

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

LIYCY 2x0,75 mm²







The Norwegian EPD Foundation

Owner of the declaration:

Elektroskandia Norge AS

Product:

LIYCY 2x0,75 mm²

Declared unit:

1 m

This declaration is based on Product Category Rules: CEN Standard EN 15804:2012+A2:2019 serves as core

PCR

NPCR 027:2020 Part B for Electrical cables and wires

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-5069-4356-EN

Registration number:

NEPD-5069-4356-EN

Issue date:

27.09.2023

Valid to:

27.09.2028

EPD Software:

LCA.no EPD generator ID: 73508



General information

Product

LIYCY 2x0,75 mm²

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway The Norwegian EPD Foundation Phone: +47 23 08 80 00 web: post@epd-norge.no

Declaration number:

NEPD-5069-4356-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR NPCR 027:2020 Part B for Electrical cables and wires

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 m LIYCY 2x0,75 mm²

Declared unit with option:

A1,A2,A3,A4,A5,C1,C2,C3,C4,D

Functional unit:

1 m installed electrical cables, including waste treatment at end-of-life

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools. Approval number: NEPDT32.

Third party verifier:

Owner of the declaration:

Elektroskandia Norge AS Contact person: Pål Kristiansen Phone: +47 97 66 22 12 e-mail: pkr@elektroskandia.no

Manufacturer:

Elis Elektro AS Jerikoveien 16 1067 Oslo, Norway

Place of production:

Kabeltec GMBH Werkstr. 43 78727 Oberndorf, Germany

Management system:

ISO 14001, ISO 9001

Organisation no:

977 454 700

Issue date:

27.09.2023

Valid to:

27.09.2028

Year of study:

2020

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway. Approval number:

Developer of EPD: Nanna Wister - Elis Elektro AS

Reviewer of company-specific input data and EPD: Stig Linneberg - Elis Elektro AS

Approved:

Håkon Hauan

Managing Director of EPD-Norway

Vito D'Incognito - Take Care International (no signature required)



Product

Product description:

LIYCY to be used as junction or connecting cables in control, measuring, and signalling technology as well as in data processing and office technology for lossless transmission of data and signals. The tight copper screening provides optimum protection against external electrical interference. Suitable for use in dry and humid rooms. For fixed laying and flexible applications with undefined cable routing and without tensile stress. Good chemical resistance, largely oil resistant.

Product specification

General: Factory Standard

Materials	kg	%
Metal - Copper	0,04	71,70
Plastic - Polyvinyl chloride (PVC)	0,02	28,30
Total	0,05	

Technical data:

Construction standards: Factory Standard.

Fine strands of bare copper conductor, stranding acc. to VDE 0295 class 5. PVC core insulation, colored cores acc. to DIN 47100 for cross sections from 0,14 to 0,75 mm².

Black cores with continuous figure imprint in white from cross sections 1,0 to 10,0 mm².

Overall screen of tinned cooper wires, cores twisted into layers, foil wrapping. PVC outer sheath grey, RAL 7001 or RAL 7032

Conductor Material: Copper, bare

Conductor class: Class 5 acc. to DIN VDE 0295 or IEC 60228

Core insulation: Thermoplastic PVC

Core identification: Cross sections from 0,14 to 0,75 mm² coloured cores acc. to DIN 47100 From 1,0 to 10 mm². Black cores with continuous

figure imprint in white

Construction: Stranding cores revolved into layers

Outer sheath: PVC

Sheath colour: Grey (RAL 7001 or RAL 7035)

Rated voltage[V]: 300/500 Testing voltage[V]: 1200/1500

Conductor resistance: according to DIN VDE 0295, IEC 60228

Insulation resistance: 20 Megaohms x km

Min. bending radius fixed [xd]: $12 \text{ mm } 5 \times d$ until $20 \text{ mm } 7.5 \times d > 20 \text{ mm}: 10$ Min. bending radius moved [xd]: $12 \text{ mm } 10 \times d$ until $20 \text{ mm } 15 \times d > 20 \text{ mm}: 20$

Working temp fixed min/max [C]: -30 °C up to +80 °C Working temp moved min/mac [C]: -15 °C up to +70 °C

Burning behaviour IEC 60332-1: self-extinguishing and flame-retardant

Approvals: based on VDE 0812

Temp at conductor max. +70 °C in operation, +160 °C in case of short-circuit

CPR: EN 50575 compliance ECA, No.DOP/229/BW/17/K

Market:

Norway

Reference service life, product

40 years. Standard lifetime for energy distribution network applications, provided in appendix 1 of PSR for wires, cables, and accessories of PEP Ecopassport.

Reference service life, building or construction works

40 years. Estimation made to match the product service life and keep the EPD environmental impact calculations at the product level.

LCA: Calculation rules

Declared unit:

1 m LIYCY 2x0,75 mm²

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation



The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Metal - Copper	ecoinvent 3.6	Database	2019
Plastic - Polyvinyl chloride (PVC)	ecoinvent 3.6	Database	2019

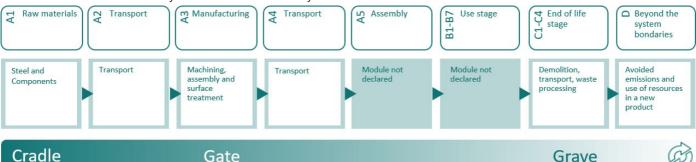


System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Р	roduct sta	ge		uction on stage	Use stage End of life stage Bey			End of life stage			Beyond the system boundaries					
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De- construction demolition	Transport	Waste	Disposal	Reuse-Recovery- Recycling-potential
A1	A2	A3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
Х	Χ	Χ	Χ	Χ	MND	MND	MND	MND	MND	MND	MND	Χ	Χ	Χ	Χ	X

System boundary:

The flowchart below illustrates the system boundaries of the analysis:



Additional technical information:

From a production volume perspective, article LIYCY Liycy 2x0,75 mm² (1001643) represents the maximum energy consumption from the most common product articles.

Range includes LIYCY cables from 0,14 mm² to 1,5 mm²

For more information and dimensions, see our webpage:

https://eliselektro.no/produkt/liycy/



LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Module A4 = In A4, a transport distance of 3992 km from the production site to Elektroskandia's warehouse in Langhus was included. A distance of 300 km was also added as additional transport to market.

Modules A5 = 2 % product losses during installation are estimated by the company. No energy use has been quantified since installation in buildings is often done by manual labour. Use of portable electrical devices (e.g., drill) usually have low energy requirements falling under the cut-off criterion of 1%.

Module C1 = de-construction in buildings is often done by manual labour. Use of portable electrical devices (e.g., drill) usually have low energy requirements falling under the cut-off criterion of 1%.

Module C2 = 85 km is added as default transport to waste treatment in C2.

Modules C3 and C4 = Waste treatment of the product follows the default values provided in EN 50693, Product Category Rules for life cycle assessments of electronic and electrical products and systems, table G.4. This table specified how different types of raw materials used in A1 will likely be treated during the end-of-life of the product. Waste treatments in C3 include material recycling and incineration with and without energy recovery and fly ash extraction. Disposal in C4 consist of landfilling of different waste fractions and of ashes.

Module D = The recyclability of metals and plastics allows the producers a credit for the net scrap that is produced at the end of a product's life. The benefits from recycling of net scrap are described in formula from EN 15804:2012+A2:2019. Substitution of heat and electricity generated by the incineration with energy recovery of plastics is also calculated in module D.

the incineration with energy recovery of plas	tics is also calculated i	n module D.			
Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 5 (kgkm) - RER	36,7 %	4292	0,044	l/tkm	188,85
Assembly (A5)	Unit	Value			
Product loss during installation (percentage of cable)	Units/DU	0,02			
Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	85	0,043	l/tkm	3,66
Waste processing (C3)	Unit	Value			
Copper to recycling (kg)	kg	0,02			
Waste treatment of polyvinylchloride (PVC), incineration with energy recovery and fly ash extraction (kg)	kg	0,01			
Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Polyvinylchloride (PVC), process per kg ashes and residues (kg)	kg	0,00			
Landfilling of copper (kg)	kg	0,02			
Landfilling of plastic mixture (kg)	kg	0,01			
Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity, in Norway (MJ)	MJ	0,01			
Substitution of primary copper with net scrap (kg)	kg	0,01			
Substitution of thermal energy, district heating, in Norway (MJ)	МЛ	0,12			



LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Envir	Environmental impact											
	Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	GWP-total	kg CO ₂ - eq	3,64E-01	2,76E-02	7,20E-03	3,79E-02	9,39E-03	0	7,36E-04	1,50E-02	1,36E-03	-3,46E-02
	GWP-fossil	kg CO ₂ - eq	3,56E-01	2,76E-02	7,20E-03	3,79E-02	9,23E-03	0	7,36E-04	1,50E-02	1,36E-03	-3,44E-02
	GWP-biogenic	kg CO ₂ - eq	7,84E-03	1,14E-05	1,18E-06	1,55E-05	1,58E-04	0	3,05E-07	6,12E-06	2,13E-07	-1,58E-04
	GWP-luluc	kg CO ₂ - eq	3,08E-04	9,83E-06	2,69E-07	1,33E-05	6,69E-06	0	2,62E-07	1,17E-06	1,36E-07	-5,88E-05
٥	ODP	kg CFC11 - eq	3,69E-08	6,26E-09	9,76E-10	8,64E-09	1,08E-09	0	1,67E-10	4,94E-10	1,02E-10	-4,90E-05
	AP	mol H+ -eq	3,34E-02	7,94E-05	5,85E-06	1,55E-04	6,74E-04	0	2,11E-06	8,69E-06	3,06E-06	-5,67E-03
-	EP-FreshWater	kg P -eq	3,28E-04	2,21E-07	9,82E-09	2,98E-07	6,56E-06	0	5,88E-09	4,42E-08	8,77E-09	-3,83E-05
4	EP-Marine	kg N -eq	1,12E-03	1,57E-05	1,64E-06	4,60E-05	2,38E-05	0	4,18E-07	2,12E-06	1,93E-06	-2,35E-04
4	EP-Terrestial	mol N - eq	1,60E-02	1,76E-04	1,80E-05	5,08E-04	3,35E-04	0	4,68E-06	2,27E-05	1,18E-05	-3,63E-03
	POCP	kg NMVOC -eq	5,06E-03	6,73E-05	6,13E-06	1,56E-04	1,06E-04	0	1,79E-06	6,44E-06	3,48E-06	-9,86E-04
	ADP- minerals&metals ¹	kg Sb - eq	9,48E-05	7,63E-07	2,85E-09	1,03E-06	1,93E-06	0	2,03E-08	3,17E-08	3,12E-09	-3,18E-05
	ADP-fossil ¹	MJ	4,53E+00	4,18E-01	1,10E-01	5,72E-01	1,14E-01	0	1,11E-02	1,98E-02	8,51E-03	-3,11E-01
<u>%</u>	WDP ¹	m ³	2,55E+00	4,04E-01	1,92E-02	5,45E-01	9,23E-02	0	1,08E-02	4,04E-01	1,75E-01	1,73E+00

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment: EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

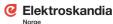
Remarks to environmental impacts

[&]quot;Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"

^{*}INA Indicator Not Assessed

^{1.} The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator





Addi	Additional environmental impact indicators											
Ind	licator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PM	Disease incidence	6,01E-08	1,69E-09	2,30E-11	2,73E-09	1,30E-09	0	4,50E-11	5,60E-11	4,80E-11	-1,17E-08
	IRP ²	kgBq U235 -eq	9,72E-03	1,83E-03	5,01E-05	2,50E-03	2,88E-04	0	4,86E-05	9,61E-05	5,14E-05	-4,36E-04
	ETP-fw ¹	CTUe	2,53E+02	3,10E-01	6,29E-03	4,21E-01	5,34E+00	0	8,25E-03	9,48E-01	9,42E+00	-5,22E+01
44. ****	HTP-c ¹	CTUh	6,07E-09	0,00E+00	1,00E-12	0,00E+00	1,22E-10	0	0,00E+00	2,00E-12	0,00E+00	-7,37E-10
8 B	HTP-nc ¹	CTUh	5,39E-07	3,38E-10	7,00E-12	4,55E-10	1,08E-08	0	9,00E-12	2,23E-10	1,90E-11	-6,31E-08
	SQP ¹	dimensionless	3,31E+00	2,92E-01	1,98E-03	3,94E-01	8,10E-02	0	7,78E-03	7,20E-03	2,09E-02	-7,26E-01

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

[&]quot;Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"

^{*}INA Indicator Not Assessed

^{1.} The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

^{2.} This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.



Resource	Resource use											
Ind	licator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	PERE	MJ	5,73E-01	5,98E-03	3,51E-04	8,07E-03	1,19E-02	0	1,59E-04	2,52E-03	9,40E-04	-1,80E-01
4	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00
₽ Ç	PERT	MJ	5,73E-01	5,98E-03	3,51E-04	8,07E-03	1,19E-02	0	1,59E-04	2,52E-03	9,40E-04	-1,80E-01
	PENRE	MJ	4,19E+00	4,18E-01	1,10E-01	5,72E-01	1,07E-01	0	1,11E-02	1,98E-02	8,51E-03	-3,11E-01
Åe e	PENRM	MJ	3,39E-01	0,00E+00	0,00E+00	0,00E+00	6,78E-03	0	0,00E+00	-3,23E-01	0,00E+00	0,00E+00
fA.	PENRT	MJ	4,53E+00	4,18E-01	1,10E-01	5,72E-01	1,14E-01	0	1,11E-02	-3,03E-01	8,51E-03	-3,11E-01
	SM	kg	9,29E-03	0,00E+00	0,00E+00	0,00E+00	1,88E-04	0	0,00E+00	0,00E+00	7,67E-05	9,88E-03
2	RSF	MJ	4,83E-03	2,14E-04	1,82E-05	2,89E-04	1,10E-04	0	5,70E-06	4,56E-05	2,01E-05	9,29E-04
<u>M</u>	NRSF	MJ	6,21E-03	7,65E-04	2,49E-05	1,03E-03	1,63E-04	0	2,04E-05	0,00E+00	2,15E-05	-1,50E-03
&	FW	m ³	6,09E-03	4,47E-05	2,64E-06	6,02E-05	1,43E-04	0	1,19E-06	4,73E-04	1,04E-05	-8,97E-04

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources; SM = Use of secondary materials; PENRM = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009" *INA Indicator Not Assessed





End of li	fe - Waste											
Ind	licator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
	HWD	kg	3,85E-03	2,15E-05	4,19E-06	2,92E-05	1,01E-04	0	5,74E-07	0,00E+00	6,77E-04	-3,83E-04
Ū	NHWD	kg	1,01E-01	2,03E-02	1,95E-03	2,73E-02	3,50E-03	0	5,41E-04	0,00E+00	2,40E-02	-1,65E-02
8	RWD	kg	9,46E-06	2,84E-06	7,00E-08	3,90E-06	3,28E-07	0	7,58E-08	0,00E+00	5,06E-08	-3,89E-07

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009" *INA Indicator Not Assessed

End of life	End of life - Output flow												
Indica	tor	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D	
@ D	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
\$\	MFR	kg	0,00E+00	0,00E+00	2,51E-03	0,00E+00	1,19E-03	0	0,00E+00	2,28E-02	8,14E-07	-3,87E-04	
D₹	MER	kg	0,00E+00	0,00E+00	1,51E-09	0,00E+00	3,00E-04	0	0,00E+00	7,50E-03	1,94E-06	-5,09E-05	
50	EEE	MJ	0,00E+00	0,00E+00	2,10E-04	0,00E+00	3,12E-04	0	0,00E+00	7,67E-03	1,81E-05	-1,25E-04	
DB	EET	MJ	0,00E+00	0,00E+00	3,17E-03	0,00E+00	4,71E-03	0	0,00E+00	1,16E-01	2,74E-04	-1,89E-03	

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009" *INA Indicator Not Assessed

Biogenic Carbon Content											
Unit	At the factory gate										
kg C	0,00E+00										
kg C	0,00E+00										
	kg C										

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2



Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Dangerous substances

The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

Indoor environment

Additional Environmental Information

Additional e	Additional environmental impact indicators required in NPCR Part A for construction products											
Indicator	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D	
GWPIOBC	kg CO ₂ -eq	3,64E-01	2,76E-02	6,73E-03	3,79E-02	9,37E-03	0	7,36E-04	1,51E-02	5,59E-04	-1,67E-02	

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.



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EPD Norway (2022). NPCR 027 Part B for electrical cables and wires. The Norwagian EPD foundation. Version 2.0 published 01.03.2022.

	Program operator and publisher	Phone:	+47 23 08 80 00
© epd-norway	The Norwegian EPD Foundation	e-mail:	post@epd-norge.no
Global Program Operator	Post Box 5250 Majorstuen, 0303 Oslo, Norway	web:	www.epd-norge.no
onninen⊾	Owner of the declaration:	Phone:	+47 97 66 22 12
☑ Elektroskandia	Elektroskandia Norge AS	e-mail:	pkr@elektroskandia.no
Norge Norge	Postboks 143, 1403 Langhus	web:	elektroskandia.no
	Author of the Life Cycle Assessment	Phone:	+47 916 50 916
(LCA)	LCA.no AS	e-mail:	post@lca.no
	Dokka 6B, 1671	web:	www.lca.no
	Developer of EPD generator	Phone:	+47 916 50 916
(LCA)	LCA.no AS	e-mail:	post@lca.no
	Dokka 6B,1671 Kråkerøy	web:	www.lca.no
ECO PLATFORM	ECO Platform	web:	www.eco-platform.org
VERIFIED	ECO Portal	web:	ECO Portal
- CRITIED			