

Recyclability assessment *

Date: December 3, 2019

IBM Power Server 8335 GCA

Part/Sub-Assembly	Mass (g)	Qty	Mass (g)/System	Recyclability rate**	Recyclable mass (g)
Central Processing Unit Bulkhead	197.4	1	197.4	97%	191
Fan Bulkhead	272.5	1	272.5	90%	245
Power Supply Baffle	47.2	1	47.2	97%	46
USB Bracket	23.9	1	23.9	97%	23
USB Cable	24.3	1	24.3	97%	24
ISRDIMM(dual in-line memory module)	18.8	32	601.6	97%	584
Circuit board W/Hardware	307.8	8	2462.4	100%	2462.4
Circuit board W/Hardware	81.9	1	81.9	100%	81.9
Circuit board W/Hardware	89.6	1	89.6	100%	89.6
HD Mini SAS Cable	15.8	1	15.8	97%	15
Power Cable	59.6	1	59.6	97%	58
1300W Power Supply	996.4	2	1992.8	97%	1933
Graphics processing unit (GPU) assembly w/o GPU	611.9	2	1223.8	97%	1187
K80 Graphics Processing Unit	999.1	2	1998.2	97%	1938
Heatsink	425.7	2	851.4	93%	792
Circuit board W/ Hardware	2910.7	1	2910.7	97%	2823
Fan Assembly	734.4	4	2937.6	97%	2849
Chassis Assembly	5094.9	1	5094.9	97%	4942
Lid (cover - steel)	2278.4	1	2278.4	100%	2278.4
Hard Disk Drive Assembly	242.1	2	484.2	92%	445
Sum ***			23648.2 g		23007.3

Recyclability rate: $R_{recy} = \frac{\sum(m_{i0}) \times RCR_{i0}}{m_{EEE}} \times 100\% = 97\%$

Symbols and definitions

m_{i0} = Mass of i^{th} part

RCR_{i0} = Recycling rate of the i^{th} part in the corresponding end-of-life treatment scenario

R_{recy} = Recyclability rate

m_{EEE} = Total product mass

* This recyclability assessment is based on the format in the International Electrotechnical Commission (IEC) 62635 Standard Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment. Recyclability is defined by the standard to be "ability of waste product to be recycled, based on actual practices." The recyclability rate calculation equation is defined by this standard. Products were assessed based on the results of reuse, recycling, and/or disposal at IBM's Product End-of-Life Management suppliers. The 2016 results for IBM product end-of-life management are attached to the right. The IBM and the Environment 2016 Annual report is located at <https://www.ibm.com/ibm/environment/annual/reporting.shtml>

** Assumptions - Recyclability rates projected for this product and parts are based on knowledge of the product material composition, publicly available reference sources for recyclability of materials (see references below) and on the overall results of IBM's product end-of-life management vendors. Where there is a publicly available recyclability rate for a commodity or assembly, such as those in the JRC Technical Report below, that rate is used. Where there is not a publicly available recyclability rate, the overall rate of 97% was chosen because that is the documented and actual recycling rates from IBM Product End of Life Management vendors. The 97% is the actual recyclability of IBM products as reported from IBM PELM vendors and the available infrastructure. According to NSF/ANSI 426-2018 - Printed circuit board substrate material, included in printed circuit boards that will be sent to a smelter for metals recycling, shall be considered recyclable for the purpose of the calculation.

*** This POWER server is unique in content based on customer ordering. The weight will vary based on content of the server. The bill of material provided here is an example for this product and that which is used for the Installation Planning manual.

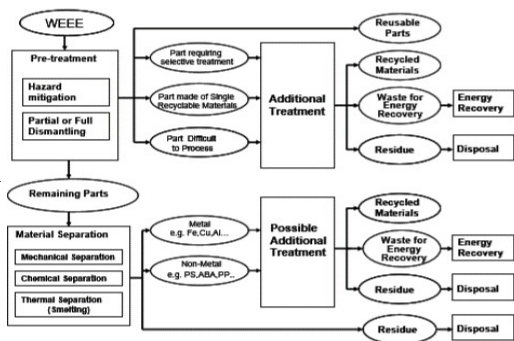
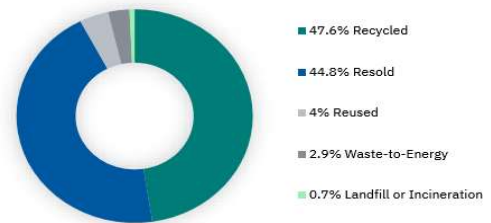
**** References: IEC/TR 62635, "Technical Report IEC/TR 62635. Guidelines for End of Life information provision from manufacturers and recyclers, and for recyclability rate calculation of Electrical and Electronic Equipment." The International Electrotechnical Commission (IEC), 2012

P. Chanceler and M. Marwede, JRC Technical Reports, Feasibility study for setting-up reference values to support the calculation of recyclability / recoverability rates of elect(ron)ic products August 2016 and NSF/ANSI 426 - 2018 Environmental Leadership and Corporate Social Responsibility Assessment of Servers

End of life treatment methodology - The methodology for recycling technologies and practices for this product generally follow the end-of-life treatment process as outlined by IEC/TR62635. See the process flow diagram to the right. Disassembly of the product is required to sort into recycling streams based on the infrastructure available to the dismantler. Generally circuit cards, backplanes, processors, etc. would go to a precious metal recycler. Metal covers, chassis, brackets, screws, etc to a metal smelter. Plastic parts such as the bezel, covers, etc. would go to a plastic recycler.

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Product end-of-life processing methods



End-of-life treatment processes from IEC/TR 62635