# Product Environmental Profile

# MX pro

From 22 to 75 kW (400V) 2.2 to 75 kW (690V)









## Product Environmental Profile - PEP

#### **Product Overview**

The MX pro range is primarily intended for the control and variation of the rotational speed of an asynchronous or synchronous electric motor.

This range comprises products with ratings from 22 to 75 kW for operation on 400 V 3-phases supplies and from 2.2 to 75 kW for operation on 690 V 3-phases supplies.

The product used for the study is the MX pro with a 22 kW, 400 V rating (ref. ELNMP4D22AAB).

It is representative of the entire range. The same technology and manufacturing process is used for other products within the range.

The environmental analysis has been performed in conformity with standard ISO 14040 "Environmental management: life cycle assessment, principle and framework". It takes into account the life cycle stages of the product.

#### **Constituent material**



Manufacturing

This range is manufactured on a Schneider Electric production site operating to an ISO 14001 certified environmental management system.

Constant process improvement enables reduction by an average 5 % of annual energy consumption of the site.

Complete waste sorting enables achievement of a recovery rate of 99 %.

#### Distribution

Packaging has been designed with a view to reducing its weight and volume, respecting packaging directive 94/62/EC of the European Union.

Total weight of packaging is 8,330 kg, mainly comprising cardboard and a wooden pallet.

No wedging foam or staples are used.

Product distribution flows are optimised by location of local distribution centres in close proximity to market areas.

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Utilization

	Products of MX pro – 2.2 to 75 kW range present no environmental stress requiring particular use precautions (noise, emissions, etc.).			
	Electrical energy consumed depends on product installation and use conditions.			
	Power consumed varies from 115 to 2320 W. It is 980 W for the MX pro - 22 kW 400V and represents less than 4.5 % of total power through the product.			
End of life				
	At end-of-life, products of the MX pro – 2.2 to 75 kW range should be dismantled to recover maximum value of the various constituent materials.			
	Recovery potential is greater than 86 %.			
	This percentage consists of ferrous metals, copper and aluminium alloysn and marked plastics.			
	Products of this range also include electronic cards to be extracted and directed towards specialised processing channels.			
	End-of-life data is detailed in the product end-of-life sheet.			
Environmental impacts				
	Life cycle assessment (LCA) was produced using EIME (Environmental Impact and Management Explorer) software, version 1.6 and its database version 5.4.			
	Product use duration is estimated as 10 years and the electrical energy model used is the European model.			

Scope of assessment is an MX pro - 22 kW 400 V.

Environmental impacts have been assessed on phases of Manufacturing (M) including conversion of raw materials, Distribution (D) and Use (U).

#### Presentation of the environmental impacts

Environmental indicators	Unit	MX pro - 22 kW 400 V (1.000 unit)			
		S = M + D + U	М	D	U
Depletion of natural resources	Y-1	1.07 10 <sup>-12</sup>	7.75 10 <sup>-13</sup>	1.05 10 <sup>-16</sup>	2.98 10 <sup>-13</sup>
Energy consumption	MJ	3.38 10 <sup>5</sup>	2.50 10 <sup>3</sup>	2.19 10 <sup>2</sup>	3.35 10 <sup>₅</sup>
Water Depletion	dm <sup>3</sup>	4.54 10 <sup>4</sup>	1.65 10 <sup>3</sup>	1.38 10 <sup>2</sup>	4.36 10 <sup>4</sup>
Global Warming	g≈CO₂	2.12 10 <sup>7</sup>	1.78 10 <sup>5</sup>	3.77 10 <sup>4</sup>	2.10 10 <sup>7</sup>
Ozone Depletion	g≈CFC-11	2.63	3.18 10 <sup>-2</sup>	1.58 10 <sup>-3</sup>	2.60
Air toxicity	m <sup>3</sup>	4.36 10 <sup>9</sup>	5.63 10 <sup>7</sup>	1.82 10 <sup>6</sup>	4.30 10 <sup>9</sup>
Photochemical Ozone Creation	g≈C₂H₄	7.54 10 <sup>4</sup>	1.22 10 <sup>2</sup>	2.82	7.41 10 <sup>4</sup>
Air Acidification	g≈H⁺	3.60 10 <sup>3</sup>	35.1	1.44	3.57 10 <sup>3</sup>
Water toxicity	dm <sup>3</sup>	1.76 10 <sup>6</sup>	5.23 10 <sup>5</sup>	2.14 10 <sup>3</sup>	1.23 10 <sup>6</sup>
Water eutrophication	g≈PO₄	5.96 10 <sup>2</sup>	5.14 10 <sup>2</sup>	9.51 10 <sup>-1</sup>	81.3
Hazardous Waste Production	kg	3.03 10 <sup>2</sup>	2.24	7.36 10 <sup>-1</sup>	3.01 10 <sup>2</sup>

The Life Cycle Assessment of the product indicates that the usage stage (stage U) is the stage that has the greatest impact on the majority of the environmental indicators. It also shows that the indicators of this stage are strongly influenced by the "heat dissipation" parameter of the product.

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#### System approach

	The variable speed drive saves energy by optimising the operating cycles of the asynchronous or synchronous electric motors. Under transient conditions, products in the MX pro – 2.2 to 75 kW range can usually reduce up to 50% the energy consumption of an installation. <i>N.B.: The environmental impact values stated above are only valid within the context specified. They cannot be directly used to compile the environmental report on the installation.</i>
Glossary	
Raw Material Depletion (RMD)	This indicator quantifies the consumption of raw materials during the life cycle of the product. It is expressed as the fraction of natural resources that disappear each year, with respect to all the annual reserves of the material.
Energy Depletion (ED)	This indicator gives the quantity of energy consumed, whether it be from fossil, hydroelectric, nuclear or other sources. This indicator takes into account the energy from the material produced during combustion. It is expressed in MJ.
Water Depletion (WD)	This indicator calculates the volume of water consumed, including drinking water and water from industrial sources. It is expressed in dm3.
Global Warming (GW)	The global warming of the planet is the result of the increase in the greenhouse effect due to the sunlight reflected by the earth's surface being absorbed by certain gases known as "greenhouse-effect" gases. The effect is quantified in gram equivalent of CO2.
Ozone Depletion (OD)	This indicator defines the contribution to the phenomenon of the disappearance of the stratospheric ozone layer due to the emission of certain specific gases. The effect is expressed in gram equivalent of CFC-11.
Photochemical Ozone Creation (POC)	This indicator quantifies the contribution to the "smog" phenomenon (the photochemical oxidation of certain gases which generates ozone) and is expressed in gram equivalent of ethylene (C2H4).
Air Acidification (AA)	The acid substances present in the atmosphere are carried by rain. A high level of acidity in the rain can cause damage to forests. The contribution of acidification is calculated using the acidification potentials of the substances concerned and is expressed in mode equivalent of H+.
Hazardous Waste Production (HWP)	This indicator calculates the quantity of specially treated waste created during all the life cycle phases (manufacturing, distribution and utilization). For example, special industrial waste in the manufacturing phase, waste associated with the production of electrical power, etc. It is expressed in kg.



We are committed to safeguarding our planet by "Combining innovation and continuous improvement to meet the new environmental challenges".

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This document is based on ISO 14020 which relates to the general principles of environmental declarations and the ISO 14025 technical report relating to type III environmental declarations.

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