

TSI Link™ Inhalation Exposure – VOC Constituent Analysis



Worksheet Guide (US)

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Overview

The VOC Constituent Analysis worksheet supports assessment of exposure limits for VOC gas mixtures using a VOC monitor that uses PID (Photoionization Detector) technology.

PID sensors used with these analysis are available with TSI® Incorporated's OmniTrak™ Solution and Q-Trak™ XP Monitor. The data from these devices seamlessly loads into Report Creator analytical templates, expediting thorough exposure analyses.

This worksheet can support over 303 different VOCs. The worksheet also includes tools to address unstable mixtures. These calculations can be complex. Being able to measure and report on them in an efficient and thorough manner can be very valuable.

Note that if you have a compound of an unknown component mixture, you may have to capture samples and send them to a lab for analysis. This can be done with a [Casella™ Sample](#).

If you are new to Report Creator, check out the [Report Creator Product Page](#) for guides and videos including: setting up an account, installing the application, using the study manager, using the layout view, customizing report creator templates, etc. This application guide builds upon those guides, it does not duplicate them.

Inhalation Exposure Worksheets

The table below lists the worksheets available in the Inhalation Exposure workbook.

Worksheet Template	Supported Measurements	Supported Instruments	Examples of Applications
VOC Constituent Analysis	VOC	OmniTrak™ Solution Q-Trak™ XP Monitor	Quantifying Exposure VOC dynamics for a painting gluing, 3D printing, manufacturing or other process

The RESOURCES section of the [Report Creator Product Page](#) has guides to other Basic Analytics worksheets: Data Table, Multi-Parameter Chart, Correlation Report.

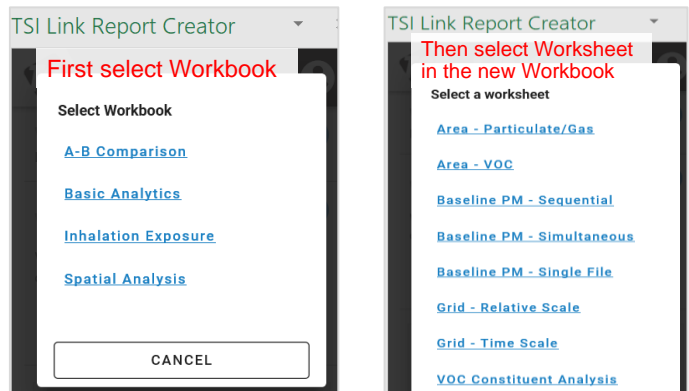
Worksheet Steps

If you repeatedly need to make measurements on the same gas mixture, you may want to create your own templates with the Exposure Thresholds, Compounds Response Factors, Cover sheet and other information filled out. Customizing the work sheet can be especially helpful with these types of complex analysis. Refer to *Customizing Report Creator Templates* for information.

Step 1. Select Workbook and Worksheet

The Inhalation Exposure Workbook is one of many that are available. An [overview of all workbooks available is on the Report Creator Product Page](#).

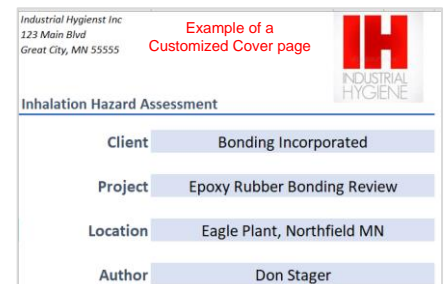
This guide focuses on the VOC Constituent Analysis, which is one of many Worksheets within the Inhalation Exposure Workbook. Guides to other Inhalation Exposure Workbooks can be found in the [Worksheet Templates section of the Report Creator Product Page](#).



Step 2. Cover Sheet

This workbook contains a simple Cover sheet that can be customized to suit your needs. See the *Customizing Report Creator Templates* in the RESOURCES section on the [Report Creator Product Page](#).

NOTICE
The bottom of the Cover sheet includes information for the CAS Number and Response Factors for different VOCs. If the Cover sheet is deleted from the workbook, this VOC Constituent Worksheet will not function.



Step 3. Demographic Information, Exposure Limits

Enter VOC and Response Factors

Enter the compounds and concentration ratios for the gas mixture. If the mixtures are unknown, you may need to obtain an air sample using a [sample pump, which can be obtained from Casella™](#).

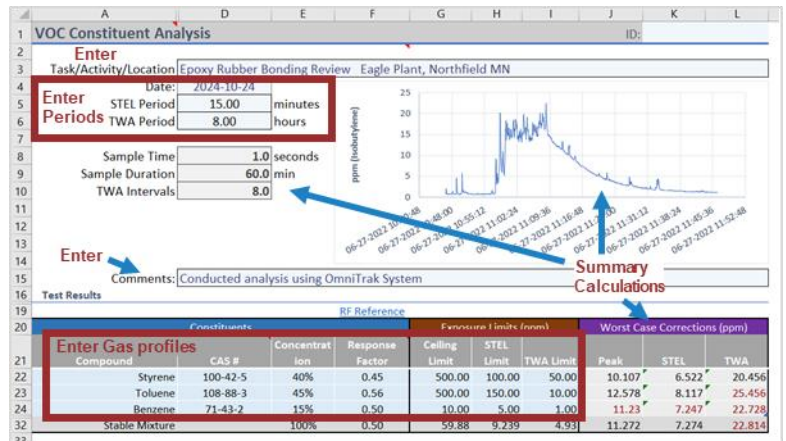
Links are provided to the right where you can look up the [response factors of the VOCs](#).

The CAS numbers and PID response factors are automatically populated when you select a compound.

Regulatory Ceiling, STEL and TWA Limits

You can enter the Ceiling, STEL, and TWA limits from the appropriate regulatory body. Some helpful regulatory links:

- [Table with 300+ of the most common gases and their CAS Numbers, Formulas and response factors](#)
- [United States OSHA Occupational Safety and Health Standards for Toxic and Hazardous Substances \(VOCs\)](#)
- [European Union Overview of Directives on Emissions of volatile organic compounds in paints, varnishes and vehicle refinishing products](#)
- [European Chemicals Agency \(ECHA\) Occupational Exposure Limits](#) and the [specific page listing the chemicals with links to the details](#)



The bottom row, called Stable Mixture, computes the aggregate response factors and limits based on the concentration you entered.

Step 4. Load Study Data

Just one study is used with this Worksheet Template. It can be loaded using the [Study Manager](#) or File Import.

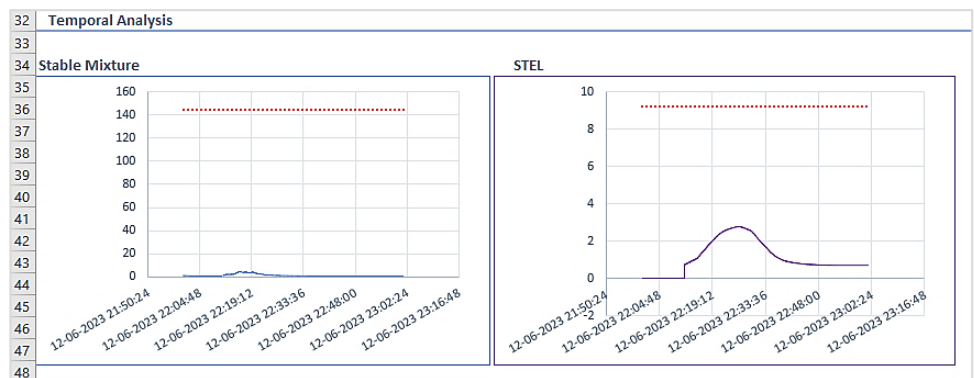
After you load the data, the statistical summary tables and charts will be populated. The detailed Measurement Data is loaded further down the sheet, around row 220.

Step 5. Analyze Data

The worksheet calculates the appropriate aggregate limits given the concentration ratios and response factors for each constituent gas. This is shown in the gray line at the bottom of the table, row 32.

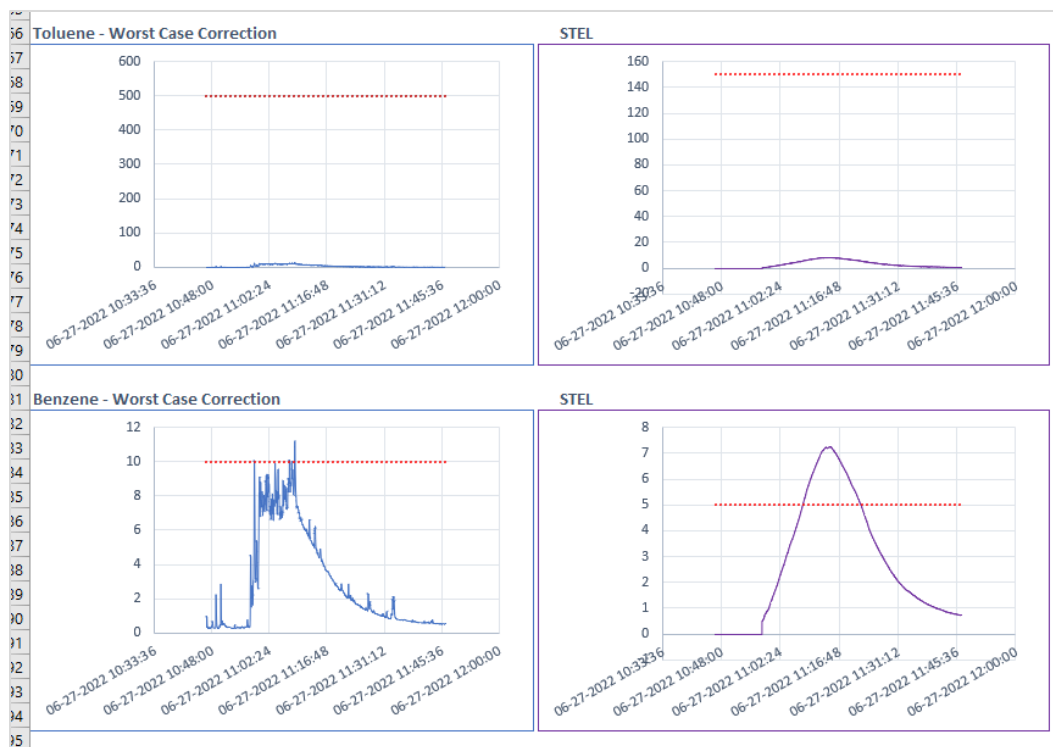
If the mixture concentration is not stable, the worksheet provides some worst-case analysis tools. Peak, STEL, and TWA are computed for each constituent

compound assuming that compound was 100% of the concentration. These worst-case ratios are also shown as time charts.



Often the worst-case ratios are overly pessimistic, so you can also want to manually adjust the concentration ratios in the statistics table to see the impact on the stable mixture. For example, you may want to see the effect of the benzene ratio doubling from 15% to 30%. You will want to adjust the other constituents to maintain the 100% limit. Note the change in the stable mixture with the new ratios.

Time charts are also displayed for the both the real-time VOC data and the STEL, along with their target limits. This is done for the scenario of a stable mixture as well as worst case scenarios focusing in individual components.



Step 6. Complete the Assessment

To complete the report, you can add recommendations under the Conclusions section, row 210.

The print layout for this sheet does not include the measurement data in the blue tables at the bottom of the sheet. They will not appear in a PDF export either.



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