Paragon IH

Task Exposure Assessment (TEA)

Program Layout Phase 2 Notes

Phase 1 allowed the user to put inputs into the program. Phase 2 will generate a risk assessment and controls based on the inputs

Risk Ranking – This shows the user how harmful the chemical, or the constituents, or the job task is that they are doing. This gives them an idea on what as a chemical or job they should be focusing on and how to protect their employees.

Chemical Ranking – The chemical ranking will rate the chemical as a whole. These numbers will come from the inputs that the user puts in the program in Phase 1.

This table is not shown. I am just showing you so that you can see how the rankings work.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Rating | Flash Point (°F) | Vapor Pressure (mmHg) | Evaporation Rate | pH |
| 5 | < 50 | > 100 | Fast (0-3 hrs) | ≤ 2.5 or ≤ 12.5 |
| 4 | 50 ≤ 100 | 28≤ 100 | Medium (3-12 hrs) |  |
| 3 | 100 ≤ 150 | 10 ≤ 28 | Slow (12-50 hrs) |  |
| 2 | 150 ≤ 200 | 1 ≤ 10 | Nil (Over 50 hrs) |  |
| 1 | > 200 | < 1 | NA | 7 |

Health Hazard (This was missing from the current version). This is grading the chemical as a whole if a SDS is checked yes for the health hazard. The user would have to check this because it will be used to determine the risk associated with the task. I assigned values next to the categories now.

□ Acute Toxicity

□ Cat. 1 – Severe - 5

□ Cat. 2 – High - 4

□ Cat. 3 – Moderate - 3

□ Cat. 4 – Mild - 2

□ Cat. 5 – Low - 1

□ Skin Corrosion/Irritation

□ Cat. 1A – Corrosion Exp <3min - 5

□ Cat. 1B – Corrosion Exp <1 hr - 4

□ Cat. 1C – Corrosion Exp < 4 hrs - 3

□ Cat. 2 – Irritation - 2

□ Cat. 3 – Mild Irritation - 1

□ Eye Effects

□ Cat. 1 – Serious - 3

□ Cat. 2A – Irritant - 2

□ Cat. 2B – Mild Irritant - 1

□ Sensitization

□ Respiratory - 3

□ Skin - 3

□ Germ Cell Mutagenicity

□ Cat. 1A Known - 5

□ Cat. 1B Presumed - 4

□ Cat. 2 Suspected - 3

□ Carcinogenicity

□ Cat. 1A – Known Human Carc. - 5

□ Cat. 1B – Presumed Human Carc. - 4

□ Cat. 2 – Suspected Carc. - 3

□ Reproductive Toxicity

□ Cat. 1A – Known - 5

□ Cat. 1B – Presumed - 4

□ Cat. 2 – Suspected - 3

□ Add. Cat – On or Via Lactation - 3

□ Target Organ Systemic Toxicity (TOST):

Single Exposure

□ Cat. 1 – Significant -4

□ Cat. 2 – Presumed - 3

□ Cat. 3 – Transient Effects - 2

Repeated Exposure

□ Cat. 1 – Significant - 4

□ Cat. 2 – Presumed - 3

□ Aspiration Toxicity

□ Cat. 1 – Known - 5

□ Cat. 2 – Presumed - 4

This table should come up, so that the user has some idea of the risk of the chemical. I am not sure how this can be displayed. If it could be displayed by using color coding of some sort to give the visual effect that can be retained by user.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Chemical Name | Manufacturer ID | Flash Point | Vapor Pressure | Evaporation Rate | pH | Health Effect |
| Benzene |  | 5 | 4 | 4 | 3 | 5 |

Constituent Ranking – Each constituent should be ranked individually as well in case there is no chemical given. The ranking would consist of ranking vapor pressure, evaporation rate, flash point, pH, health effect, exposure based on the exposure limit. The user does not have to enter anything for these since they should be populated in the table, unless the constituent is not listed in the excel table but it will come up if they enter it.

This table is not shown. I am just showing you so that you can see how the rankings work.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rating | Flash Point (°F) | Vapor Pressure (mmHg) | Evaporation Rate | pH | Gas and Vapor (ppm) | Mist/Particulate (mg/m3) |
| 5 | < 50 | > 100 | Fast (0-3 hrs) | ≤ 2.5 or ≤ 12.5 | < 1 | 0 – 0.1 |
| 4 | 50 ≤ 100 | 28≤ 100 | Medium (3-12 hrs) |  | 1 ≤ 10 | 0.1 ≤ 1.0 |
| 3 | 100 ≤ 150 | 10 ≤ 28 | Slow (12-50 hrs) |  | 1 ≤ 50 | 1.0 ≤ 5.0 |
| 2 | 150 ≤ 200 | 1 ≤ 10 | Nil (Over 50 hrs) |  | 50 ≤ 100 | 5.0 ≤ 10.0 |
| 1 | > 200 | < 1 | NA | 7 | > 100 | > 10.0 |

Health Hazard (This was missing from the current version. This is grading each of the constituents listed. Which I would put in the category in the table when I populate the constituents. I assigned values next to the categories now.

□ Acute Toxicity

□ Cat. 1 – Severe - 5

□ Cat. 2 – High - 4

□ Cat. 3 – Moderate - 3

□ Cat. 4 – Mild - 2

□ Cat. 5 – Low - 1

□ Skin Corrosion/Irritation

□ Cat. 1A – Corrosion Exp <3min - 5

□ Cat. 1B – Corrosion Exp <1 hr - 4

□ Cat. 1C – Corrosion Exp < 4 hrs - 3

□ Cat. 2 – Irritation - 2

□ Cat. 3 – Mild Irritation - 1

□ Eye Effects

□ Cat. 1 – Serious - 3

□ Cat. 2A – Irritant - 2

□ Cat. 2B – Mild Irritant - 1

□ Sensitization

□ Respiratory - 3

□ Skin - 3

□ Germ Cell Mutagenicity

□ Cat. 1A Known - 5

□ Cat. 1B Presumed - 4

□ Cat. 2 Suspected - 3

□ Carcinogenicity

□ Cat. 1A – Known Human Carc. - 5

□ Cat. 1B – Presumed Human Carc. - 4

□ Cat. 2 – Suspected Carc. - 3

□ Reproductive Toxicity

□ Cat. 1A – Known - 5

□ Cat. 1B – Presumed - 4

□ Cat. 2 – Suspected - 3

□ Add. Cat – On or Via Lactation - 3

□ Target Organ Systemic Toxicity (TOST):

Single Exposure

□ Cat. 1 – Significant -4

□ Cat. 2 – Presumed - 3

□ Cat. 3 – Transient Effects - 2

Repeated Exposure

□ Cat. 1 – Significant - 4

□ Cat. 2 – Presumed - 3

□ Aspiration Toxicity

□ Cat. 1 – Known - 5

□ Cat. 2 – Presumed - 4

This table should come up, so that the user has some idea of the risk of the constituent. All the constituents marked would come up. I am not sure how this can be displayed. If it could be displayed by using color coding of some sort to give the visual effect that can be retained by user.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chemical Name | CAS # | Flash Point | Vapor Pressure | Evaporation Rate | pH | Gas and Vapor | Mist/Particulate | Health Effect |
| Benzene |  | 5 | 4 | 4 | 3 | 5 | NA | 5 |
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**Task Ranking**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rating | Work Site | Space Volume | Frequency of Exposure | Duration | Task Type |
| 5 | See below | 0 – 500 ft3 | Daily | 8 to 12 hours | See below |
| 4 |  | 501 – 1000 ft3 | Weekly | 4 to 8 hours |  |
| 3 |  | 1001 – 5000 ft3 | Monthly | 2 to 4 hours |  |
| 2 |  | 5001 – 10000 ft3 | Yearly | 1 to 2 hours |  |
| 1 |  | > 10000 ft3 | NA | 15 minutes to 1 hour, < 15 minutes |  |

Need to determine the best way to do this. Is there a way to assign values next to these items in the phase 1 part? Especially for the job tasks.

+ Work Site

* Open Air – 2
* Cabinet Enclosure – 1
* Inside non-shop with obstructions -3
* Inside non-shop without obstructions – 2
* Well Cellar – 4
* Prefab Shelter – 3
* Shop Module – 3
* Horizontal Drum – 4
* Vertical Drum – 4
* Storage Tank – 4
* Pipe – 4
* Confined Space – 5
* Closed System - 1

+ Task Type

+ Material Fabrication

+ Shield Metal Arc Welding - 4

+ Gas Tungsten Arc Welding - 1

+ Gas Metal Arc Welding - 2

+ Flux Core Arc Welding - 4

+ Carbon Arc Cutting - 4

+ Plasma Arc Cutting - 3

+ Oxyfuel Cutting - 5

+ Soldering - 2

+ Forging - 2

+ Cutting - 2

+ Material Removal – This is correct. Just repeating.

+ Abrasive Gun Blasting - 5

+ Needle Gunning - 3

+ Grinding - 3

+ Sanding - 4

+ Chemical Stripping - 3

+ Scrapping - 2

+ Heating - 4

+ Chopping - 3

+ Jackhammering - 4

+ Drilling - 2

+ Chiseling - 2

+ Manual -2

+ Buffing - 4

+ Material Application

+ Spraying - 5

+ Rolling - 3

+ Brushing - 2

+ Caulking - 2

+ Galvanizing - 4

+ Electroplating - 4

+ Material Handling

+ Mixing - 3

+ Gauging - 4

+ Dismantling - 5

+ Transferring - 3

+ Material Cleanup

+ Cleaning - 3

+ Vacuuming - 2

+ Sweeping - 4

**Exposure Data**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Chemical Name | CAS # | Modeled Exposure Results | Predictive Exposure Results | Objective Data Exposure Results |
|  |  |  |  |  |
|  |  |  |  |  |
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Modeled Exposure Results – Based on the following formulas and variables put in by the user. At this time, this will not be used. Will be used in the future with the formulas.

Predictive Exposure Results – Put in by the User based by their own judgement. There should be an input feature to allow the user to put in their own predictive value.

Objective Date Exposure Results – Come from past sampling performed for this task. Need some way to link the past data from other entries.

If the following product category is chosen the following formulas are used. This will be populated at a later time.

Gas:

Liquid:

Dust:

Fiber:

Fume:

**Controls**

Engineering Controls – Comes from the Job Task. I will populate these for each of the tasks. This just needs to be entered in a table associated with the job task. These will come up once the task is clicked. Like if someone clicks on Shield Metal Arc Welding then it will come up with the information.

**Local Exhaust Ventilation**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters | Slot Hood Without Flange | Slot Hood With Flange | Plain Opening Hood | Flanged Opening Hood | Plain Multiple Slot Hood | Flange Multiple Slot Hood | Canopy Hood | Booth |
| Size |  |  |  |  |  |  |  |  |
| Hood Capture Velocity |  |  |  |  |  |  |  |  |
| Hood Flow Rate |  |  |  |  |  |  |  |  |
| Duct Velocity |  |  |  |  |  |  |  |  |

**General Dilution** – Calculation Comes from Phase 1 inputs. The calculation should be done automatically from the inputs and compared with the chart below to make sure enough air exchanges are in place.

The air changes per hour (ACH) will be generated as follows:

ACH = 60 \* (Room Ventilation In) ÷ Space Volume

The recommended air changes per hour are as follows:

|  |  |
| --- | --- |
| Air Changes per Hour | Recommendation |
| < 5 | Need more ventilation |
| 5 ≤ 20 | Recommended for semi- open spaces |
| ≥ 20 | Recommended for confined spaces |

**Protective Gloves**

Comes from the constituents selected by the user which comes from the populated excel spreadsheet. The type of glove will be given with the breakthrough times if available. So these will come up to give the user some recommendations then the user will have to select which one, they actually used for the job as a record of use.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chemical | CAS # | Butyl Rubber | Natural Rubber | Neoprene Rubber | Nitrile Rubber | Polyethylene (PE) | Polyvinylalcohol (PVAL) | Polyvinylchloride (PVC) | Viton ® | Viton ®/Butyl Rubber | Barrier ® (PE/PA/PE | Silver Shield/4H® (PE/EVAL/PE |
| Benzene |  |  |  |  |  |  |  |  |  |  |  |  |
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A caution statement needs to be put in like this

Notes: Recommendations are NOT valid for very thin chemicals gloves (0.3 mm or less). This information is based on technical data that the manufacturer believes to be reliable. It is subject to revision as additional knowledge and experience are acquired. There can be no guarantee of the results as applications can be different and no liability or obligation can be assumed. A > sign indicates greater than. A blank cell indicates the fabric has not been tested.

**Protective Clothing**

Comes from the constituents selected by the user which comes from the populated excel spreadsheet. The type of protective clothing will be given with the breakthrough times if available. So these will come up to give the user some recommendations then the user will have to select which one, they actually used for the job as a record of use.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chemical | CAS # | Trellchem®HPS | Trellchem®VPS | Tychem® QC | Tychem® SL (Saranex®) | Tychem® TF | Tychem® TP | Tychem® C3 | Tychem® RC | Tychem® TR | Tychem® RF | Tychem® CPF3 | Tychem® F | Tychem® BR/LV | Tychem® Responder | Tychem® TK | Tychem® TF |
| Benzene |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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A caution statement needs to be put in like this

Note: This information is based on technical data that the manufacturer believes to be reliable. It is subject to revision as additional knowledge and experience are acquired. There can be no guarantee of the results as applications can be different and no liability or obligation can be assumed. A > sign indicates greater than. A blank cell indicates the fabric has not been tested.

**Respiratory Protection**

Comes from the constituents selected by the user which comes from the populated excel spreadsheet. The type of respirator will be given with the maximum use concentration of the chemical. So these will come up to give the user some recommendations then the user will have to select which one, they actually used for the job as a record of use.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Chemical | CAS# | Air Purifying Respirator | | | Powered Air Purifying Respirator | | | Supplied Air | | | SCBA |
| Quarter Dust Mask | Half Face | Full Face | Half Face | Full Face | Helmet/Hood | Half Face Continuous Flow/Pressure Demand | Full Face Continuous Flow/Pressure Demand | Helmet/  Hood Continuous Flow |
| Benzene |  | NA | 5 ppm | 25 ppm | 5 ppm | 25 ppm | 50 ppm | 100 ppm | 500 ppm | 1000 ppm | 10,000 ppm |
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Breakthrough Schedule for Cartridges for Air Purifying Respirators – This will based on a calculation. Will add later on.

Direct Reading Exposure Monitoring

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Chemical | Cas # | PID CF | | | LEL CF | Colorimetric Tube/Chip | Other |
| 9.8 | 10.6 | 11.7 |
| Benzene |  |  |  |  |  |  |  |
| Toluene |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
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Sampling Data – Includes Engineering Controls in Place

Based on the sampling conducted by the end user

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Chemical | Cas # | Sample Number | Date | Sampling Time | Volume (L) | Result |
| Benzene |  |  |  |  |  |  |
| Toluene |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
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