



HYDRUS 2.0 M-Bus DN20/190

Environmental Product Declaration

Declaration of general information

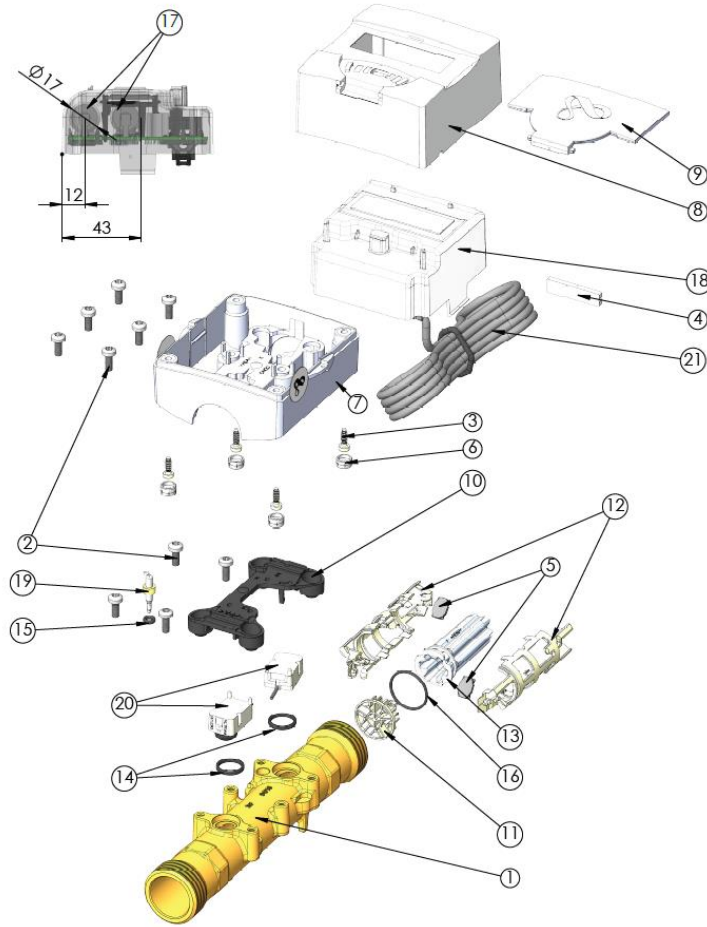
This Environmental Product Declaration (EPD) is based on a life cycle assessment (LCA) conducted by EVEA LCA experts. This study is part of Diehl Metering eco-design approach.

The EPD is dedicated to the communication between Diehl Metering and its customers (Business to Business).

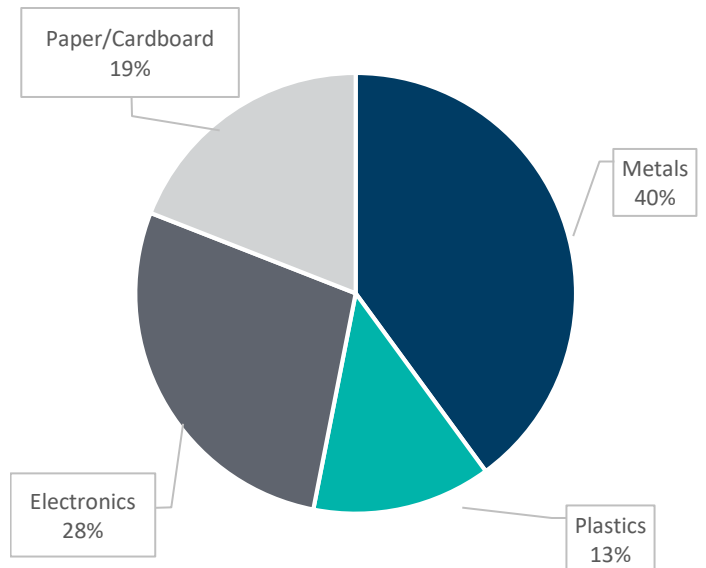
The corresponding project report has been published in June 2021.

The life cycle assessment of HYDRUS 2.0 M-Bus has been performed with SimaPro 9.1 (preferred database: Ecoinvent v3.6; impact assessment according to Method EN 15804 A2_FR_Ev-DEC 1.04_ei3.6, developed by EVEA).

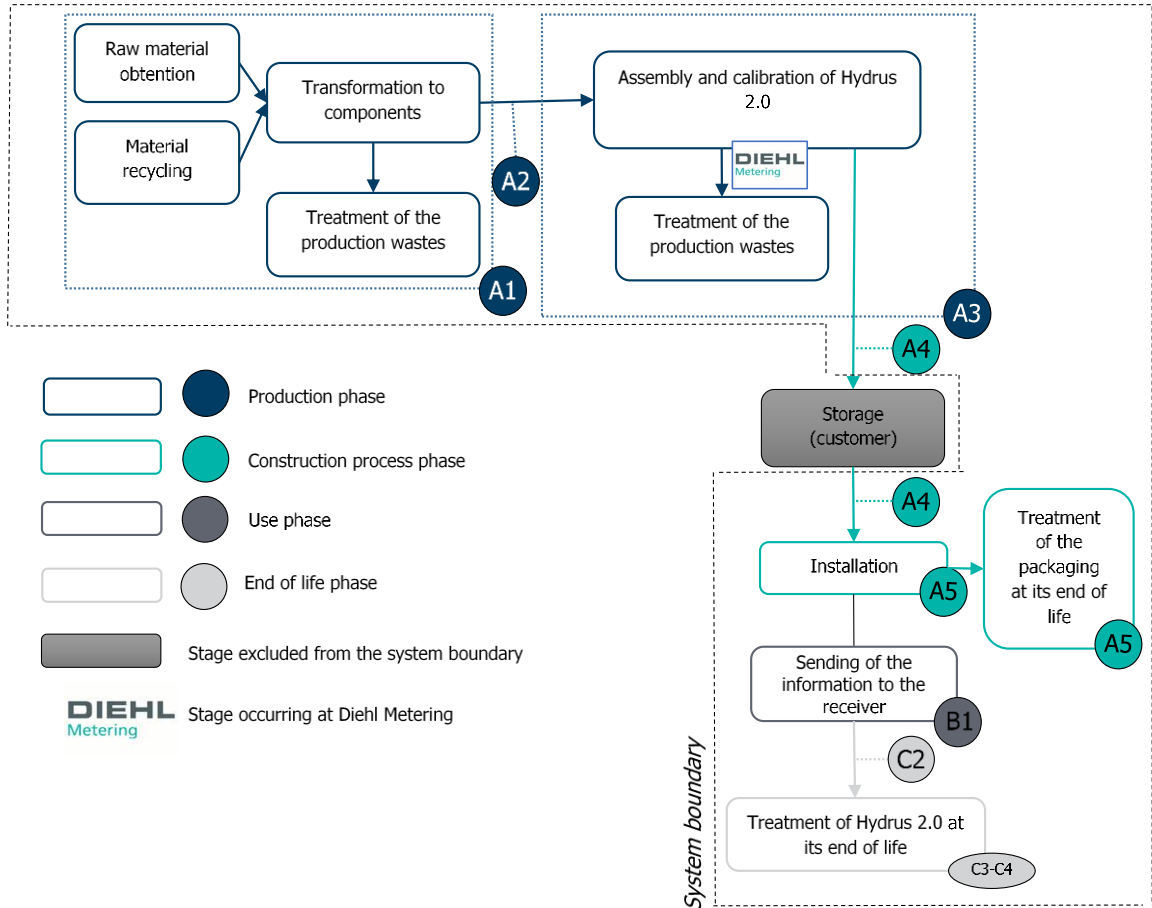
Description and declared unit	HYDRUS 2.0 RESIDENTIAL is a static water meter operating on ultrasonic measuring technology. It has been developed within the framework of the MID, complies with the European regulations and holds sanitary conformity certificates.
Functional unit	Measure a volume of potable water on a flowrate range of 1.4 l/h to 3125 l/h and a temperature range between 0.1°C to 90°C in compliance with MID (Measuring Instrument Directive, 2014/32/EU directive) regulation, at R = 800 and transmit this index via M-Bus during 16 years in standard use and temperatures conditions.
Packaging	The product is placed in a cardboard. A plug is screwed in the extremity of each side of the water meter. The packaging of the raw material and the packaging of the components are considered (cardboard and pallet). Some of them are reusable packaging, (mass allocation). They are considered to be reused 200 times.



	Component	Weight (g)
1	Body	407,0
2	Screws	15,6
3	Screws	3,2
4	Sheet	5,8
5	Reflectors	2,6
6	Cap housing	0,2
7	Register lower part	49,6
8	Register upper part	52,1
9	Lid	10,6
10	Fixation	12,5
11	Strainer	1,6
12	Brackets	7,0
13	Measuring pipe	6,3
14, 15 & 16	O-rings	3,0
17	Batteries	43,8
18	Calculator	219,6
19	NTC	1,9
20	Transducers	12,4
21	Cable	25,2
Total		879,91



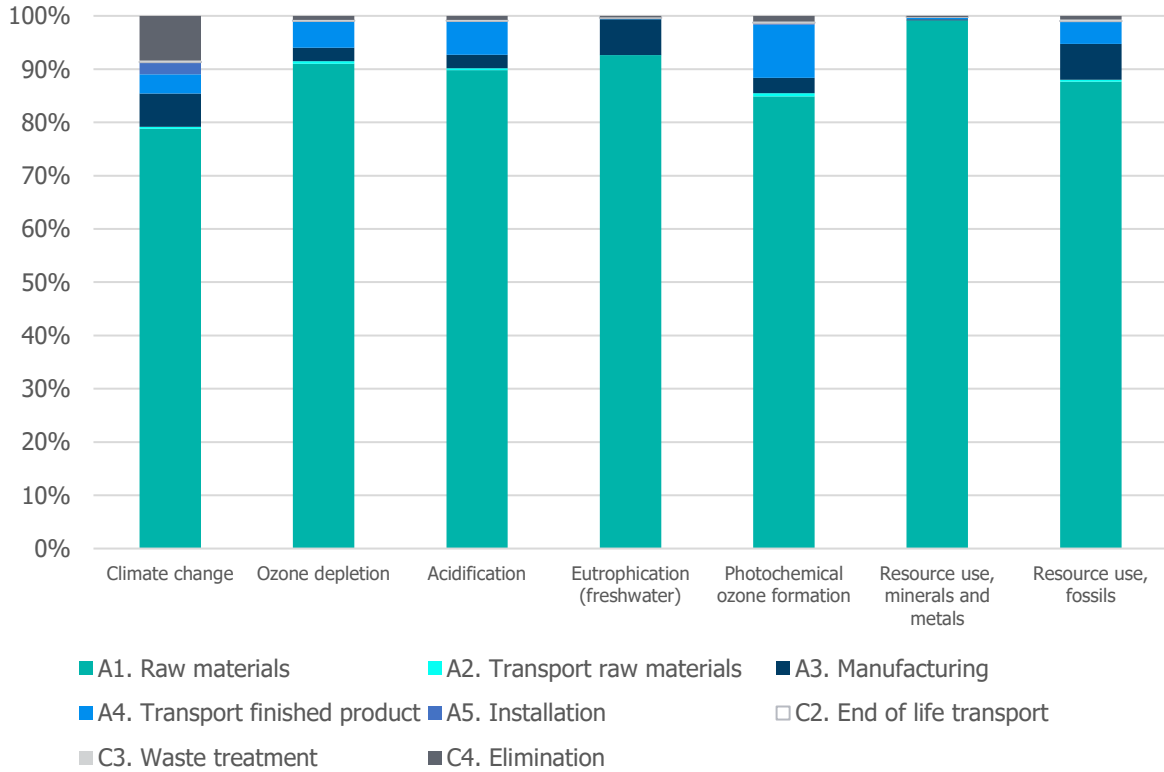
Declaration of environmental parameters derived from LCA



Type of EPD	This is a “cradle to grave” EPD, the stages from raw material obtaining to the end of life treatment are covered as shown on the figure below
System boundary	All modules according the standard EN 15804 are taken into account, shown in the figure above. In addition, module D (costs and benefits outside the system’s borders) is considered.
Additional information on the release of dangerous substances in the indoor air, soil and water during use stage	HYDRUS 2.0 RESIDENTIAL is covered by no harmonised test method related to the measurement of the release of dangerous substances in the indoor air, soil and water during use stage. Thus, according to chapter 7.4 of NF EN 15804 standard, this study does not need to contain this information. No test is available. Nevertheless, HYDRUS 2.0 RESIDENTIAL is approved for potable water contact according to ACS, WRAS, Belgaqua and KTW BWGL.

Life cycle assessment results HYDRUS 2.0 M-Bus DN20/190

Indicators describing environmental impacts per life cycle phase and per impact category



Impact category	Unit	Total*	A1. Raw materials	A2. Transport Raw materials	A3. Manufacturing	A4. Transport finished product	A5. Installation	C2. Transport	C3. Waste treatment	C4. Elimination	D. Benefits
Climate change - total	kg CO2 eq	10,06	7,94	0,03	0,63	0,36	0,23	1,67E-04	0,03	0,84	-0,63
Climate change - fossil	kg CO2 eq	9,79	7,88	0,03	0,61	0,36	0,03	1,67E-04	0,03	0,84	-0,63
Climate change - biogenic	kg CO2 eq	0,27	0,05	1,27E-05	0,02	1,32E-04	0,20	6,80E-08	7,67E-05	3,19E-03	-1,20E-03
Climate change - land use and change	kg CO2 eq	0,01	0,01	1,31E-05	2,23E-03	1,67E-04	3,94E-06	5,83E-08	3,89E-05	8,22E-05	-8,28E-04
Ozone depletion	kg CFC11 eq	1,61E-06	1,47E-06	7,32E-09	4,09E-08	7,92E-08	2,14E-09	3,79E-11	2,92E-09	1,21E-08	-6,44E-08
Acidification	mol H+ eq	0,08	0,07	2,67E-04	1,98E-03	4,83E-03	8,43E-05	6,81E-07	1,50E-04	5,92E-04	3,46E-03
Eutrophication, freshwater	kg P eq	0,01	9,38E-03	2,24E-06	6,80E-04	2,25E-05	1,31E-06	1,22E-08	1,17E-05	2,80E-05	5,44E-04
Eutrophication, marine	kg N eq	0,02	0,01	7,18E-05	7,27E-04	1,24E-03	2,14E-04	2,04E-07	3,12E-05	1,71E-04	-4,70E-04
Eutrophication, terrestrial	mol N eq	0,13	0,11	7,92E-04	5,54E-03	0,01	3,22E-04	2,23E-06	3,37E-04	1,50E-03	-3,72E-03
Photochemical ozone formation	kg NMVOC eq	0,04	0,03	2,23E-04	1,06E-03	3,71E-03	1,41E-04	6,84E-07	9,24E-05	3,89E-04	-1,03E-03
Resource use, minerals and metals	kg Sb eq	1,87E-03	1,86E-03	7,95E-07	4,00E-06	7,49E-06	1,65E-07	4,51E-09	8,48E-07	3,46E-06	-1,73E-03
Resource use, fossils	MJ	125,92	110,35	0,48	8,50	5,19	0,12	2,51E-03	0,42	0,84	-8,91
Water use	m3 depriv.	2,68	2,54	1,27E-03	0,09	0,01	1,70E-03	7,00E-06	3,80E-03	0,03	-0,08
Particulate Matter	disease inc.	4,46E-07	4,00E-07	2,10E-09	1,38E-08	2,07E-08	8,43E-10	1,16E-11	1,46E-09	6,77E-09	-5,48E-09
Ionising radiation, human health	kBq U-235 eq	1,08	0,94	2,45E-03	0,09	0,03	9,82E-04	1,30E-05	3,45E-03	7,48E-03	-0,07
Ecotoxicity, freshwater	CTUe	1,48E+03	1,43E+03	0,38	40,95	3,92	0,76	2,01E-03	0,69	5,91	42,65
Human toxicity, cancer	CTUh	1,78E-08	1,67E-08	1,22E-11	1,78E-10	1,50E-10	4,00E-11	5,66E-14	1,64E-11	7,02E-10	5,30E-10
Human toxicity, non-cancer	CTUh	5,68E-07	5,53E-07	4,01E-10	6,09E-09	3,99E-09	6,68E-10	2,19E-12	8,34E-10	3,43E-09	7,59E-08
Land use	Pt	71,83	60,94	0,43	5,61	3,84	0,18	2,54E-03	0,28	0,55	-1,50
Renewable primary energy excl. RM	MJ, net CV	11,87	10,39	6,38E-03	1,14	0,06	7,54E-03	3,55E-05	0,10	0,17	-0,43
Renewable primary energy used as RM	MJ, net CV	0,09	0,04	0	0,05	0	0	0	0	0	0
Total renewable primary energy	MJ, net CV	11,96	10,43	6,38E-03	1,19	0,06	7,54E-03	3,55E-05	0,10	0,17	-0,43
Non renewable primary energy excl. RM	MJ, net CV	111,24	96,31	0,48	7,86	5,19	0,12	2,51E-03	0,42	0,84	-8,88

Impact category	Unit	Total*	A1. Raw materials	A2. Transport Raw materials	A3. Manufacturing	A4. Transport finished product	A5. Installation	C2. Transport	C3. Waste treatment	C4. Elimination	D. Benefits
Non renewable primary energy used as RM	MJ, net CV	14,43	13,81	0	0,62	0	0	0	0	0	0
Total non renewable primary energy	MJ, net CV	125,60	110,05	0,48	8,48	5,19	0,12	2,51E-03	0,42	0,84	-8,88
Use of secondary material	kg	0,38	0,38	0	0	0	0	0	0	0	-0,38
Use of renewable secondary fuels	MJ, net CV	0	0	0	0	0	0	0	0	0	0
Use of non renewable secondary fuels	MJ, net CV	0	0	0	0	0	0	0	0	0	0
Net use of fresh water	m3	0,09	0,09	4,65E-05	5,36E-03	4,50E-04	1,28E-04	2,60E-07	1,63E-04	1,68E-03	-3,34E-03
Hazardous waste disposed	kg	0,67	0,59	3,20E-04	0,01	3,58E-03	1,89E-03	1,62E-06	1,07E-03	0,07	-3,48E-03
Non hazardous waste disposed	kg	7,91	7,35	0,02	0,15	0,20	0,11	1,32E-04	0,02	0,05	-0,10
Radioactive waste disposed	kg	3,92E-04	3,16E-04	3,30E-06	3,11E-05	3,56E-05	7,82E-07	1,71E-08	1,67E-06	3,24E-06	-2,47E-05
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0,48	0	0	0,09	0	0	0	0,39	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0
Exported energy - electricity	MJ	1,60	0	0	2,76E-04	0	0,19	0	0	1,41	0
Exported energy - steam	MJ	2,90	0	0	5,64E-04	0	0,39	0	0	2,51	0
Exported energy - gas and process	MJ	0	0	0	0	0	0	0	0	0	0

B1-B7 and C1 stages are included to the scope of this study. There is no impact related to these stage whatever the impact category.

*Total includes all the stages, which are part of the system boundary (A1 to C4). Module D is not included in the system boundary.