ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

JRG SANIPEX PE-Xa PIPES IN CONDUIT

GEORG FISCHER JRG AG

EPD HUB, HUB-0370
Publishing date 4 April 2023, last updated date 4 April 2023, valid until 4 April 2028

Environmental Product Declaration created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Georg Fischer JRG AG
Address	Hauptstrasse 130, 4450 Sissach, Switzerland
Contact details	info.jrg.ps@georgfischer.com
Website	www.gfps.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Laura Bianchi, GF Piping Systems Ltd.
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	H.N, as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	JRG Sanipex PE-Xa pipes in conduit
Additional labels	-
Product reference	5706.012 (355622831, 355622801), 5706.212 (355622811), 5706.016 (355447331, 355447301), 5706.216 (355447320), 5706.020 (355553131, 355553101)
Place of production	Verona (Italy)
Period for data	2021
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	-

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	2.97
GWP-total, A1-A3 (kgCO2e)	2.97
Secondary material, inputs (%)	2.9
Secondary material, outputs (%)	0.0
Total energy use, A1-A3 (kWh)	11.5
Total water use, A1-A3 (m3e)	0.0213

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

GF Piping Systems is one of the three divisions within Georg Fischer Corporation and a leading provider of plastic and metal piping systems with global market presence. The product portfolio includes pipes, fittings, valves and the corresponding automation and jointing technology for industry and building technology as well as for water and gas utilities. Georg Fischer Piping Systems proactively incorporates its environmental responsibility into its everyday business activities. Because we understand environmental awareness as one of the corporation‘s core values, internal structures and processes are geared towards sustainability. Within this context, we increasingly utilize Life Cycle Assessments (LCA) to gain insight into the different life cycle phases of our systems. GF JRG is the building technology competence centre within this chain and offers high quality, innovative products and customer- and application oriented solutions. We have been setting standards since 1802 and are well known as a reliable partner with production sites and sales companies worldwide.

PRODUCT DESCRIPTION

JRG Sanipex is the world's first plastic pipe in pipe drinking water installation system. For more than 40 years it has been constantly updated to reflect the latest technology and needs of the market.
The unique cone grip connection guarantees a secure and water pocket-free connection with full flow. It can be removed at any time and requires no additional sealing materials.
The pipe in pipe technology allows the pipes to be laid directly into concrete or other building structures (e.g. timber constructions) because the PE-X pipes within the conduit can be replaced if needed and installed according the technical recommendations. Furthermore this can be done without damaging floors or tiles if our special boxes are used and the manifolds are visible or easily accessible as for example in a cabinet.

This EPD covers the JRG Sanipex PE-Xa pipes in conduit made of cross-linked polyethylene.
Our high quality pipes with conduit are mainly used for tap water.
The pipes have very good long-term properties and a low corrosion and incrustation potential as well as a low roughness coefficient.
The pipes also have the advantage of not being affected so much by high water speeds or aggressive waters, not emitting taste, smell, heavy metals or harmful substances into drinking water and all JRG Sanipex pipes with conduit are in accordance with the new hygienic requirement in the Positive Lists for Organic Materials, 4MS Common Approach.
JRG Sanipex is mainly made for drinking water and hot and cold domestic potable water distributions, but can be also used for heating, ventilation and air conditioning applications (HVAC) as well as residential firefighting systems (e.g. water mist) by using pipes with oxygen barriers and/or other special components.

Further information can be found at www.gfps.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0	-
Minerals	0	-
Fossil materials	100	EU, USA
Bio-based materials	0	-

BIOGENIC CARBON CONTENT

Product’s biogenic carbon content at the factory gate.

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.01713

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg
Mass per declared unit	1 kg

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol	Transport	Waste	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

JRG Sanipex PE-Xa pipe in conduit is manufactured from high density polyethylene, cross-linking additive and stabilizers. The materials are mixed after which the mix is fed into an extruder where the material melts and is cross-linked by heat. The cross-linked pipe is calibrated to correct dimension, cooled, coiled and packed. Specific transport distances for the supply of raw materials were taken into account and data for transport type from Ecoinvent were selected. The extruded pipe subjected to quality control and inserted in the conduit pipe also made of HDPE. Medium and conduit pipes are marked and the coils are packed in cardboard boxes. Packed coils are shipped on EUR-pallets. In this EPD 46% of the PE-Xa pipe in conduit is manufactured in GF Piping Systems plant in Italy and 56% is supplied from an external company in northern Europe. The wastes generated during manufacturing consist mainly of discarded pipes and packaging of purchased raw material and are entirely recycled. Wastewater is collected separately and treated in an external wastewater recycling plant.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

A4 - Transport to the building site

The transportation distance is defined according to the PCR. Average distances from the manufacturing plant to the installation sites are based on actual sales average figures. The transportation vehicle is assumed to be lorry for road transports and container ship for sea transport. It is assumed that vehicles travel at full load capacity and that the return trips are used by transportation companies to ship other customers goods. There is no material loss during transportation as the coils are well packed.

A5 - Installation into the building site

The product is installed manually. The environmental impacts from waste packaging material are considered as well as those from installation losses, which are estimated to be 1% of the declared unit (according to TEPPFA Life Cycle Assessment of a PEX Hot & Cold water pipe system for hot and cold water in the building). The installation of the pipes is possible only via supporting clamps (both in plastics and metal). The environmental impacts related to the clamps production and transport to building site are taken into account in this stage. Cardboard packaging is recycled, plastic

packaging is in part recycled and in part incinerated and installation losses are landfilled. EUR-pallets are reused multiple times to transport new goods but in this EPD it is conservatively assumed that EUR-pallets are just used once.

PRODUCT USE AND MAINTENANCE (B1-B7)

The use phase is not declared in this EPD.

PRODUCT END OF LIFE (C1-C4, D)

C1 – Deconstruction

The removal of the pipes happens when the building is demolished. The pipes are not structural components of the building and the consumption of energy for disassembling the end-of-life product is negligible. For these reasons the impacts of demolition are assumed to be zero.

C2 - Transport to waste processing

The distance to transport the end-of-life product form the demolition site to the closest facility is assumed to be 50 km and the transport vehicle lorry.

C3 - Waste processing for reuse, recovery and/or recycling

According to research studies, it realistic to assume that 75% of the end-of-life plastic pipes and clamps are incinerated with energy recovery, and 15% is recycled. According to the World Steel Association 95% of the metal clamps are recycled.

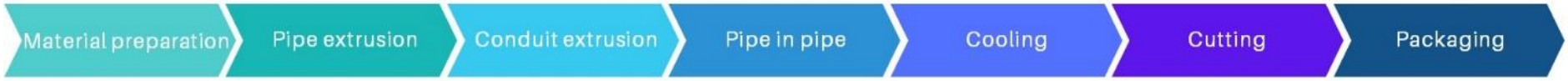
C4 – Disposal

The remaining 10% of end-of-life plastic pipes and clamps and 5% of metal clamps are landfilled.

D - Benefits and loads beyond the system boundary

Due to the waste recycling and incineration with energy recovery associated to the waste generated during the product lifecycle some environmental benefits and loads are generated and taken into account in module D. Recycled material is generated from plastic, cardboard and wood packaging during installation and end-of-life products. Electrical energy and heat are generated during the incineration of plastic packaging and end-of-life products.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	-
Variation in GWP-fossil for A1-A3	-

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent 3.8 and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1 – B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	2,61E0	6,65E-2	2,87E-1	2,97E0	2,64E-2	4,11E-1	MND	0E0	0E0	2,38E0	1,49E-2	0E0
GWP – fossil	kg CO_2e	2,56E0	1,31E-1	2,76E-1	2,97E0	2,67E-2	3,44E-1	MND	0E0	0E0	2,38E0	1,48E-2	-2E0
GWP – biogenic	kg CO_2e	4,82E-2	2,09E-4	1,05E-2	5,9E-2	0E0	6,63E-2	MND	0E0	0E0	2,98E-3	1,41E-5	-1,27E-1
GWP – LULUC	kg CO_2e	1,08E-3	4,72E-5	3,14E-4	1,44E-3	9,6E-6	2,24E-4	MND	0E0	0E0	2,78E-5	1,14E-6	-1,96E-3
Ozone depletion pot.	kg CFC_{-11}e	6,69E-7	3,13E-8	3,48E-8	7,36E-7	6,38E-9	1,84E-8	MND	0E0	0E0	2,58E-9	3,28E-10	-9,66E-8
Acidification potential	mol H^+e	8,61E-3	5,51E-4	1,39E-3	1,05E-2	1,11E-4	2,64E-3	MND	0E0	0E0	3,77E-4	9,31E-6	-1,43E-2
EP-freshwater	kg Pe	1,61E-5	8,98E-7	1,03E-5	2,72E-5	1,83E-7	1,33E-5	MND	0E0	0E0	6,79E-7	1,78E-8	-7,17E-5
EP-marine	kg Ne	1,52E-3	1,67E-4	2,49E-4	1,94E-3	3,37E-5	2,96E-4	MND	0E0	0E0	1,66E-4	5,7E-6	-1,72E-3
EP-terrestrial	mol Ne	1,7E-2	1,84E-3	2,64E-3	2,14E-2	3,72E-4	8,51E-3	MND	0E0	0E0	1,78E-3	3,44E-5	-2,08E-2
POCP (“smog”)	kg NMVOCe	7,99E-3	5,9E-4	7,48E-4	9,33E-3	1,2E-4	1,28E-3	MND	0E0	0E0	4,42E-4	1,32E-5	-6,37E-3
ADP-minerals & metals	kg Sbe	2,18E-5	3,08E-7	2,5E-6	2,46E-5	6,27E-8	7,18E-6	MND	0E0	0E0	4,32E-7	3,68E-9	-5,07E-6
ADP-fossil resources	MJ	8,06E1	2,01E0	4,21E0	8,68E1	4,08E-1	6,6E0	MND	0E0	0E0	3,17E-1	2,51E-2	-3,19E1
Water use	m^3e depr.	1,37E0	9,27E-3	1,68E-1	1,55E0	1,89E-3	1,58E-1	MND	0E0	0E0	7,13E-2	1,5E-4	-3,12E-1

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1 – B7	C1	C2	C3	C4	D
Particulate matter	Incidence	8,47E-8	1,54E-8	1,21E-8	1,12E-7	3,14E-9	3,03E-8	MND	0E0	0E0	8,19E-9	1,86E-10	-1,35E-7
Ionizing radiation	kBq U235e	1,02E-1	1,03E-2	3,86E-2	1,51E-1	2,1E-3	3,49E-2	MND	0E0	0E0	1,09E-3	1,21E-4	-4,15E-1
Ecotoxicity (freshwater)	CTUe	1,65E1	1,67E0	3,74E0	2,19E1	3,4E-1	8,72E0	MND	0E0	0E0	1,23E0	2,67E-2	-4,14E1
Human toxicity, cancer	CTUh	7,87E-10	4,41E-11	1,5E-10	9,82E-10	8,96E-12	1,1E-9	MND	0E0	0E0	1,53E-10	8,18E-13	6,44E-11
Human tox. non-cancer	CTUh	1,7E-8	1,77E-9	3,73E-9	2,25E-8	3,6E-10	6,53E-9	MND	0E0	0E0	3,7E-9	1,58E-11	-1,35E-8
SQP	-	2,57E0	2,34E0	7,98E0	1,29E1	4,76E-1	1,12E0	MND	0E0	0E0	2,6E-1	6,04E-2	-2,28E1

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1 – B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	6,08E0	2,6E-2	1,53E0	7,64E0	5,29E-3	-3,28E-1	MND	0E0	0E0	1,63E-2	4,64E-4	-5,82E0
Renew. PER as material	MJ	2,9E-2	0E0	9,08E-1	9,37E-1	0E0	-9,06E-1	MND	0E0	0E0	0E0	0E0	7,89E-1
Total use of renew. PER	MJ	6,11E0	2,6E-2	2,44E0	8,58E0	5,29E-3	-1,23E0	MND	0E0	0E0	1,63E-2	4,64E-4	-5,03E0
Non-re. PER as energy	MJ	2,95E1	2,01E0	2,35E0	3,39E1	4,09E-1	3,89E0	MND	0E0	0E0	-3,96E1	-4,22E0	-3,19E1
Non-re. PER as material	MJ	4,86E1	0E0	-1,61E0	4,7E1	0E0	1,62E0	MND	0E0	0E0	-4,82E1	-6,33E-1	4,38E1
Total use of non-re. PER	MJ	7,82E1	2,01E0	7,47E-1	8,09E1	4,09E-1	5,51E0	MND	0E0	0E0	-8,78E1	-4,85E0	1,19E1
Secondary materials	kg	4,26E-3	5,66E-4	2,42E-2	2,9E-2	1,15E-4	1,54E-2	MND	0E0	0E0	8,61E-4	8,89E-6	2,49E-1
Renew. secondary fuels	MJ	4,48E-5	4,99E-6	3,11E-3	3,16E-3	1,02E-6	8,11E-4	MND	0E0	0E0	6,98E-6	3,41E-7	-2,86E-3
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	1,62E-2	2,66E-4	4,81E-3	0.0213	5,42E-5	3,91E-3	MND	0E0	0E0	2,83E-4	2,69E-5	-2,08E-2

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1 – B7	C1	C2	C3	C4	D
Hazardous waste	kg	6,37E-2	2,15E-3	2,16E-2	8,75E-2	4,38E-4	7,63E-2	MND	0E0	0E0	1,69E-3	0E0	-1,72E-1
Non-hazardous waste	kg	1,87E0	3,75E-2	3,88E-1	2,3E0	7,62E-3	5,74E-1	MND	0E0	0E0	7,99E-1	1,04E-1	-5,59E0
Radioactive waste	kg	5,27E-5	1,39E-5	1,25E-5	7,9E-5	2,82E-6	1,23E-5	MND	0E0	0E0	3,59E-7	0E0	-1,2E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1 – B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	1,29E-1	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	1,57E-2	0E0	4,31E-2	5,89E-2	0E0	1,04E-1	MND	0E0	0E0	1,6E-1	0E0	0E0
Materials for energy rec	kg	6,96E-2	0E0	0E0	6,96E-2	0E0	0E0	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	8,38E-2	MND	0E0	0E0	2,46E1	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1 – B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	2,41E0	1,3E-1	2,72E-1	2,81E0	2,64E-2	3,32E-1	MND	0E0	0E0	2,38E0	1,21E-2	-1,94E0
Ozone depletion Pot.	kg $CFC_{-11}e$	8,63E-7	2,48E-8	3,02E-8	9,18E-7	5,05E-9	1,71E-8	MND	0E0	0E0	2,24E-9	2,61E-10	-8E-8
Acidification	kg SO_2e	7,11E-3	4,27E-4	1,13E-3	8,67E-3	8,63E-5	1,81E-3	MND	0E0	0E0	2,7E-4	7,07E-6	-1,21E-2
Eutrophication	kg PO_4^3e	1,91E-3	9,52E-5	6,07E-4	2,61E-3	1,93E-5	7,67E-4	MND	0E0	0E0	3,78E-4	5,58E-4	-2,79E-3
POCP (“smog”)	kg C_2H_4e	7,13E-4	1,68E-5	6,15E-5	7,92E-4	3,4E-6	1,24E-4	MND	0E0	0E0	9,11E-6	2,19E-6	-6,16E-4
ADP-elements	kg Sbe	2,17E-5	3E-7	2,48E-6	2,45E-5	6,09E-8	7,15E-6	MND	0E0	0E0	4,19E-7	3,56E-9	-5,07E-6
ADP-fossil	MJ	8,06E1	2,01E0	4,21E0	8,68E1	4,08E-1	6,6E0	MND	0E0	0E0	3,17E-1	2,51E-2	-3,15E1

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online.
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
04.04.2023

VERIFIED ISO 14025

ANNEX 1: CONVERSION TABLE FOR PRODUCT STAGE (A1-A3) GWP – EN 15804+A2, PEF

Catalogue number	Product number (GF Code)	Product description Coils with conduit d x s [mm]	Unit product weight [kg/m]	GWP - total, Stages A1-A3, [kg CO2e/m]	Product length [m]	GWP - total, Stages A1-A3, [kg CO2e]
5706.012	355 622 831	d12x1.7	0.094	0.279	50	13.96
5706.012	355 622 801	d12x1.7	0.094	0.279	50	13.96
5706.212	355 622 811	d12x1.7	0.094	0.279	200	55.84
5706.016	355 447 331	d16x2.2	0.158	0.469	50	23.46
5706.016	355 447 301	d16x2.2	0.158	0.469	50	23.46
5706.216	355 447 320	d16x2.2	0.158	0.469	200	93.85
5706.020	355 553 131	d20x2.8	0.239	0.710	50	35.49
5706.020	355 553 101	d20x2.8	0.239	0.710	50	35.49

ANNEX 2: CONVERSION TABLE FOR PRODUCT STAGE (A1-A3) GWP – EN 15804+A1, CML / ISO 21930

Catalogue number	Product number (GF Code)	Product description Coils with conduit d x s [mm]	Unit product weight [kg/m]	GWP - total, Stages A1-A3, [kg CO2e/m]	Product length [m]	GWP - total, Stages A1-A3, [kg CO2e]
5706.012	355 622 831	d12x1.7	0.094	0.264	50	13.21
5706.012	355 622 801	d12x1.7	0.094	0.264	50	13.21
5706.212	355 622 811	d12x1.7	0.094	0.264	200	52.83
5706.016	355 447 331	d16x2.2	0.158	0.444	50	22.20
5706.016	355 447 301	d16x2.2	0.158	0.444	50	22.20
5706.216	355 447 320	d16x2.2	0.158	0.444	200	88.80
5706.020	355 553 131	d20x2.8	0.239	0.672	50	33.58
5706.020	355 553 101	d20x2.8	0.239	0.672	50	33.58