

Painting Line Production Unit Example

Example

The example detailed below describes a production unit for a painting line. The equipment is the paint booth which has air emissions and produces waste (filters with paint). There is also a washing operation process equipment that produces a water discharge.

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Painting Line Production Unit Example

Define

Create Paint: Material List:

- Click Define – Material – Material List OR Materials toolbar icon
- click NEW to make blank row and type in paint data and SAVE



Material ID	Material Name	Material Type	Manufacturer Name	Density	VOC %	Mfr Written Date	Mfr Revision Date
001	Fructose Gelatin	Adhesives and Resins	Smuckers	0.2	0.04	01/01/2007	01/31/2007
002	Zinc Oxide	DEF		0.0	0.00	00/00/0000	00/00/0000
003	Material			0.0	0.00	00/00/0000	00/00/0000
DIESEL FUEL	Diesel Fuel	Fuel	Joe's Fuel Company	0.0	0.00	00/00/0000	00/00/0000
FAC PAINT1	Krylon Ultra Flat Black 1602	Paint		6.52	52.00	00/00/0000	00/00/0000

Create Paint: Material Detail:

- Click More Detail or Double Click
- Type in multiple rows of CAS number constituents using NEW to make blank lines
- Use binoculars to look up cas if needed

Material Detail: FAC PAINT1

MATERIAL ID: FAC PAINT1 | Written Date: 00/00/0000 | Revision Date: 00/00/0000 | Active?

Material Type: Paint | Material Name: Krylon Ultra Flat Black 1602

Trade Name: | Hazardous Warnings: |

Mfr Name: | Target Organs: |

Density: 6.5000 | VOC %: 52.00 | Update Date: 11/27/2007

Comments: |

Constituent	Synonyms	Container			
CAS Number	From %	To %	Avg %	Chemical Name:	Update Date
74-98-6	.0	.0	18	Propane	11/27/2007
108-88-3	.0	.0	33.0	Toluene	11/27/2007

- Click on **Synonym** tab to fill in optional aliases or synonyms

Synonyms | Constituent | Container

Synonym Name: Black Paint | Updated: 11/27/2007

- Click on **Container** tab to fill in purchasing unit of measure data

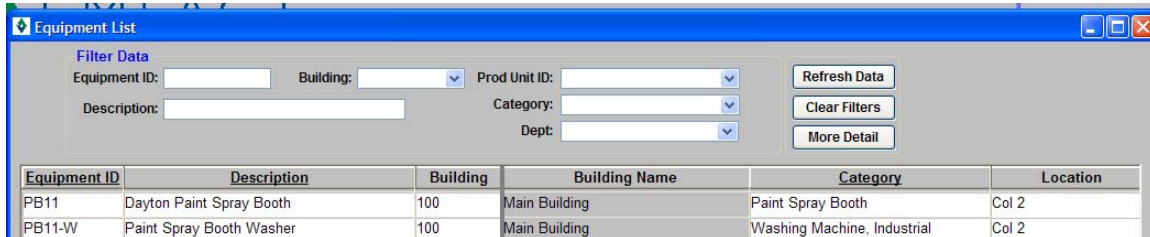
Container | Constituent | Synonyms

Size Purchase Unit: Bucket | Size Quantity: 20 | Size Unit: Gallons | 11/27/2007

Painting Line Production Unit Example

Create Equipment: Equipment List

- Click Define – Equipment – Equipment List OR Equipment toolbar icon
- Click NEW twice to make 2 blank rows and type in paint booth and washer data and SAVE.
- Note that paint booth category should be Paint Spray Booth.

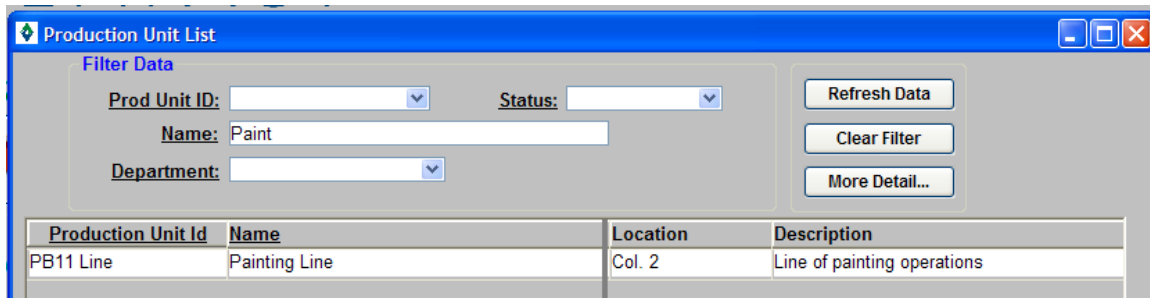


The screenshot shows the "Equipment List" window with filter fields and a table of equipment.

Equipment ID	Description	Building	Building Name	Category	Location
PB11	Dayton Paint Spray Booth	100	Main Building	Paint Spray Booth	Col 2
PB11-W	Paint Spray Booth Washer	100	Main Building	Washing Machine, Industrial	Col 2

Create Production Unit: Production Unit List

- Click Define – Equipment – Production Unit List OR Prod Unit toolbar icon
- Click NEW to make a blank row and type in painting line data and SAVE.

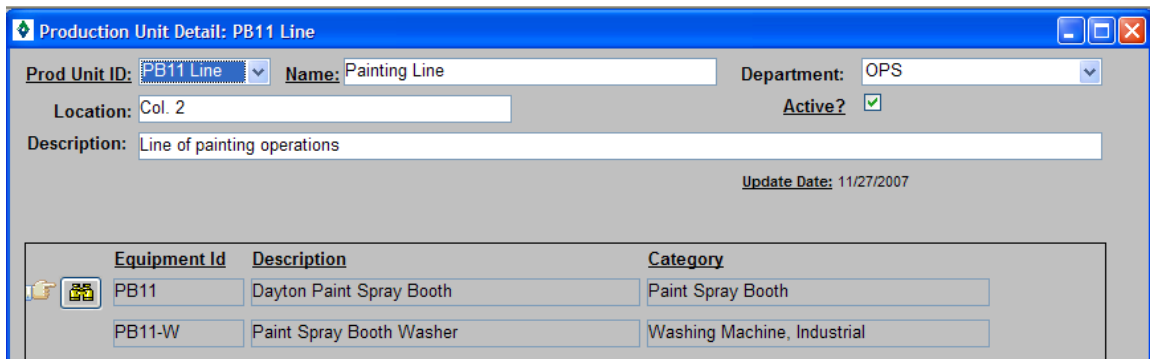


The screenshot shows the "Production Unit List" window with filter fields and a table of production units.

Production Unit Id	Name	Location	Description
PB11 Line	Painting Line	Col. 2	Line of painting operations

Create Production Unit: Production Unit Detail

- Click More Detail or Double Click
- Fill in the department for the production unit in the header.
- Type in the 2 equipment ids (or use binoculars to search) established above to associate them with the painting line production unit



The screenshot shows the "Production Unit Detail: PB11 Line" window with fields for production unit information and a table of associated equipment.

Prod Unit ID: PB11 Line | Name: Painting Line | Department: OPS | Location: Col. 2 | Active?: | Description: Line of painting operations | Update Date: 11/27/2007

Equipment Id	Description	Category
PB11	Dayton Paint Spray Booth	Paint Spray Booth
PB11-W	Paint Spray Booth Washer	Washing Machine, Industrial

Painting Line Production Unit Example

Create Product – Product List

- Click Define – Outputs – Product List
- Click NEW to make a blank row and type in product data. Note that total weight of product is used for computations in output and mass balance reports.



Product List window showing a table of products. The table has columns for Product Model No, Product Name, Weight in Lbs., and Update Date. Two rows are visible: Product V200 (5,000.00 lbs) and Painted Blade (10,000.00 lbs). Each row has a Comments field and a Costs icon.

Product Model No	Product Name	Weight in Lbs.	Update Date
V200	Product V200	5,000.00	09/22/2008
Comments: Another product			
V100	Painted Blade	10,000.00	09/22/2008
Comments: This is a product we make			

List Intermediate Products per Product – Intermediate Product List

- Double click on the Product model to view the list of related intermediate products (Product Recipe).
- Click NEW to make a blank row and type in intermediate products data Note that weight % that the intermediate product makes up of the whole product is used for computations in output and mass balance reports.

Intermediate Product List window showing a table of intermediate products. The table has columns for Product Model No, Product Name, Intermediate Product No, Intermediate Product Name, Weight %, and Update Date. Three rows are visible, all for Product Model No V100 (Painted Blade): IP101 (Painted Part 101, 25.00%), IP102 (Painted Part 102, 35.00%), and IP103 (Painted Part 103, 40.00%).

Product Model No	Product Name	Intermediate Product No	Intermediate Product Name	Weight %	Update Date
V100	Painted Blade	IP101	Painted Part 101	25.00	09/22/2008
V100	Painted Blade	IP102	Painted Part 102	35.00	09/22/2008
V100	Painted Blade	IP103	Painted Part 103	40.00	09/22/2008

Create Discharge Point – Water Discharge Point List

- Click Define – Outputs – Water Discharge Points List
- Click NEW to make a blank row and type in discharge point data

Water Discharge Point List window showing a table of discharge points. The table has columns for DSN, Description, Discharge Point Type, Permit Nbr, Update Date, and Receiving Entity. Two rows are visible: Water Discharge (NPDES, Permit Nbr 12345, Update Date 12/07/2007) and Stuff (Sanitary, Permit Nbr, Update Date).

DSN	Description	Discharge Point Type	Permit Nbr	Update Date	Receiving Entity
123-456	Water Discharge	NPDES	12345	12/07/2007	CT River
2222	Stuff	Sanitary			

Painting Line Production Unit Example

Create Waste Type – Waste Type List

- Click Define – Outputs – Waste Type List
- Click NEW to make a blank row and select from the standard waste types or type in your own name. Indicate if the waste is hazardous.

Waste Type	Hazardous?	Physical State	Cost per Lb. in \$
Filters with Paint	<input checked="" type="checkbox"/>	<input type="radio"/> Liquid <input checked="" type="radio"/> Solid <input type="radio"/> Sludge <input type="radio"/> Other	10.00

Update Date: 11/27/2007 EPA Codes...

Create Waste Type – Waste Type EPA Codes

- If the waste is hazardous, then click on EPA Codes button
- Click NEW to make a blank row and select from the list of standard EPA Codes.

EPA Code	EPA Code Description	Last Update
D006	Cadmium Toxicity Characteristic	11/27/2007

Link

Relate Production Unit to materials

- Click Link – Production Unit OR Link Pr Unit toolbar icon
- Select the paint from DEFINE and assign to the production unit.



Material ID	Material Name	Material Type	Manufacturer Name	Active?	Update Date
FAC PAINT1	Krylon Ultra Flat Black 1602	PAINT		<input checked="" type="checkbox"/>	11/27/2007

Relate Production Unit to Intermediate Product

- On the **Products** tab establish the link to the products that are painted or produced at this production unit.
- Select the entire product model or individual intermediate products. Click NEW to list as many lines as appropriate.

Painting Line Production Unit Example

Relate Production Unit to air

- On the **Emission** tab establish the Prod Unit as a painting operation and input the VOC or TSP control efficiencies if known (otherwise leave as 0%). Determine the unit of measure the paint is typically painted with.

- On the **Air Factors** tab select the paint and the pollutant. Enter the pollutant content. Note the algorithm description describing the paint computations.
- Click NEW to make a blank row to put in the next pollutant.

If Material Type is Fuel then:
Air emissions are computed as usage qty * emission factor (if usage based) otherwise usage hours * emission factor (if time based)

If Material Type is Paint/Coating then:
Air emissions are computed as (usage qty * pollutant%) * (100-Ctrl Efficiency%) where pollutant% is pollutant content/density

For other Material Types:
Air emissions are computed as usage qty * emission factor

Relate Production Unit to water

- On the **Discharge** tab assign flow #1, pick the DSN and describe the discharge.

- On the **Water Poll** tab select the flow established on the discharge tab and select a pollutant to document the concentration of the pollutant in the discharge.

Painting Line Production Unit Example

Flow Number	Discharge Serial No.	Potential Pollutant	Concentration	Units	Active?	Update Date:
1	123-456	NPDES Water Discharge	Cadmium	0.0500 ppm	<input checked="" type="checkbox"/>	06/05/2008

Comments: _____

Relate Production Unit to waste

- On the **Waste** tab select waste type established earlier.

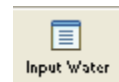
Waste Type:	Physical State:	Hazardous?	Active?	Update Date
Filters with Paint	<input type="radio"/> Liquid <input checked="" type="radio"/> Solid <input type="radio"/> Sludge <input type="radio"/> Other	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	11/27/2007

Comments: _____

Inputs

Enter Water Usage

- Click Inputs – Material Usage – Enter Water Use OR Input Water toolbar icon
- Select the production unit and type in quantity of water used per frequency and SAVE.



Enter Water Usage

Production Unit/ Equipment ID: PB11 Line Department: OPS

Material ID:	Usage Date	Usage Qty	Units	Frequency
WATER	11/30/2007	36,000.00	Gallons	Per Month

Save Usage Cost (US \$): 120.00 Comment: water bill

Entered Data so far...

Production Unit / Equipment ID	Material ID	Date	Start Qty/Units	Frequency	Qty in Lbs.
PB11 Line	WATER	11/30/2007	36,000.00	Gallons Monthly	298,800.00

Update

Usage Report Enable Advanced Fields INP101

Enter Air Usage

- Click Inputs – Material Usage – Enter Fuel/Paint/Other Air Use OR Input Air toolbar icon
- Select the production unit and paint established above and type in usage date/qty and SAVE.



Painting Line Production Unit Example

- Click Update/View Emissions to see the air emissions created by the SAVE usage button or click the Air Out toolbar icon to view emissions by other filters.



Enter Material Usage

- Click Inputs – Material Usage – Enter Other Material Use OR Input Matl toolbar icon



Painting Line Production Unit Example

- Select the production unit and other materials used in the process and type in usage date/qty and SAVE.

Material ID	Usage Date	Original Usage Qty/Units	Usage Qty (Lbs)	Production Unit/Equipment ID	Material Cost (US\$)
123-A	04/01/2008	50.00 Gal	245.00	PB11 Line	80.00

Outputs

Enter Wastewater Discharge

- Click Outputs – Enter Wastewater Discharge OR Water Out toolbar icon
- Select the production unit and flow established above and type in quantity of Wastewater discharged per frequency and SAVE.



Production Unit/Equipment ID	Material ID	Date	Start Qty/Units	Frequency	Qty in Lbs.
PB11 Line	WATER	11/30/2007	10,000.00 Gallons	Monthly	83,000.00

- Click Update/View Pollutants see the water discharge created by the SAVE Discharge button or click Output - Wastewater Discharge with Pollutants to view discharge by other filters.

Painting Line Production Unit Example

Wastewater Discharge with Pollutants

Filter Data: Equipment ID: [] Usage Date From: 00/00/0000
 Production Unit ID: [] Usage Date To: 00/00/0000
 Usage Record No.: 233 [Clear Filters]

Production Unit
 Equipment ID: Production Unit PB11 Line PB11 Line Painting Line
 Flow Number: 1 123-456 NPDES Water Discharge

Material ID: Usage Date Frequency Usage Qty/Units
 Cost (US \$): 20.50 WATER 11/30/2007 Monthly 10,000.00 Gallons
 Comment: 83,000.00 Lbs.

Pollutant	Discharge (Lbs.)	Date
CADMIUM	.00417	11/30/2007

Updated: 06/05/2008

Usage Report Discharge Report Enable Advanced Fields 1 of 1 Records
 OUT104

Enter Waste Shipment

- Click Outputs – Waste Management OR Waste Out toolbar icon
- Click NEW button in header to create new shipment and fill in shipment activity date and click SAVE.
- Double click to enter the detail.



Waste Management Activity List

Filter Data: Activity No.: [] Activity Type: Shipment for Disposal Activity Date: From: 05/07/2008 To: 06/06/2008
 Vendor Name: [] [Refresh Data] [Clear Filter] [More Detail]

Activity No	Activity Type	Activity Date	Contact Person	Vendor Name	Treatment Method
0000012	Shipment for Disposal	11/30/2007	Basic User		

Enable Advanced Fields 0 of 0 Records
 OUT106

Painting Line Production Unit Example

- Enter the vendor and manifest data as appropriate. Click SAVE.
- Select the waste type established for the production unit. Put in weights and costs and select the production unit to allocate back. Click SAVE.

Waste Management for Activity No.: 0000012

Activity No.: 0000012 Activity Type: Shipment for Disposal Activity Date: 11/30/2007

Contact Person: Basic User Update Date: 06/06/2008

Vendor Name: Clean Harbors Treatment Method:

File Name:

State Manifest

Manifest No.: CT2233-44 Document No.: 011 Returned?: # of Days Outstanding: 189

Total Weight in Lbs.: 35 Total Cost in \$: 130.00

Waste

Waste Type	Weight in Lbs.	Internal Cost in \$	Vendor Cost in \$	Total Cost in \$
Filters with Paint	35	30.00	100.00	130.00

Equipment/Production Unit ID: Production Unit ID: PB11 Line Painting Line Last Update: 06/06/2008

Enter Product Volume

- Click Outputs – Enter Product Volume
- Select the product model and/or intermediate product and the production unit and type in quantity of products produced per frequency and SAVE. Note that the LBS of product is computed based on the weight or % weight indicated during DEFINE.

Enter Product Output Volume

Product Model No.: V100 Painted Blade

Intermediate Product No.: IP101 Painted Part 101

Production Unit/Equipment ID: PB11 Line Painting Line Department: OPS

Save Product Output

Output Date: 05/01/2008 Output Qty: 8 Output Lbs.: 20,000.00 Frequency: Per Month

Entered Data so far...

Product Model No.	Intermediate Product No.	Production Unit/Equipment ID	Output Date	Output Qty/Units	Frequency
V100	IP101	PB11 Line	04/01/2008	10 Each	Monthly

Update

Reports

Materials Reports

- Click Reports – Materials – Used – Weight per CAS Number to view how many LBS of the CAS number constituents in the paint were used.

Painting Line Production Unit Example

Materials Used: Weight per CAS Number Report

Find CAS Number:

Filter Data

From Date: 05-2007 To Date: 11-2007

List Name:

Include Data for No Equipment/Prod Unit AND:

Equipment (not in Prod Unit) + Prod Unit
 All Equipment only

Scope:

All detail
 CAS / Material Summary
 CAS Summary

Refresh Data

Materials Used: Weight per CAS Number Report From 05-2007 To 11-2007

Note: Gas usage is not included

CAS Number	Material	Usage Type	Usage Cost	Usage in Lbs.	Usage Date	Production Unit / Equipment ID	Department
108-88-3	Toluene						
	FAC PAINT1	Krylon Ultra Flat Black 1602				\$.00	
		Paint	\$0.00	0.6724	11/30/2007 (P)	PB11 Line	OPS
Total for FAC PAINT1:			\$1.82	0.807			
Total for 108-88-3:			\$1.82	0.807			

Air Reports

- Click Reports – Air – Usage – Weight per Material with 12 month Rolling to view how many LBS of Paint was used with the previous 11 months plus current compared next to the current.

Usage (Air): Weight per Material with 12 month Rolling Report

Filter Data

Report Detail Level: Daily Monthly

From Date: 05-2007 To Date: 11-2007

Production Unit/Equipment ID: PB11 Line

Include Data for Prod Unit:

Input as Prod Unit
 Input for Equipment where part of the Prod Unit

Refresh Data
Clear Filter

Usage (Air): Weight per Material with 12 month Rolling Report (Daily)

Printed on: 06-Jun-2008 WIND

PB11 Line

Material/ Usage Date	Usage Cost	Usage Hours	Original Usage Qty / Units	Paint Usage Qty	12 Month Rolling Totals	
					Usage Hours	Usage Qty
FAC PAINT1 Krylon Ultra Flat Black 1602						
10-2007						
10/31/2007	\$0.00	3.0	4.0 Ounces, wt	0.2038 Lbs	3.0	0.2038 Lbs
Monthly Totals:		3.00		0.2038 Lbs		
11-2007						
11/30/2007	\$5.50	4.0	4.0 Ounces, wt	0.2038 Lbs	11.0	2.4451 Lbs
11/30/2007	\$0.00	4.0	40.0 Ounces, wt	2.0375 Lbs	11.0	2.4451 Lbs
Monthly Totals:		8.00		2.2413 Lbs		
Material Totals:		11.00		2.4451 Lbs		
Grand Total:		11.00		2.4451 Lbs		

- Click Reports – Air - Emissions – Weight per Pollutant with 12 month Rolling to view how many pollutant was emitted during the paint usage.

Painting Line Production Unit Example

Air Emissions: Weight per Pollutant with 12 Month Rolling Report

Filter Data
 Report Detail Level: Daily Monthly
 From Date: 05-2007 To Date: 11-2007
 Production Unit/Equipment ID: PB11 Line
 Include Data for Prod Unit:
 Input as Prod Unit
 Input for Equipment where part of the Prod Unit
 Refresh Data Clear Filter

06/06/2008 15:27:04 Air Emissions: Weight per Pollutant with 12 Month Rolling Report Page 1 of 1
 From 05-2007 To 11-2007

Usage Month	Current Month Totals				12 Month Rolling Totals			
	Hours	Usage	Pollutant	Total Emissions	Hours	Usage	Pollutant	Total Emissions
10-2007	3.00	0.20	TSP	0.0048 Lbs.	0.00	0.20	TSP	0.0048 Lbs.
			VOC	0.1075 Lbs.			VOC	0.1075 Lbs.
11-2007	8.00	2.24	TSP	0.0529 Lbs.	0.00	2.45	TSP	0.0578 Lbs.
			VOC	1.1825 Lbs.			VOC	1.2900 Lbs.

Wastewater Reports

- Click Reports – Water – Discharge - Weight per Material to view how many LBS of wastewater discharged (converted from gallons).

Wastewater Discharge: Weight per Material Report

Filter Data
 Report Detail Level: Daily Monthly
 From Date: 05-2007 To Date: 11-2007
 Production Unit/Equipment ID: PB11 Line
 Include Data for Prod Unit:
 Input as Prod Unit
 Input for Equipment where part of the Prod Unit
 Refresh Data Clear Filter

Printed on: 06/06/2008 15:28 Page 1 of 1

Source ID / Name	Usage Month/Year	Usage Date	Original Usage Qty / Units	Frequency	Usage Cost	Usage Qty	Material
PB11 Line	Painting Line						
11-2007							
	11/30/2007		10,000.0 Gallons	Monthly	\$20.50	83,000.0 Lbs.	WATER
Monthly Total:					\$20.50	83,000.0 Lbs.	
Grand Total					\$20.50	83,000.0 Lbs.	

- Click Reports – Water - Discharge – Weight per Pollutant to view how many LBS of pollutant was included in the wastewater discharge (converted from ppm).

Wastewater Discharge: Weight per Pollutant with 12 Month Rolling Report

Filter Data
 Report Detail Level: Daily Monthly
 From Date: 05-2007 To Date: 11-2007
 Production Unit/Equipment ID: PB11 Line
 Include Data for Prod Unit:
 Input as Prod Unit
 Input for Equipment where part of the Prod Unit
 Refresh Data Clear Filter

06/06/2008 15:30:22 Wastewater Discharge: Weight per Pollutant Page 1 of 1
 From 05-2007 To 11-2007

Usage Month	Current Month Totals		
	Usage	Pollutant	Total Emissions
11-2007	83,000.00	CADMIUM	0.0042 Lbs.

Painting Line Production Unit Example

Waste Management Reports

- Click Reports – Waste Reports and choose Activity Costs – to view LBS of waste per shipment grouped by waste type.

Waste Management Reports

Select Report: Activity Costs

Filter Report by: Activity Date From: 05-2007 To: 11-2007 Hazardous?: Refresh Data

06/06/2008 15:31:50 Waste Management Report - Chargeback Costs Page 1 of 2

Waste Type	Activity Type	Activity Date	Weight in Lbs.	Cost per Lb. in \$	Chargeback Cost in \$
Filters with Paint Hazardous? <input checked="" type="checkbox"/>					
	Shipment for Disposal	11/27/2007	35	10	\$350.00
	Shipment for Disposal	11/30/2007	35	10	\$350.00
Total for: Filters with Paint			70		\$700.00
<hr/>					
Oil, Hazardous Waste Hazardous? <input checked="" type="checkbox"/>					
	Shipment for Disposal	10/04/2007	2,200	4	\$8,800.00
	Offsite Treatmnt	10/17/2007	100	4	\$400.00

Mass Balance Report

- Click Reports – Mass Balance to view all of the inputs and outputs data from this scenario. Choose input data source as Usage and note the incoming paint and water usage and the outgoing product volume, air emissions, wastewater discharge (with pollutants), and waste shipment.

Mass Balance Report

Filter Data

Production Unit/Equipment ID: All

From Date: 01-2008 To Date: 09-2008

Input Data Source: Purchases Usage

Include Data for Prod Unit: Input as Prod Unit Input for Equipment where part of the Prod Unit

Refresh Data Clear Filter

09/22/2008 10:49:05 Mass Balance Usage Report Page 1 of 2

(IN): Material Usage: Cost and Lbs per Material

Material ID	Material Name		Usage Cost	Usage Qty in Lbs.
003	Material 3	Other	\$4,444.00	1,800.0969
123-A	Other Materials	Other	\$142.00	392.0000
DIESEL FUEL	Diesel Fuel	Fuelburn	\$443.00	3,815.0000
FAC PAINT1	Krylon Ultra Flat Black 1602	Paintman	\$200.00	18.5922

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Total Usage: \$514,175.00 83,925.8891

(IN): Material Usage: Cost and CuFt per Gas

Material ID	Material Name	Usage Cost	Usage Qty in CuFt
GAS	Natural Gas	\$0.00	9,230.3200
GAS	Natural Gas Fuelburn	\$2,827.00	84,145.8400
Total Usage:		\$2,827.00	93,376.1600

(OUT) Product: Weight per Material Report

Material ID / Name	Product Model	Intermediate Product No.	Product Output in Lbs.
FAC PAINT1	Krylon Ultra Flat Black 1602		
V100	Painted Blade		
	IP101	Painted Part 101	33,825.0000
	IP103	Painted Part 103	199,920.0000
Total for V100:			233,745.0000
Total for FAC PAINT1:			233,745.0000
GLIDDEN1	Glidden Eggshell Paint		
V100	Painted Blade		
	IP101	Painted Part 101	25,625.0000
Total for V100:			25,625.0000
Total for GLIDDEN1:			25,625.0000
Total Product Weight:			259,370.0000

(OUT) Air Emissions: Lbs. per Pollutant

Pollutant	Emission Qty in Lbs.
CO	28.0000
NOx	733,240.8953
PM10	84,693.0000
SOx	1,634,506.0000
TSP	183.1630
VOC	3,443.7480
Total Air Emissions Weight:	2,456,094.8063

(OUT): Wastewater: Cost and Gallons converted to Lbs.

Material (Water)	Wastewater Cost	Wastewater Qty in Lbs.
Total Wastewater:	\$3,610.00	51,711.7666

Painting Line Production Unit Example

(OUT): Wastewater Discharge: Lbs. per Pollutant

Pollutant	Discharge Qty in Lbs.
ALUMINUM	0.9601
BARIUM	0.0251
CADMIUM	3.9203
Total Wastewater Discharge Weight:	4.9054

(OUT) Waste: Cost and Lbs. per Waste Type

Waste Type	Hazardous?	Waste Cost	Waste Weight in Lbs.
Acids, Non-hazardous	<input type="checkbox"/>	\$0.00	22,222.0000
Alkalis	<input checked="" type="checkbox"/>	\$22.00	2,000.0000
Filters with Paint	<input checked="" type="checkbox"/>	\$0.00	6,004.0000
Sludge(paint) from paint booth water curtain system	<input type="checkbox"/>	\$0.00	2,222.0000
Total Waste:		\$22.00	32,448.0000