



ISOPA

**Eco-profile study (2021) results
with EN15804+A2 methodology**

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MDI (Mass+Elemental Allocation) Results

Table 1: LCIA results per 1 kg of MDI (Mass+Elemental Allocation) with EN15804+A2 (EF 3.1)

EN15804+A2 (EF 3.1) indicators	Unit	Value
Environmental impact indicators		
01 Climate Change - total	kg CO2 eq.	2.78E+00
02 Climate Change, fossil	kg CO2 eq.	2.77E+00
03 Climate Change, biogenic	kg CO2 eq.	9.25E-03
04 Climate Change, land use and land use change	kg CO2 eq.	6.42E-04
05 Ozone depletion	kg CFC-11 eq.	5.95E-15
06 Acidification	Mole of H+ eq.	3.99E-03
07 Eutrophication, freshwater	kg P eq.	3.51E-06
08 Eutrophication, marine	kg N eq.	1.25E-03
09 Eutrophication, terrestrial	Mole of N eq.	1.24E-02
10 Photochemical ozone formation, human health	kg NMVOC eq.	4.38E-03
11 Resource use, mineral and metals	kg Sb eq.	2.76E-07
12 Resource use, fossils	MJ	7.64E+01
13 Water use	m ³ world equiv.	2.49E-01
Resource use indicators		
01 EN15804+A2 Use of renewable primary energy (PERE)	MJ	1.83E+00
02 EN15804+A2 Primary energy resources used as raw materials (PERM)	MJ	0.00E+00
03 EN15804+A2 Total use of renewable primary energy resources (PERT)	MJ	1.83E+00
04 EN15804+A2 Use of non-renewable primary energy (PENRE)	MJ	4.97E+01
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM)	MJ	2.68E+01
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT)	MJ	7.65E+01
07 EN15804+A2 Input of secondary material (SM)	kg	0.00E+00
08 EN15804+A2 Use of renewable secondary fuels (RSF)	MJ	0.00E+00
09 EN15804+A2 Use of non renewable secondary fuels (NRSF)	MJ	0.00E+00
10 EN15804+A2 Use of net fresh water (FW)	m ³	1.22E-02
Output flows and waste categories		
01 EN15804+A2 Hazardous waste disposed (HWD)	kg	2.88E-08
02 EN15804+A2 Non-hazardous waste disposed (NHWD)	kg	1.68E-02
03 EN15804+A2 Radioactive waste disposed (RWD)	kg	6.74E-04
Optional indicators		
01 Particulate matter	Disease incidences	3.13E-08
02 Ionising radiation, human health	kBq U235 eq.	7.14E-02
03 Ecotoxicity, freshwater	CTUe	2.60E+01
04 Human toxicity, cancer	CTUh	7.38E-10
05 Human toxicity, non-cancer	CTUh	2.84E-08
06 Land Use	Pt	1.80E+00

MDI (Economic Allocation) Results

Table 2: LCIA results per 1 kg of MDI (Economic Allocation) with EN15804+A2 (EF 3.1)

EN15804+A2 (EF 3.1) indicators	Unit	Value
Environmental impact indicators		
01 Climate Change - total	kg CO2 eq.	3.39E+00
02 Climate Change, fossil	kg CO2 eq.	3.38E+00
03 Climate Change, biogenic	kg CO2 eq.	9.98E-03
04 Climate Change, land use and land use change	kg CO2 eq.	1.51E-03
05 Ozone depletion	kg CFC-11 eq.	1.45E-14
06 Acidification	Mole of H+ eq.	5.37E-03
07 Eutrophication, freshwater	kg P eq.	5.84E-06
08 Eutrophication, marine	kg N eq.	1.69E-03
09 Eutrophication, terrestrial	Mole of N eq.	1.73E-02
10 Photochemical ozone formation, human health	kg NMVOC eq.	5.56E-03
11 Resource use, mineral and metals	kg Sb eq.	3.96E-07
12 Resource use, fossils	MJ	8.64E+01
13 Water use	m ³ world equiv.	2.92E-01
Resource use indicators		
01 EN15804+A2 Use of renewable primary energy (PERE)	MJ	4.32E+00
02 EN15804+A2 Primary energy resources used as raw materials (PERM)	MJ	0.00E+00
03 EN15804+A2 Total use of renewable primary energy resources (PERT)	MJ	4.32E+00
04 EN15804+A2 Use of non-renewable primary energy (PENRE)	MJ	5.97E+01
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM)	MJ	2.68E+01
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT)	MJ	8.65E+01
07 EN15804+A2 Input of secondary material (SM)	kg	0.00E+00
08 EN15804+A2 Use of renewable secondary fuels (RSF)	MJ	0.00E+00
09 EN15804+A2 Use of non renewable secondary fuels (NRSF)	MJ	0.00E+00
10 EN15804+A2 Use of net fresh water (FW)	m ³	1.51E-02
Output flows and waste categories		
01 EN15804+A2 Hazardous waste disposed (HWD)	kg	5.33E-08
02 EN15804+A2 Non-hazardous waste disposed (NHWD)	kg	2.65E-02
03 EN15804+A2 Radioactive waste disposed (RWD)	kg	1.65E-03
Optional indicators		
01 Particulate matter	Disease incidences	4.93E-08
02 Ionising radiation, human health	kBq U235 eq.	1.54E-01
03 Ecotoxicity, freshwater	CTUe	3.07E+01
04 Human toxicity, cancer	CTUh	8.59E-10
05 Human toxicity, non-cancer	CTUh	3.23E-08
06 Land Use	Pt	4.48E+00

TDI (Mass+Elemental Allocation) Results

Table 3: LCIA results per 1 kg of TDI (Mass+Elemental Allocation) with EN15804+A2 (EF 3.1)

EN15804+A2 (EF 3.1) indicators	Unit	Value
Environmental impact indicators		
01 Climate Change - total	kg CO2 eq.	3.16E+00
02 Climate Change, fossil	kg CO2 eq.	3.13E+00
03 Climate Change, biogenic	kg CO2 eq.	2.26E-02
04 Climate Change, land use and land use change	kg CO2 eq.	8.51E-04
05 Ozone depletion	kg CFC-11 eq.	8.26E-15
06 Acidification	Mole of H+ eq.	4.03E-03
07 Eutrophication, freshwater	kg P eq.	3.80E-06
08 Eutrophication, marine	kg N eq.	1.44E-03
09 Eutrophication, terrestrial	Mole of N eq.	1.26E-02
10 Photochemical ozone formation, human health	kg NMVOC eq.	4.79E-03
11 Resource use, mineral and metals	kg Sb eq.	3.96E-07
12 Resource use, fossils	MJ	7.27E+01
13 Water use	m ³ world equiv.	3.12E-02
Resource use indicators		
01 EN15804+A2 Use of renewable primary energy (PERE)	MJ	2.21E+00
02 EN15804+A2 Primary energy resources used as raw materials (PERM)	MJ	0.00E+00
03 EN15804+A2 Total use of renewable primary energy resources (PERT)	MJ	2.21E+00
04 EN15804+A2 Use of non-renewable primary energy (PENRE)	MJ	5.09E+01
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM)	MJ	2.18E+01
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT)	MJ	7.27E+01
07 EN15804+A2 Input of secondary material (SM)	kg	0.00E+00
08 EN15804+A2 Use of renewable secondary fuels (RSF)	MJ	0.00E+00
09 EN15804+A2 Use of non renewable secondary fuels (NRSF)	MJ	0.00E+00
10 EN15804+A2 Use of net fresh water (FW)	m ³	9.32E-03
Output flows and waste categories		
01 EN15804+A2 Hazardous waste disposed (HWD)	kg	2.41E-08
02 EN15804+A2 Non-hazardous waste disposed (NHWD)	kg	2.79E-02
03 EN15804+A2 Radioactive waste disposed (RWD)	kg	6.15E-04
Optional indicators		
01 Particulate matter	Disease incidences	2.60E-08
02 Ionising radiation, human health	kBq U235 eq.	5.02E-02
03 Ecotoxicity, freshwater	CTUe	2.85E+01
04 Human toxicity, cancer	CTUh	7.26E-10
05 Human toxicity, non-cancer	CTUh	3.13E-08
06 Land Use	Pt	2.16E+00

TDI (Economic Allocation) Results

Table 4: LCIA results per 1 kg of TDI (Economic Allocation) with EN15804+A2 (EF 3.1)

EN15804+A2 (EF 3.1) indicators	Unit	Value
Environmental impact indicators		
01 Climate Change - total	kg CO2 eq.	4.62E+00
02 Climate Change, fossil	kg CO2 eq.	4.58E+00
03 Climate Change, biogenic	kg CO2 eq.	3.28E-02
04 Climate Change, land use and land use change	kg CO2 eq.	2.95E-03
05 Ozone depletion	kg CFC-11 eq.	2.48E-14
06 Acidification	Mole of H+ eq.	7.61E-03
07 Eutrophication, freshwater	kg P eq.	8.65E-06
08 Eutrophication, marine	kg N eq.	2.36E-03
09 Eutrophication, terrestrial	Mole of N eq.	2.29E-02
10 Photochemical ozone formation, human health	kg NMVOC eq.	7.28E-03
11 Resource use, mineral and metals	kg Sb eq.	7.02E-07
12 Resource use, fossils	MJ	9.60E+01
13 Water use	m ³ world equiv.	5.63E-02
Resource use indicators		
01 EN15804+A2 Use of renewable primary energy (PERE)	MJ	6.95E+00
02 EN15804+A2 Primary energy resources used as raw materials (PERM)	MJ	0.00E+00
03 EN15804+A2 Total use of renewable primary energy resources (PERT)	MJ	6.95E+00
04 EN15804+A2 Use of non-renewable primary energy (PENRE)	MJ	7.42E+01
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM)	MJ	2.18E+01
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT)	MJ	9.60E+01
07 EN15804+A2 Input of secondary material (SM)	kg	0.00E+00
08 EN15804+A2 Use of renewable secondary fuels (RSF)	MJ	0.00E+00
09 EN15804+A2 Use of non renewable secondary fuels (NRSF)	MJ	0.00E+00
10 EN15804+A2 Use of net fresh water (FW)	m ³	1.46E-02
Output flows and waste categories		
01 EN15804+A2 Hazardous waste disposed (HWD)	kg	7.62E-08
02 EN15804+A2 Non-hazardous waste disposed (NHWD)	kg	4.86E-02
03 EN15804+A2 Radioactive waste disposed (RWD)	kg	2.54E-03
Optional indicators		
01 Particulate matter	Disease incidences	6.68E-08
02 Ionising radiation, human health	kBq U235 eq.	1.91E-01
03 Ecotoxicity, freshwater	CTUe	3.86E+01
04 Human toxicity, cancer	CTUh	9.54E-10
05 Human toxicity, non-cancer	CTUh	4.38E-08
06 Land Use	Pt	7.46E+00

Short Chain Polyether Polyol Results

Table 5: LCIA results per 1 kg of Short Chain Polyether Polyol with EN15804+A2 (EF 3.1)

EN15804+A2 (EF 3.1) indicators	Unit	Value
Environmental impact indicators		
01 Climate Change - total	kg CO2 eq.	2.80E+00
02 Climate Change, fossil	kg CO2 eq.	3.16E+00
03 Climate Change, biogenic	kg CO2 eq.	-3.65E-01
04 Climate Change, land use and land use change	kg CO2 eq.	4.55E-03
05 Ozone depletion	kg CFC-11 eq.	3.27E-13
06 Acidification	Mole of H+ eq.	5.38E-03
07 Eutrophication, freshwater	kg P eq.	5.50E-05
08 Eutrophication, marine	kg N eq.	1.89E-03
09 Eutrophication, terrestrial	Mole of N eq.	1.89E-02
10 Photochemical ozone formation, human health	kg NMVOC eq.	5.06E-03
11 Resource use, mineral and metals	kg Sb eq.	8.37E-07
12 Resource use, fossils	MJ	7.38E+01
13 Water use	m ³ world equiv.	2.76E-01
Resource use indicators		
01 EN15804+A2 Use of renewable primary energy (PERE)	MJ	7.46E+00
02 EN15804+A2 Primary energy resources used as raw materials (PERM)	MJ	3.59E+00
03 EN15804+A2 Total use of renewable primary energy resources (PERT)	MJ	1.10E+01
04 EN15804+A2 Use of non-renewable primary energy (PENRE)	MJ	4.29E+01
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM)	MJ	3.09E+01
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT)	MJ	7.39E+01
07 EN15804+A2 Input of secondary material (SM)	kg	0.00E+00
08 EN15804+A2 Use of renewable secondary fuels (RSF)	MJ	0.00E+00
09 EN15804+A2 Use of non renewable secondary fuels (NRSF)	MJ	0.00E+00
10 EN15804+A2 Use of net fresh water (FW)	m ³	3.39E-02
Output flows and waste categories		
01 EN15804+A2 Hazardous waste disposed (HWD)	kg	3.32E-06
02 EN15804+A2 Non-hazardous waste disposed (NHWD)	kg	8.16E-02
03 EN15804+A2 Radioactive waste disposed (RWD)	kg	1.40E-03
Optional indicators		
01 Particulate matter	Disease incidences	5.22E-08
02 Ionising radiation, human health	kBq U235 eq.	1.46E-01
03 Ecotoxicity, freshwater	CTUe	3.34E+01
04 Human toxicity, cancer	CTUh	1.03E-09
05 Human toxicity, non-cancer	CTUh	5.36E-08
06 Land Use	Pt	3.53E+01

Long Chain Polyether Polyol Results

Table 6: LCIA results per 1 kg of Long Chain Polyether Polyol with EN15804+A2 (EF 3.1)

EN15804+A2 (EF 3.1) indicators	Unit	Value
Environmental impact indicators		
01 Climate Change - total	kg CO2 eq.	2.93E+00
02 Climate Change, fossil	kg CO2 eq.	2.95E+00
03 Climate Change, biogenic	kg CO2 eq.	-2.42E-02
04 Climate Change, land use and land use change	kg CO2 eq.	5.03E-03
05 Ozone depletion	kg CFC-11 eq.	3.06E-13
06 Acidification	Mole of H+ eq.	5.55E-03
07 Eutrophication, freshwater	kg P eq.	2.78E-05
08 Eutrophication, marine	kg N eq.	1.76E-03
09 Eutrophication, terrestrial	Mole of N eq.	1.91E-02
10 Photochemical ozone formation, human health	kg NMVOC eq.	5.33E-03
11 Resource use, mineral and metals	kg Sb eq.	5.18E-07
12 Resource use, fossils	MJ	7.90E+01
13 Water use	m ³ world equiv.	2.98E-01
Resource use indicators		
01 EN15804+A2 Use of renewable primary energy (PERE)	MJ	5.74E+00
02 EN15804+A2 Primary energy resources used as raw materials (PERM)	MJ	3.67E-01
03 EN15804+A2 Total use of renewable primary energy resources (PERT)	MJ	6.11E+00
04 EN15804+A2 Use of non-renewable primary energy (PENRE)	MJ	4.49E+01
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM)	MJ	3.41E+01
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT)	MJ	7.90E+01
07 EN15804+A2 Input of secondary material (SM)	kg	0.00E+00
08 EN15804+A2 Use of renewable secondary fuels (RSF)	MJ	0.00E+00
09 EN15804+A2 Use of non renewable secondary fuels (NRSF)	MJ	0.00E+00
10 EN15804+A2 Use of net fresh water (FW)	m3	1.93E-02
Output flows and waste categories		
01 EN15804+A2 Hazardous waste disposed (HWD)	kg	6.31E-08
02 EN15804+A2 Non-hazardous waste disposed (NHWD)	kg	6.15E-02
03 EN15804+A2 Radioactive waste disposed (RWD)	kg	1.35E-03
Optional indicators		
01 Particulate matter	Disease incidences	5.02E-08
02 Ionising radiation, human health	kBq U235 eq.	1.33E-01
03 Ecotoxicity, freshwater	CTUe	4.05E+01
04 Human toxicity, cancer	CTUh	1.16E-09
05 Human toxicity, non-cancer	CTUh	6.36E-08
06 Land Use	Pt	9.56E+00