PEP Ecopassport®

Product Environmental Profile – Air-Cooled Magnetic Bearing Chillers Model TCA

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Product Environmental Profile - PEP Ecopassport.
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Company	Trane Technologies
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Company Description

Trane Technologies® is a world leader in heating and cooling systems, services, and solutions. Together with our brands, Trane® and Thermo King®, we bring efficient and sustainable climate innovations to buildings, homes, and transportation.

Trane helps customers succeed by providing innovative solutions that optimize indoor environments through a broad portfolio of energy-efficient heating, ventilating, and air conditioning systems, buildings, contracting and energy services, parts support, and advanced controls for homes and commercial buildings.

Trane serves engineers, contractors, and building owners on all continents and in an array of markets including education, healthcare, government, industrial/ manufacturing, data centers, lodging, retail, and commercial real estate. With more than 900 U.S. patents to date, Trane creates comfortable and energy-efficient environments around the world.

Trane systems and services have a reputation for reliability, high quality, and advanced innovation; and are available through a powerful distribution network. Trane employees and distributors are respected industry-wide for their skills and performance in designing, manufacturing, marketing, and supporting commercial and residential systems.

	Product Information
Reference Product	Air-Cooled Magnetic Bearing Chiller Model TCAA 330
Product Description	Trane Air-Cooled Magnetic Bearing Chillers are engineered to meet the escalating cooling demands of modern data centers. As next generation microprocessors drive increased rack density, efficient and high-capacity cooling solutions become essential. The Trane TCA chiller is designed to maximize cooling capacity per square foot, reduce installation costs, and minimize sound transmission. Leading the market in both full and part load energy efficiency, the TCA chiller is the optimal solution for today's data centers. **Maximize Space Efficiency** The TCA chiller offers exceptional cooling per square foot of unit footprint, often reducing the number of chillers needed onsite. This high-capacity unit rejects more heat per square foot, ensuring data centers operate efficiently and effectively. **Reduce Costs and Enhance Profitability** By replacing multiple chillers with a single, larger-capacity unit, the TCA chiller reduces overall installation costs and energy consumption. This leads to lower power demand and improved profitability, making it a cost-effective solution for data centers. **Minimize Sound, Maximize Uptime** Designed with low sound variable speed compressors and EC fans, the TCA chiller ensures quiet operation, ideal for sound-sensitive locations. The Rapid Restart™ feature guarantees that your system is back online swiftly after a power cycle event, ensuring minimal downtime and maximum reliability. **Specifications** • Capacity range: 100-850 tons • Refrigerant: R-515B or R-1234ze • Compressor Design: Mag-bearing Centrifugal • Controls: Advanced Intelligent Controls for Data Centers • Factory-Installed Optional Features: Harmonic filter, compressor assisted economizer, factory pumping packages
Functional Unit	To produce 1 kW of cooling, according to the appropriate usage scenario defined the AHRI 550/590 standard and during the 22-year reference lifetime of the product
Declared Unit	To produce cooling thanks to air-to-water cooling of 1055 kW according to the appropriate usage scenario and during the 22-year lifetime of the product. *Note: the mathematical relationship between the functional and declared unit is such that the declared unit divided by its capacity in kW equals the functional unit.*
Other Products Covered	List of other products covered in this PEP is presented in the section which concerned the extrapolation rules
Reference Lifetime*	22 Years

*Reference lifetime was defined as 22 years by the Product Category Rules which governed this analysis.

Technical Characteristics	
Data Point	**Air-Cooled Magnetic Bearing Chiller Model TCAA 330**
Product Category	Chiller
Chiller Technology	Air to water
Reversible or Non-reversible	Non-reversible
Cooling Capacity*	300 tons 1055 kW
IPLV*	0.592 kW/ton 5.94 kW/kW
Refrigerant Used	R-515B
Refill Threshold**	90%

*Capacity and IPLV at AHRI 550/590 conditions
**Refill threshold denotes the ratio of refrigerant (expressed as a %) at which a refill back up to the original charge takes place. Per the Product Category Rules, the refill threshold is considered 90% by default.

Constituent Materials >> Total weight of the reference product: 12,610 kg					
Plastics as % of weight		**Metals as % of weight**		**Others as % of weight**	
Product only: 12,610 kg					
Various plastics	0.1%	Steel	55.5%	Refrigerant	4.5%
		Copper	27.6%	Other miscellaneous	0.5%
		Cast Iron	5.7%		
		Other metals	6.1%		
Packaging only: 0 kg					
	0%		0%		0%
Total plastics	**0.1%**	**Total metals**	**94.9%**	**Total others**	**5.0%**

	Life Cycle Stages
Manufacturing	The manufacturing stage includes the production of raw and intermediate materials, as well as transportation to the manufacturer's last logistic platform for TCA chillers. The final assembly of the product is carried out at Trane's plant in Grand Rapids, Michigan, USA. As a member of SteelZero, Trane has pledged to procure, specify or stock 50% net-zero steel by 2030 and 100% net-zero steel by 2050. The main process steps for production include cutting, rolling, machining, brazing, welding, painting, sub- and final assemblies, and end-of-the-line testing.
Distribution	The transport from Trane's manufacturing facility to the customer was considered. The distance was calculated using averages for all shipped orders in 2025.
Installation	The installation stage includes diesel consumed by machinery used to move and place the product during installation.
Use	The use stage is conducted in alignment with the PSR, which models energy use of this air-cooled chiller associated with comfort cooling applications over its 22-year lifetime. The conditions outlined AHRI Standard 550/590 were used to set product capacity and efficiency. Refrigerant leak, replacement parts, and electricity usage are considered in this stage. Default refrigerant leak amounts from the PSR were used.
End of Life	The end-of-life stage includes transportation to the end-of-life facility of the disposal of product. End of life fates were modeled by material for the region where they are being disposed, in this case the United States.
Benefits and loads beyond the system boundaries	Throughout the life cycle of the product, net loads and benefits beyond system boundaries are included.

	Data Quality and Software
Geographical Representativeness	The geographical scope of this PEP across all life cycle stages (manufacturing, distribution, installation, customer use, and end of life) is North America (United States and Canada). Overall geographical representativeness is considered good.
Temporal Representativeness	Primary data was collected from 2025. Secondary data refers to the Ecoinvent database published in 2023. The temporal coverage for each secondary process used in the LCA model is specified in the documentation section of individual Ecoinvent datasets.
Technological Representativeness	Overall technology representativeness is considered good.
Software and Database Used	Sima Pro desktop 9.6.0.1 Ecoinvent Database Version 3.10

	Energy Model Used
Manufacturing	Manufacturing electricity considers the eGRID specific region from which the product is being manufactured in Ecoinvent's datasets (market for electricity, medium voltage {US-RFC}).
Distribution	No energy consumption occurs during the distribution stage.
Installation	No energy consumption occurs during the installation stage.
Use	Use stage electricity is modeled using an average North American grid mix dataset (market group for electricity, medium voltage {RNA}).
End of Life	No energy consumption occurs during the end-of-life stage.
Benefits and loads beyond the system boundaries	End of life benefits consider average North American electricity (market group for electricity, medium voltage {RNA}).

Environmental Impacts

EN 15804 + A2 Environmental Impact Indicators, per kW corresponding to the functional unit											
		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	End of Life C1-C4	Module D
Climate change - total	GWP	1.06E+03	kg CO_2 eq	7.09E+01	1.46E+00	8.30E-02	7.02E-02	2.71E-01	9.45E+02	4.12E+01	-1.24E+01
Climate change - fossil fuels	GWPf	1.05E+03	kg CO_2 eq	7.13E+01	1.46E+00	8.30E-02	7.02E-02	2.71E-01	9.37E+02	3.91E+01	-1.23E+01
Climate change - biogenics	GWPb	7.39E+00	kg CO_2 eq	-4.51E-01	1.71E-04	9.93E-06	0.00E+00	5.48E-05	5.74E+00	2.10E+00	-3.49E-02
Climate change - land use and land use transformation	GWPlu	2.91E+00	kg CO_2 eq	6.46E-02	4.22E-05	2.43E-06	0.00E+00	9.22E-06	2.85E+00	3.17E-04	-5.84E-02
Ozone depletion	ODP	4.30E-04	kg CFC-11 eq	4.25E-04	1.94E-08	1.12E-09	0.00E+00	4.16E-09	5.00E-06	3.41E-08	-8.63E-08
Acidification	AP	4.25E+00	mole of H+ eq	1.77E+00	3.84E-03	2.32E-04	0.00E+00	1.06E-03	2.47E+00	5.70E-03	-5.54E-01
Eutrophication, freshwater	Epf	7.51E-02	kg P eq	1.04E-02	3.57E-06	1.91E-07	0.00E+00	6.19E-07	6.46E-02	7.20E-05	-1.67E-03
Eutrophication, marine aquatic	Epm	4.97E-01	kg of N eq	1.18E-01	1.38E-03	8.65E-05	0.00E+00	4.27E-04	3.72E-01	4.38E-03	-2.40E-02
Eutrophication, terrestrial	Ept	5.82E+00	mole of N eq	1.59E+00	1.52E-02	9.48E-04	0.00E+00	4.73E-03	4.20E+00	1.94E-02	-3.29E-01
Photochemical ozone formation	POCP	2.21E+00	kg NMVOC eq	4.71E-01	5.73E-03	3.51E-04	0.00E+00	1.79E-03	1.73E+00	7.38E-03	-1.06E-01
Abiotic resource depletion – elements	ADPe	2.57E-02	kg Sb eq	2.56E-02	8.57E-08	4.74E-09	0.00E+00	1.59E-08	4.68E-05	2.24E-06	-7.24E-03
Abiotic resource depletion – fossil fuels	ADPf	1.87E+04	MJ	7.33E+02	1.93E+01	1.09E+00	0.00E+00	3.58E+00	1.79E+04	2.15E+01	-1.34E+02
Water use	WU	2.63E+02	m3 world eq	3.44E+01	1.78E-02	9.95E-04	0.00E+00	3.36E-03	2.29E+02	-3.83E-01	-9.14E+00

Note: characterization factors use the -1/+1 biogenic carbon storage assessment methodology

Inventory Flow Indicators, per kW corresponding to the functional unit											
		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	End of Life C1-C4	Module D
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	PERE	2.61E+03	MJ	1.19E+02	3.10E-02	1.81E-03	0.00E+00	7.64E-03	2.49E+03	3.75E-01	-4.03E+01
Use of renewable primary energy resources used as raw materials	PERM	1.90E+01	MJ	1.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	PERT	2.63E+03	MJ	1.38E+02	3.10E-02	1.81E-03	0.00E+00	7.64E-03	2.49E+03	3.75E-01	-4.03E+01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	PENRM	7.64E+00	MJ	7.64E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.20E-01
Use of non-renewable primary energy resources used as raw materials	PENRE	1.87E+04	MJ	7.33E+02	1.93E+01	1.09E+00	0.00E+00	3.58E+00	1.79E+04	2.15E+01	-1.34E+02
Total use of non-renewable primary energy resources	PENRT	1.87E+04	MJ	7.41E+02	1.93E+01	1.09E+00	0.00E+00	3.58E+00	1.79E+04	2.15E+01	-1.34E+02
Use of secondary materials	USM	5.22E+00	kg	5.22E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	URSF	0.00E+00	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	UNRSF	0.00E+00	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	NUFW	1.20E+01	m3	9.10E-01	6.48E-04	3.65E-05	0.00E+00	1.33E-04	1.11E+01	-8.25E-03	-3.02E-01
Hazardous waste disposed	HWD	6.51E-01	kg	1.18E-01	1.57E-04	8.82E-06	0.00E+00	3.04E-05	4.64E-01	6.86E-02	-2.19E-03
Non-hazardous waste disposed	NHWD	2.61E+01	kg	5.71E+00	8.01E-04	4.42E-05	0.00E+00	1.45E-04	8.90E+00	1.15E+01	-4.10E-01
Radioactive waste disposed	RWD	1.01E-01	kg	1.29E-03	6.94E-07	4.07E-08	0.00E+00	1.69E-07	9.98E-02	8.76E-06	-2.00E-04
Components for re-use	CRU	0.00E+00	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	1.19E+01	kg	3.59E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.28E+00	0.00E+00
Materials for energy recovery	MER	0.00E+00	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	EE	2.80E-01	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.80E-01	0.00E+00
Biogenic carbon content - product	BCC	0.00E+00	kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content - packaging	BCCP	0.00E+00	kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TRACI 2.1 Environmental Impact Indicators, per kW corresponding to the functional unit											
		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	End of Life C1-C4	Module D
Ozone depletion	OD	1.06E-05	kg CFC-11 eq	1.49E-07	1.18E-09	0.00E+00	4.41E-09	1.06E-05	0.00E+00	-8.65E-08	-2.18E-07
Global warming	GW	9.71E+02	kg CO2 eq	1.38E+01	8.20E-02	6.56E-02	2.67E-01	9.31E+02	3.41E+01	-8.39E+00	-2.15E+01
Smog	SG	2.23E+01	kg O3 eq	4.18E-01	5.50E-03	1.63E-05	2.75E-02	2.32E+01	8.47E-03	-1.37E+00	-3.20E+00
Acidification	A	1.69E+00	kg SO2 eq	1.96E-02	2.09E-04	0.00E+00	9.65E-04	2.09E+00	0.00E+00	-4.26E-01	-1.04E+00
Eutrophication	E	5.12E-01	kg N eq	2.77E-03	1.42E-05	0.00E+00	6.32E-05	5.22E-01	0.00E+00	-1.23E-02	-3.79E-02
Carcinogenics	C	1.46E-06	CTUh	1.83E-08	6.22E-11	5.78E-13	4.51E-10	2.54E-06	3.00E-10	-1.10E-06	-2.55E-06
Non carcinogenics	NC	2.68E-07	CTUh	1.36E-06	1.20E-08	2.10E-13	6.73E-09	3.75E-05	1.09E-10	-3.86E-05	-9.87E-05
Respiratory effects	RE	1.41E+00	kg PM2.5 eq	3.80E-03	3.34E-05	0.00E+00	1.30E-04	1.45E+00	0.00E+00	-4.84E-02	-1.15E-01
Ecotoxicity	EX	6.92E+01	CTUe	1.73E+01	2.49E-01	0.00E+00	5.90E-02	1.33E+02	0.00E+00	-8.15E+01	-1.96E+02
Fossil fuel depletion	FFD	1.13E+03	MJ surplus	1.26E+01	1.54E-01	0.00E+00	5.06E-01	1.12E+03	0.00E+00	-6.55E+00	-1.73E+01

EN 15804 + A2 Environmental Impact Indicators, per device corresponding to the reference product											
		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	End of Life C1-C4	Module D
Climate change - total	GWP	1.12E+06	kg CO_2 eq	7.48E+04	1.55E+03	8.76E+01	7.41E+01	2.85E+02	9.97E+05	4.34E+04	-1.31E+04
Climate change - fossil fuels	GWPf	1.11E+06	kg CO_2 eq	7.52E+04	1.55E+03	8.76E+01	7.41E+01	2.85E+02	9.88E+05	4.12E+04	-1.30E+04
Climate change - biogenics	GWPb	7.80E+03	kg CO_2 eq	-4.76E+02	1.80E-01	1.05E-02	0.00E+00	5.78E-02	6.06E+03	2.21E+03	-3.69E+01
Climate change - land use and land use transformation	GWPlu	3.07E+03	kg CO_2 eq	6.82E+01	4.45E-02	2.56E-03	0.00E+00	9.73E-03	3.00E+03	3.35E-01	-6.16E+01
Ozone depletion	ODP	4.53E-01	kg CFC-11 eq	4.48E-01	2.05E-05	1.18E-06	0.00E+00	4.39E-06	5.27E-03	3.60E-05	-9.10E-05
Acidification	AP	4.49E+03	mole of H+ eq	1.87E+03	4.06E+00	2.45E-01	0.00E+00	1.12E+00	2.60E+03	6.01E+00	-5.84E+02
Eutrophication, freshwater	Epf	7.92E+01	kg P eq	1.10E+01	3.77E-03	2.02E-04	0.00E+00	6.53E-04	6.81E+01	7.60E-02	-1.76E+00
Eutrophication, marine aquatic	Epm	5.24E+02	kg of N eq	1.24E+02	1.46E+00	9.12E-02	0.00E+00	4.50E-01	3.93E+02	4.63E+00	-2.53E+01
Eutrophication, terrestrial	Ept	6.14E+03	mole of N eq	1.68E+03	1.60E+01	1.00E+00	0.00E+00	4.99E+00	4.43E+03	2.04E+01	-3.47E+02
Photochemical ozone formation	POCP	2.33E+03	kg NMVOC eq	4.97E+02	6.05E+00	3.70E-01	0.00E+00	1.89E+00	1.82E+03	7.79E+00	-1.12E+02
Abiotic resource depletion – elements	ADPe	2.71E+01	kg Sb eq	2.70E+01	9.04E-05	5.00E-06	0.00E+00	1.68E-05	4.94E-02	2.36E-03	-7.64E+00
Abiotic resource depletion – fossil fuels	ADPf	1.97E+07	MJ	7.73E+05	2.03E+04	1.15E+03	0.00E+00	3.78E+03	1.89E+07	2.26E+04	-1.42E+05
Water use	WU	2.77E+05	m3 world eq	3.63E+04	1.88E+01	1.05E+00	0.00E+00	3.54E+00	2.41E+05	-4.04E+02	-9.64E+03

Note: characterization factors use the -1/+1 biogenic carbon storage assessment methodology

Inventory Flow Indicators, per device corresponding to the reference product											
		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	End of Life C1-C4	Module D
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	PERE	2.75E+06	MJ	1.25E+05	3.27E+01	1.91E+00	0.00E+00	8.06E+00	2.63E+06	3.96E+02	-4.25E+04
Use of renewable primary energy resources used as raw materials	PERM	2.01E+04	MJ	2.01E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	PERT	2.77E+06	MJ	1.45E+05	3.27E+01	1.91E+00	0.00E+00	8.06E+00	2.63E+06	3.96E+02	-4.25E+04
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	PENRM	8.06E+03	MJ	8.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.26E+02
Use of non-renewable primary energy resources used as raw materials	PENRE	1.97E+07	MJ	7.73E+05	2.03E+04	1.15E+03	0.00E+00	3.78E+03	1.89E+07	2.26E+04	-1.42E+05
Total use of non-renewable primary energy resources	PENRT	1.97E+07	MJ	7.81E+05	2.03E+04	1.15E+03	0.00E+00	3.78E+03	1.89E+07	2.26E+04	-1.42E+05
Use of secondary materials	USM	5.51E+03	kg	5.51E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	URSF	0.00E+00	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	UNRSF	0.00E+00	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	NUFW	1.27E+04	m3	9.60E+02	6.84E-01	3.85E-02	0.00E+00	1.41E-01	1.17E+04	-8.70E+00	-3.19E+02
Hazardous waste disposed	HWD	6.87E+02	kg	1.25E+02	1.65E-01	9.31E-03	0.00E+00	3.21E-02	4.90E+02	7.24E+01	-2.32E+00
Non-hazardous waste disposed	NHWD	2.76E+04	kg	6.03E+03	8.45E-01	4.66E-02	0.00E+00	1.53E-01	9.39E+03	1.21E+04	-4.32E+02
Radioactive waste disposed	RWD	1.07E+02	kg	1.36E+00	7.32E-04	4.29E-05	0.00E+00	1.78E-04	1.05E+02	9.24E-03	-2.11E-01
Components for re-use	CRU	0.00E+00	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	MFR	1.25E+04	kg	3.79E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.74E+03	0.00E+00
Materials for energy recovery	MER	0.00E+00	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	EE	2.95E+02	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E+02	0.00E+00
Biogenic carbon content - product	BCC	0.00E+00	kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content - packaging	BCCP	0.00E+00	kg C	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TRACI 2.1 Environmental Impact Indicators, per device corresponding to the reference product											
		Total Life Cycle Impacts (Excluding Module D)		Manufacturing A1-A3	Distribution A4	Installation A5	Use B1	Maintenance B2	Operational Energy Use B6	End of Life C1-C4	Module D
Ozone depletion	OD	1.12E-02	kg CFC-11 eq	1.58E-04	1.25E-06	0.00E+00	4.65E-06	1.11E-02	0.00E+00	-9.12E-05	-2.30E-04
Global warming	GW	1.02E+06	kg CO2 eq	1.45E+04	8.66E+01	6.92E+01	2.82E+02	9.82E+05	3.60E+04	-8.85E+03	-2.27E+04
Smog	SG	2.35E+04	kg O3 eq	4.41E+02	5.81E+00	1.72E-02	2.90E+01	2.45E+04	8.93E+00	-1.44E+03	-3.38E+03
Acidification	A	1.78E+03	kg SO2 eq	2.07E+01	2.21E-01	0.00E+00	1.02E+00	2.21E+03	0.00E+00	-4.49E+02	-1.10E+03
Eutrophication	E	5.40E+02	kg N eq	2.92E+00	1.50E-02	0.00E+00	6.67E-02	5.50E+02	0.00E+00	-1.30E+01	-4.00E+01
Carcinogenics	C	1.54E-03	CTUh	1.93E-05	6.56E-08	6.10E-10	4.76E-07	2.68E-03	3.17E-07	-1.16E-03	-2.69E-03
Non carcinogenics	NC	2.82E-04	CTUh	1.43E-03	1.27E-05	2.22E-10	7.10E-06	3.96E-02	1.15E-07	-4.08E-02	-1.04E-01
Respiratory effects	RE	1.48E+03	kg PM2.5 eq	4.01E+00	3.52E-02	0.00E+00	1.37E-01	1.53E+03	0.00E+00	-5.10E+01	-1.21E+02
Ecotoxicity	EX	7.30E+04	CTUe	1.83E+04	2.62E+02	0.00E+00	6.23E+01	1.40E+05	0.00E+00	-8.60E+04	-2.07E+05
Fossil fuel depletion	FFD	1.19E+06	MJ surplus	1.33E+04	1.63E+02	0.00E+00	5.33E+02	1.19E+06	0.00E+00	-6.91E+03	-1.82E+04

Extrapolation Factors

TCA products are part of a homogenous family of Trane chillers. Additional products covered by this PEP are detailed below, with the reference product denoted in blue.

TCAA 220
TCAA 330
TCAB 570

For products other than the reference product, the environmental impacts can be calculated using the extrapolation rules below. The following tables contain factors to be used in the extrapolation of LCIA results for the TCA Chillers covered in this report. These scaling factors are intended to allow interested parties to determine the environmental impacts of TCA products of interest.

Extrapolation coefficients are given for the environmental impact of the functional unit, i.e. the emission of 1 kW cooling power. For each stage of the life cycle, the environmental impacts of the product concerned are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient. The "Total" column should be calculated by adding the environmental impacts of each stage of the life cycle.

To use these scaling factors, individuals should:

1. Identify the LCIA result of interest and product of interest.
2. Multiply the results in the reference product's environmental impact indicator table, found on page 4-7, by the corresponding cell in the table that pertains to the product of interest, found below.

	Extrapolation Factors – Declared Unit								Extrapolation Factors – Functional Unit							
Product	A1-A3	A4	A5	B1	B2	B6	C1-C4	D	A1-A3	A4	A5	B1	B2	B6	C1-C4	D
TCAA 220	1.00	1.00	1.00	1.00	1.00	0.82	1.00	1.00	1.16	1.16	1.16	1.16	1.16	0.95	1.16	1.16
TCAA 330	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
TCAB 570	1.22	1.22	1.00	1.00	1.00	1.50	1.22	1.22	0.83	0.83	0.68	0.68	0.68	1.02	0.83	0.83

Comparability

EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows PEP comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.

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