Recyclability assessment *
Date: November 25, 2019
IBM Power Server 8408 44E

Brand name =	IBM				
Model name =	8408 44E		Product weight =	69.05 kg	

Part/Sub-Assembly - 8408 44E	Mass (g)	Qty	Mass/System	Recyclability rate**	Recyclable mass (g)
System Planar with USB cable	4420	1	4420	97%	4287
PCIe card	160	1	160	100%	160
PCIe card	480	4	1920	100%	1920
PCIe card	320	6	1920	100%	1920
PCIe card	300	1	300	100%	300
I/O card	260	1	260	100%	260
PCIe card	20	1	20	100%	20
System Planar	13460	1	13460	100%	13460
CDIMM (dual in-line memory module)	120	32	3840	97%	3725
Heatsink	820	4	3280	93%	3050
Distribution Channel Management (DCM)	100	4	400	97%	388
Central Processor (CP) Core Cache voltage regulator module (VRM)	260	4	1040	97%	1009
Stiffener	5061	1	5061	97%	4909
Bezel	280	1	280	62%	174
Power supply	1060	4	4240	97%	4113
Power distribution board	560	1	560	97%	543
Chassis and USB cable	10000	1	10000	97%	9700
Chassis cover	2560	1	2560	100%	2560
240 VA safety cover	780	1	780	62%	484
Fan	840	5	4200	97%	4074
Redundant Array of Independent Disks (RAID) assembly	6760	1	6760	97%	6557
Fans	180	4	720	90%	648
Hard disk drives	245	8	1960	92%	1803
Solid state drives	100	4	400	82%	328
Operator panel	180	1	180	97%	175
DVD drive assembly	330	1	330	97%	320
Sum ***			69051 g		66887 g

Recyclability rate: R_{rcy} = $\sum(m_{(i)} \times RCR_{(i)} / m_{EEE} \times 100\% = 97\ \%$

Symbols and definitions

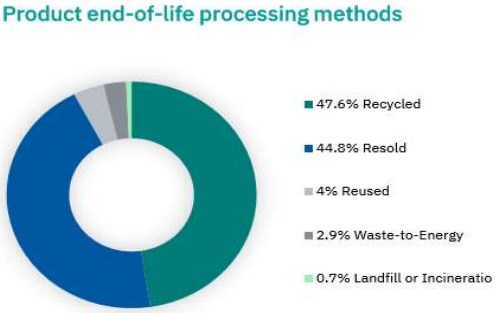
$m_{(i)}$ = Mass of i^{th} part

$RCR_{(i)}$ = 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 venders. 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 treatement 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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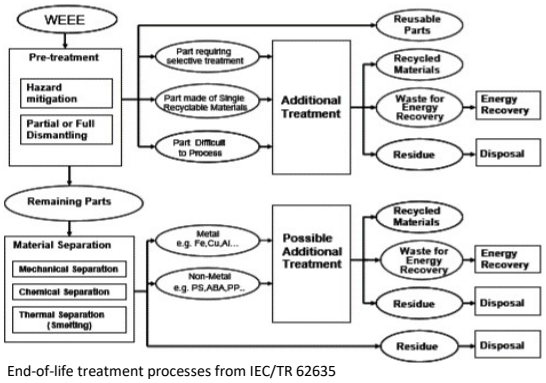

End-of-life treatment processes from IEC/TR 62635