Product Environmental Profile

ALTIVAR PROCESS
Ranges:
15 to 22 kW - 3PH - 400/480V - IP55

PEP ecoPASSPORT®

Schneider Electric

Product overview

The main function of the Altivar Process product range is the speed control and variation of a synchronous, asynchronous or reluctance electric motor for fluid management and industrial applications.

Calculation of the environmental impacts is based on 10 years of product service lifetime. The usage profile taken into account is 80% uptime in use phase at 75% loading rate and 20% uptime in stand by phase.

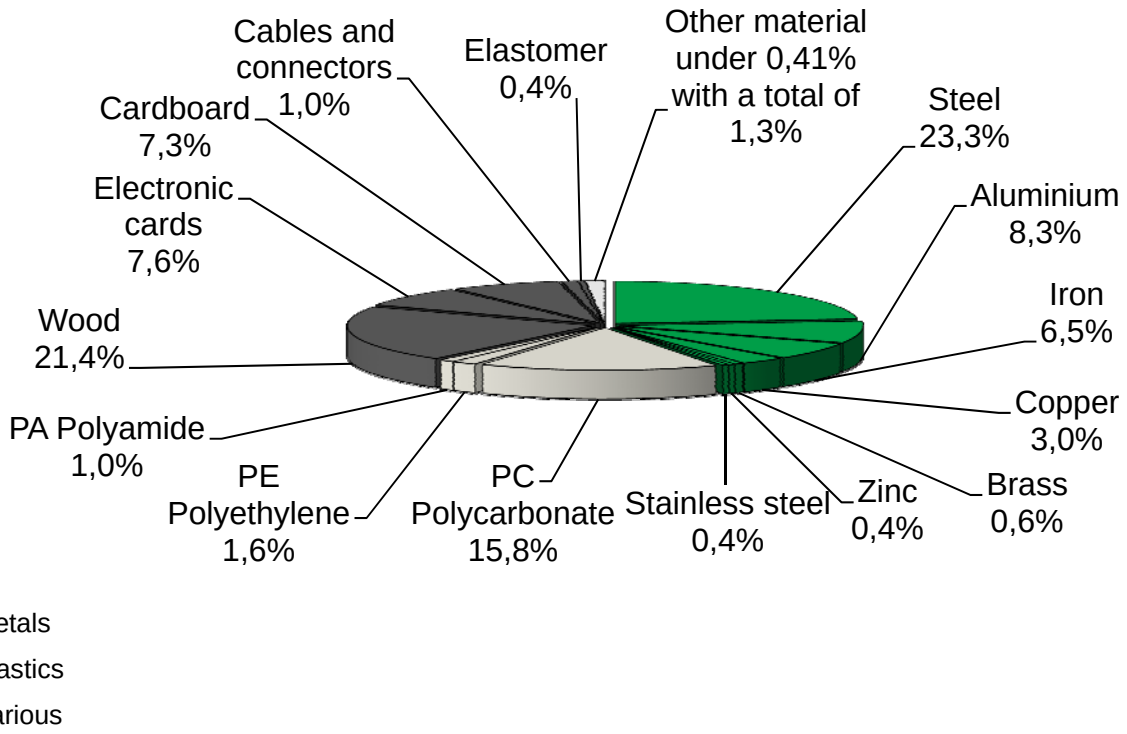
This range consists of products Altivar 650 and Altivar 950 with ratings from 15 to 22 kW for operation on 400V and 480V, 3-phase supplies, IP55. The representative product used for the analysis is the Altivar 650 - 22 kW / 400-480V / 3-ph rating / IP55 (ref. ATV650D22N4E).

The environmental impacts of this referenced product are representative of the impacts of the other products of the range which are developed with a similar technology.

The environmental analysis was performed in conformity with ISO 14040.

Constituent materials

The mass of the product range is from 21300 g and 30720 g including packaging. It is 30720 g for the Altivar 650 - 22 kW / 400-480V / 3-ph rating / IP55. The constituent materials are distributed as follows:



Substance assessment

Products of this range are designed in conformity with the requirements of the European RoHS Directive 2011/65/EU and do not contain, or only contain in the authorised proportions, lead, mercury, cadmium, hexavalent chromium or flame retardants (polybrominated biphenyls - PBB, polybrominated diphenyl ethers - PBDE) as mentioned in the Directive.

Details of ROHS and REACH substances information are available on the Schneider-Electric Green Premium website .
(http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page)

Manufacturing

The Altivar Process product range is manufactured at a Schneider Electric production site on which an ISO14001 certified environmental management system has been established.

Distribution

The weight and volume of the packaging have been optimized, based on the European Union's packaging directive.
The Altivar 650 - 22 kW / 400-480V / 3-ph rating / IP55 packaging weight is *9420 g*. It consists of 6580 g wood pallet, 2240 g recyclable cardboard, 450 g HDPE foam for wedge, 60 g notice paper, 60 g desiccant dryer bag and 30 g polyethylene film.
The product distribution flows have been optimised by setting up local distribution centres close to the market areas.

Use

The products of the Altivar Process range do not generate environmental pollution (noise, emissions) requiring special precautionary measures in standard use.
The electrical power consumption depends on the conditions under which the product is implemented and used. The electrical power consumed by the Altivar range is between 431 W and 569 W at 100% Loading rate. It is 569 W in active mode and 20 W in standby mode for the referenced Altivar 650 - 22 kW / 400-480V / 3-ph rating / IP55.
The product range does not require special maintenance operations.

End of life

At end of life, the products in the Altivar Process range have been optimized to decrease the amount of waste and allow recovery of the product components and materials.
This product range contains PCBAs and Electrolytic Capacitors that should be separated from the stream of waste so as to optimize end-of-life treatment by special treatments. The location of these components and other recommendations are given in the End of Life Instruction document which is available for this product range on the Schneider-Electric Green Premium website Green Premium website
(http://www2.schneider-electric.com/sites/corporate/en/products-services/green-premium/green-premium.page).

The recyclability potential of the products has been evaluated using the “ECO DEEE recyclability and recoverability calculation method” (version V1, 20 Sep. 2008 presented to the French Agency for Environment and Energy Management: ADEME).
According to this method, the potential recyclability ratio without packaging is: 77 %.
As described in the recyclability calculation method this ratio includes only metals and plastics which have proven industrial recycling processes.

Environmental impacts

Life cycle assessment has been performed on the following life cycle phases: Materials and Manufacturing (M), Distribution (D), Installation (I) Use (U), and End of life (E).

Modeling hypothesis and method:

- The calculation was performed on the Altivar 650 - 22 kW / 400-480V / 3-ph rating / IP55.
- Product packaging is included.
- Installation components: no special components included.
- Scenario for the Use phase: this product range is included in the category 2: Energy Consuming Product Assumed service lifetime is 10 years.
    - Use scenario is the following:
        - Active mode
            - Consumed power is 439 W
              (Supply voltage is 400V, switching frequency is 4 kHz, loading rate is 75%)
            - Service uptime percentage is 80%
        - Standby mode
            - Consumed power is 20 W
            - Service uptime percentage is 20%
- The geographical representative area for the assessment is Europe and the electrical power model used for calculation is European model.
- End of life impacts are based on a worst case transport distance to the recycling plant (1000km)

Presentation of the product environmental impacts

Environmental indicators	Unit	For Altivar 650 - 22 kW / 400-480V / 3-ph rating / IP55					
		S = M + D + I + U + E	M	D	I	U	E
Air Acidification (AA)	**kg H+ eq**	4,02E+00	5,21E-02	9,91E-04	0,00E+00	3,97E+00	3,98E-04
Air toxicity (AT)	**m^3**	4,68E+09	7,55E+07	1,47E+06	0,00E+00	4,60E+09	5,92E+05
Energy Depletion (ED)	**MJ**	3,76E+05	3,86E+03	7,43E+01	0,00E+00	3,72E+05	2,85E+01
Global Warming Potential (GWP)	**kg CO_2 eq.**	1,86E+04	2,36E+02	5,28E+00	0,00E+00	1,84E+04	2,03E+00
Hazardous Waste Production (HWP)	**kg**	1,00E+01	6,84E+00	6,52E-06	0,00E+00	3,15E+00	2,51E-06
Ozone Depletion Potential (ODP)	**kg CFC-11 eq.**	4,21E-03	2,16E-05	9,99E-09	0,00E+00	4,19E-03	3,84E-09
Photochemical Ozone Creation Potential (POCP)	**kg C_2H_4 eq.**	1,21E+00	7,37E-02	1,36E-03	0,00E+00	1,14E+00	5,04E-04
Raw Material Depletion (RMD)	**Y-1**	1,11E-12	8,59E-13	1,08E-16	0,00E+00	2,48E-13	4,14E-17
Water Depletion (WD)	**dm3**	4,96E+04	1,71E+03	5,47E-01	0,00E+00	4,79E+04	2,10E-01
Water Eutrophication (WE)	**kg PO_4^{3-} eq.**	1,87E-01	1,24E-02	9,79E-06	0,00E+00	1,75E-01	3,76E-06
Water Toxicity (WT)	**m^3**	8,25E+03	6,22E+01	2,25E+00	0,00E+00	8,18E+03	8,66E-01

Life cycle assessment has been performed with the EIME software (Environmental Impact and Management Explorer), version 5.5.0.4 and with its database version 2013-02

The use phase is the life cycle phase which has the greatest impact on the majority of environmental indicators.

Depending on the impact analysis, the environmental indicators (without RMD and HWP) of other products in this family may be proportionally extrapolated by energy consumption values.

For RMD and HWP, impacts may be proportionally extrapolated by the products weights.

System approach

The variable speed drive saves up to 50% energy by optimising the operating cycles of the machines used for fluid applications with Altivar Process.

As the products of the range are designed in accordance with the European RoHS Directive 2011/65/EU, they can be incorporated without any restriction in an assembly or an installation subject to this Directive.
Please note that the values given above are only valid within the context specified and cannot be used directly to draw up the environmental assessment of an installation.

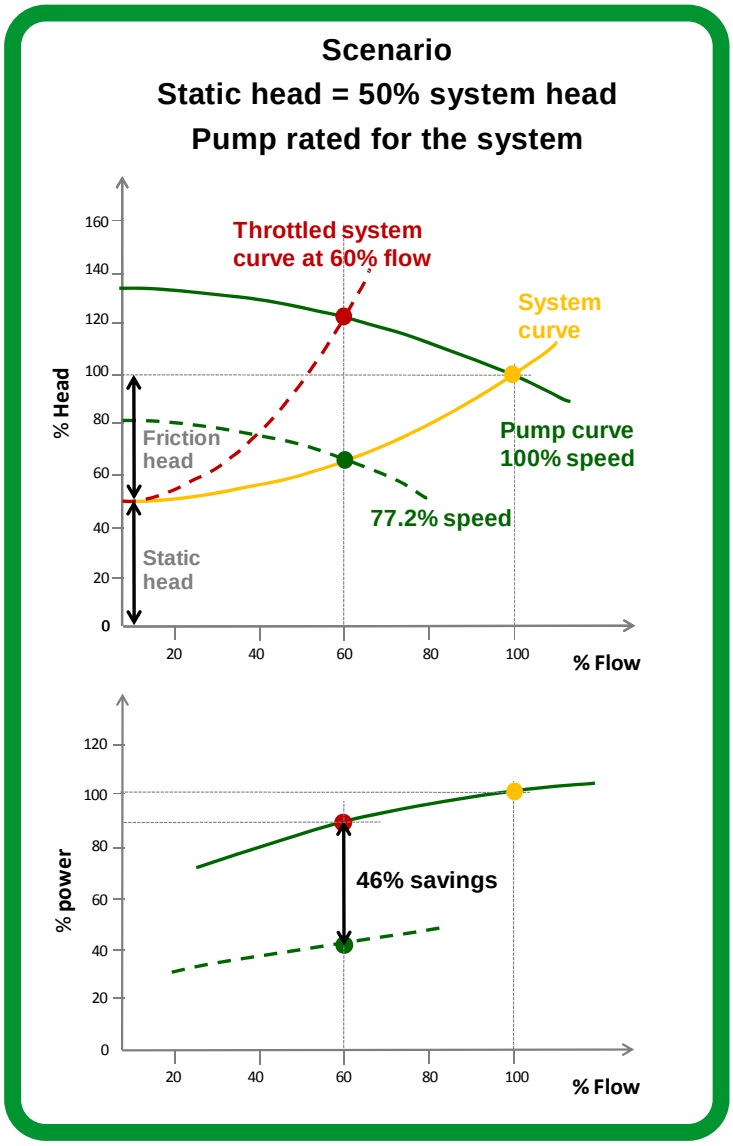


Figure 1

Energy saved with variable vs. fixed speed drives at 100% and 60% flow, according to the static head and pump sizing. The operating point is represented as the intersection of the pump curve with the system curve

The example in **Figure 1** compares two installations (one with a variable speed drive one with a fixed drive throttled system) in which static heads (height difference between the source and the end use) are different.

The static head represents 50% of the system head, and the pump is rated for the head and flow of the system. At 100% flow, the power consumed by the pump is the same at both fixed speed and with a variable speed drive. At 60% flow, the energy savings resulting in the variable speed drive use is 46%.

Glossary

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^+.
Air Toxicity (AT)	This indicator represents the air toxicity in a human environment. It takes into account the usually accepted concentrations for several gases in the air and the quantity of gas released over the life cycle. The indication given corresponds to the air volume needed to dilute these gases down to acceptable concentrations.
Energy Depletion (ED)	This indicator gives the quantity of energy consumed, whether it is from fossil, hydroelectric, nuclear or other sources. It takes into account the energy from the material produced during combustion. It is expressed in MJ.
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 CO_2.
Hazardous Waste Production (HWP)	This indicator quantifies 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.
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 (C_2H_4).
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.
Water Depletion (WD)	This indicator calculates the volume of water consumed, including drinking water and water from industrial sources. It is expressed in dm^3.
Water Eutrophication (WE)	Eutrophication is a natural process defined as the enrichment in mineral salts of marine or lake waters or a process accelerated by human intervention, defined as the enrichment in nutritive elements (phosphorous compounds, nitrogen compounds and organic matter). This indicator represents the water eutrophication of lakes and marine waters by the release of specific substances in the effluents. It is expressed in grams equivalency of PO43-(phosphate).
Water Toxicity (WT)	This indicator represents the water toxicity. It takes into account the usually accepted concentrations for several substances in water and the quantity of substances released over the life cycle. The indication given corresponds to the water volume needed to dilute these substances down to acceptable concentrations.

Registration N° : **SCHN-2014-025**				Applicable PCR : PEP–PCR–ed 2.1-EN-2012 12 11
Verifier accreditation N° : VH08				Program information: www.pep-ecopassport.org
Date of issue: 09 - 2014				Period of validity: 4 years
Independent verification of the declaration and data, according to ISO 14025:2006				
Internal		External	X	
In compliance with ISO 14025:2006 type III environmental declarations				
PCR review was conducted by an expert panel chaired by J. Chevalier (CSTB).				
The elements of the actual PEP cannot be compared with elements from another program.				

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