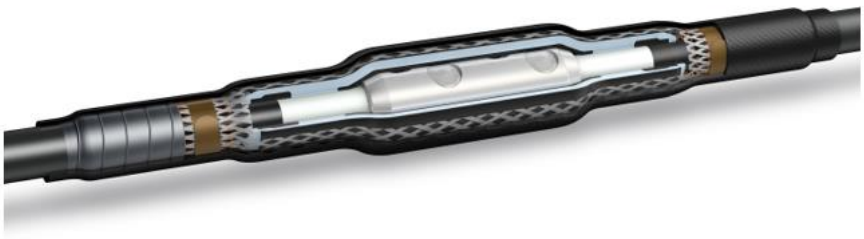
PRODUCT ENVIRONMENTAL PROFILE

Cold shrink Joint - CS8221-000



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Verifier accreditation number: VH26	**Information and reference documents:** www.pep-ecopassport.org
Date of issue: 07-2025	**Validity period:** 5 years
Independent verification of the declaration and data in compliance with ISO 14025:2006	
Internal: ☐	**External:** ☒
The PCR review was conducted by a panel of experts chaired by Julie ORGELET - DDemain	
PEPs are compliant with XP C08-100-1:2016 or EN 50693:2019 The components of the present PEP may not be compared with components from any other program.	
Document complies with ISO 14025:2006 “Environmental labels and declarations. Type III environmental declarations”	

1 GENERAL INFORMATION

PEP ECOPASSPORT® OWNER

Tyco Electronics Polska Sp. Z o.o. Plant, Kablowa 1, 70-895 Szczecin, Poland

REFERENCE PRODUCT

CSJA-24B/1XU-1XU-M: CS8221-000

DESCRIPTION OF THE PRODUCT

The CSJA Cold Shrink "All-In-One" Straight Joint is a medium-voltage cable accessory for polymeric insulated cables up to 42 kV. It combines the joint body, earthing system, and rejacketing into a single, pre-expanded holdout system, allowing fast, tool-free installation with minimal space requirements. Made of high-performance silicone rubber, the joint features integrated electrical stress control, factory-molded stress cones, and a Faraday cage for superior dielectric and shielding performance. Each kit includes a mechanical connector per IEC 61238-1 and covers a wide range of cable sizes and conductor types.

FUNCTIONAL UNIT

To connect together the power transmission cables, or connect them to equipment, for one unit and its packaging, under operating conditions identical to those of the cable, namely: 1 A during 30 years, with a use rate of 100%, according to the standards in force.

OTHER PRODUCTS COVERED

- CSJA-24C/1XU-1XU-M1: CS8298-000
- CSJA-24D/1XU-1XU-M: CS8236-000
- CSJA-24E/1XU-1XU-M2: CS8295-000

MARKET APPLICABILITY

Global

COMPANY REFERENCE CONTACT

Sustainability Analyst & LCA Specialist: Waleed Qatrameez – waleed.qatrameez@te.com
Sustainability Manager: Łukasz Sadowski – lukasz.sadowski@te.com

PLANTS LOCATION

Environmental impacts have been calculated for the TE Connectivity plants located in France, Germany and UK:

- Tyco Electronics UK Ltd. Freebournes Road, Witham, Essex, CM8 3AH
- Tyco Electronics Simel SAS, 1 Rue Paul Martin, 21220 Gevrey-Chambertin, France
- TE Connectivity – Tyco Electronics Raychem GmbH, Finsinger Feld 1 · 85521 Ottobrunn, Germany

SOFTWARE USED
iPoint Umberto 11 (version 11.15.2.0)

DATABASE
Ecoinvent 3.11 and Industry data

REFERENCE YEAR
The reference year used for primary data collection and processing is 2024

2 DESCRIPTION OF THE COMPANY

TE is an international group which has its core business in producing highly engineered connectivity, insulating and sensing products covering a large variety of purposes, from global communication infrastructures, utility networks, factories, smart homes and transport sector. For more than 75 years, TE has partnered with customers to produce highly engineered connectivity and sensing products. With approximately 80,000 employees in 107 manufacturing sites around the world, including more than 7,500 engineers, working alongside customers in approximately 140 countries, TE ensures that every connection counts. TE Connectivity consists of the following segments:

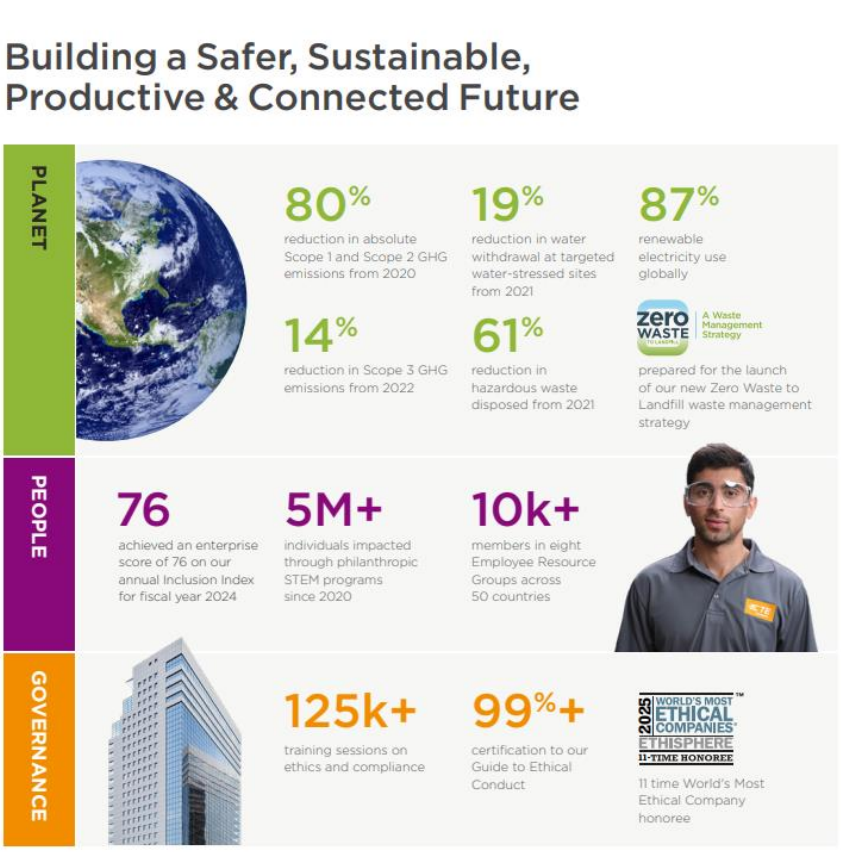
- THE TRANSPORTATION segment consists of: Automotive, Industrial & Commercial Transportation, Sensors, Application Tooling BU's.
- THE INDUSTRIAL segment consists of: Industrial, Aerospace, Defense & Marine, Medical, Energy BU's.
- THE COMMUNICATIONS segment consists of: Appliances, Data & Devices BU's

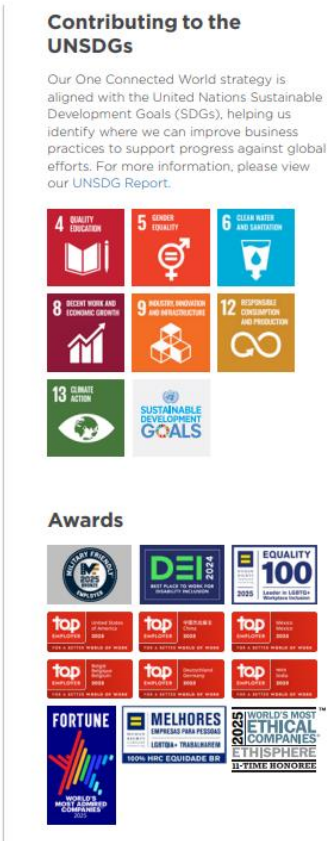
ENVIRONMENTAL POLICY AND ACTIONS

TE is committed in a sustainable management of its operations. This includes our ambitions to reduce our GHG emissions by more than 35 percent by 2030 (Scope 1 and Scope 2 emissions on a normalized basis), decreasing our waste disposed and helping 100 percent of our facilities in water-stressed regions meet water reduction targets.

All plants in Witham, Gevrey-Chambertin and Ottobrunn owns the following certifications:

- ISO 14001
- ISO 14064 for FY21 period (October 2020 - September 2021)





TE Connectivity Witham, Gevrey-Chambertin and Ottobrunn plants:

WITHAM

GEVREY-CHAMBERTIN

OTTOBRUNN

3 PRODUCT SPECIFICATIONS

The CSJA is a pre-expanded cold shrink joint for polymeric cables up to 42 kV, designed for fast, tool-free installation with minimal space requirements. Its silicone rubber body features integrated stress control, a Faraday cage, and requires no mastics. Supplied with an IEC 61238-1 compliant mechanical connector, it supports both mechanical and compression terminations. The system ensures reliable indoor and outdoor performance and exceeds CENELEC HD 629.1 standards.

Technical specifications of the product are reported in the following table:

Cable Insulation Diameter Range	18.9 – 30.1	mm
Connector Cross Section Range	35 – 185	mm^2
Maximum System Voltage	24	kV
Compatible Cable Cross-Section-Main (Max)	185	mm^2

Compatible Cable Cross-Section-Main (Min)	35	mm^2
Sheath Outside Diameter	26 – 41	mm

Total weight of product, packaging and additional elements, as well as the list of **constituent materials**, are provided in the following tables:

Total weight	Product	Packaging	Additional elements	Unit
1.399	0.990	0.409	0.0	Kg

Constituent materials	Plastic	11.50%
	Metals	12.90%
	Other	75.60%

4 MANUFACTURING PROCESS

The manufacturing process of the Cold Shrink Joint CSJA involves several coordinated stages across different TE facilities. In Gevrey, France, the cable lug, made of aluminium, is cast, machined to precise dimensions, and treated for corrosion resistance before being shipped to the Witham plant for assembly. In Ottobrunn, Germany, the CSJA joint body, made from liquid silicone rubber (LSR), is moulded using injection moulding technology and quality checked before being sent to Witham. At the Witham facility, the cable lug from Gevrey is manually greased and assembled with inserts and bolts. The CSJA body is then manually assembled with the pre-assembled lug, and the complete joint undergoes quality control. Finally, the product is packed with all required kit components, labelled, and prepared for shipment.

5 RESULTS

Environmental impacts are calculated considering a cradle-to-grave system boundary, including the following life cycle stages:

Manufacturing stage		Distribution stage	Installation stage	Use & maintenance stage	End-of-life stage
Upstream	**Core**	**Downstream**			

PRODUCT CATEGORY: Cold Shrink Joint for polymeric cables
INSTALLATION ELEMENTS: Steel elements-installation kit provided together with the product
USE SCENARIO: The product has no active function and electricity is negligible, as confirmed by the engineering department. However, a minimal consumption scenario is included for completeness and consistency with standardized assumptions, in line with PSR requirements.
GEOGRAPHICAL REPRESENTATIVENESS: European market with focus on Norwegian market
TEMPORAL REPRESENTATIVENESS: Publication of this PEP is not later than 2 years beyond time validity of Ecoinvent datasets chosen
TECHNOLOGICAL REPRESENTATIVENESS: Datasets chosen for modelling product's manufacturing process are representative of the actual production process
ENERGY DATASETS: Country-specific energy datasets for manufacturing processes are considered (UK, French and German)
Results are reported with the same number of significant figures for each impact indicator. Sums may not coincide with totals due to rounding.

ENVIRONMENTAL IMPACTS

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
GWP, t	kg CO_2 eq	5.37E+00	3.39E-01	1.56E-01	9.66E-04	1.41E+00	7.28E+00
GWP, f	kg CO_2 eq	6.34E+00	3.38E-01	6.65E-02	9.23E-04	1.41E+00	8.16E+00
GWP, b	kg CO_2 eq	-1.02E+00	2.14E-04	8.92E-02	4.26E-05	1.13E-03	-9.28E-01
GWP, luluc	kg CO_2 eq	4.15E-02	1.13E-04	6.52E-05	5.07E-07	9.35E-06	4.17E-02
AP	kg H+ eq	2.79E-02	1.15E-03	1.31E-04	3.18E-06	2.60E-04	2.95E-02
EPf	kg P eq	2.80E-03	2.30E-05	1.27E-05	2.48E-07	6.14E-06	2.84E-03
EPm	kg N eq	6.10E-03	3.80E-04	2.07E-04	8.57E-07	1.12E-04	6.80E-03
EPt	mol N eq	5.72E-02	4.14E-03	3.18E-04	9.27E-06	1.15E-03	6.29E-02
POCP	kg NMVOC eq	2.25E-02	1.69E-03	1.28E-04	2.92E-06	3.22E-04	2.46E-02
ODP	kg CFC-11 eq	7.77E-05	7.35E-09	4.38E-10	6.07E-12	6.61E-10	7.77E-05
ADPe	kg Sb eq	7.43E-05	1.16E-06	2.74E-07	6.67E-09	1.26E-07	7.59E-05

ADPf	MJ	1.11E+02	4.79E+00	4.29E-01	7.05E-03	3.94E-01	1.16E+02
WDP	m3 depriv.	6.59E+00	2.50E-02	1.39E-02	1.16E-01	7.71E-02	6.83E+00

GWP, t: Global Warming Potential total; GWP, f: Global Warming Potential fossil; GWP, b: Global Warming Potential biogenic; GWP, luluc: Global Warming Potential land use and land use change; GWP, GHG: Global Warming Potential irreversible; ODP: Depletion potential of the stratospheric ozone layer; AP: Acidification potential; EP, f: Eutrophication potential-freshwater; EP, m: Eutrophication potential-marine; EP, t: Eutrophication potential-terrestrial; POCP: Formation potential of tropospheric ozone; ADP, e: Abiotic Depletion for non-fossil resources potential; ADP, f: Abiotic Depletion for non-fossil resources potential, WDP: Water deprivation potential

USE OF RESOURCES

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
PERE	MJ	3.46E+01	7.77E-02	8.97E-02	3.80E-01	1.61E-02	3.52E+01
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.46E+01	7.77E-02	8.97E-02	3.80E-01	1.61E-02	3.52E+01
PENRE	MJ	1.11E+02	4.79E+00	4.29E-01	7.05E-03	3.94E-01	1.17E+02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.11E+02	4.79E+00	4.29E-01	7.05E-03	3.94E-01	1.17E+02
SM	kg	5.79E-01	2.14E-03	3.03E-04	2.72E-05	8.04E-04	5.83E-01
RSF	MJ	3.62E-01	2.80E-05	2.30E-06	6.45E-08	8.60E-06	3.62E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.53E-01	5.78E-04	-2.66E-04	2.71E-03	1.43E-03	1.57E-01

PERE: Renewable Primary Energy excluding Primary Energy used as raw material; PERM: Renewable Primary Energy used as raw material; PERT: Total use of Renewable Primary Energy; PENRE: Non-renewable Primary Energy excluding Primary Energy used as raw material; PENRM: Non-renewable Primary Energy used as raw material; PENRT: Total use of Non-renewable Primary Energy; SM: Use of secondary raw materials; RSF: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels; FW: Net use of fresh water.

OUTPUT FLOWS AND WASTE PRODUCTION

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
HWD	kg	5.51E-01	6.86E-03	2.00E-03	1.08E-04	2.43E-02	5.84E-01
NHWD	kg	1.68E+01	1.47E-01	7.69E-01	3.65E-03	8.57E-01	1.86E+01
RWD	kg	2.59E-04	1.40E-06	2.05E-06	1.30E-08	2.70E-07	2.63E-04
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

MFR	kg	1.17E-01	8.35E-05	3.92E-01	2.02E-05	5.58E-02	5.64E-01
MER	kg	7.56E-06	3.03E-07	4.04E-07	1.25E-09	2.11E-08	8.29E-06
EE	MJ	1.20E-01	2.09E-03	1.91E-03	1.36E-05	6.77E-02	1.92E-01

HWV: Hazardous waste disposed; NHWD: Non-hazardous waste disposed; RWD: Radioactive waste disposed; CRU: Components for re-use; MFR: Materials for recycling; MER: Materials for energy recovery; EEE: Exported energy – electricity; EET: Exported energy – thermal energy.

INVENTORY FLOW INDICATOR – OTHER INDICATORS

Impact category	Unit	Manufacturing	Distribution	Installation	Use	End of life	Total
Biogenic carbon content in product	Kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	Kg C	2.06E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-01

6 CALCULATION RULES

According to reference PCR the main activities are listed and divided in the following stages:

This declaration is a cradle to grave EPD type, based on the application of Life Cycle Assessment (LCA) methodology to the whole life-cycle system. In the whole LCA model, infrastructures and production equipment are not considered.

Customized LCA questionnaires were used to gather primary data about all aspects of the production system (for example manufacturing processes consumptions and efficiencies, waste management), to provide a complete picture of the environmental burden of the system from raw materials supply to final products delivery.

Allocation occurs anytime a system is producing more than a single output. In this case it is necessary to choose a technique to proper split the environmental burdens among the output flows; international standards ISO 14040 and 14044 provide guidelines about how to deal with this issue, that have been implemented in this project as well. Physical allocation - based on total production amount - was adopted to consistently assign plant data (electricity for services, gas and fuel consumption, water supply, waste treatment) and electricity production process data to the product under study.

Below the sub-phases considered in the analysis are reported, per each life cycle stage:

MANUFACTURING STAGE

- Elbow connector raw materials production
- Kit parts production
- Raw materials and kit components transportation to Gevrey plant
- Manufacturing processes from raw materials to semi-finished products at Gevrey plant
- Raw materials and kit components transportation to Ottobrunn plant
- Manufacturing processes from raw materials to semi-finished products at Ottobrunn plant
- Transportation to Witham plant
- Semi-finished product transportation from Gevrey and Ottobrunn to Witham plant
- Product kitting at Witham plant
- Witham, Gevrey and Ottobrunn plants services consumption
- Production of packaging materials for product delivery to customers
- Process waste transportation to treatment sites from Witham, Gevrey and Ottobrunn plants
- Treatment of process waste for Witham, Gevrey and Ottobrunn plants, according to indications provided by TE

DISTRIBUTION STAGE

- Product delivery to final customer, considering a specific scenario of transportation to Oslo (Norway) by truck and ferry

INSTALLATION STAGE [1]

- Transportation of waste product packaging to treatment site (50 km assumption)
- Treatment of waste product packaging, according to Norwegian scenarios

USE STAGE

- A minimal electricity consumption of 0.10 kWh over the reference service life was modeled in accordance with PSR requirements, ensuring completeness and consistency with standardized assumptions
- The background electricity supply uses Ecoinvent v3.11, dataset: Electricity, high voltage {NO}|electricity, high voltage, production mix | Cut-off, U

END-OF-LIFE STAGE

- Transportation of decommissioned product to treatment site (50 km assumption)
- Treatment of decommissioned product[2]

[1] The product on-site installation procedures were not considered in the LCA model, requiring no relevant inputs in terms of materials and energy.

[2] According to 2021 WEEE end-of-life scenarios, provided by Eurostat https://ec.europa.eu/eurostat/statistics_-_explained/index.php?title=Waste_statistics_-_electrical_and_electronic_equipment

7 EXTRAPOLATION FACTORS

The environmental impacts for the other three products covered by this PEP, which belong to the same product family as the reference product, can be derived from the reference product's results by applying proportionality rules based on the parameters listed in the following tables—one for each relevant life cycle stage. Since the installation phase involves only packaging waste treatment and is identical for all products, it does not vary. Similarly, the use phase does not vary, as energy consumption is negligible and consistent with the applicable Product Specific Rules (PSR) across all products. Therefore, extrapolation rules are provided only for the manufacturing, distribution, and end-of-life stages.

MANUFACTURING STAGE				
Impact category	**CS8221-000**	**CS8298-000**	**CS8236-000**	**CS8295-000**
GWP, t	1.00	2.25	2.31	3.07
GWP, f	1.00	2.03	2.10	2.73
GWP, b	1.00	0.92	0.94	0.90
GWP, luluc	1.00	1.77	2.65	3.11
AP	1.00	7.60	8.67	13.19
EPf	1.00	6.32	7.18	10.89
EPm	1.00	2.92	3.16	4.46
EPt	1.00	3.60	3.93	5.68
POCP	1.00	3.08	3.32	4.71
ODP	1.00	1.97	1.93	1.89
ADPe	1.00	29.88	34.19	54.24
ADPf	1.00	1.92	1.93	2.48
WDP	1.00	2.32	2.41	3.16
PERE	1.00	1.58	1.82	2.17
PERM	0.00	0.00	0.00	0.00
PERT	1.00	1.58	1.82	2.17

PENRE	1.00	1.93	1.93	2.48
PENRM	0.00	0.00	0.00	0.00
PENRT	1.00	1.93	1.93	2.48
SM	1.00	1.20	1.24	1.52
RSF	1.00	1.00	1.00	1.00
NRSF	0.00	0.00	0.00	0.00
FW	1.00	2.42	2.50	3.31
HWD	1.00	3.16	4.01	5.74
NHWD	1.00	4.56	5.09	7.68
RWD	1.00	1.90	2.25	2.78
CRU	0.00	0.00	0.00	0.00
MFR	1.00	1.09	1.10	1.16
MER	1.00	3.04	3.21	4.81
EE	1.00	2.11	1.75	2.37

DISTRIBUTION STAGE

Impact category	CS8221-000	CS8298-000	CS8236-000	CS8295-000
GWP, t	1.00	2.18	1.51	1.98
GWP, f	1.00	2.18	1.51	1.99
GWP, b	1.00	2.19	1.51	1.99
GWP, luluc	1.00	2.18	1.50	1.98
AP	1.00	2.17	1.50	1.98
EPf	1.00	2.18	1.51	1.99
EPm	1.00	2.18	1.51	1.98

EPt	1.00	2.18	1.51	1.98
POCP	1.00	2.18	1.51	1.98
ODP	1.00	2.18	1.51	1.99
ADPe	1.00	2.18	1.51	1.98
ADPf	1.00	2.19	1.51	1.99
WDP	1.00	2.18	1.52	1.99
PERE	1.00	2.19	1.52	1.98
PERM	0.00	0.00	0.00	0.00
PERT	1.00	2.19	1.52	1.98
PENRE	1.00	2.19	1.51	1.99
PENRM	0.00	0.00	0.00	0.00
PENRT	1.00	2.19	1.51	1.99
SM	1.00	2.18	1.51	1.99
RSF	1.00	2.18	1.51	1.98
NRSF	0.00	0.00	0.00	0.00
FW	1.00	2.18	1.51	1.99
HWD	1.00	2.19	1.52	1.98
NHWD	1.00	2.18	1.51	1.99
RWD	1.00	2.19	1.51	1.99
CRU	0.00	0.00	0.00	0.00
MFR	1.00	2.18	1.51	1.99
MER	1.00	2.18	1.51	1.98
EE	1.00	2.18	1.51	1.98

END-OF-LIFE STAGE				
Impact category	CS8221-000	CS8298-000	CS8236-000	CS8295-000
GWP, t	1.00	2.26	1.61	2.15
GWP, f	1.00	2.26	1.60	2.15
GWP, b	1.00	2.66	3.58	5.29
GWP, luluc	1.00	2.37	1.97	2.33
AP	1.00	2.34	1.87	2.32
EPf	1.00	2.21	1.82	2.43
EPm	1.00	2.35	1.89	2.31
EPt	1.00	2.36	1.89	2.33
POCP	1.00	2.38	1.93	2.35
ODP	1.00	2.42	2.01	2.33
ADPe	1.00	2.33	1.84	2.25
ADPf	1.00	2.46	2.09	2.40
WDP	1.00	2.27	1.65	2.20
PERE	1.00	2.35	1.86	2.35
PERM	0.00	0.00	0.00	0.00
PERT	1.00	2.35	1.86	2.35
PENRE	1.00	2.46	2.09	2.40
PENRM	0.00	0.00	0.00	0.00
PENRT	1.00	2.46	2.09	2.40
SM	1.00	2.64	3.37	4.88
RSF	1.00	2.40	1.99	2.65
NRSF	0.00	0.00	0.00	0.00

FW	1.00	2.29	1.66	2.22
HWD	1.00	2.25	1.60	2.16
NHWD	1.00	2.57	2.60	3.72
RWD	1.00	2.33	1.81	2.30
CRU	0.00	0.00	0.00	0.00
MFR	1.00	2.53	3.21	5.02
MER	1.00	2.38	2.01	2.35
EE	1.00	2.82	4.37	6.29