Oregon Department of Environmental Quality

# Cleaner Air Oregon Emissions Inventory Form AQ520

## Introduction

The first technical submittal in the Cleaner Air Oregon (CAO) program is the CAO Emissions Inventory Form AQ520 and Categorically Exempt Toxics Emissions Units (TEUs) Form AQ523. Sources are required to develop emission estimates for both annual and maximum daily scenarios which are used to assess both chronic and acute risk, respectively. Air pollution sources in Oregon are required to complete and submit these forms if they are:

- A new source applying for a Simple or Standard Air Contaminant Discharge Permit; **OR**
- An existing source who has received notice that they are "called-in" to the CAO program; **OR**
- Any source notified by DEQ that they are required to complete a CAO Risk Assessment to demonstrate compliance with the CAO rules.

The AQ520 form is available online in Microsoft Excel workbook (.xlsx) format. These instructions were developed by DEQ to help facilities complete the AQ520 form. This document also provides links to additional references that may be helpful in preparing a CAO Emissions Inventory.

## Table of Contents

## Acronyms

| | |
|---|---|
| CAO | Cleaner Air Oregon |
| CASRN | Chemical Abstracts Service Record Number |
| CE | capture efficiency |
| DRE | destruction and removal efficiency |
| EF | emission factor |
| gal | gallon |
| lb | pound |
| MB | material balance |
| OAR | Oregon Administrative Rule |
| PM | particulate matter |
| PTE | potential to emit |
| RE | retention efficiency |
| SDS | safety data sheet |
| TAC | Toxic Air Contaminant |
| TE | transfer efficiency |
| TESU | Toxics Emissions Sub-unit |
| TEU | Toxics Emissions Unit |
| VOC | volatile organic compound |
| yr | year |

## Overview

To complete the AQ520 form:

1. Download a copy of the form to your own computer. The form can be accessed here or directly from the CAO applications in Your DEQ Online.
2. Review additional information as needed on specific aspects of CAO emissions reporting:
   - CAO Step by Step Guide – See "Step 2: Emissions Inventory and Source Testing" for instructions and recommended procedures for submitting a CAO Emissions Inventory.
   - CAO Frequently Asked Questions for Emissions Inventories – Step 2
   - Identification of TEUs Quick Guide – identifies the types of TEUs (Gas Combustion, Aggregate, Exempt, and Significant) and how they are designated for CAO.
   - Exempt TEUs Reporting Document – for information about TEUs that are not categorically exempt under Oregon Administrative Rule (OAR) 340-245-0060(3)(b) but may still be considered Exempt TEUs with prior DEQ approval.
   - Combustion Emission Factors Tool – DEQ-approved emission factors for common combustion equipment (boilers, heaters, engines, etc.) and fuel types.
3. Review the "DEQ Pollutant List" worksheet in the AQ520 form and determine which Toxic Air Contaminants (TACs) the facility emits.

**Text Box 1. Emission Factor (EF) versus Material Balance (MB)**

- Information for each TEU should be included in *either* the EF Worksheets (2 and 3) *or* the MB Worksheets (4 and 5) of the AQ520 form.
  - If emission estimations for the TEU are derived from emission factors and process activity (production, throughput, or fuel usage rates) , include the information for that TEU in Worksheets 2 and 3;
  - If emissions estimations for the TEU are derived from material usage and percent TAC composition, include the information for that TEU in Worksheets 4 and 5. Additional information on the material balance approach is outlined in the DEQ quick guide and in later sections of this document.
- Use only those worksheets required to capture your facility's operations.

4. Fill out Worksheets 1 through 5 of the AQ520 form using the instructions provided in this document. Worksheet 1 is required for all submittals. Worksheets 2 through 5 will be completed as needed to capture facility operations.
5. Submit the AQ520 form to DEQ using the appropriate application in Your DEQ Online. For more information about submitting CAO applications in Your DEQ Online, see the User Guides located on the Air Quality Permits in Your DEQ Online web page. Sources within Lane County should submit the AQ520 form to Lane Regional Air Protection Agency (LRAPA) either through their Permit Writer or sent to permitting@lrapa-or.gov.

Note, the AQ523 form for Categorially Exempt TEU activities must be completed and submitted with the AQ520. The form is an editable Adobe PDF format and can be accessed here or directly from the CAO applications in Your DEQ Online.

# Worksheet 1: Facility Information

Provide the following information in the boxes provided:

- **Facility Name:** Name of facility. Should match the source's permit. Facility name as entered will appear at the top of Worksheets 2 through 5.
- **Facility Street Address:** Street address of facility location. Facility address may be different than mailing address.
- **City:** City or town where facility is located. Facility address may be different than mailing address.
- **Zip Code:** Zip code where facility is located. Facility address may be different than mailing address.
- **Source Number:** For existing sources, the source number is the first 6 digits of the permit number (##-####). New sources should leave the source number blank unless known. Source number as entered will appear at the top of Worksheets 2 through 5.
- **Facility Contact:** Provide name of preferred contact at facility. This is the individual DEQ will contact if there are questions about the submitted information.
- **Contact Phone Number:** Provide phone number for the facility contact noted above.
- **Contact Email:** Provide email for the facility contact noted above.
- **Date of Form Submittal:** Record the date of submission to DEQ. This assists with tracking if multiple versions of the AQ520 form are submitted. Submittal date as entered will appear at the top of Worksheets 2 through 5.

- **Facility Notes:** Provide any supplemental notes regarding this submittal. For example, if outside support was used to prepare the CAO Emissions Inventory (such as consultants) and you would like DEQ to contact this individual with questions, provide their contact information.

## Worksheet 2: TEUs & Activities - EF

On Worksheet 2, enter the activity information listed below for all TEUs that have emissions estimates derived from process activity (production, throughput, or fuel usage rates) and emission factors. For material balance activities proceed to Worksheet 4.

Toxics Emissions Unit (TEU) Information:

A. **Toxics Emissions Unit (TEU) ID:** Use emission unit or activity IDs from the source permit or permit application where applicable and create new IDs as necessary.

**Text Box 2. Exempt TEUs**

Exempt TEUs fall into two categories, which are treated differently in the AQ520 form:

- Categorically Exempt TEUs: **Do not include** Categorically Exempt TEUs [those listed in OAR 340-245-0060(3)(b)] in Worksheet 2. Report these activities in the AQ523 Form.
- TEUs that are Exempt with DEQ Approval: **Do include** TEUs that are exempt by DEQ determination under OAR 340-245-0060(3)(a). For these Exempt TEUs, provide information in the first three columns of Worksheet 2 only – Exempt TEUs do not need to have activity information provided or emissions calculated on Worksheet 3. In Column C ("TEU/TESU Description"), note that the TEU is an Exempt TEU.

For more information on how Exempt TEUs are designated, see DEQ's Identification of TEUs Quick Guide. For more information on the approval process for Exempt TEUs requiring prior DEQ approval see the Exempt TEUs Reporting Document. Approval is given at the discretion of DEQ.

B. **Toxics Emissions Sub-Unit (TESU) ID:** This column will only be filled in for TEUs that need to be split into sub-units or processes for the purposes of calculating emissions or clarifying emissions points. In this case, duplicate the TEU ID in the Column A and include one row for each "sub-unit." See Text Box 3 on page 5 for additional information on TESUs. Where not applicable, leave blank.

**Text Box 3. Toxics Emissions Sub-Units (TESUs)**

A source can define multiple TESUs for a TEU that may need to be split into sub-units for the purposes of calculating emissions or clarifying emission points. TESUs are for convenience and documentation purposes only. The TEU will remain the primary unit for permitting purposes.

Examples of TEUs that may need sub-units include:

- A TEU that has different throughput rates or emission factors for different types of throughputs or activities, such as a boiler that burns multiple fuel types or a kiln that dries multiple wood species. Other air permitting programs may refer to sub-units as "processes" in this context. For example, if the emission unit is Boiler 1, "P-1" is natural gas and "P-2" is diesel backup. Note that depending on the way emissions units are designated in the permit, these may also be appropriately listed as separate TEUs.
- A TEU that has emissions based on different activity units for different TACs. For example, a diesel engine has emission factors in pounds per gallon of fuel for most TACs but in pounds per hour for diesel particulate matter.
- A TEU which has multiple emission routes. For example, emissions through both stacks and fugitive emissions, or a TEU where only a portion of the emissions are routed to a control device.

C. **TEU/TESU Description:** Include a description of the TEU (or TESU). Where applicable, maintain consistency with the existing air permit or permit application. Note if the TEU is an Exempt TEU.
D. **Control Device(s):** Identify each control device (include type and an ID for each) for the TEU (or TESU), maintaining consistency with the existing air permit where applicable.
    i. If emissions are routed through multiple controls, list all.
    ii. If no control devices are present, either leave blank or enter "none."

Emissions Release Information:

E. **Emission Type (Point or Fugitive):** Type either "Point" or "Fugitive" (or select from the dropdown list).
    i. Point emissions are air contaminants which are discharged to atmosphere through an identifiable stack, vent, duct, or equivalent opening.
    ii. Fugitive emissions are emissions of any air contaminant which escape to the atmosphere from any point or area that is not identifiable as a stack, vent, duct, or equivalent opening. [OAR 340-200-0020(70)]
F. **Stack or Fugitive ID:** Provide a unique ID for each toxics emitting release location at the facility. Use stack IDs from the source permit where applicable and create new IDs as necessary. Note, multiple TEUs or TESUs may have the same Stack/Fugitive ID if they share a release location. IDs should match those used for modeling.

Activity Information:

**Text Box 4. Activity Information**

Provide both annual and maximum daily production, throughput, or fuel usage rates for each TEU or TESU. When determining maximum daily activity information, consider any co-occurring activities, processes and/or maintenance that would account for the maximum emissions of each TAC.

The Worksheet contains references to "Actual," "Requested PTE," and "Capacity." Note that not all columns will be applicable for all facilities. Where not applicable, leave the column blank.

- "Actual" *activity is applicable only to existing sources* and is based on the calendar year prior to the date the source was called in to CAO.
- "Requested PTE (Potential to Emit)" is the activity level basis being requested by the source, on which permit conditions may be based. This may be higher than "Actual" activity levels. Requested PTE does not necessarily represent the physical or design capacity of the TEU or TESU. [OAR 340-200-0020(123)]
- "Capacity" is the activity level based on the maximum regulated pollutant emissions under the source's physical and operational design. This is typically equivalent to operating 24 hours per day (maximum daily) and 8,760 hours per year (annual). Capacity is not reported in its own column, rather, the "Is Requested PTE Capacity?" column should be used to indicate that the activity level provided in the Requested PTE column represents capacity. *Facilities requesting de minimis status for CAO must assess risk at capacity for all TEUs and TESUs*. See OAR 340-245-0050(7) for additional information on de minimis source determinations.

For TESUs that represent multiple emission routes for a single activity, list the total activity for the TEU for each of the TESUs. Account for the division between multiple emission routes using the Capture Efficiency column in Worksheet 3 (see Section 3). For example, a continuously operating process (TEU ID: TEU1) has both fugitive (TESU ID: TEU1_F) and point (TESU ID: TEU1_P) emissions and the emission basis is hours of operation. For both TESUs, the annual activity will be listed as

G. **Activity Units:** Enter the units of the emitting activity (production, throughput, or fuel usage rates) for each TEU or TESU. Examples: million cubic feet, gallons, tons, or hours. Note, the activity units must match the units of the emission factors for the TEU (or TESU) in Worksheet 3.
H. **Description/Type:** Enter a brief descriptor for the activity basis for each TEU or TESU (such as production/throughput materials or fuel types). Examples: natural gas usage, diesel fuel usage, wood processed, metal poured, or hours of operation.
I. **Actual Annual Activity**: *Required only for existing sources*. Based on the full calendar year prior to the date the source was called in to CAO.
J. **Requested PTE Annual Activity:** Annual activity level requested by the source on which permit conditions may be based.
K. **Is Requested PTE Capacity?:** Enter "Yes" if the values in the "Requested PTE" column (Column J) represent capacity of the TEU or TESU. *Facilities requesting de minimis status for CAO must assess risk at capacity for all TEUs and TESUs*. If left blank, DEQ will assume Requested PTE is not capacity.

L. **Actual Max Daily Activity:** *Required only for existing sources*. The basis of maximum daily should be the maximum 24-hour activity period for the individual TEU or TESU from the previous calendar year. The maximum 24-hour activity period of reference may vary between TEUs.
M. **Requested PTE Max Daily Activity:** Maximum daily activity level requested by the source on which permitting limits may be based.
N. **Is Requested PTE Capacity?:** Enter "Yes" if the values in the "Requested PTE" column (Column M) represent capacity of the TEU or TESU. *Facilities requesting de minimis status for CAO must assess risk at capacity*. If left blank, DEQ will assume Requested PTE is not capacity.

# Worksheet 3: Pollutant Emissions – EF

On Worksheet 3, enter emissions information for all TEUs and TESUs that have emissions estimates derived from process activity (production, throughput, or fuel usage rates) and emission factors. TEU and TESU IDs entered in Worksheet 2 will auto-populate the dropdown list in Worksheet 3. *Therefore, Columns A and B in Worksheet 2 must be completed before entries in Column A and B in Worksheet 3 can be made for a given TEU or TESU.*

Toxics Emissions Unit (TEU) Information:

A. **Toxics Emissions Unit (TEU) ID:** Select the appropriate TEU ID from the dropdown. The dropdown list will auto-populate based on the information entered in Column A of Worksheet 2. *Therefore, Column A in Worksheet 2 must be completed before entries in Column A of Worksheet 3 can be completed.* Duplicate the TEU IDs as needed to include one row for each TAC emitted from the specified TEU and TESU(s). Exempt TEUs do not need to be listed here, even if they are included on Worksheet 2.
B. **Toxics Emissions Sub-Unit (TESU) ID:** Select the appropriate TESU ID from the dropdown or leave blank as applicable. The dropdown list will auto-populate based on the information entered in Column B of Worksheet 2. *Therefore, Column B in Worksheet 2 must be completed before entries in Column B of Worksheet 3 can be completed.* Duplicate the TESU IDs as needed to include one row for each TAC emitted from the specified TEU and TESU.

Toxic Air Contaminant (TAC) Information:

C. **CASRN or DEQ ID:** Either type the numeric Chemical Abstracts Service Record Number (CASRN) or DEQ ID for each pollutant as found in Column A of the "DEQ Pollutant List" worksheet or select a CASRN or DEQ ID from the dropdown list. Entries to this column which are not listed on DEQ's TAC list will result in a pop-up box stating: "This CAS is not in the DEQ CAO pollutant list." If you select "OK" the workbook will allow the entry regardless, but Column D will not auto-populate and the cells in Columns C and D will be highlighted.
D. **Toxic Air Contaminant (TAC) Name:** This column will auto-populate when a CASRN or DEQ ID is entered in Column C by performing a lookup from the "DEQ Pollutant List" worksheet. This will not auto-populate if the entry in Column C is not on the pollutant list.

Emission Factor (EF) Information:

E. **Capture Efficiency (CE):** Capture efficiency is the weight percentage of emissions from the TEU that are captured and directed to the emission point. Enter the total combined capture efficiency for the specified TEU/TESU and ensure it is expressed as a percentage. This column is pre-formatted for

percentages. So, for example, if the capture efficiency is 90 percent, enter "90" not "0.90." Capture efficiency will be less than 100 percent if emissions are only partially captured by a stack or control device, or if emissions from a single activity are split between multiple TEU/TESUs. Note that emissions that are not captured by a stack may need to be included as a fugitive TEU/TESU. Emission calculations in Columns M and N assume 100 percent capture if this is left blank.

F. **Destruction/Removal Efficiency (DRE):** Destruction and removal efficiency is the weight percentage of emitted TAC that is removed or destroyed by a control device. Enter the total combined pollutant-specific destruction and removal efficiency for each TAC from the specified TEU/TESU. This may be composed of multiple destruction and removal efficiencies.
    i. Destruction and removal efficiencies may differ between TACs from the same TEU/TESU. Such as for gaseous versus particulate emissions.
    ii. Estimated destruction and removal efficiencies should be listed, when possible, even if the destruction and removal efficiency is included in the emission factor. Note, this may not always be possible, such as when the emission factor is derived from source test data (outlet only).
    iii. Ensure the destruction and removal efficiency is entered as a percentage. This column is pre-formatted for percentages. So, for example, if the destruction and removal efficiency is 99 percent, enter "99" not "0.99."
G. **EF Includes CE?:** If the capture efficiency is already incorporated in the emission factor, select "Yes" from the dropdown. If capture efficiency is not incorporated in the emission factor, select "No" from the dropdown or leave blank. If "Yes", the listed capture efficiency will not be used in the emissions calculation.
H. **EF Includes DRE?:** If the destruction and removal efficiency is already incorporated in the emission factor, select "Yes" from the dropdown. If destruction and removal efficiency is not incorporated in the emission factor, select "No" from the dropdown or leave blank. If "Yes", the listed destruction and removal efficiency will not be used in the emissions calculation.
I. **Annual EF Value:** Provide TAC-specific emission factors for Annual emissions. Emission factors may be the same as for Maximum Daily, but please populate both columns.
J. **Max Daily EF Value:** Provide TAC-specific emission factors for Maximum Daily emissions. Emission factors may be the same as for Annual, but please populate both columns.
K. **Units EF Value:** Provide the units for the emission factor values in lb/[unit] where [unit] matches the activity units entered for the TEU/TESU in Column G of Worksheet 2. For example, if the emission factor is in units of pounds of TAC emitted per gallon of diesel fuel, enter "lb/gal."
L. **EF Reference/Notes:** Provide specific information about the source of each emission factor. Common emission factor references include: AP-42, WebFire, and source test data (include date with reference). Also include any related notes here, including (as appropriate): capture efficiency reference(s); destruction and removal efficiency reference(s); method of TAC speciation if a general volatile organic compound (VOC) or particulate matter (PM) emission factor has been used. This column is not limited to the space viewable and will allow longer inputs.

**Text Box 5. Emissions Calculations – EF**

Sources are only required to calculate TAC emissions for the emissions basis on which they choose to be permitted (both annual and maximum daily). The "Calculated Emissions" columns are pre-populated with a formula to calculate TAC emissions using the activity values in the "Requested PTE" columns in Worksheet 2 and should do so automatically once all the information is entered correctly in Worksheets 2 and 3. Alternatively, emission estimates can be entered as hard-coded values into cells. Emissions are calculated from emission factors using the following general formula:

$$E = P \times \mathrm{EF} \times \mathrm{CE} \times (1 - \mathrm{DRE})$$

Where,

| | | |
|---|---|---|
| $E$ | = | Annual or Maximum Daily TAC emissions [lb/year or lb/day] |
| $P$ | = | Production, throughput, or fuel usage rate [(units)/year or (units)/day] |
| EF | = | Pollutant emission factor (EF) [lb/(unit)] |
| CE | = | Overall capture efficiency (CE) expressed as a fraction. Excluded if CE is incorporated into the EF. |
| DRE | = | Overall destruction and removal efficiency (DRE) expressed as a fraction. Excluded if DRE is incorporated into the EF. |

M. **Annual [lb/year] Calculated Emissions – Requested PTE:** Estimate of TAC emissions in pounds per year at the Requested PTE. Use the emission factor provided in Column I and appropriately account for capture efficiency and destruction and removal efficiency. This column is pre-populated with an equation to calculate TAC emissions automatically as outlined in Text Box 5 above, but cells can be edited. For example, if emissions estimates are prepared in a separate calculation sheet, values can be copied and pasted here. If using the pre-populated equation to calculate TAC emissions, the facility is still responsible for ensuring the accuracy of the calculated emissions.

N. **Max Daily [lb/day] Calculated Emissions – Requested PTE:** Estimate of TAC emissions in pounds per day at the Requested PTE. Use the emission factor provided in Column J and appropriately account for capture efficiency and destruction and removal efficiency. This column is pre-populated with an equation to calculate TAC emissions automatically as outlined in in Text Box 5 above, but cells can be edited. For example, if emissions estimates are prepared in a separate calculation sheet, values can be copied and pasted here. If using the pre-populated equation to calculate TAC emissions, the facility is still responsible for ensuring the accuracy of the calculated emissions.

## Worksheet 4: TEUs & Activities – MB

On Worksheet 4, enter the activity information listed below for all TEUs and TESUs that have emissions estimates derived from material balance calculations. Material balance calculations are derived from usage rates and material compositions.

Toxics Emissions Unit (TEU) Information:

Categorically Exempt TEUs do not need to be included in Worksheet 4. Exempt TEUs that are not categorically exempt should be listed here, but do not need to have emissions calculated on Worksheet 5. Only information in the first three columns is needed for Exempt TEUs.

A. **Toxics Emissions Unit (TEU) ID:** Use emission unit or activity IDs from the source permit or permit application where applicable and create new IDs as necessary.
B. **Toxics Emissions Sub-Unit (TESU) ID:** This column will only be filled in for TEUs that need to be split into sub-units for the purposes of calculating emissions or clarifying emissions points. In this case, duplicate the TEU ID in the Column A and include one row for each "sub-unit." See Text Box 2 on page 4 for additional information on TESUs. Where not applicable, leave blank.
C. **TEU/TESU Description:** Include a description of the TEU (or TESU). Where applicable maintain consistency with the existing air permit or permit application. Note if the TEU is an Exempt TEU.
D. **Control Device(s):** Identify each control device (include type and an ID for each) for the TEU (or TESU), maintaining consistency with the existing air permit where applicable.
    i. If emissions are routed through multiple controls, list all.
    ii. If no control devices are present, either leave blank or enter "none".

Material Information:

E. **Material Name:** Commercial name of material as provided on the manufacturer's safety data sheet (SDS).
F. **Manufacturer:** Name of manufacturer as provided on the SDS.

Emissions Release Information:

G. **Emission Type (Point or Fugitive):** Type either "Point" or "Fugitive" (or select from the dropdown list).
    i. Point emissions are air contaminants which are discharged to atmosphere through an identifiable stack, vent, duct, or equivalent opening.
    ii. Fugitive emissions are emissions of any air contaminant which escape to the atmosphere from any point or area that is not identifiable as a stack, vent, duct, or equivalent opening. [OAR 340-200-0020(70)]
H. **Stack or Fugitive ID:** Provide a unique ID for each toxics emitting release location at the facility. Use stack IDs from the source permit where applicable and create new IDs as necessary. Note, multiple TEUs or TESUs may have the same Stack/Fugitive ID if they share a release location. IDs should match those used for modeling.

**Text Box 6. Material Usage and Waste Rates**

Provide both annual and maximum daily material usage and waste rates for each material used at each TEU or TESU. When determining maximum activity information, consider any co-occurring activities, processes and/or maintenance that would account for the maximum emissions of each TAC. The maximum Material Usage Rate minus Material Waste Rate (or "net Material Usage") reported should reflect the maximum daily or annual rate.

Worksheet 4 contains references to "Actual," "Requested PTE," and "Capacity." Note that not all columns will be applicable for all facilities. Where not applicable, leave the column blank.

- "Actual" *material usage or waste rate is applicable only to existing sources* and is based on the calendar year prior to the date the source was called in to CAO.
- "Requested PTE" is the material usage or waste rate requested by the source on which permit conditions may be based. Requested PTE does not necessarily represent capacity of the TEU or TESU.
- "Capacity" is the material usage or waste rate based on the maximum regulated pollutant emissions under the source's physical and operational design. This is typically equivalent the maximum material usage of the equipment being operated. Capacity is not reported in its own column, rather, the "Is Requested PTE Capacity?" column may be used to indicate that the material usage or waste rates provided in the Requested PTE column represents capacity. *Facilities requesting de minimis status for CAO must assess risk at capacity for all TEUs and TESUs*. See OAR 340-245-0050(7) for additional information on de minimis source determinations.

Report material usage and waste rates in pounds per year [lb/year] or pounds per day [lb/day] as applicable. If rates are tracked by volume, this will need to be converted to a weight basis using the material's density or specific gravity. This information is typically found in Section 9 of the SDS. The below equations describe the conversion from a weight basis to volume basis using either the material's density or specific gravity.

Weight [lb/year or lb/day] = Volume [gal/year or gal/day] x Density [lb/gal]
Weight [lb/year or lb/day] = Volume [gal/year or gal/day] x Specific Gravity x (8.34 lb/gal)

**Material Usage:** Report in [lb/year] or [lb/day] as applicable.

**Material Waste:** Account for any material that is collected and shipped off-site, material that drains to a collection/treatment system, or any material that should be excluded from emissions calculations. Material waste is subtracted from material usage rates in the emissions estimate calculation. Therefore, higher waste rates will result in lower net emissions from the TEU or TESU. Report in [lb/year] or [lb/day] as applicable. Including material waste rates is optional. Sources may prefer to conservatively assume no material waste for simplicity in recordkeeping, etc.

For TESUs that represent multiple emission routes for a single material balance activity, list the total usage and waste for the TEU for each of the TESUs. Account for the division between multiple emission routes using the capture efficiency in Column G of Worksheet 5 (see Section 5). For example, consider a process which continuously uses 1 pound of material per hour (TEU ID: TEU2) and has both fugitive (TESU ID: TEU2_F) and point (TESU ID: TEU2_P) emissions. For both TESUs, the annual usage will be listed as 8,760 lb/year and maximum daily as 24 lb/day.

Material Usage:

I. **Actual Annual [lb/year] Material Usage:** *Required only for existing sources*. Usage rates based on the full calendar year prior to the date the source was called in to CAO. Report annual usage in [lb/year].
J. **Requested PTE Annual [lb/year] Material Usage:** Annual usage rates requested by the source on which permit conditions may be based. Provide in [lb/year].
K. **Is Requested PTE Capacity?:** Enter "Yes" if the values in the "Requested PTE" column (Column J) represent capacity of the TEU or TESU. *Facilities requesting de minimis status for CAO must assess risk at capacity for all TEUs and TESUs*. If left blank, DEQ will assume Requested PTE is not capacity.
L. **Actual Max Daily [lb/day] Material Usage:** *Required only for existing sources*. The basis of maximum daily usage rates should be the maximum 24-hour activity period for the individual TEU or TESU from the previous calendar year. The maximum 24-hour activity period of reference may vary between TEUs. Report maximum daily usage in [lb/day].
M. **Requested PTE Max Daily [lb/day] Material Usage:** Maximum daily usage rates requested by the source on which permit conditions may be based. Provide in [lb/day].
N. **Is Requested PTE Capacity?:** Enter "Yes" if the values in the "Requested PTE" column (Column M) represent capacity of the TEU or TESU. *Facilities requesting de minimis status for CAO must assess risk at capacity for all TEUs and TESUs*. If left blank, DEQ will assume Requested PTE is not capacity.

Material Waste:

O. **Actual Annual [lb/year] Material Waste:** *Applicable only to existing sources*. Waste rates based on the full calendar year prior to the date the source was called in to CAO. Report annual waste in [lb/year].
P. **Requested PTE Annual [lb/year] Material Waste**: Annual waste rates requested by the source for which permitting limits will be based. Provide in [lb/year].
Q. **Is Requested PTE Capacity?:** Enter "Yes" if the values in the "Requested PTE" column (Column P) represent capacity of the TEU or TESU. If left blank, DEQ will assume Requested PTE is not capacity.
R. **Actual Max Daily [lb/day] Material Waste:** *Applicable only to existing sources*. The basis of maximum daily waste rates should be the maximum 24-hour net Material Usage period for the individual TEU or TESU from the previous calendar year. The maximum 24-hour net Material Usage period of reference may vary between TEUs. Report maximum daily waste in [lb/day].
S. **Requested PTE Max Daily [lb/day] Material Waste**: Maximum daily waste rates requested by the source for which permitting limits will be based. Provide in [lb/day].
T. **Is Requested PTE Capacity?:** Enter "Yes" if the values in the "Requested PTE" column (Column S) represent capacity of the TEU or TESU. If left blank, DEQ will assume Requested PTE is not capacity.

# Worksheet 5: Pollutant Emissions – MB

On Worksheet 5, enter emissions information for all TEUs and TESUs that have emissions estimates derived from material balance calculations. TEU ID, TESU ID, and Material Name information entered in Worksheet 4 will auto-populate the dropdown lists in Worksheet 5. *Therefore, Columns A, B, and E in Worksheet 4 must be completed before entries in Columns A, B, and C in Worksheet 5 can be made for a given TEU or TESU and material.*

Toxics Emissions Unit (TEU) Information:

A. **Toxics Emissions Unit (TEU) ID:** Select the appropriate TEU ID from the dropdown. The dropdown list will auto-populate based on the information entered in Column A of Worksheet 4. *Therefore, Column A in Worksheet 4 must be completed before entries in Column A of Worksheet 5 can be completed*. Duplicate the TEU IDs as needed to include one row for each TAC emitted from the specified TEU, TESU(s) and material. Note, Exempt TEUs do not need to be listed here, even if they are included on Worksheet 4.
B. **Toxics Emissions Sub-Unit (TESU) ID:** Select the appropriate TESU ID from the dropdown or leave blank as applicable. The dropdown list will auto-populate based on the information entered in Column B of Worksheet 4. *Therefore, Column B in Worksheet 4 must be completed before entries in Column B of Worksheet 5 can be completed*. Duplicate the TESU IDs as needed to include one row for each TAC emitted from a specified TEU, TESU, and material.

Material Information:

C. **Material Name:** Select the appropriate Material Name from the dropdown. The dropdown list will auto-populate based on information entered in Column E of Worksheet 4. *Therefore, Column E in Worksheet 4 must be completed before entries in Column C of Worksheet 5 can be completed*. Duplicate the Material Name as needed to include one row for each TAC emitted from a specified TEU, TESU, and material.

Toxic Air Contaminant (TAC) Information:

D. **CASRN or DEQ ID:** Either type the numeric CASRN or DEQ ID for each pollutant as found in Column A of the "DEQ Pollutant List" worksheet or select a CASRN or DEQ ID from the dropdown list. Pollutant information should be reflective of the best available material composition information (for example, the SDS or analytical batch reports from the manufacturer). Entries to this column which are not listed on DEQ's TAC list will result in a pop-up box stating: "This CAS is not in the DEQ CAO pollutant list." If you select "OK" the workbook will allow the entry regardless, but Column E will not auto-populate and the cells in Columns D and E will be highlighted.
E. **Toxic Air Contaminant (TAC) Name:** This column will auto-populate when a CASRN or DEQ ID is entered in Column D by performing a lookup from the "DEQ Pollutant List" worksheet. This will not auto-populate if the entry in Column D is not on the pollutant list.
F. **Percent Composition:** Enter composition information for TAC (as weight percentage) from SDS. Enter the weight percentage and ensure it is expressed as a percentage. This column is pre-formatted for percentages. For example, if TAC composition is 10 percent, type "10" not "0.1." *Also note that for weight percentages less than 1 percent, the zero before the decimal must be included or Excel will misread the entry. Therefore, if the composition is 0.5 percent, type "0.5" not ".5"*. The Text Box 7 on page 14 outlines how to calculate the TAC composition if information provided in the SDS is not an exact number.

**Text Box 7. Percent Composition from SDS**

If composition is provided as other than an exact number calculate percent composition as follows:

- Composition Range: For percentages given as a range, determine the mean value or use the maximum of the range. For example, 10-20% would be entered as either 15% or 20%. Mean = (low end + high end)/2 = (10+20)/2 = 15%
- Less than (<): Use the mean of the given value and zero or use the provided value. For example, <10% would be entered as either 5% or 10%. Mean = (0+10)/2 = 5%
- Less than or equal to (≤): Use provided value. For example, ≤10% would be entered as 10%.
- Greater than (>) or greater than or equal to (≥): Use either 100% or the mean of the given value and 100. For example, >90% (or ≥90%) would be entered as 95%. Mean = (90+100)/2 = 95%

Note, DEQ may request that more specific composition information be requested from the material's manufacturer or require adjustments from the methods presented above in instances where compositions provided in SDS lack specificity. For example, in instances where the TAC composition is a very wide range and the material is used in large quantities or the TAC is of particular concern.

Emissions Information:

G. **Capture Efficiency (CE):** Capture efficiency is the weight percentage of emissions from the TEU that are captured and directed to the emission point. Enter the capture efficiency for the specified TEU/TESU and ensure it is expressed as a percentage. This column is pre-formatted for percentages. So, for example, if the capture efficiency 90 percent, type "90" not "0.90." Capture efficiency will be less than 100 percent if emissions are only partially captured by a stack or control device or if emissions from a single activity are split between multiple TEU/TESUs. Note that all emissions that are not captured by a stack may need to be included as a fugitive TEU/TESU. Emission calculations in Columns L and M assume 100 percent capture of emissions if left blank.

H. **Transfer Efficiency (TE):** Transfer efficiency is the weight percentage of the coating material that is successfully applied to the product. For example, a transfer efficiency would be included for solid constituents of a coating material applied with a spray gun. A transfer efficiency is not typically applicable to volatile constituents of a coating. Enter the transfer efficiency for the specified TEU/TESU and TAC and ensure it is expressed as a percentage. This column is pre-formatted for percentages. So, for example, if the transfer efficiency is 60 percent, type "60" not "0.60."

I. **Retention Efficiency (RE):** Retention efficiency is the weight percentage of the constituent in the material that is retained in the product once reacted. For example, a retention efficiency would be applied to emissions of diisocyanate compounds in two-part material systems where a reaction occurs upon mixing of the two materials and a portion of the compound is retained in the final product. Enter the retention efficiency for the specified TEU/TESU and TAC and ensure it is expressed as a percentage. This column is pre-formatted for percentages. So, for example, if the retention efficiency is 80 percent, type "80" not "0.80."

J. **Destruction/Removal Efficiency (DRE):** Destruction and removal efficiency is the percentage of emitted TAC (by weight) that is removed or destroyed by a control device. Enter the total combined

pollutant-specific destruction and removal efficiency for each TAC from the specified TEU/TESU. This may be composed of multiple destruction and removal efficiencies.

i. Destruction and removal efficiencies may differ between TACs from the same TEU/TESU.
ii. Ensure the destruction and removal efficiency is entered as a percentage. This column is pre-formatted for percentages. For example, if the destruction and removal efficiency is 99 percent, enter "99" not "0.99."

K. **Reference/Notes:** Provide relevant references or notes, including sources or estimation methods for capture efficiencies and destruction and removal efficiencies, and a description of how material waste was determined if material waste was reported. This column is not limited to the space viewable and will allow longer inputs.

**Text Box 8. Emissions Calculations – MB**

Sources are only required to calculate TAC emissions for the emissions basis on which they choose to be permitted (both annual and maximum daily). The "Calculated Emissions" columns are pre-populated with a formula to calculate TAC emissions using the activity values in the "Requested PTE" columns in Worksheet 4 and should do so automatically once all the information is entered correctly in Worksheets 4 and 5. Alternatively, emission estimates can be entered as hard-coded values into cells. Emissions are calculated using the following general formula:

$$E = (C - W) \times K \times \mathrm{CE} \times (1 - \mathrm{TE}) \times (1 - \mathrm{RE}) \times (1 - \mathrm{DRE})$$

Where,

| | | |
|---|---|---|
| $E$ | = | Annual or Maximum Daily TAC emissions [lb/year or lb/day] |
| $C$ | = | Material usage [lb/year or lb/day] |
| $W$ | = | Material waste [lb/year or lb/day] |
| $K$ | = | TAC composition, weight percentage expressed as a fraction. |
| CE | = | Overall capture efficiency (CE) expressed as a fraction. |
| TE | = | Transfer efficiency (TE) expressed as a fraction. |
| RE | = | Retention efficiency (RE) expressed as a fraction. |
| DRE | = | Overall destruction and removal efficiency (DRE) expressed as a fraction. |

L. **Annual [lb/year] Calculated Emissions – Requested PTE:** Estimate of TAC emissions in pounds per year at the Requested PTE Annual Material Usage and Waste Rates. Column L is pre-populated with an equation to calculate TAC emissions automatically, but cells can be edited. For example, if emissions estimates are prepared in a separate calculation sheet, values can be copied and pasted here. If using the pre-populated equation to calculate TAC emissions, the facility is still responsible for ensuring the accuracy of the calculated emissions.

M. **Max Daily [lb/day] Calculated Emissions – Requested PTE:** Estimate of TAC emissions in pounds per day at the Requested PTE Maximum Daily Material Usage and Waste Rates. Column M is pre-populated with an equation to calculate TAC emissions automatically, but cells can be edited. For example, if emissions estimates are prepared in a separate calculation sheet, values can be copied and pasted here. If using the pre-populated equation to calculate TAC emissions, the facility is still responsible for ensuring the accuracy of the calculated emissions.

## Example AQ520 Workbook

An example Form AQ520 has been prepared by DEQ for reference.

## Contact Information

Information about air quality permits and DEQ's regulations may be obtained from the DEQ's web page. Inquiries related to the CAO Risk Assessment process should be directed to cleanerair@deq.oregon.gov, or to the CAO Project Manager for your facility.

Sources within Lane County should contact Lane Regional Air Protection Agency (LRAPA). Information about Lane County air quality permits and LRAPA's regulations may be obtained from the LRAPA web page. Inquiries related to the CAO Risk Assessment process should be directed to permitting@lrapa-or.gov, or to the Permit Writer for your facility. For sources located outside of Lane County, information about air quality permits and DEQ's regulations may be obtained from the DEQ's web page. Inquiries related to the CAO Risk Assessment process should be directed to cleanerair@deq.oregon.gov, or to the CAO Project Manager for your facility.

Sources in Lane County should contact Lane Regional Air Protection Agency (LRAPA). Information about Lane County air quality permits and LRAPA's regulations may be obtained from the LRAPA web page. Inquiries related to the CAO Risk Assessment process should be directed to LRAPA@lrapa-or.gov, or to the Permit Writer for your facility.

## Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities. Visit DEQ's Civil Rights and Environmental Justice page.