA max	9-14 Vdc, 2 VA max
Dimensions	90 x 80 x 60 mm	143 x 90 x 30 mm
Container	Plastic IP53	Plastic IP40
Operating temperature	-10°C +50°C	-20°C +60°C
Storage temperature	-20°C +70°C	-20°C +70°C

Zvei Probe with USB-A and USB-C connectors

The Zvei Probe is an optical interface used to connect PCs and PDAs to electricity and gas tariff meters, with a galvanically isolated connection. The Zvei probe is manufactured at TEAMWARE in full compliance with the IEC EN62056-21 (formerly IEC 61107) standard. It allows bidirectional communication between devices, using an infrared LED for transmission and a phototransistor for reception; the device is powered directly from the PC's serial/USB port. A special circuitry allows the current absorption to be kept limited to a few mA, thus ensuring perfect operation with any USB port. To simplify the implementation of the communication software, the suppression of the echo in reception, otherwise present due to optical reflections, is electronically guaranteed. The magnet used is made of "rare earth", to ensure a firmer hold with the meter than the traditional ferrite magnet ($F > 15N$). The USB probe is produced in two different versions: one equipped with a USB type A connector (**bottom left photograph**); typically used on PCs, and the other USB type C connector (**bottom right photograph**); typically used on Tablets and Smartphones. Both are USB 1.1 and 2.0 full speed compatible. The serial probe can also be equipped with a 9-pin male SUB-D connector for connection to a PDA (DCE), or a 9-pin female SUB-D connector for connection to a PC (DTE). The TEAMWARE product code for the Zvei Probe with USB-A and USB-C connectors is **038S431** and **038S454**, respectively. The Technical features of the Zvei probe are as follows; Interface: IEC RS-232C / USB, Power consumption: with power supply from DTR (+15V): < 15 mA (in tx); < 10 mA (in rx), and Baud rate: from 300 to 19200 bits / sec.

Material composition

The declaration on the content of materials for each of the fully assembled and packaged products was done by the manufacturer in accordance with EN IEC 62474. The material class names, unique ID and percentage mass share of all the materials and declarable substances contained in the fully assembled products i.e., GTS 9000+, GTS 9010+, Zvei Probe with USB-A, and Zvei Probe with USB-C connectors, plus

their packaging materials are reported in **table 2**. The material class name “Other” represents miscellaneous electronic materials not on the declarable substance list under EN IEC 62474.

Table 2. Material composition for the fully assembled and packaged products

Material class name	ID	Percentage mass share			
		GTS 9000+	GTS 9010+	Zvei Probe with USB-A	Zvei Probe with USB-C
Other ferrous alloys, non-stainless steels	M-119	4,7173%	3,3429%	15,0572%	16,2684%
Copper and its alloys	M-121	19,7077%	15,4518%	-	
PolyVinylChloride (PVC)	M-200	-	-	8,1476%	8,8030%
PolyEthylene (PE)	M-201	1,8869%	1,3372%	4,3499%	4,6998%
PolyCarbonate (PC)	M-204	14,5711%	10,1774%	-	-
Other unfilled thermoplastics	M-249	12,9987%	17,0490%	-	-
Other duromers	M-319	-	-	7,5320%	8,1378%
Paper	M-341	12,1601%	8,6174%	19,4071%	20,9682%
Other*	OTHER	33,9581%	44,0243%	45,5063%	41,1229%

*Miscellaneous electronic materials with no unique ID

Reference service life

The reference service life (RSL) of each of the products was taken to be 10 years.

4. SCOPE AND TYPE OF EPD

This is a product-specific EPD for the GTS 9000+, GTS 9010+ , Zvei Probe with USB-A, and Zvei Probe with USB-C connectors, that are all produced by TW-TeamWare SRL, a COL GROUP company, in compliance with ISO 14025 and EN 50693 under the EPDItaly program regulations. It is based on a cradle to grave life cycle assessment (LCA) methodology in accordance with the ISO 14040 and 14044 standards. The spatio-temporal scope for the data used in this study are summarized in **table 3** basing on the current global level of technology. The results were automatically generated using the excel-based LCA tool “LCA-COL GROUP Tool 2.3” of 08.07.2025., and they were intended for internal research and development (R&D), as well as external B2B and B2C communication. In effect, these results facilitated judicious corporate decisions through comparison of the environmental attributes of products that have similar functional requirements.

Table 3. The spatio-temporal scope of the LCA study at the current global level of technology

Representativeness	Scope
Spatial	Italy
Temporal	January to December, 2021

Functional unit

The functional unit (FU) was a fully assembled, tested, and packaged GTS 9000+, GTS 9010+, Zvei Probes with USB-A and USB-C connectors whose technical specifications are described in **section 3** of this document, distributed to sites within Italy, installed and used as technology for providing a solution to observability of distribution networks, during a RSL of 10 years, working continuously.

System boundary

The system boundary implemented in this LCA covered the entire lifecycle of the products i.e., from cradle to grave as shown in **table 4** with the life cycle stages and the geographical scopes for all the major activities involved, grouped into three distinct modules i.e., upstream, core, and downstream with reference to EN 50693. The product life cycle and inventory analysis describing all the activities, simplifying assumptions, and modelling scenarios used in the LCA has been thoroughly conducted under **section 5** of this document.

Table 4. The life cycle stages, geographical scope, and modules declared in the system boundary

Manufacturing			Distribution	Installation	Use	End of life
CN	IT	IT	IT	IT	IT	IT
Upstream		Core	Downstream			
✓		✓	✓	✓	✓	✓

CN = China, IT = Italy, ✓ = Lifecycle stages and modules declared in the LCA

Cut-off criteria

The mandatory cut-off for mass and energy flows in this LCA study was set at 1% as defined and modelled in the LCA TOOL "LCA-COL GROUP Tool 2.3" of 08.07.2025. All the material and energy flows within the system boundary known to have potential to cause significant impacts on the LCA results have been accounted for. However, cut-off was applied to the potential impacts that could have resulted from production and disposal of the packaging materials of all the semi-finished products included in the BOMs (e.g., sheets, electronics, screws, etc.) transported to TW-TeamWare SRL for processing and later assembling of the final products as it was assumed that such impacts were negligible. Furthermore, a cut-off was similarly applied to the impacts associated with the skilled labour required during installation before use and dismantling of the products at their end-of-life. Potential impacts that could have arisen from maintenance were ignored since the products were assumed to not require any maintenance for the entire expected service life.

Allocation rules

The allocation criteria adopted for the LCA model was guided by the PCR of the reference product. Since many other products are produced at the reference site, the "multi-output" allocation rule was applied to calculate the environmental impact of the products being studied. The primary data relating to waste

generation, water, and energy consumption (petrol, electricity, and natural gas) used was provided for the reference year, and these were allocated based on economic value (revenue generated in millions of euros) using the total annual revenue of the company, annual revenue from selling each of the products being studied, and the number of the studied product sold in the reference year, to get the allocation factor.

Data quality

The most recent and verifiable site-specific data collected in 2021 was used in this study, and the International System of Units (SI) was adopted while recording the data. The initial primary data forming the basis for the LCA were the production specifications i.e., BOMs, mechanical drawings, and technical information from the client provided by TW-TeamWare SRL to its external suppliers for each sub-assembly of the final products, and these were analysed using Microsoft excel. In instances where data was missing for some individual electronic components, approximations were made in the BOMs and proxy data with the nearest equivalence in terms of functionality and mass was used for modelling such components. The weight and surface area of the structural components were calculated using the Solid Edge software. For the electronic components, information from product datasheets obtained from the websites of Farnell Italia and Mouser Electronics was used, these were complimented with data from Altium and Microarea Mago4 software. Additional primary data used included the water and energy (petrol, electricity, and natural gas) consumption for the core activities at TW-TeamWare SRL premises during the reference year, and these were downloaded from the company's reference production site account on the website of the service providers. A similar approach was applied to download annual data for fuel consumption by company vehicles from the Q8 online portal which documents electronic fuel vouchers. In addition to that, the distances from the manufacturing sites of all the external suppliers to TW-TeamWare SRL were evaluated with the aid of Google Maps and Ports.com for transport by road and sea, respectively. The same technique was applied to determine the distributing distance from TW-TeamWare SRL to the client's location within Italy, and justification was provided for all the simplifying assumptions stated. In terms of secondary data, databases from legitimate sources already embedded in the LCA TOOL "LCA-COL GROUP Tool 2.3" of 08.07.2025 were used to obtain generic data for some up- and down-stream processes in the life cycle of the products.

5. PRODUCT LIFE CYCLE AND INVENTORY ANALYSIS

The life cycle inventory (LCI) lists and quantifies all the flows entering and leaving all the declared life cycle stages of the product within the system boundary considered in relation to the scope of the study. The reference flow for the LCI is 1 piece of each of the fully assembled and packaged products, whose individual weights are as indicated in **table 5**.

Table 5. Weights of the fully assembled and packaged products

Product	GTS 9000+	GTS 9010+	Zvei Probe with USB-A	Zvei Probe with USB-C
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Total weight (kg)	0,382	0,538	0,120	0,111
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Manufacturing

This first life cycle stage covers all the activities spanning across the upstream and core modules. The supply chain processes commence with the extraction of raw materials to produce sub-assemblies comprising of electronic and structural components which are constituents of the final products, and the packaging materials for each of the final products. The electronic components ordinarily are made of cables and printed circuit boards (PCB) on which smaller components are mounted, whereas the structural component consists of mostly plastic and PVC materials, ferromagnetic steel, and fibreglass. The production of these various components was done by external suppliers on their manufacturing sites whose distances from TW-TeamWare SRL were obtained using Google Maps. The electronic components were made in China and assumed to be shipped to the port of Genova and then transported by road in a 16 - 32 tonne EURO5 lorry to TW-TeamWare SRL premises. Along similar lines, the structural components and packaging materials manufactured within Italy were transported in a 16 - 32 tonne EURO5 lorry to the reference production site where the core activities of assembling, testing, and final packaging of each of the products were done. Each of the fully assembled products was then packaged by the application of a double-layered technique, starting by covering the product in a PE-film, and thereafter placing it in a cardboard box to minimize any potential damage during distribution. All the wastes generated on-site from these activities (except packaging) are documented by category in the production site register and declared annually in the MUD “*Modello Unico di Dichiarazione ambientale*” following the applicable regulations and deadlines. Furthermore, these wastes were assumed to be transported periodically in a 16 - 32 tonne ACI mix lorry to a waste treatment plant located **50 km** away.

Distribution

Henceforth, all the activities are classified under the downstream module. Each of the fully assembled and packaged products on the pallet is loaded onto a 16 - 32 tonne EURO5 lorry for final delivery to the various installation sites throughout Italy. All the sites where each of the products was distributed and installed during the reference year were considered and their distances (in kilometres) from TEAMWARE considering the fastest route were obtained from Google Maps. However, since the distribution each of the products was not homogeneous across the entire Italian territory, these distances were weighted against the quantity of the product distributed in each of the installation sites, and the sum of the various weighted distances (**table 6**) was taken as the distribution distance for each of the fully assembled and packaged products

Table 6. Weighted distribution distance for the products

Product	GTS 9000+	GTS 9010+	Zvei Probe with USB-A	Zvei Probe with USB-C
Distribution distance (km)	473,466	268,759	558,854	271,330

Installation

Upon arrival at the client's location, the products are unloaded, carefully removed from the packaging, and installed by skilled technicians. It is immediately after this process that the packaging materials are returned for reuse as per the reduction of packaging waste agreement between TW-TeamWare SRL and its external suppliers. At the end of life of the packaging materials, they are assumed to be transported in a 7 - 16 tonne EURO5 lorry to a waste treatment plant **50 km** away.

Use

Each of the perfectly installed products consume kWh of electricity, E_{use} , as reported in **table 7**, during a **RSL** of 10 years, operating constantly during the use phase, and this was computed using **Equation 1** with **8760** representing the number of hours in a year; and **1000** is the conversion factor that allows the energy consumed in kWh over the product's service life to be expressed. The nominal power of the device (in Watts), P_{use} was obtained from the product datasheets of the devices.

$$E_{use}[\text{kWh}] = \frac{P_{use} * 8760 * \text{RSL}}{1000} \quad (1)$$

Table 7. Electricity consumption in kWh of the four products during use phase

Product	GTS 9000+	GTS 9010+	Zvei Probe with USB-A	Zvei Probe with USB-C
Electricity Consumption (kWh)	87,600	87,600	19,710	19,710

All four products do not have any batteries, and therefore it was assumed that no periodic or extraordinary maintenance works were required throughout the use phase. An additional environmental information is that during the installation and use stages, both the products do not emit any pollutants or substances which are dangerous for the environment and health.

End of life

At the end of the RSL of the products, the dismantling process and separation of the device components is done following guidelines given by the manufacturer, and the resulting wastes were assumed to be transported using a 7,5 - 16 tonne EURO5 lorry to a waste treatment plant located **50 km** away from the installation site.

6. LCA RESULTS

The environmental performance results of each of the products for the different lifecycle stages per FU accounting for all the mandatory environmental impact indicators (**Tables 8, 11, 14, and 17**) and descriptive parameters for resource use (**Tables 9, 12, 15, and 18**) and waste production (**Tables 10, 13, 16, and 19**) calculated as per Core PCR: EPDItaly007 and EN 50693 were automatically generated using the LCA TOOL "LCA-COL GROUP Tool 2.3" of 08.07.2025.

Environmental impacts for GTS 9000+

Table 8. LCA results for the environmental impact indicators

Impact indicators	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
GWP-total	kg CO ₂ eq.	1,58E+01	2,81E-02	1,46E-02	3,13E+01	4,77E-01	4,77E+01
GWP-fossil	kg CO ₂ eq.	1,58E+01	2,81E-02	6,54E-03	3,12E+01	4,75E-01	4,75E+01
GWP-biogenic	kg CO ₂ eq.	1,53E-02	9,58E-07	8,10E-03	1,34E-01	1,87E-05	1,58E-01
GWP-luluc	kg CO ₂ eq.	2,17E-02	6,89E-07	1,92E-07	1,96E-03	3,03E-05	2,37E-02
ODP	kg CFC-11 eq.	7,24E-07	5,72E-10	1,55E-11	6,52E-07	3,09E-10	1,38E-06
AP	mol H ⁺ eq.	1,65E-01	6,98E-05	6,15E-06	1,02E-01	2,02E-04	2,67E-01
EP-freshwater	kg P eq.	3,02E-03	2,35E-08	5,43E-09	5,31E-04	8,24E-07	3,55E-03
EP-marine	kg N eq.	3,64E-02	2,68E-05	9,85E-06	1,57E-02	7,98E-05	5,22E-02
EP-terrestrial	mol N eq.	2,63E-01	2,93E-04	2,57E-05	1,79E-01	8,18E-04	4,43E-01
POCP	kg NMVOC eq.	8,31E-02	1,22E-04	1,03E-05	8,29E-02	2,17E-04	1,66E-01
ADP-min & met	kg Sb eq.	5,63E-03	9,26E-10	2,04E-10	4,54E-07	5,29E-09	5,63E-03
ADP-fossil	MJ	2,05E+02	3,70E-01	1,02E-02	5,15E+02	3,44E-01	7,21E+02
WDP	m ³ eq. deprived	5,26E+00	1,57E-04	-1,11E-03	2,30E+01	9,09E-03	2,83E+01

Caption: **GWP-total** = Global Warming Potential – total; **GWP-fossil** = Global Warming Potential – fossil; **GWP-biogenic** = Global Warming Potential – biogenic; **GWP-luluc** = Global Warming Potential – land use and land use change; **ODP** = Ozone Depletion Potential; **AP** = Acidification Potential; **EP-freshwater** = Eutrophication potential, aquatic freshwater; **EP-marine** = Eutrophication potential, marine; **EP-terrestrial** = Eutrophication potential, terrestrial; **POCP** = Photochemical ozone formation; **ADP-min & met** = Depletion of abiotic resources – minerals and metals; **ADP-fossil** = Depletion of abiotic resources – fossil fuels; **WDP** = Water deprivation potential

Resource use for GTS 9000+

Table 9. LCA results for the environmental parameters describing resource use

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
PERE	MJ	2,77E+01	1,29E-03	1,65E-04	1,78E+02	2,44E-02	2,06E+02
PERM	MJ	2,32E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,32E-01
PERT	MJ	2,80E+01	1,29E-03	1,65E-04	1,78E+02	2,44E-02	2,06E+02
PENRE	MJ	2,00E+02	3,70E-01	1,02E-02	5,15E+02	3,44E-01	7,15E+02
PENRM	MJ	5,73E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,73E+00
PENRT	MJ	2,05E+02	3,70E-01	1,02E-02	5,15E+02	3,44E-01	7,21E+02
MS	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,59E-01	9,49E-06	-2,16E-05	6,05E-01	3,24E-04	7,65E-01

Caption: **PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy resources used as raw material; **PERT** = Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; **PENRM** = Use of non-renewable primary energy resources used as raw material; **PENRT** = Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); **MS** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of fresh water

Waste production for GTS 9000+

Table 10. LCA results for the environmental parameters describing waste production

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
HWD	kg	8,11E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,11E-03
NHWD	kg	0,00E+00	0,00E+00	9,02E-03	0,00E+00	1,93E-01	2,02E-01
RWD	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,36E-02	0,00E+00	3,69E-02	0,00E+00	8,20E-02	1,43E-01
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,26E-02	5,26E-02
ETE	MJ	0,00E+00	0,00E+00	1,76E-01	0,00E+00	0,00E+00	1,76E-01
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption: **HWD** = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed; **CRU** = Components for reuse; **MFR** = Material for recycling; **MER** = Materials for energy recovery; **ETE** = Exported thermal energy; **EEE** = Exported electricity energy

Environmental impacts for GTS 9010+

Table 11. LCA results for the environmental impact indicators

Impact indicators	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
GWP-total	kg CO ₂ eq.	2,15E+01	2,25E-02	1,46E-02	3,13E+01	6,92E-01	5,36E+01
GWP-fossil	kg CO ₂ eq.	2,15E+01	2,25E-02	6,54E-03	3,12E+01	6,89E-01	5,34E+01
GWP-biogenic	kg CO ₂ eq.	2,12E-02	7,67E-07	8,10E-03	1,34E-01	2,73E-05	1,64E-01
GWP-luluc	kg CO ₂ eq.	2,94E-02	5,52E-07	1,92E-07	1,96E-03	4,48E-05	3,14E-02
ODP	kg CFC-11 eq.	9,06E-07	4,58E-10	1,55E-11	6,52E-07	4,54E-10	1,56E-06
AP	mol H ⁺ eq.	2,32E-01	5,59E-05	6,15E-06	1,02E-01	2,96E-04	3,34E-01
EP-freshwater	kg P eq.	4,00E-03	1,88E-08	5,43E-09	5,31E-04	1,22E-06	4,53E-03
EP-marine	kg N eq.	4,49E-02	2,14E-05	9,85E-06	1,57E-02	1,16E-04	6,08E-02
EP-terrestrial	mol N eq.	3,65E-01	2,35E-04	2,57E-05	1,79E-01	1,19E-03	5,46E-01
POCP	kg NMVOC eq.	1,15E-01	9,76E-05	1,03E-05	8,29E-02	3,16E-04	1,99E-01
ADP-min & met	kg Sb eq.	7,92E-03	7,42E-10	2,04E-10	4,54E-07	7,69E-09	7,92E-03
ADP-fossil	MJ	2,79E+02	2,97E-01	1,02E-02	5,15E+02	5,06E-01	7,94E+02
WDP	m ³ eq. deprived	7,34E+00	1,26E-04	-1,11E-03	2,30E+01	1,32E-02	3,04E+01

Caption: **GWP-total** = Global Warming Potential – total; **GWP-fossil** = Global Warming Potential – fossil; **GWP-biogenic** = Global Warming Potential – biogenic; **GWP-luluc** = Global Warming Potential – land use and land use change; **ODP** = Ozone Depletion Potential; **AP** = Acidification Potential; **EP-freshwater** = Eutrophication potential, aquatic freshwater; **EP-marine** = Eutrophication potential, marine; **EP-terrestrial** = Eutrophication potential, terrestrial; **POCP** = Photochemical ozone formation; **ADP-min & met** = Depletion of abiotic resources – minerals and metals; **ADP-fossil** = Depletion of abiotic resources – fossil fuels; **WDP** = Water deprivation potential

Resource use for GTS 9010+

Table 12. LCA results for the environmental parameters describing resource use

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
PERE	MJ	3,76E+01	1,03E-03	1,65E-04	1,78E+02	3,60E-02	2,16E+02
PERM	MJ	2,32E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,32E-01
PERT	MJ	3,79E+01	1,03E-03	1,65E-04	1,78E+02	3,60E-02	2,16E+02
PENRE	MJ	2,70E+02	2,97E-01	1,02E-02	5,15E+02	5,06E-01	7,86E+02
PENRM	MJ	8,35E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,35E+00
PENRT	MJ	2,79E+02	2,97E-01	1,02E-02	5,15E+02	5,06E-01	7,94E+02
MS	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	2,21E-01	7,61E-06	-2,16E-05	6,05E-01	4,72E-04	8,27E-01

Caption: **PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy resources used as raw material; **PERT** = Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; **PENRM** = Use of non-renewable primary energy resources used as raw material; **PENRT** = Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); **MS** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of fresh water

Waste production for GTS 9010+

Table 13. LCA results for the environmental parameters describing waste production

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
HWD	kg	1,13E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,13E-02
NHWD	kg	0,00E+00	0,00E+00	9,02E-03	0,00E+00	2,98E-01	3,07E-01
RWD	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	3,28E-02	0,00E+00	3,69E-02	0,00E+00	1,14E-01	1,83E-01
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,33E-02	7,33E-02
ETE	MJ	0,00E+00	0,00E+00	1,76E-01	0,00E+00	0,00E+00	1,76E-01
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption: **HWD** = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed; **CRU** = Components for reuse; **MFR** = Material for recycling; **MER** = Materials for energy recovery; **ETE** = Exported thermal energy; **EEE** = Exported electricity energy

Environmental impacts for Zvei Probe with USB-A

Table 14. LCA results for the environmental impact indicators

Impact indicators	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
GWP-total	kg CO ₂ eq.	2,63E+00	1,04E-02	8,63E-03	7,05E+00	1,17E-01	9,81E+00
GWP-fossil	kg CO ₂ eq.	2,62E+00	1,04E-02	4,58E-03	7,02E+00	1,16E-01	9,77E+00
GWP-biogenic	kg CO ₂ eq.	3,06E-03	3,54E-07	4,05E-03	3,02E-02	4,86E-06	3,73E-02
GWP-luluc	kg CO ₂ eq.	4,12E-03	2,55E-07	1,05E-07	4,42E-04	8,37E-06	4,57E-03
ODP	kg CFC-11 eq.	7,09E-08	2,12E-10	8,60E-12	1,47E-07	8,17E-11	2,18E-07
AP	mol H ⁺ eq.	3,08E-02	2,58E-05	3,44E-06	2,29E-02	5,23E-05	5,37E-02
EP-freshwater	kg P eq.	3,66E-04	8,69E-09	3,02E-09	1,19E-04	2,26E-07	4,86E-04
EP-marine	kg N eq.	1,81E-02	9,90E-06	5,15E-06	3,53E-03	2,01E-05	2,17E-02
EP-terrestrial	mol N eq.	4,58E-02	1,08E-04	1,46E-05	4,03E-02	2,06E-04	8,64E-02
POCP	kg NMVOC eq.	2,13E-02	4,50E-05	5,65E-06	1,87E-02	5,51E-05	4,01E-02
ADP-min & met	kg Sb eq.	3,57E-04	3,43E-10	1,21E-10	1,02E-07	1,31E-09	3,58E-04
ADP-fossil	MJ	3,54E+01	1,37E-01	5,62E-03	1,16E+02	9,30E-02	1,51E+02
WDP	m ³ eq. deprived	1,56E+00	5,82E-05	-6,15E-04	5,18E+00	2,30E-03	6,74E+00

Caption: **GWP-total** = Global Warming Potential – total; **GWP-fossil** = Global Warming Potential – fossil; **GWP-biogenic** = Global Warming Potential – biogenic; **GWP-luluc** = Global Warming Potential – land use and land use change; **ODP** = Ozone Depletion Potential; **AP** = Acidification Potential; **EP-freshwater** = Eutrophication potential, aquatic freshwater; **EP-marine** = Eutrophication potential, marine; **EP-terrestrial** = Eutrophication potential, terrestrial; **POCP** = Photochemical ozone formation; **ADP-min & met** = Depletion of abiotic resources – minerals and metals; **ADP-fossil** = Depletion of abiotic resources – fossil fuels; **WDP** = Water deprivation potential

Resource use for Zvei Probe with USB-A

Table 15. LCA results for the environmental parameters describing resource use

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
PERE	MJ	8,91E+00	4,75E-04	9,15E-05	4,01E+01	6,73E-03	4,90E+01
PERM	MJ	1,16E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,16E-01
PERT	MJ	9,03E+00	4,75E-04	9,15E-05	4,01E+01	6,73E-03	4,92E+01
PENRE	MJ	3,40E+01	1,37E-01	5,62E-03	1,16E+02	9,30E-02	1,50E+02
PENRM	MJ	1,41E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,41E+00
PENRT	MJ	3,54E+01	1,37E-01	5,62E-03	1,16E+02	9,30E-02	1,51E+02
MS	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	3,36E-02	3,51E-06	-1,17E-05	1,36E-01	8,23E-05	1,70E-01

Caption: **PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy resources used as raw material; **PERT** = Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; **PENRM** = Use of non-renewable primary energy resources used as raw material; **PENRT** = Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); **MS** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of fresh water

Waste production for Zvei Probe with USB-A

Table 16. LCA results for the environmental parameters describing waste production

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
HWD	kg	7,60E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,60E-03
NHWD	kg	0,00E+00	0,00E+00	5,13E-03	0,00E+00	6,37E-02	6,88E-02
RWD	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,21E-02	0,00E+00	1,89E-02	0,00E+00	1,81E-02	5,92E-02
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,37E-03	9,37E-03
ETE	MJ	0,00E+00	0,00E+00	1,06E-01	0,00E+00	0,00E+00	1,06E-01
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption: **HWD** = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed; **CRU** = Components for reuse; **MFR** = Material for recycling; **MER** = Materials for energy recovery; **ETE** = Exported thermal energy; **EEE** = Exported electricity energy

Environmental impacts for Zvei Probe with USB-C

Table 17. LCA results for the environmental impact indicators

Impact indicators	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
GWP-total	kg CO ₂ eq.	2,64E+00	4,66E-03	8,63E-03	7,05E+00	1,08E-01	9,81E+00
GWP-fossil	kg CO ₂ eq.	2,64E+00	4,66E-03	4,58E-03	7,02E+00	1,08E-01	9,77E+00
GWP-biogenic	kg CO ₂ eq.	2,93E-03	1,59E-07	4,05E-03	3,02E-02	4,44E-06	3,72E-02
GWP-luluc	kg CO ₂ eq.	4,06E-03	1,14E-07	1,05E-07	4,42E-04	7,56E-06	4,51E-03
ODP	kg CFC-11 eq.	7,21E-08	9,51E-11	8,60E-12	1,47E-07	7,45E-11	2,19E-07
AP	mol H ⁺ eq.	2,76E-02	1,16E-05	3,44E-06	2,29E-02	4,78E-05	5,05E-02
EP-freshwater	kg P eq.	3,52E-04	3,91E-09	3,02E-09	1,19E-04	2,05E-07	4,71E-04
EP-marine	kg N eq.	1,80E-02	4,45E-06	5,15E-06	3,53E-03	1,85E-05	2,16E-02
EP-terrestrial	mol N eq.	4,43E-02	4,87E-05	1,46E-05	4,03E-02	1,90E-04	8,49E-02
POCP	kg NMVOC eq.	2,14E-02	2,02E-05	5,65E-06	1,87E-02	5,06E-05	4,01E-02
ADP-min & met	kg Sb eq.	3,14E-04	1,54E-10	1,21E-10	1,02E-07	1,21E-09	3,14E-04
ADP-fossil	MJ	3,56E+01	6,15E-02	5,62E-03	1,16E+02	8,43E-02	1,51E+02
WDP	m ³ eq. deprived	1,56E+00	2,61E-05	-6,15E-04	5,18E+00	2,11E-03	6,73E+00

Caption: **GWP-total** = Global Warming Potential – total; **GWP-fossil** = Global Warming Potential – fossil; **GWP-biogenic** = Global Warming Potential – biogenic; **GWP-luluc** = Global Warming Potential – land use and land use change; **ODP** = Ozone Depletion Potential; **AP** = Acidification Potential; **EP-freshwater** = Eutrophication potential, aquatic freshwater; **EP-marine** = Eutrophication potential, marine; **EP-terrestrial** = Eutrophication potential, terrestrial; **POCP** = Photochemical ozone formation; **ADP-min & met** = Depletion of abiotic resources – minerals and metals; **ADP-fossil** = Depletion of abiotic resources – fossil fuels; **WDP** = Water deprivation potential

Resource use for Zvei Probe with USB-C

Table 18. LCA results for the environmental parameters describing resource use

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
PERE	MJ	9,15E+00	2,14E-04	9,15E-05	4,01E+01	6,08E-03	4,93E+01
PERM	MJ	1,16E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,16E-01
PERT	MJ	9,27E+00	2,14E-04	9,15E-05	4,01E+01	6,08E-03	4,94E+01
PENRE	MJ	3,43E+01	6,15E-02	5,62E-03	1,16E+02	8,43E-02	1,50E+02
PENRM	MJ	1,26E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,26E+00
PENRT	MJ	3,56E+01	6,15E-02	5,62E-03	1,16E+02	8,43E-02	1,51E+02
MS	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	3,35E-02	1,58E-06	-1,17E-05	1,36E-01	7,56E-05	1,70E-01

Caption: **PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PERM** = Use of renewable primary energy resources used as raw material; **PERT** = Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; **PENRM** = Use of non-renewable primary energy resources used as raw material; **PENRT** = Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); **MS** = Use of secondary materials; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Net use of fresh water

Waste production for Zvei Probe with USB-C

Table 19. LCA results for the environmental parameters describing waste production

Parameters	Unit of measurement	Manufacturing	Distribution	Installation	Use	End of life	TOTAL
HWD	kg	8,05E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,05E-03
NHWD	kg	0,00E+00	0,00E+00	5,13E-03	0,00E+00	5,70E-02	6,21E-02
RWD	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	2,34E-02	0,00E+00	1,89E-02	0,00E+00	1,59E-02	5,82E-02
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,37E-03	9,37E-03
ETE	MJ	0,00E+00	0,00E+00	1,06E-01	0,00E+00	0,00E+00	1,06E-01
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Caption: **HWD** = Hazardous waste disposed; **NHWD** = Non-hazardous waste disposed; **RWD** = Radioactive waste disposed; **CRU** = Components for reuse; **MFR** = Material for recycling; **MER** = Materials for energy recovery; **ETE** = Exported thermal energy; **EEE** = Exported electricity energy

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