# Table 5-1
# Level 1 Risk Assessment Result Summary and RAL Evaluations
# FormFactor, Inc.

| Exposure Assessment | New Source RAL | | | RA Result | RAL Analysis |
|---|---|---|---|---|---|
| | Aggregate TEU Level | Source Permit Level | Community Engagement Level | | |
| Excess Cancer Risk (increased chances in a million) | | | | | |
| Residential | 0.5 | 0.5 | 5 | <0.1 | Below Source Permit Level |
| Nonresidential Child | | | | <0.1 | Below Source Permit Level |
| Nonresidential Worker | | | | <0.1 | Below Source Permit Level |
| Chronic Noncancer Hazard Index | | | | | |
| Residential | 0.1 | 0.5 | 1 | <0.1 | Below Source Permit Level |
| Nonresidential Child | | | | <0.1 | Below Source Permit Level |
| Nonresidential Worker | | | | <0.1 | Below Source Permit Level |
| Acute Noncancer Hazard Index | | | | | |
| Acute | 0.1 | 0.5 | 1 | 0.2 | Below Source Permit Level |

**Notes**

RA = risk assessment.

RAL = Risk Action Level.

TEU = toxic emission unit.

# Table 5-2
## Level 1 Cancer Risk Assessment Summary—Significant TEU
## FormFactor, Inc.

| Toxic Air Contaminant | CAS | TAC Annual Emission Rates [1] (lb/yr) | Residential Exposure | | Nonresidential Child Exposure | | Nonresidential Worker Exposure | |
|---|---|---|---|---|---|---|---|---|
| | | | RBC ($ug/m^3$) | Excess Cancer Risk [a] | RBC ($ug/m^3$) | Excess Cancer Risk [a] | RBC ($ug/m^3$) | Excess Cancer Risk [a] |
| **Cumulative Facility-Wide Risk** | | | -- | **6.75E-06** | -- | **1.68E-07** | -- | **1.05E-05** |
| **Risk Comparison Value [2]** | | | -- | **<0.1** | -- | **<0.1** | -- | **<0.1** |
| **TEU FAB Stack ID [3]** | | | **EF-16** | | **EF-22** | | **EF-10** | |
| **TEU Dispersion Factor ($ug/m^3$/lb/yr) [4]** | | | **9.2E-05** | | **6.0E-05** | | **1.73E-03** | |
| Copper and Compounds | 7440-50-8 | 0.32 | -- | -- | -- | -- | -- | -- |
| Nickel and Compounds | 7440-02-0 | 2.8E-04 | 3.8E-03 | 6.7E-06 | 0.10 | 1.7E-07 | 0.046 | 1.0E-05 |
| 1-Methoxy-2-propanol | 107-98-2 | 10,939 | -- | -- | -- | -- | -- | -- |
| 1-Methoxy-2-propanol acetate | 108-65-6 | 5,840 | -- | -- | -- | -- | -- | -- |
| Acetone | 67-64-1 | 3,872 | -- | -- | -- | -- | -- | -- |
| Bis (2-methoxyethyl) ether | 111-96-6 | 3,417 | -- | -- | -- | -- | -- | -- |
| Ethylene Glycol | 107-21-1 | 9.29 | -- | -- | -- | -- | -- | -- |
| Isopropanol | 67-63-0 | 3,327 | -- | -- | -- | -- | -- | -- |
| Methanol | 67-56-1 | 379 | -- | -- | -- | -- | -- | -- |
| Hydrochloric Acid | 7647-01-0 | 283 | -- | -- | -- | -- | -- | -- |
| Hydrofluoric Acid | 7664-39-3 | 8.45 | -- | -- | -- | -- | -- | -- |
| Nitric Acid | 7697-37-2 | 13.1 | -- | -- | -- | -- | -- | -- |
| Phosphoric Acid | 7664-38-2 | 62.2 | -- | -- | -- | -- | -- | -- |
| Sulfuric acid | 7664-93-9 | 2.9E-03 | -- | -- | -- | -- | -- | -- |
| Total Fluorides | 239 | 150 | -- | -- | -- | -- | -- | -- |

**Notes**

$ug/m^3$ = microgram per cubic meter.

RBC = risk-based concentration

TAC = Toxic Air Contaminant.

TEU = toxic emission unit.

[a] Excess cancer risk = (TAC annual emission rate [lb/yr]) x (TEU dispersion factor [$ug/m^3$/lb/yr]) / (RBC [$ug/m^3$])

**References**

[1] See Table 3-2, Level 1 Risk Assessment Emission Rates—Significant TEU.

[2] Risk comparison value is the facility total risk rounded in accordance with OAR 340-245-0200(4)(a)(A).

[3] 100 percent of emissions from the FAB TEU are allocated to the closest stack for each exposure type.

[4] See Table 4-1, TEU Dispersion Factors—Significant TEU.

# Table 5-3
## Level 1 Noncancer Risk Assessment Summary—Significant TEU
## FormFactor, Inc.

| TAC | CAS | TAC Emission Rate [1] | | Chronic Noncancer | | | | | | Acute Noncancer | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential | | Nonresidential Child | | Nonresidential Worker | | | |
| | | Daily (lb/day) | Annual (lb/yr) | RBC ($ug/m^3$) | Hazard Index [a] | RBC ($ug/m^3$) | Hazard Index [a] | RBC ($ug/m^3$) | Hazard Index [a] | RBC ($ug/m^3$) | Hazard Index [b] |
| **Cumulative Facility-Wide Risk** | | | | -- | **9.9E-03** | -- | **1.0E-03** | -- | **0.029** | -- | **0.17** |
| **Risk Comparison Value [2]** | | | | -- | **<0.1** | -- | **<0.1** | -- | **<0.1** | -- | **0.2** |
| **TEU FAB Stack ID [3]** | | | | **EF-16** | | **EF-22** | | **EF-10** | | **EF-10** | |
| **TEU Dispersion Factor ($ug/m^3$/lb/yr) [4]** | | | | **9.18E-05** | | **6.00E-05** | | **1.73E-03** | | **--** | |
| **TEU Dispersion Factor ($ug/m^3$/lb/day) [4]** | | | | **--** | | **--** | | **--** | | **4.57** | |
| Copper and Compounds | 7440-50-8 | 8.6E-04 | 0.32 | -- | -- | -- | -- | -- | -- | 100 | 3.95E-05 |
| Nickel and Compounds | 7440-02-0 | 7.7E-07 | 2.8E-04 | 0.014 | 1.83E-06 | 0.062 | 2.70E-07 | 0.062 | 7.77E-06 | 0.20 | 1.75E-05 |
| 1-Methoxy-2-propanol | 107-98-2 | 150 | 10,939 | 7,000 | 1.43E-04 | 31,000 | 2.12E-05 | 31,000 | 6.09E-04 | -- | -- |
| 1-Methoxy-2-propanol acetate | 108-65-6 | 81.6 | 5,840 | -- | -- | -- | -- | -- | -- | -- | -- |
| Acetone | 67-64-1 | 53.4 | 3,872 | 31,000 | 1.15E-05 | 140,000 | 1.66E-06 | 140,000 | 4.77E-05 | 62,000 | 3.94E-03 |
| Bis (2-methoxyethyl) ether | 111-96-6 | 46.7 | 3,417 | -- | -- | -- | -- | -- | -- | -- | -- |
| Ethylene Glycol | 107-21-1 | 9.29 | 9.29 | 400 | 2.13E-06 | 1,800 | 3.10E-07 | 1,800 | 8.90E-06 | 2,000 | 0.021 |
| Isopropanol | 67-63-0 | 45.5 | 3,327 | 200 | 1.53E-03 | 880 | 2.27E-04 | 880 | 6.52E-03 | 3,200 | 0.065 |
| Methanol | 67-56-1 | 7.90 | 379 | 4,000 | 8.71E-06 | 18,000 | 1.26E-06 | 18,000 | 3.64E-05 | 28,000 | 1.29E-03 |
| Hydrochloric Acid | 7647-01-0 | 0.77 | 283 | 20.0 | 1.30E-03 | 88.0 | 1.93E-04 | 88.0 | 5.54E-03 | 2,100 | 1.69E-03 |
| Hydrofluoric Acid | 7664-39-3 | 0.12 | 8.45 | 2.10 | 3.69E-04 | 19.0 | 2.67E-05 | 19.0 | 7.67E-04 | 16.0 | 0.033 |
| Nitric Acid | 7697-37-2 | 0.036 | 13.1 | -- | -- | -- | -- | -- | -- | 86.0 | 1.91E-03 |
| Phosphoric Acid | 7664-38-2 | 0.17 | 62.2 | 10.0 | 5.71E-04 | 44.0 | 8.48E-05 | 44.0 | 2.44E-03 | -- | -- |
| Sulfuric acid | 7664-93-9 | 7.9E-06 | 2.9E-03 | 1.00 | 2.64E-07 | 4.40 | 3.92E-08 | 4.40 | 1.13E-06 | 120 | 3.00E-07 |
| Total Fluorides | 239 | 2.04 | 150 | 2.30 | 5.99E-03 | 20.0 | 4.50E-04 | 20.0 | 0.013 | 240 | 0.039 |

**Notes**

$ug/m^3$ = microgram per cubic meter.
RBC = risk-based concentration
TAC = Toxic Air Contaminant.
TEU = toxic emission unit.

[a] Chronic noncancer hazard index = (TAC annual emission rate [lb/yr]) x (TEU dispersion factor [$ug/m^3$/lb/yr]) / (RBC [$ug/m^3$])

[b] Acute noncancer hazard index = (TAC daily emission rate [lb/day]) x (TEU dispersion factor [$ug/m^3$/lb/day]) / (RBC [$ug/m^3$])

**References**

[1] See Table 3-2, Level 1 Risk Assessment Emission Rates—Significant TEU.

[2] Risk comparison value is the facility total risk rounded in accordance with OAR 340-245-0200(4)(a)(A).

[3] 100 percent of emissions from the FAB TEU are allocated to the closest stack for each exposure type.

[4] See Table 4-1, TEU Dispersion Factors—Significant TEU.