# Product environnemental profile

## Fuse NH1 500V GG

## PRODUCT DESCRIPTION

Type “gG” NH fuse-links are full range breaking capacity fuse-links and are used to protect cables and equipment. They can interrupt any current surge, from the lowest fusing current up to their breaking capacity, and so can be used alone as protection. They also protect electrical devices and industrial set-ups from the electrodynamic effects of very high short-circuit currents.

The rated voltage is 500V AC and the breaking capacity is 120 kA.

These fuses comply with IEC 60269-1 and 2 standard and with VDE 0636-part 201 standard

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## PRODUCT REFERENCE

The product selected as reference is the highest rating of the range. It is the one using the most of raw materials.




**Designation:** Fuse NH1 355A 500V GG
**Reference:** R228520
**Mass:** 420g (with packaging)

**Functional unit:** Protect equipment downstream of the circuit from the effects of an overload or a short circuit by interrupting the fault current for a reference lifetime of 20 years.

Fuses are into the "other electrical equipment, passive product" category of PSR-0005. This scenario corresponds to use at 30% of rated current for a total operating time of 30% of its lifetime.

# Fuse NH1 500V GG

## PRODUCT RANGE

| NH1 | | | |
|---|---|---|---|
| **Reference** | **Designation** | **Reference** | **Designation** |
| M200801 | NH1 16 A 500V GG | X216703 | NH1 100 A 500V GG |
| C201344 | NH1 20 A 500V GG | V236044 | NH1 125 A 500V GG |
| N201860 | NH1 25 A 500V GG | A218247 | NH1 160 A 500V GG |
| L211081 | NH1 32 A 500V GG | P218766 | NH1 200 A 500V GG |
| A211600 | NH1 35 A 500V GG | D219285 | NH1 224 A 500V GG |
| Y212633 | NH1 40 A 500V GG | E219815 | NH1 250 A 500V GG |
| B213648 | NH1 50 A 500V GG | Q228519 | NH1 315 A 500V GG |
| L214669 | NH1 63 A 500V GG | R228520 | NH1 355 A 500V GG |
| S215687 | NH1 80 A 500V GG | | |

## BILL OF MATERIALS

| Metals | | | Others | | |
|---|---|---|---|---|---|
| **Designation** | **Mass (g)** | **%** | **Designation** | **Mass (g)** | **%** |
| Brass | 76,91 | 18,62% | Ceramic | 190,63 | 46,16% |
| Aluminium | 23,56 | 5,71% | Sand | 89,90 | 21,77% |
| Steel | 8,68 | 2,10% | Cardboard | 14,71 | 3,56% |
| Copper | 5,37E+00 | 1,30% | Felted cardboard | 2,20E+00 | < 0,1% |
| Tin | 3,42E-01 | < 0,1% | Paper | 2,60E-01 | < 0,1% |
| Lead | 1,54E-01 | < 0,1% | PBT GF30 | 1,20E-01 | < 0,1% |
| Copper Nickel alloy | 3,60E-02 | < 0,1% | PA 66 GF30 | 1,00E-01 | < 0,1% |
| Silver | 1,51E-02 | < 0,1% | Ink | 1,90E-02 | < 0,1% |
| **TOTAL** | **115,05** | **27,86%** | **TOTAL** | **297,92** | **72,14%** |

# LYFE CYCLE

The Life Cycle Analysis is realized in compliance with ISO 14 040 and 14 044 standards and with the EIME© v5.9.3 software with the database version CODDE-2022-01.

The analysis of this product and its range represents a Hungarian manufacture and a European use.

## MANUFATURING

These products are manufactured in the factory located in Hungary. This is an assembly process with no major impact on the environment. For the electrical consumption of this assembly process, the local energy mix has been used.

In addition, the Hungarian manufacturing site is ISO 14001 certified.

## DISTRIBUTION

The market for these fuses is in Europe. The transport is done by road.

## INSTALLATION

The fuse is mounted by hand with no power or additional equipment. All energy mixes used for end-of-life treatment of packaging are based on European data.

## USE

In normal use, a fuse consumes energy through heat dissipation. It doesn't emit noise or electromagnetic radiation and doesn't require maintenance. The energy mix used is based on European data.

Fuses are into the PSR-005 category "other electrical equipment, passive product".

This scenario corresponds to use at 30% of rated current, which is 0.07 times the power dissipation in watt, *(23.7 x 0.07) x 3600 = 5972 joules per hour*, for a total operating time of 30% of its lifetime (20 years), *(20 x 365) x (0.3 x 24) = 52560 hours*.

The total consumption of the reference product is 5972 x 52560=313.9 megajoules.

## END OF LIFE

This product family is listed in the European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE). The products must be reprocessed in compliance with the legislation of the country. All energy mixes used are based on European data.

# ENVIRONMENTAL IMPACTS

## Environmental impact indicators

| Lifecycle phase / Environmental indicators | 1. Manufacturing | 2. Distribution | 3. Installation | 4. Use | 5. End of life | Total | Module D | Unit |
|---|---|---|---|---|---|---|---|---|
| Resource use, minerals and metals (PEF-ADPe) | 1,98E-04 | 1,93E-11 | 7,89E-10 | 2,59E-06 | 9,71E-08 | 2,00E-04 | -9,51E-05 | kg SB eq. |
| | 98,66% | 0* | 0* | 1,29% | 0,05% | | | |
| Resource use, fossils (PEF-ADPf) | 2,98E+01 | 2,73E+00 | 2,45E-01 | 9,11E+02 | 1,88E+00 | 9,45E+02 | -5,02E+00 | MJ |
| | 3,15% | 0,29% | 0,03% | 96,34% | 0,20% | | | |
| Acidification (PEF-AP) | 2,19E-02 | 9,78E-04 | 9,35E-05 | 2,04E-01 | 2,87E-03 | 2,30E-01 | -2,86E-02 | mol H+ eq. |
| | 9,55% | 0,43% | 0,04% | 88,74% | 1,25% | | | |
| Ecotoxicity, freshwater (PEF-CTUe) | 8,05E+01 | 9,23E-01 | 1,76E-01 | 3,85E+02 | 6,96E+01 | 5,36E+02 | -1,97E+02 | CTUe |
| | 15,02% | 0,17% | 0,03% | 71,78% | 12,99% | | | |
| Human toxicity, cancer (PEF-CTUh-c) | 1,26E-06 | 3,17E-12 | 8,67E-09 | 4,17E-09 | 2,31E-10 | 1,27E-06 | -3,60E-09 | CTUh |
| | 98,97% | 0* | 0,68% | 0,33% | 0,02% | | | |
| Human toxicity, non-cancer (PEF-CTUh-nc) | 3,19E-07 | 5,94E-10 | 1,29E-10 | 1,65E-07 | 2,21E-08 | 5,07E-07 | -3,19E-07 | CTUh |
| | 62,92% | 0,12% | 0,03% | 32,58% | 4,36% | | | |
| Eutrophication, freshwater (PEF-Epf) | 9,48E-05 | 2,63E-08 | 1,75E-07 | 9,79E-05 | 6,59E-06 | 1,99E-04 | -2,69E-03 | kg P eq. |
| | 47,52% | 0,01% | 0,09% | 49,07% | 3,30% | | | |
| Eutrophication marine (PEF-Epm) | 1,81E-03 | 4,49E-04 | 2,46E-05 | 2,32E-02 | 1,91E-03 | 2,74E-02 | -1,41E-03 | kg N eq. |
| | 6,62% | 1,64% | 0,09% | 84,65% | 6,99% | | | |
| Eutrophication, terrestrial (PEF-Ept) | 1,99E-02 | 4,87E-03 | 1,78E-04 | 3,48E-01 | 1,50E-03 | 3,75E-01 | -1,76E-02 | mol N eq. |
| | 5,31% | 1,30% | 0,05% | 92,95% | 0,40% | | | |
| Climate change (PEF-GWP) | 2,10E+00 | 2,25E-01 | 2,42E-02 | 3,57E+01 | 1,24E-01 | 3,82E+01 | -4,75E-01 | kg CO2 eq. |
| | 5,48% | 0,59% | 0,06% | 93,54% | 0,33% | | | |
| Climate change-Biogenic (PEF-GWPb) | 2,05E-01 | 0,00E+00 | 1,08E-03 | 4,77E-02 | 7,39E-03 | 2,62E-01 | -3,77E-02 | kg CO2 eq. |
| | 78,54% | 0,00% | 0,41% | 18,22% | 2,83% | | | |
| Climate change-Fossil (PEF-GWPf) | 1,89E+00 | 2,25E-01 | 2,31E-02 | 3,57E+01 | 1,17E-01 | 3,79E+01 | -4,37E-01 | kg CO2 eq. |
| | 4,98% | 0,59% | 0,06% | 94,06% | 0,31% | | | |
| Climate change-Land use and land use change (PEF-GWPlu) | 7,35E-07 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 7,35E-07 | 0,00E+00 | kg CO2 eq. |
| | 100,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Ionising radiation, human health (PEF-IR) | 1,58E+02 | 4,99E-04 | 1,14E-03 | 5,31E+01 | 1,27E-02 | 2,11E+02 | -1,34E+01 | kg U235 eq. |
| | 74,85% | 0* | 0* | 25,14% | 0* | | | |
| Land use (PEF-LU) | 4,44E-01 | 0,00E+00 | 0,00E+00 | 7,11E-01 | 6,23E-01 | 1,78E+00 | -2,91E+00 | no dimension |
| | 24,96% | 0,00% | 0,00% | 40,00% | 35,04% | | | |
| Ozone depletion (PEF-ODP) | 4,21E-07 | 1,99E-07 | 1,61E-09 | 1,53E-07 | 1,44E-08 | 7,88E-07 | -2,14E-08 | kg CFC-11 eq. |
| | 53,39% | 25,19% | 0,20% | 19,39% | 1,83% | | | |
| EF-particulate Matter (PEF-PM) | 1,45E-07 | 2,65E-09 | 6,15E-10 | 1,58E-06 | 8,57E-09 | 1,74E-06 | -6,63E-08 | disease occurrence |
| | 8,34% | 0,15% | 0,04% | 90,98% | 0,49% | | | |
| Photochemical ozone formation - human health (PEF-POCP) | 6,82E-03 | 1,60E-03 | 4,78E-05 | 7,44E-02 | 5,32E-04 | 8,34E-02 | -5,05E-03 | kg NMVOC eq. |
| | 8,18% | 1,91% | 0,06% | 89,21% | 0,64% | | | |
| Water use (PEF-WU) | 5,60E+00 | 1,14E-02 | 1,05E-02 | 1,19E+00 | 4,06E+01 | 4,74E+01 | -3,17E+02 | m3 eq. |
| | 11,80% | 0,02% | 0,02% | 2,51% | 85,65% | | | |

0 (*) represent less than 0,01% of the total lifecycle reference flow

# Fuse NH1 500V GG

## Resources use indicators

| Ressources use \ Lifecycle phase | 1. Manufacturing | 2. Distribution | 3. Installation | 4. Use | 5. End of life | Total | Module D | Unit |
|---|---|---|---|---|---|---|---|---|
| Total Primary Energy | 3,46E+01 | 2,73E+00 | 2,63E-01 | 1,09E+03 | 2,08E+00 | 1,13E+03 | -7,00E+00 | MJ |
| | 3,08% | 0,24% | 0,02% | 96,47% | 0,19% | | | |
| Use of renewable primary energy excluding renewable primary energy used as raw material | 4,47E+00 | 1,83E-05 | 1,81E-02 | 1,75E+02 | 2,06E-01 | 1,80E+02 | -1,88E+00 | MJ |
| | 2,49% | 0* | 0,01% | 97,39% | 0,11% | | | |
| Use of renewable primary energy resources used as raw material | 4,10E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,10E-01 | -1,07E-01 | MJ |
| | 100,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Total use of renewable primary energy resources | 4,88E+00 | 1,83E-05 | 1,81E-02 | 1,75E+02 | 2,06E-01 | 1,80E+02 | -1,99E+00 | MJ |
| | 2,71% | 0* | 0,01% | 97,17% | 0,11% | | | |
| Use of non renewable primary energy excluding non renewable primary energy used as raw material | 2,97E+01 | 2,73E+00 | 2,45E-01 | 9,11E+02 | 1,88E+00 | 9,45E+02 | -5,02E+00 | MJ |
| | 3,15% | 0,29% | 0,03% | 96,34% | 0,20% | | | |
| Use of non renewable primary energy resources used as raw material | 8,55E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 8,55E-03 | 0,00E+00 | MJ |
| | 100,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Total use of non-renewable primary energy resources | 2,98E+01 | 2,73E+00 | 2,45E-01 | 9,11E+02 | 1,88E+00 | 9,45E+02 | -5,02E+00 | MJ |
| | 3,15% | 0,29% | 0,03% | 96,34% | 0,20% | | | |
| Use of secondary material | 5,40E-06 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 5,40E-06 | 0,00E+00 | MJ |
| | 100,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Use of renewable secondary fuels | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MJ |
| | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Use of non renewable secondary fuels | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MJ |
| | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Net use of freshwater | 1,28E-01 | 2,66E-04 | 1,22E-04 | 2,92E-02 | 7,13E-02 | 2,29E-01 | -3,11E+00 | m3 |
| | 55,95% | 0,12% | 0,05% | 12,77% | 31,12% | | | |
| Biogenic carbon content in the product | 6,16E-04 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 6,16E-04 | 0,00E+00 | kg of C |
| | 100,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Biogenic carbon content in the packaging | 4,22E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,22E-03 | 0,00E+00 | kg of C |
| | 100,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |

0 (*) represent less than 0,01% of the total lifecycle reference flow

## Waste category indicators

| Waste indicators \ Lifecycle phase | 1. Manufacturing | 2. Distribution | 3. Installation | 4. Use | 5. End of life | Total | Module D | Unit |
|---|---|---|---|---|---|---|---|---|
| Hazardous waste disposed | 8,13E+00 | 1,86E-04 | 2,87E-04 | 6,68E-01 | 6,42E-05 | 8,80E+00 | 0,00E+00 | kg |
| | 92,40% | 0* | 0* | 7,59% | 0* | | | |
| Non hazardous waste disposed | 2,54E+00 | 2,29E-04 | 8,05E-02 | 5,14E+00 | 2,90E-01 | 8,06E+00 | -9,66E-04 | kg |
| | 31,56% | 0* | 1,00% | 63,83% | 3,61% | | | |
| Radioactive waste disposed | 1,37E-03 | 4,47E-05 | 1,06E-05 | 1,08E-03 | 1,27E-06 | 2,50E-03 | 0,00E+00 | kg |
| | 54,72% | 1,79% | 0,42% | 43,01% | 0,05% | | | |

0 (*) represent less than 0,01% of the total lifecycle reference flow

## Output flow indicators

| Other indicators \ Lifecycle phase | 1. Manufacturing | 2. Distribution | 3. Installation | 4. Use | 5. End of life | Total | Module D | Unit |
|---|---|---|---|---|---|---|---|---|
| Component for reuse | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | kg |
| | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Materials for recycling | 1,50E-01 | 0,00E+00 | 1,33E-02 | 0,00E+00 | 1,01E-01 | 2,64E-01 | 0,00E+00 | kg |
| | 56,65% | 0,00% | 5,04% | 0,00% | 38,31% | | | |
| Materials for energy recovery | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | kg |
| | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |
| Exported energy | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MJ |
| | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | | | |

0 (*) represent less than 0,01% of the total lifecycle reference flow

## Extrapolation rules

- **For manufacturing, distribution, installation, and end of life phases:**

The impacts of the fuses NH1 from rating 160A to 315A are covered by those of the reference product.

The impacts of the fuses NH1 rating 125A and below (compact version) are extrapolated from those of the reference product.

The following coefficients must be applied to obtain the different impacts for rating 125A and below:

| | Extrapolation coefficient for rating 125A and below | | | |
|---|---|---|---|---|
| **Type of indicators** | **1. Manufacturing** | **2. Distribution** | **3.Installation** | **5. End of life** |
| **Environmental impact indicators** | 0,95 | 0,67 | 0,76 | 0,71 |
| **Ressource use indicators** | 1,00 | 0,67 | 0,76 | 0,69 |
| **Waste category indicators** | 0,63 | 0,67 | 0,76 | 0,69 |
| **Output flow indicators** | 0,90 | 1,00 | 0,76 | 0,67 |
| **Biogenic carbon indicators** | 0,77 | 1,00 | 1,00 | 1,00 |

- **For use phase:**

To obtain impact of the use phase, the following coefficients must be applied:

| 4. Use | | |
|---|---|---|
| **Designation** | **Power dissipation at In (W)** | **Coefficient to apply** |
| NH1 16 A 500V GG | 1,8 | **0,08** |
| NH1 20 A 500V GG | 2,3 | **0,10** |
| NH1 25 A 500V GG | 2,4 | **0,10** |
| NH1 32 A 500V GG | 3,1 | **0,13** |
| NH1 35 A 500V GG | 3 | **0,13** |
| NH1 40 A 500V GG | 3,7 | **0,16** |
| NH1 50 A 500V GG | 4,1 | **0,17** |
| NH1 63 A 500V GG | 6,6 | **0,28** |
| NH1 80 A 500V GG | 8 | **0,34** |
| NH1 100 A 500V GG | 9,4 | **0,40** |
| NH1 125 A 500V GG | 11,8 | **0,50** |
| NH1 160 A 500V GG | 14,6 | **0,62** |
| NH1 200 A 500V GG | 18 | **0,76** |
| NH1 224 A 500V GG | 19 | **0,80** |
| NH1 250 A 500V GG | 20 | **0,84** |
| NH1 315 A 500V GG | 20,5 | **0,86** |
| NH1 355 A 500V GG | 23,7 | **1,00** |

# POTENTIAL RECYCLABILITY

| End of life of the product | Rate (%) |
|---|---|
| **Recyclable component** | **25,0%** |
| **Incinerated components** | **0,3%** |
| **Waste** | **74,7%** |

This estimation has been calculated with EIME© v5.9.3 software with the Eco'DEEE methodology.

# CHECKS

| | |
|---|---|
| **Registration N° :** MERS-00061-V01.01-EN | **Drafting rules :** PCR-ed4-EN-2021 09 06<br>Supplemented by PSR-0005-ed2-FR-2016 03 29 |
| **Verifier accreditation N° :** VH32 | **Information and reference documentation :** www.pep-ecopassport.org |
| **Date of issue :** 20/10/2022 | **Validity period :** 5 years |
| Independent verification of the declaration and data, in compliance with ISO 14025 : 2010<br>☐ internal ☒ external | |
| The PCR review was conducted by a panel of experts chaired by Julie ORGELET (DDemain) | |
| PEP are compliant with XP C08-100-1 :2016 or EN 50693 :2019<br>The elements of the present PEP cannot be compared with elements from another program. | |
| Document in compliance with ISO 14025 : 2010 « Environmental labels and declarations.<br>Déclarations environnementales de Type III" | |