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# PURPOSE

To establish a standardized method to provide consistency of chemical exposure assessments across Texas Instruments (TI).

# SCOPE

The provisions of this specification apply to all TI employees and supplimental suppliers at TI sites worldwide.

# reference documents

## TI Standard Policy and Procedure (SP&P) 04-04-01: "Environmental, Health and Safety"

Appendix A TI Occupational Exposure Limit

# Definitions

[TI ESH Standards Glossary of Definitions](https://sps01.itg.ti.com/sites/wwf/esh/standards/Knowledge_Bank/00.01.xlsx)

# Requirements

Sites shall develop and use a chemical exposure assessment process that, at a minimum, includes the following elements:

## Qualitative Assessments

### Provisions for Workplace Characterization

Sites shall conduct a workplace characterization that includes a review and written description of at least the following:

#### Processes - Description of operations, and controls

#### Workgroups - Job titles, and descriptions of tasks, and

#### Chemical Agents - Inventory, and description of health effects.

### Provisions for Similar Exposure Groups

#### Sites shall establish and document similar exposure groups (SEGs) based on the workplace characterization and professional judgement. Typically, SEGs are defined by the process step, job title, and job function.

### Relative Exposure Risk Evaluation

#### Sites shall define the exposure risk evaluation process used to evaluate risk of chemical exposure and determine whether a chemical agent requires quantitative assessment (e.g., sampling). The exposure risk evaluation shall, at a minimum, consider the following:

##### Health effects of the chemicals, and

##### Relative risk posed by the task, and exposure

### Qualitative Assessment Documentation

#### For each similar exposure group, the site shall conduct and document a qualitative assessment, including but not limited to, the following:

##### Name of person conducting the assessment,

##### Assessment date,

##### Area description,

##### SEG definition,

##### Chemical list

##### Summary of hazard information,

##### Summary of the exposure risk evaluation (i.e., health risk ranking or equivalent), and

##### Chemical agents to be added to the sampling strategy.

### Change Management

Sites shall develop a process to ensure that exposure risk evaluations are updated when changes are made which may affect the outcome. Changes include, but are not limited to, the following:

#### New chemicals,

#### Reformulated chemicals,

#### Use of existing chemicals in a new or changed process,

#### Chemicals for which new hazard information is received,

#### Changes to engineering controls, and

#### Changes in exposure duration.

### Re-Assessment

Sites shall review and update qualitative assessments at least annually to determine if there have been any changes (i.e., process or chemical change, controls, etc.) that could increase potential for chemical exposure.

## Quantitative Assessment

### Sampling Strategy

#### Sites shall develop and maintain a sampling strategy that includes, at a minimum, those chemical agents identified during the qualitative assessment as requiring a quantitative assessment. The sampling strategy shall represent the site’s plan of monitoring to be performed and shall include the following:

##### SEG name,

##### Job and task to be sampled,

##### Chemical to be sampled,

##### Note: For chemicals that do not have a sampling method, the site shall clearly document the rationale for either using an alternative method, or determining that there was no acceptable alternative method available.

##### Type of sample to be collected (personal air, area air, wipe or bulk), and

##### Note: Personal air monitoring shall be used when the goal is to obtain data to determine the potential for employee inhalation exposure.

##### Duration of sample (full-shift or task).

### Minimum number of sampling events.

##### If the qualitative assessment (i.e., health risk ranking or equivalent) requires exposure assessment sampling, the site shall perform an exposure assessment sampling event as follows:

#### For initial assessment of a chemical within an SEG, the site shall perform expsosure assessement sampling for that material within 6-months of the start of the exposure potential.

Note: The site shall use professional judgment to ensure that any historical data that may have been taken in the past is representative of the current SEG being evaluated. For a sampling event to have any statistical confidence, a minimum of 3 samples are needed. Enough samples shall be taken in order for the safety and health professional (in most cases, the industrial hygienist - IH), to estimate the true potential for exposure to hazardous agents. If the 3 samples are not statistically consistent in results, additional samples may be required.

#### If any exposure assessment data for any particular chemical within a SEG is at or above the action level (e.g..50% of the TI OEL or country regulatory limit; whichever is more conservative) the site shall perform additional exposure assessment sampling of this material within 30 days. In the case where the operation is not going to be performed again within 30 days, the sampling event should take place when the operation is performed next.

#### If the statistical average of the initial exposure assessment sampling data for any particular chemical within a SEG is between 25-50%of the TI OEL or country regulatory limit; whichever is more conservative, the site shall perform additional exposure assessment sampling of this materialin the next calendar year. If the operation is not performed in that time frame, the sampling event should take place when the operation is performed next.

#### If the statistical average of the initial sampling data for any particular chemical within a SEG is between 10% and25% of the TI OEL or country regulatory limit; whichever is more conservative, the site shall shall conduct one exposure assessment sampling event of this material every two to three calendar years based on the professional judgement of the site IH.

#### If the statistical average of all sampling data for any particular chemical within a SEG is below 10% of the TI OEL or country regulatory limit; whichever is more conservative , the site can omit sampling for this material until the exposure scenario changes.

### Data Collection and Evaluation

#### Sites shall conduct exposure assessment sampling according to the site exposure assessment strategy and evaluate results against the TI established occupational exposure limit (OEL) and any country regulations. The list will be maintained by WWF-ESH Services.

### Documentation

Quantitative chemical assessment documentation (i.e., sampling report) shall include, at a minimum, the following:

#### SEG Name ,

#### Area Description – Area and process, area contact,

#### Event Description – Chemical product, chemical agent being sampled, person conducting the sample, sample date, type of sample (personal air, area air, wipe or bulk), employee name and location of pump,

#### Calibration Data – Calibration instruments, calibration date, pump and flow rate,

#### Sampling Data - Sample number, sample media, sample method, pump start and stop time(s), flow rate, sampling volume,

#### Field Notes – including chronological account of the sampled employee's activities, personal protective equipment utilized, engineering controls, and environmental factors that might impact the sampling results,

#### Lab Data - Analysis request and chain of custody, lab report, and

#### Results - Lab results including sampling blanks, time-weighted average (TWA) calculation, comparison to TI OEL or country regulatory limit.

### Employee Communications

#### The safety and health professional shall issue an employee notification containing the following:

##### A summary of the sampling event,

##### The results of the sampling,

##### An explanation of the sampling results to each sampled employee and immediate supervisor upon completion of personal air monitoring, and

##### Any recommendations for improving workplace and employee exposures.

#### Employee notifications shall be made within 5 working days of receipt for sampling results above the action level and no more than 15 working days for sampling results below the action level, unless more stringent local or regulatory requirements apply.

##### For any sampling results above the action level or TI OEL, the IH shall obtain a written or electronic signature from the sampled employee, within 5 working days of receiving the results , to indicate that the employee received a copy of the sampling results.

#### Note: In the US, a written signature must be obtained.

#### A summary of the results shall be prepared and distributed to the employees of each SEG at least annually.

## Corrective Actions and Follow-up

### Sites shall develop, implement and document corrective actions (i.e., engineering controls, administrative controls, personal protective equipment, etc.) to reduce potential exposures in the event that the statistical average of sampling results for a particular SEG is at or above the action level

### Sites shall develop a process for tracking recommendations resulting from the sampling, corrective actions and follow-up to ensure that corrective actions were implemented

### Sites shall re-sample chemicals following implementation of corrective actions to verify that airborne concentrations are below the action level, and that the implemented actions are effective.

## Provisions for Record Retention

All qualitative and quantitative assessment documentation shall be retained per TI record retention policy SP&P.

# STANDARD Approval

This standard has been approved by David Thomas, TI Vice President.

# Revision history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rev#** | **Date** | **Nature of Revision** | **Author/Editor** | **Approver** |
| A | 12/15/2006 | Major periodic review; updated minimum number of samples required, 3.1(d) (f) 1. Appendices A,B,D,E moved to Knowledge Bank; TI OEL list renamed as Appendix A | Gene Schaefers |  |
| B | 03/15/2007 | Appendix A – TI OEL list updated. Items revised:  Aluminum (Respirable Dust), Anisole, Benzotriazole  Borate Compounds (inc. Orthoboric acid), Butyl Carbitol (aka Diglycol monobutyl ether), Carbon Tetrafluoride, Catechol, Chlorine Dioxide, Copper Fumes (Elements), Diesel Exhaust, Diethylene Glycol Dibutyl Ether, Fiberglass, Gallic Acid, Graphite Dust (Respirable), Hexafluoroethane, Mercury (Elemental and Inorganic), Mercury (Alkyl/(Organic), Mercury (Aryl/Organic Ring), Methyl 3-Methoxypropionate, Nickel (elemental, inhalable), Ozone, Platinum, Sodium Chlorate, Stoddard Solvent (Mineral Spirits), Silver (metal, insoluble), Trimethyl Borate (TMB), Trimethyl Phosphate (TMP), Zinc Oxide Fume | Gene Schaefers |  |
| C | 01/31/2008 | Appendix A – TI OEL list updated: n-Butyl Alcohol (n-Butanol) - TI OEL (8 Hour) reduced from 25 to 20ppm;  Cyclohexanone - TI OEL (8 Hour) reduced from 25 to 20ppm; Ethylene glycol monobutyl Ether (EGBE)- TI OEL (8 Hour) reduced from 25 to 20ppm; Addition of **Wipe Sample Guidelines** for selected substances; Addition of **Liquid/Gas Expansion Table.** | Gene Schaefers |  |
| D | 06/02/2010 | Appendix A updated: Hydrogen was added to the “Gas-Liquid Expansions” tab; Zirconium was added to the “Wipe Sample Guidelines” tab; A new tab “OEL Calculator” was added; A new tab “Health Effects Ratings” was added | Gene Schaefers |  |
| E | 02/08/2011 | Minor update to Appendix A. Updated ethyl benzene, MIBK, SO2, Toluene and TCE. Updated Lead wipe sample guideline |  |  |
| F | 04/18/2013 | Rearranged flow of document and modified requirements for sampling and equipment and resampling when results are above action levels. Toluene 12 hour OEL corrected on 2011 OEL Tab in Appendix. | Tim Yeakley | ELC |
| G | 05/14/2014 | Added 5.2.5.2.1 regarding documentation of employee notifications. | Mike Alton | ELC |
| H | 10/26/16 | 3 year review – no changes | Michele Smith | ELC |
| I | 05/13/2020 | Clarification of terms (e.g. wher taking samples is used, exposure assessment sampling has been inserted.); Add that follow-up sampling is performed as a means of verifying the effectiveness of implemented controls. | Michele Smith | ELC |