



GUIDANCE DOCUMENT

Demonstrating Compliance with the Ambient Impact Requirement under the Toxic Air Pollutant (TAP) Regulations (COMAR 26.11.15.06)

The ambient impact requirement states that sources must demonstrate that their emissions of toxic air pollutants (TAP) will not endanger public health. The ambient impact requirement is one of the more complex regulatory requirements to meet because there are several options that can be used to demonstrate compliance and some of the options require the use of an air dispersion model. This document provides guidance on the procedures for demonstrating compliance with the ambient impact requirement.

To determine which TAPs are subject to the ambient impact requirement, follow Steps 1 and 2 of the Department's Toxic Air Pollutant (TAP) Emissions Summary and Compliance Demonstration form (Form 5T). Each TAP subject to the ambient impact requirement must be individually evaluated to determine that the emissions of the TAP will not endanger public health. The evaluation consists of a series of tests. Once a TAP passes a test in the series, compliance is demonstrated for that TAP, and no further analysis is required for that TAP.

Test 1: Charts of Allowable Emissions in COMAR 26.11.16.02

The charts in COMAR 26.11.16.02 list maximum allowable, premises wide emission rates based on TAP screening levels. The charts are the result of very simple, conservative modeling and based on the following equations:

| Type of Screening Level | Stack Sources (10 meters or greater and no downwash) | Shorter Stack, Possible Downwash, or Fugitive |
|-------------------------|--|---|
| Annual | AER = 1664 x SL | AER = 365 x SL |
| 1-hour or 8-hour | AER = 0.0163 x SL | AER = 0.00358 x SL |

AER = Allowable emission rate in pounds per year or pounds per hour, appropriately.

SL = The appropriate screening level for the TAP in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

Downwash occurs if the stack height is less than 2.5 times the height of the building where the stack is located.

Compliance Demonstration Example – Test 1

Company ABC is installing a new paint spray booth with a stack of 15 meters and no downwash, operating 3000 hours per year. TAP emissions from the proposed installation and existing installations are summarized in the following table:

| Pollutant | Emissions from the Proposed Installation (lb/hr) | Emissions from Existing Installations (lb/hr) | Total Premises Wide Emissions (lb/hr) | Total Premises Wide Emissions (lb/yr) |
|-----------|--|---|---------------------------------------|---------------------------------------|
| TAP A | 0.75 | 1.5 | 2.25 | 6750 |
| TAP B | 0.05 | 0 | 0.05 | 150 |
| TAP C | 6.5 | 5.5 | 12 | 36,000 |
| TAP D | 1.5 | 2 | 3.5 | 10,500 |
| TAP E | 3 | 0 | 3 | 9000 |

The screening levels for each TAP are listed in the following table:

| Pollutant | Screening Levels ($\mu\text{g}/\text{m}^3$) | | |
|-----------|---|--------|--------|
| | 1-hour | 8-hour | Annual |
| TAP A | 3260 | 2282 | None |
| TAP B | 100 | 70 | None |
| TAP C | 650 | 520 | 50 |
| TAP D | 50 | None | None |
| TAP E | None | 10 | 0.75 |

Based on the equations that govern the charts in COMAR 26.11.16.02, the maximum allowable, premises wide emission rate of each TAP based on a tall stack with no downwash is listed in the following table:

| Pollutant | Premises Wide Allowable Emission Rate (AER) | | |
|-----------|---|----------------|----------------|
| | 1-hour (lb/hr) | 8-hour (lb/hr) | Annual (lb/yr) |
| TAP A | 53.1 | 37.2 | N/A |
| TAP B | 1.6 | 1.1 | N/A |
| TAP C | 10.6 | 8.5 | 83,200 |
| TAP D | 0.82 | N/A | N/A |
| TAP E | N/A | 0.16 | 1248 |

As shown in the tables above, emissions of TAP A and TAP B are less than all calculated allowable emission rates for those TAP. Compliance with the ambient impact requirement is demonstrated for TAP A and TAP B. TAP C, TAP D, and TAP E require further evaluation to demonstrate compliance with the ambient impact requirement.

Test 2: Hand Dispersion Calculations using Technical Memorandum TM 86-02

The Technical Memorandum TM 86-02 provides a methodology to predict off-site concentrations of a TAP. If the concentrations predicted by TM 86-02 are less than the screening level of the TAP for the appropriate averaging times, the emissions of the TAP would be in compliance with the ambient impact requirement. A copy of TM 86-02 is available from the Department's Air Quality Permit Program upon request.

While this option is still available for use, it is recommended that this test be skipped to proceed to the simple computer screening model step (Test 3 below). The use of a computer screening model takes a few minutes to set-up and to get results. TM 86-02 is a series of hand calculations that may be more susceptible to user error.

Test 3: Computer Screening Models

The most common computer screening models (SCREEN3, TSCREEN, or AERSCREEN) combine site-specific information (such as stack height, gas temperature, and other physical properties) and generic weather information to predict ground level concentrations of pollutants. The predicted concentrations of the model are compared to the screening level of the TAP. If the predicted concentrations are less than the screening level of the TAP for the appropriate averaging times, the emissions of the TAP would be in compliance with the ambient impact requirement. Computer screening models can be downloaded from the U.S. EPA at the following website address:

http://www.epa.gov/scram001/dispersion_screening.htm

Compliance Demonstration Example – Test 3

Following the results of the example for Test 1, TAP C, TAP D, and TAP E still require further evaluation to demonstrate compliance with the ambient impact requirement. The results of SCREEN3 models for TAP C, TAP D, and TAP E are presented in the following table:

| Pollutant | Off-Site Concentrations Predicted by SCREEN3 ($\mu\text{g}/\text{m}^3$) | | |
|-----------|---|--------|--------|
| | 1-hour | 8-hour | Annual |
| TAP C | 400 | 280 | 32 |
| TAP D | 43 | N/A | N/A |
| TAP E | N/A | 25 | 2.9 |

The predicted off-site concentrations for TAP C and TAP D are less than the screening levels for those TAP for the appropriate averaging times. Emissions of TAP C and TAP D are in compliance with the ambient impact requirement. TAP E requires further evaluation demonstrate compliance with the ambient impact requirement.

Test 4 – Refined Computer Models

Refined computer models, such as AERMOD, use actual meteorological data to predict off-site concentrations. Any refined model that is approved by the U.S. EPA and appropriate for the situation can be used. The Department generally requires five consecutive years of meteorological data to be used and that all regulatory default options are employed. It is recommended that persons using refined computer modeling to demonstrate compliance with the ambient impact requirement contact the Department's Air Quality Permits Program for guidance. Refined computer models can be downloaded from the U.S. EPA at the following website address:

http://www.epa.gov/ttn/scram/dispersion_prefrec.htm

Compliance Demonstration Example – Test 4

Following the results of the example for Test 3, TAP E still requires further evaluation to demonstrate compliance with the ambient impact requirement. The results of an AERMOD model for TAP E are presented in the following table:

| Pollutant | Off-Site Concentrations Predicted by AERMOD ($\mu\text{g}/\text{m}^3$) | | |
|-----------|--|--------|--------|
| | 1-hour | 8-hour | Annual |
| TAP E | N/A | 5.6 | 0.64 |

The predicted off-site concentrations for TAP E are less than the screening levels for that TAP for the appropriate averaging times. Emissions of TAP E are in compliance with the ambient impact requirement.