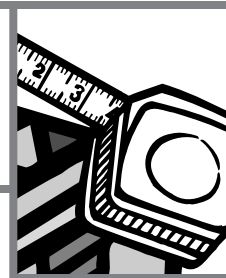


US EPA ARCHIVE DOCUMENT

Calculating Amount Reduced



WasteWise partners report significant waste reduction results for each year. Quantifying waste prevention results is one of the most challenging aspects of any waste reduction program. To help address some of the obstacles associated with measurement, 'Calculating Amount Reduced' is designed to help WasteWise partners quantify waste reduction results for certain common activities.

Waste prevention measurement is an evolving field. Unlike recycling, waste prevention does not result in a quantity of material that can be easily measured since the waste is not generated in the first place. In addition, every organization is different. The ability to measure the amount of waste prevented will depend on the activity conducted, the degree of accuracy desired, and in some cases, the way the organization is structured.

The following methods illustrate measurement approaches that are activity-specific. The four activities covered include:

- Packaging reduction
- Office paper reduction
- Office equipment and supply reuse and donation
- Toner cartridge remanufacturing

We have tried to keep the equations simple. They are intended to help you identify the type of information you may need to collect on a routine basis in order to quantify your results. Some of the common variable names that appear in many of the equations are **number**, **frequency**, **distribution**, and **weight**.

Often a subscript will help differentiate between variables referring to the same information for different items (e.g., $Weight_{new}$, $Weight_{old}$).

The information provided also includes examples to help illustrate how each equation may apply to a specific situation. At the end of this section, an appendix is provided with estimated default values for the weights of many paper, packaging, office equipment and supply, and toner cartridge products.

Additional worksheets can be found in EPA's *Business Guide for Reducing Solid Waste* (EPA530-K-92-004). Worksheet G may be particularly valuable to you.

When activity-specific data are not available, progress in preventing waste can be measured using purchasing or waste generation data. If you choose to use purchasing data or waste generation data, several related factors must be taken into account. These include changes in the number of employees, fluctuations in sales volume, or changes in manufacturing rate, all of which affect the amount of material used by a company.

The activity-specific methods contained in this document provide guidelines and ideas that might be useful as you develop your own measurement methods. As we learn more about measuring waste prevention, we will share our developments with you to facilitate more accurate reporting results in the future.

Calculating The Amount Of Packaging Conserved

Many WasteWise partners reduce packaging either through using less packaging or using reusable packaging. Reductions can be made by organizations that manufacture packaging materials, organizations that use manufacturing materials to distribute their products, and organizations that receive products in packaging materials. The latter two may need to work with their suppliers to initiate changes. Some of the activities that WasteWise partners have implemented that use less packaging include:

- Changing or redesigning the structure of a package to use less material while still protecting the same amount of product.
- Switching to a lighter-weight packaging material.
- Removing extraneous packaging materials.
- Replacing single-use containers with multiple-use containers.

Below are two methods for measuring packaging reductions. Method 1 calculates packaging weight reduction from using less packaging (e.g., switching to a lighter-weight packaging material). Method 2 calculates the reduction associated with switching from single-use to multiple-use containers.

Method 1: Using less packaging

To measure packaging conserved by using less packaging, obtain the following information:

Number= The number of containers used per year. Try obtaining this from purchasing records, suppliers, or production records.

Weight_{old}= Weight of the old package.*

Weight_{new}= Weight of the new package.*

* If you are unable to actually weigh the old or new package, you might be able to obtain the weight from your supplier, manufacturer, or trade association.

$$\text{Annual Reduction} = [\text{Number} \times (\text{Weight}_{\text{old}} - \text{Weight}_{\text{new}})]$$

This equation assumes the same number of containers will be used before and after the packaging modifications are made.

Example:

An organization requested that its vendor reduce the amount of packaging by substituting a lighter-weight packaging material. At 2.5 pounds per unit, the new material weighs 1.3 pounds less than the old packaging (3.8 pounds per unit). The organization used 450,000 packaging units per year. The annual reduction can be calculated as follows:

Number= 450,000 packages per year
 Weight_{old}= 3.8 lbs
 Weight_{new}= 2.5 lbs

Annual reduction in packaging:

$$= 450,000 \text{ packages} \times (3.8 \text{ lbs} - 2.5 \text{ lbs})$$

$$= 585,000 \text{ lbs}$$

**Method 2:
 Single-Use Versus
 Multiple-Use
 Containers**

This method calculates the amount of packaging materials conserved resulting from a switch from disposable (single-use) to reusable (multiple-use) containers. Reusing containers can lead to significant cost savings and waste reduction. As shown in Table 1 of the appendix, corrugated containers generally can be used up to 12 times while plastic containers may be used a maximum of 250 times. To estimate the weight of the single- and multiple-use containers, you can weigh them, obtain a figure from the manufacturer, or use the default values presented in Table 1.

To calculate the packaging reduced, obtain the following information:

- Weight_{single}= Weight of the disposable container previously used.
- Number_{multi}= The number of reusable containers purchased by your company. This information should be available from your purchasing department.
- Weight_{multi}= Weight of the multiple-use container.
- Trips_{annual}= The number of trips expected to be made annually. If your business needs have not changed, this should equal the number of single-use containers previously purchased per year.

You will also need to account for the fact that even reusable containers will eventually need to be recycled or thrown away. This involves estimating the number of multi-use containers disposed of each year (Disposed_{multi}).

- Reuses_{multi}= The estimated lifespan in number of trips of the multi-use container. This information should be available from the manufacturer or you can use the estimates in Table 1.
- Disposed_{multi}= Divide the number of trips made per year (Trips_{annual}) by the estimated number of trips each multi-use container can make in its lifetime (Reuses_{multi}). The result of this division is an estimate of the number of multiple-use containers disposed of per year.

Number of reusable containers disposed of per year:

$$\text{Disposed}_{\text{multi}} = (\text{Trips}_{\text{annual}}) / (\text{Reuses}_{\text{multi}})$$

Annual reduction in packaging:

$$\text{Reduction} = [(\text{Trips}_{\text{annual}}) \times (\text{Weight}_{\text{single}}) - (\text{Disposed}_{\text{multi}}) \times (\text{Weight}_{\text{multi}})]$$

This equation assumes you will dispose of an equal number of reusable containers each year. In reality, your organization may not dispose of any of the reusable containers in the early years of implementation and need to throw away or recycle all containers in the final years of estimated life. If you prefer, you may calculate the total waste reduction benefit over the entire lifespan of the product rather than annually. This calculation also assumes that the manufacturer’s estimated life projection is correct. If the container’s lifespan is shorter or longer than expected, the waste reduction benefits will be decreased or increased, respectively.

Example:

An organization purchases 200 reusable plastic containers weighing 5.5 pounds each. The organization plans to use these containers to transport supplies an average of 1,000 times per month, for a total of 12,000 trips annually. From Table 1, the estimated life of each container is 250 trips. The new containers replace corrugated containers, weighing 1.5 pounds each, that were used one time and discarded.

- Number_{multi}= 200 containers
- Reuses_{multi}= 250 trips/container
- Weight_{single}= 1.5 lbs
- Weight_{multi}= 5.5 lbs
- Trips_{annual}= 12,000 trips
- Disposed_{multi}= 48 multi-use containers per year

To calculate the waste reduced annually, the organization first estimated the number of reusable containers that it would have to throw away each year.

$$\begin{aligned} \text{Number of reusable containers disposed of per year:} \\ &= (12,000 \text{ trips}) / (250 \text{ trips/container}) \\ &= 48 \text{ containers disposed of or recycled per year} \end{aligned}$$

The organization used this information to calculate the annual reduction in packaging:

$$\begin{aligned} \text{Annual reduction in packaging:} \\ &= [(12,000 \text{ trips} \times 1.5 \text{ lbs}) - (48 \text{ containers} \times 5.5 \text{ lbs})] \\ &= 18,000 \text{ lbs} - 264 \text{ lbs} \\ &= 17,736 \text{ lbs} \end{aligned}$$

Calculating The Amount Of Office Paper Conserved

Many WasteWise partners have implemented office paper reduction goals as part of their waste reduction programs. Common activities include increased use of e-mail, elimination of unnecessary forms and other documents, increased double sided copying, electronic storage of files, and electronic purchasing. When it comes to paper reduction, every employee that uses paper on a regular basis has a role to play. Therefore, employee education is critical to changing corporate culture and people's behaviors. To accomplish a successful paper reduction program, WasteWise recommends designing and implementing a dynamic employee education program. (Please refer to the *WasteWise Update* on employee education for further information.) Measurement activities would then follow several months later. This section is designed to help you measure office paper reductions associated with the distribution of a document where the document length is known or can be easily estimated.

Office paper can be conserved through activities that *eliminate* the need to use paper, such as:

- E-mails that do not need to be printed
- On-line phone directories, manuals, catalogs, and other documents
- Electronic data interchange

Office paper can also be conserved through activities that *reduce* the amount of paper used, such as:

- Duplexing
- Routing or posting documents in central locations

For examples of other possible paper reduction activities, please refer to *Selected Goals of WasteWise Partners*.

If your organization conducts a broad-based paper reduction campaign, measuring specific activities may not be feasible. For this situation, many partners have successfully used paper purchasing records to calculate the reduction amount. Please keep in mind, however, that factors such as number of employees, number of customers, and other workload indicators should be taken into account when calculating volume reductions through purchasing records.

The method presented below represents one possible way to calculate specific paper conservation efforts. Certain activities can be measured by other means, such as using a copy counter to help track duplex copying. These methods will be explored in more detail in additional waste prevention measurement tips, which EPA plans to develop in the near future.

Method:
Reducing the number of pages used

To measure paper reductions for a specific activity where document length is known or can be easily estimated, you will need to obtain or estimate the following information:

- Sheets_{before}= Sheets of paper that would have been used before implementing the office paper reduction activity.
- Sheets_{after}= Sheets of paper used after implementing the office paper reduction activity.
- Frequency = Number of times per time period the document is distributed.
- Distribution = Number of people to whom the document is distributed.
- Weight= Weight of the paper. If you are unable to actually weigh the paper, you should be able to estimate the weight using Table 2.
- Reduction Factor= Percentage of reduction from the activity.

Reduction Factor = $\frac{[\text{Sheets}_{\text{before}} - \text{Sheets}_{\text{after}}]}{\text{Sheets}_{\text{before}}}$

Annual Reduction = $[\text{Sheets}_{\text{before}} \times \text{Frequency} \times \text{Distribution} \times \text{Weight} \times \text{Reduction Factor}]$

Example 1:
Activities that eliminate paper

An organization conducted extensive employee education on the benefits of using e-mail. Several months later, the company surveyed a representative sample of its 1,000 employees. The survey revealed that employees in most of the departments had switched to distributing weekly status reports to their managers via e-mail. These reports were 5-page (8-1/2 x 11) documents distributed on a weekly basis by 850 people.

- Sheets_{before}= 5 sheets
- Sheets_{after}= 0 sheets
- Distribution= 850 people
- Frequency= 1 time per week
- Weight= 1 sheet x (5 lbs/500sheets) = 0.01 lbs

Reduction Factor:

$$= (5 \text{ sheets} - 0 \text{ sheets}) \div 5 \text{ sheets}$$

$$= 1^*$$

Annual reduction in paper:

$$= (5 \text{ sheets}) \times (1/\text{wk}) \times (850 \text{ people}) \times (0.01 \text{ lbs/sheet}) \times (1)$$

$$= (42.5 \text{ lbs/wk}) \times (52 \text{ wks/yr})$$

$$= 2,210 \text{ lbs/yr}$$

* For activities that *eliminate* paper, paper is reduced by 100%, so the reduction factor is 1.

Example 2:
Activities that
reduce the amount
of paper generated

An organization (still in the process of updating its electronic network to allow e-mail) encouraged its departmental secretaries to begin duplexing inter-departmental project updates, each approximately 25 pages long. Each of the 10 departments distribute approximately one update per week to nearly 200 people. By duplexing, the organization was able to reduce the amount of paper used.

$$\text{Sheets}_{\text{before}} = 25 \text{ sheets}$$

$$\text{Sheets}_{\text{after}} = 13 \text{ sheets}$$

$$\text{Distribution} = 200 \text{ people}$$

$$\text{Frequency} = 10 \text{ times per week}$$

$$\text{Weight} = 1 \text{ sheet} \times (5 \text{ lbs}/500\text{ sheets}) = 0.01 \text{ lbs}$$

Reduction Factor:

$$= (25 \text{ sheets} - 13 \text{ sheets}) \div 25 \text{ sheets}$$

$$= .48$$

Annual reduction in paper:

$$= (25 \text{ sheets}) \times (10/\text{wk}) \times (200 \text{ people}) \times (0.01 \text{ lbs/sheet}) \times (0.48)$$

$$= (240 \text{ lbs/yr}) \times (52 \text{ wks/yr})$$

$$= 12,480 \text{ lbs/yr}$$

Survey Form

One way to collect the information needed for measuring paper reduction activities is to send a survey via e-mail, such as the one below, to a representative sample of employees to track results. You should distribute this survey several months after the start of an employee education campaign. You may want to modify the instructions and/or actual survey matrix to meet the needs of your organization.

To: Name
 Date: March 1, 2001
 Re: Paper Reduction Progress

Now that everyone has had a chance to implement some of their paper reducing ideas, we are interested in tracking how much paper you have saved. Please indicate all of the different ways that your department has been able to reduce paper usage. Feel free to estimate individual savings for your department. **PLEASE COMPLETE THE FOLLOWING FORM AND RETURN IT TO [Insert Coordinator's Name] BY [Insert Date].**

Item	# of Pages	Frequency	Distribution	New Method	Estimated Savings (# of pages/wk)	Estimated Savings (in lbs)
Example: Weekly Status Report	5	1/wk	Goes to 1 person from 850 people	Now use cc:Mail	4,250 pages/wk	42.5 lbs/wk
Example: Inter-dept Project Update	25 on avg.	10/wk	Goes to 200 people	Now copy double-sided	24,000 pages/wk	240 lbs/wk

Calculating The Amount Of Office Equipment/Supplies Conserved

Many WasteWise partners encourage employees to routinely reuse office supplies and equipment, establish office supply exchange centers, or set up office spring cleaning days as waste prevention goals. The methods below are intended to help partners quantify the results from these efforts. There are many ways to implement office supply reuse and donation programs.

The methods below calculate the amount of office equipment and supplies reduced per year. Method 1 calculates the reduction amount for donating or selling office equipment and supplies, and Method 2 calculates the reduction amount for reusing these items.

**Method 1:
Donating or selling
office equipment and
supplies**

This method calculates the reduction amount associated with donating or selling office equipment and supplies. In order to use this method to quantify waste reduction results, an organization would need to determine or estimate:

- Number= Number of each item donated or sold.
- Weight= Weight of each item donated or sold.

Annual Reduction = Number × Weight

If different types of office equipment or supplies were donated or sold, repeat the formula for each item and add together all of the reductions for each type of equipment donated or sold at your facility.

For accurate measurement, each item donated or sold should be weighed individually. The weights may be obtained from purchasing catalogs, if available. If the exact weights are unknown, default weights can be obtained from Table 3 of the appendix. If an item is not listed, use the nearest dimension and material from Table 3 to approximate the weight.

Example:

An organization donated four wood single-pedestal executive desks, two wood bookcases with three shelves, and five computers during the course of a year. The office equipment weights are based on the estimates in Table 3. The annual reduction can be calculated as illustrated below:

- Number_{desk}= 4
- Number_{bookcase}= 2
- Number_{computers}= 5
- Weight_{desk}= 246 lbs
- Weight_{bookcase}= 90 lbs
- Weight_{computer}= 56 lbs

Reduction from desk donations:

$$= (4 \text{ desks per year} \times 246 \text{ lbs})$$

$$= 984 \text{ lbs per year}$$

Reduction from bookcase donations:

$$= (2 \text{ bookcases per year} \times 90 \text{ lbs})$$

$$= 180 \text{ lbs per year}$$

Reduction from computer donations:

$$= (5 \text{ computers per year} \times 56 \text{ lbs})$$

$$= 280 \text{ lbs per year}$$

Annual reduction:

$$= (984 + 180 + 280) \text{ lbs per year}$$

$$= 1,444 \text{ lbs of office equipment per year}$$

**Method 2:
Reusing office
equipment and
supplies**

This method calculates the amount of office equipment and supplies reused. The estimated reuse of office equipment and supplies depends on usage, type of office, size of business, and company and/or department policy. Generally, most offices discard and/or reuse folders, binders, and other office equipment and supplies when the office is cleaning house, reorganizing, or downsizing. Similar to paper reduction activities, it is recommended that you conduct an employee education campaign to ensure the success of an office equipment and supply reuse program. (Please refer to the *WasteWise Update* on employee education for further information.) Measurement activities would then follow several months later.

In order to use this method to quantify waste reduction results, an organization would need to determine or estimate:

- Number= Number of each item reused.
- Reuses= Number of times each office supply is reused.
- Weight= Weight of each office supply.

Annual Reduction = Number × Reuses × Weight

Repeat this formula for each item and total the reductions of each type of office supply item reused at your facility.

If exact weights are unknown, default weights can be obtained from Table 4 of the appendix. The number of times the item is reused will need to be estimated. An estimate could be obtained from your supplier or through an employee survey.

Example:

An organization educated its employees on the benefits of reusing office supplies. Several months later, the organization surveyed a representative sample of its 1,000 employees in the accounting department. The survey revealed that many employees had begun reusing various folders. The departmental survey concluded that 50 manila folders (letter size) and 35 hanging folders (letter size) were reused once a week. The weights of the office items are based on the default estimates in Table 4.

Number _{manila} =	50
Number _{hanging} =	35
Weight _{manila} =	6.5 lbs/100 folders
Weight _{hanging} =	3.5 lbs/25 folders
Reuses _{manila} =	1 per week
Reuses _{hanging} =	1 per week

Reduction from manila folders:

$$= ((6.5 \text{ lbs}/100 \text{ folders}) \times 50 \text{ folders per week} \times 1 \text{ reuse})$$

$$= 3.25 \text{ lbs of manila folders per week}$$

Reduction from hanging folders:

$$= ((3.5 \text{ lbs}/25 \text{ folders}) \times 35 \text{ folders per week} \times 1 \text{ reuse})$$

$$= 4.9 \text{ lbs of hanging folders per week}$$

Total reduction:

$$= (3.25 + 4.9) \text{ lbs per week}$$

$$= 8.15 \text{ lbs per week}$$

Annual reduction:

$$= (8.15 \text{ lbs per week} \times 52 \text{ weeks per year})$$

$$= 424 \text{ lbs of folders reused per year}$$

Calculating The Amount Of Toner Cartridges Conserved

Many WasteWise partners include returning toner cartridges for remanufacture and/or purchasing remanufactured cartridges as a waste prevention goal. Often partners can determine the number of cartridges sent for remanufacture or purchased, but have difficulty converting that quantity to tons or pounds. The method below is intended to help companies estimate the waste reduction associated with cartridge remanufacturing.

Method:

Sending toner cartridges for remanufacturing or purchasing remanufactured cartridges

To complete the calculation, you will need:

- Number=** The number of toner cartridges sent for remanufacturing or purchased again each year. You can obtain this information from your purchasing records or your remanufacturer.
- Weight=** The weight of an empty cartridge, along with its packaging material. You may obtain this information from Table 5 of the appendix or by weighing a sample of each type of used cartridge. If these options are insufficient, you may use the default value of 4 pounds per cartridge (includes packaging, which is returned and reused).

$$\text{Annual Reduction} = \text{Number} \times \text{Weight}$$

If you use multiple types of toner cartridges, you will need to repeat the formula for each type of toner cartridge diverted and combine the results to obtain the total reduction amount.

Example:

From its purchasing records, an organization determined that it purchased 100 copier toner cartridges and 200 laser printer cartridges last year. All of the used cartridges were sent to a remanufacturer. The weights of the cartridges are unknown, so the organization chooses to use the default value.

$$\begin{aligned} \text{Number}_{\text{copier}} &= 100 \\ \text{Number}_{\text{laser}} &= 200 \\ \text{Weight}_{\text{copier}} &= 4 \text{ lbs} \\ \text{Weight}_{\text{laser}} &= 4 \text{ lbs} \end{aligned}$$

Reduction of copier cartridges:

$$\begin{aligned} &= (4 \text{ lbs} \times 100 \text{ toner cartridges remanufactured/year}) \\ &= 400 \text{ lbs} \end{aligned}$$

Reduction of laser printer cartridges:

$$\begin{aligned} &= (4 \text{ lbs} \times 200 \text{ toner cartridges remanufactured/year}) \\ &= 800 \text{ lbs} \end{aligned}$$

Total annual reduction:

$$\begin{aligned} &= 400 \text{ lbs} + 800 \text{ lbs} \\ &= 1,200 \text{ lbs of cartridges remanufactured per year} \end{aligned}$$

Appendix

Table 1. Container Default Weights and Estimated Reuses

Type of Container	Dimension (in.)	Volume (cu ft)	Container weight (lbs)	Number of reuses
Corrugated single-wall	14.25 x 12 x 9.25	2.00	0.50	4
Corrugated single-wall	17.25 x 11.25 x 10		1.20	4
Corrugated single-wall	17.25 x 11.25 x 10		1.40	4
Corrugated (One-way)		2.00	1.50	1
Corrugated (One-way)		2.00	1.50	2
Corrugated single-wall	18 x 18 x 16	3.00	1.50	NA
Corrugated single-wall	18 x 18 x 16	3.02	2.00	12
Corrugated single-wall	17 x 12.25 x 9		2.00	4
Reusable Corrugated		2.00	2.20	5
Corrugated double-wall	18 x 17 x 17		5.00	10
Reusable Plastic (HDPE)			5.00	200
Reusable Plastic		2.00	5.50	250

NA = Not Available

Sources: D. Sapphire, Delivering the Goods: Benefits of Reusable Shipping Containers; WestPack Conference (October 18, 1995)

Table 2. Paper Default Weights

Type of paper	Dimensions (in.)	Sheets/lb	Sheets/ton
White Ledger	8.5 x 11	500 sheets/5.0 lbs	200,000 sheets/ton
White Ledger	8.5 x 14	500 sheets/6.4 lbs	156,250 sheets/ton
Glossy Magazine	8.5 x 11	500 sheets/9.0 lbs	111,111 sheets/ton
Computer	9.5 x 11	1,100 sheets/15.0 lbs	146,667 sheets/ton
Computer	9.5 x 11	1,650 sheets/15.0 lbs	220,000 sheets/ton
Thermal Fax	8.5 x 11	1,000 sheets/7.4 lbs	270,270 sheets/ton
White Envelopes	4.125 x 9.5	500 sheets/24.0 lbs	41,666 sheets/ton

1 ton = 2,000 pounds

Table 3. Office Furniture Default Weights

Item	Type	Material	Size	Avg. Weight (lbs)
Desk	Executive, Single Pedestal	Wood	72" x 36"	246.33
Desk	Executive, Double Pedestal	Wood		345.00
Desk	Double Pedestal	Laminate	72" x 36"	299.50
Desk	Double Pedestal	Laminate	60" x 30"	231.00
Desk	Single Pedestal	Laminate	72" x 36"	250.00
Desk	Single Pedestal	Laminate	42" x 24"	146.00
Desk	Double Pedestal	Metal	72" x 36"	224.67
Desk	Double Pedestal	Metal	60" x 30"	184.75
Desk	Double Pedestal	Metal	54" x 24"	124.00
Desk	Single Pedestal	Metal	72" x 36"	189.00
Desk	Single Pedestal	Metal	48" x 30"	133.67
Desk	Single Pedestal	Metal	42" x 24"	146.00
Desk	Single Pedestal	Metal	40" x 20"	82.00
Desk	Small Modular Panel System			422.00
Desk	Large Modular Panel System			650.00
Workstation	With Return	Laminate	60" x 30"	329.33
Workstation	With Return	Metal	60" x 30"	230.67
Bridge	Executive	Wood		76.67
Bridge		Laminate		140.00
Credenza		Wood		250.78
Credenza		Laminate		230.14
Credenza	With Knee Space	Metal	60" x 24"	156.67
Round Table Conference		Wood	42" diameter	91.50
Bookcase	2 Shelves	Wood	36" wide	57.20
Bookcase	3 Shelves	Wood	36" wide	90.00
Bookcase	4 Shelves	Wood	36" wide	110.90
Bookcase	5 Shelves	Wood	36" wide	138.80
Bookcase	6 Shelves	Wood	36" wide	134.60
Bookcase	7 Shelves	Wood	34" wide	138.50
Bookcase	4 Shelves	Laminate		85.00
Bookcase	5 Shelves	Laminate		110.00
Bookcase	2 Shelves	Metal	34" - 36"	44.50
Bookcase	3 Shelves	Metal	34" - 36"	57.50
Bookcase	4 Shelves	Metal	34" - 36"	70.50
Bookcase	5 Shelves	Metal	34" - 36"	89.00

Table 3. (Continued)

Item	Type	Material	Size	Avg. Weight (lbs)
Bookcase	6 Shelves	Metal	34" - 36"	101.00
File Cabinet	2 Drawer, Lateral	Wood		155.14
File Cabinet	2 Drawer, Lateral	Laminate		171.50
File Cabinet	2 Drawer, Lateral	Metal	30" - 42"	230.67
File Cabinet	4 Drawer, Lateral	Metal	36"	207.33
File Cabinet	2 Drawer, Vertical	Metal	Letter Size	60.60
File Cabinet	4 Drawer, Vertical	Metal	Letter Size	107.60
File Cabinet	2 Drawer, Vertical	Metal	Legal Size	71.50
File Cabinet	4 Drawer, Vertical	Metal	Legal Size	123.50
Chair	Executive Desk			51.167
Chair	Guest Arm			38.20
Chair	Swivel Arm			45.25
Chair	Secretary with no arms			31.76
Chair	Stacking			15.83
Personal Computer	CPU (Central Processing Unit)			26.00
Computer Monitor				30.00
Computer Printer				25.33
Fax Machine				19.67
Copier	Desktop			28.00
Word Processors				41.75
Sofa	Office		75" - 80"	97.33
Mat	Chair			20.83
Refrigerator	Office		2.5 cubic ft.	46.00
Refrigerator	Office		3.6 cubic ft.	60.50
Microwave Oven				35.00

Source: JC Penny's, Office Depot, Sears

Table 4. Office Supplies Default Weights and Reuse Factors

Material	Type	Dimension	Estimated Weight (lbs)	Average Reuse
Folders	Manila	Legal Size	6.5 lbs / 100	NA
Folders	Kraft	Letter Size	8.5 lbs / 100	NA
Hanging Folders		Letter Size	3.5 lbs / 25	NA
Hanging Folders		Legal Size	4.5 lbs / 25	NA
Interoffice Envelopes	Paper	Letter Size	NA	20
Interoffice Envelopes	Paper	Legal Size	NA	42
Envelopes (clasp)	Paper	9.5" x 12"	4 lbs / 100	NA

Source: Office Depot
 NA = Not Available

Table 5. Toner Cartridge Weight Default Values

Laser Printer (Brand Name)	Product Name	Shipping Weight (Full)	Shipping Weight (Empty)
Canon	EP-S		2.3 lb.
Canon	EP-N		3.2 lb.
Canon	EP-E		2.9 lb.
Epson	IBS300	6 lb.	
Epson	S051009	6 lb.	
Epson	S051011	6 lb.	
Epson	S051016	6 lb.	
Epson	S051023	6 lb.	
Hewlett-Packard	EP		4 lb.
Hewlett-Packard	EP-SX		4 lb.
Hewlett-Packard	EP-LX		4 lb.
Hewlett-Packard	EP-NX		4 lb.
Hewlett-Packard	EP-EX		4 lb.

Source: Field studies