

Recyclability assessment \*

Date: December 3, 2019

IBM Power Server 8247 22L 8284 22A

Brand name =	IBM				
Model name =	8247 22L 8284 22A		Product weight =	28.66 kg	
Part/Sub-Assembly	Mass (g)	Qty	Mass/System	Recyclability rate**	Recyclable mass (g)
Frame Assembly	7270	1	7270	97%	7052
CDIMM (dual in-line memory module)	110	16	1760	97%	1707
Planar Assembly	5450	1	5450	97%	5287
Heatsink Assembly	680	2	1360	93%	1265
Power Supply Assembly	1070	2	2140	97%	2076
Direct access storage device (DASD) Backplane	1090	1	1090	100%	1090
Solid State Drive (SSD) 1.8"	90	6	540	82%	443
Direct Access Storage Drive (DASD) 2.5"	360	8	2880	92%	2650
SAS Redundant Array of Independent Disks (RAID) Card	550	2	1100	100%	1100
Peripheral Component Interconnect (PCI) Card	360	8	2880	100%	2880
Ethernet Card	140	1	140	100%	140
USB Card	140	1	140	100%	140
Fan Assembly	300	6	1800	90%	1620
DVD Drive Assembly	110	1	110	97%	107
Sum ***			28660 g		27557 g

Recyclability rate:  $R_{rcy} = \frac{\sum(m_{(i)} \times RCR_{(i)})}{m_{EEE}} \times 100\% = 96\%$

Symbols and definitions

$m_{(i)}$  = Mass of  $i^{th}$  part

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

$R_{rcy}$  = 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 2018 results for IBM product end-of-life management are attached to the right. The IBM and the Environment 2018 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, publically 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 publically 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 publically 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.

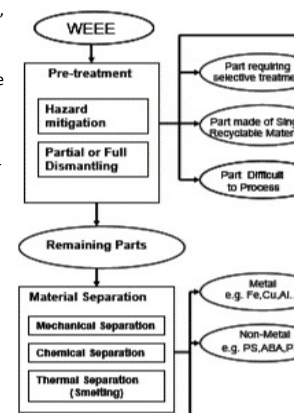
\*\*\*\* References: IEC/TR 62635, "Technical Report IEC/TR 62635. Guidelines for End of Life information provision from manufacturers and recyclers, and for recyclability rate calculation of Electrical and Electronic Equipment." The International Electrotechnical Commission (IEC), 2012;

P. Chancerel and M. Marwede, JRC Technical Reports, Feasibility study for setting-up reference values to support the calculation of recyclability / recoverability rates of electr(on)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



End-of-life treatment processes from

## Processing methods

