DEPARTMENT OF OCCUPATIONAL
SAFETY AND HEALTH

FAQ
HIGIEN TECHNICIAN 1 (HT1) 2025

CHEMICAL MANAGEMENT DIVISION
DEPARTMENT OF OCCUPATIONAL SAFETY & HEALTH MALAYSIA

QUESTION	ANSWER
Q1 : If the hazardous chemical is found as a content in client's product, and is used in a commercial/office setting without high risk of exposure to users, does industrial hygiene monitoring still need to be conducted?	A1 : The determination of chemical risks exposure in Malaysia must be based on the CHRA report conducted by a registered CHRA assessor. The need to conduct a chemical exposure monitoring (CEM) is based on recommendation by CHRA assessor. Upon recommendation, employers are obligated to implement the control measures. Failing to do so will result in non-compliances.

CEM FAQ

SOALAN	JAWAPAN
Q1 : Jika bahan kimia berbahaya terdapat sebagai kandungan dalam produk pelanggan, dan digunakan dalam persekitaran komersial/pejabat tanpa risiko tinggi pendedahan kepada pengguna, adakah pemantauan kebersihan industri masih perlu dijalankan?	A1 : Penentuan tahap pendedahan risiko bahan kimia di Malaysia mesti berdasarkan laporan CHRA yang dijalankan oleh Penilai CHRA berdaftar. Keperluan untuk menjalankan Pemantauan Pendedahan Bahan Kimia (CEM) adalah berdasarkan syor daripada Penilai CHRA. Setelah disyorkan, majikan wajib melaksanakan langkah kawalan yang dicadangkan. Kegagalan untuk berbuat demikian akan mengakibatkan ketidakpatuhan terhadap peraturan.

SITUATION

CEM FAQ

Since the Guidelines on Monitoring of Airborne Chemical Hazardous to Health 2022 mentioned if any of the first 3 samples are exceeding 10% of PEL, another six (6) more samples are required to be taken to conduct statistical study and perform compliance test.

QUESTION

Q2 : If the results of several samples are NOT DETECTED (ND), how can I do statistical study? What value should I pick or key in?

Sample Data
ND(<0.05)
ND(<0.05)
0.18
0.15
0.06
ND(<0.05)
0.09
0.11
0.08

ANSWER

A2 : Referring to sub chapter 6.2.3 Interpretation of Results, Guidelines on Monitoring of Airborne Chemical Hazardous to Health 2022, if the results from the laboratory indicates as non-detected (ND), concentration must be based on LOD (limit of detection) or LOR (limit of reporting) that can be reliably measured by an analytical procedure stated in the laboratory report.

To answer your question, the value that needs to be used for statistical analysis is the LOD (limit of detection) value or LOR (limit of reporting) value from the certificate of analysis (COA). Referring to the data provided by you, the value that can be used for statistical analysis is 0.05 for ND samples. However, you need to ensure that the value is the concentration value (mg/m3 or ppm).

SITUASI

CEM FAQ

Memandangkan Garis Panduan Pemantauan Bahan Kimia Berbahaya di Udara kepada Kesihatan 2022 menyatakan bahawa jika mana-mana daripada tiga (3) sampel pertama melebihi 10% daripada PEL, enam (6) lagi sampel tambahan perlu diambil untuk menjalankan kajian statistik dan melaksanakan ujian pematuhan.

SOALAN

Q2 : Jika keputusan beberapa sampel adalah TIDAK DIKESAN (ND), bagaimana saya boleh menjalankan kajian statistik? Nilai apa yang perlu saya pilih atau masukkan?

Sample Data
ND(<0.05)
ND(<0.05)
0.18
0.15
0.06
ND(<0.05)
0.09
0.11
0.08

JAWAPAN

A2 : Merujuk kepada sub bab 6.2.3 Pentafsiran Keputusan, Garis Panduan Pemantauan Bahan Kimia Berbahaya di Udara kepada Kesihatan 2022, jika keputusan daripada makmal menunjukkan sebagai tidak dikesan (ND), kepekatan mestilah berdasarkan had pengesanan (LOD) atau had pelaporan (LOR) yang boleh diukur dengan pasti melalui prosedur analisis yang dinyatakan dalam laporan makmal.
Untuk menjawab soalan anda, nilai yang perlu digunakan untuk analisis statistik ialah nilai LOD (had pengesanan) atau LOR (had pelaporan) yang diperoleh daripada sijil analisis (COA). Merujuk kepada data yang anda berikan, nilai yang boleh digunakan untuk analisis statistik ialah 0.05 bagi sampel ND. Walau bagaimanapun, anda perlu memastikan bahawa nilai tersebut adalah nilai kepekatan (mg/m³ atau ppm).

CEM FAQ

QUESTION

Q3 : Parameter: Carbon Black, PEL in USECHH = 2.92 mg/m3

No. of sample		
Raj	Ali	Chin
Result (mg/m3)		
1.39	0.76	0.18
0.54	0.18	2.36
1.09	0.73	1.09

	Logged value		
	Raj	Ali	Chin
	0.14	-0.12	-0.74
	-0.27	-0.74	0.37
	0.04	-0.14	0.04
log GM	-0.158		
log GSD	0.379		
Calculated U	1.643		
Limiting value of U	2.035		

The calculated U is less than the limiting value of U with 9 measurements. Hence, PEL is not complied with and the compliance test is considered fail in this case.

All the results are below PEL. However, the calculated U is less than the limiting value, which means the PEL is not complied. How we going to justify the final outcome in the report since all the 9 measurements are below PEL?

ANSWER

A3 : Kindly refer to Figure 4: Air Monitoring Procedure when the compliance test failed. You can also refer to references as guidance in the Guidelines on Monitoring of Airborne Chemical Hazardous to Health 2022 such as Testing Compliance with Occupational Exposure Limits for Airborne Substances [British Occupational Hygiene Society & Nederlandse Vereniging voor Arbeidshygiëne (2011)].

PELs apply to all workers, not just to a group, so any monitoring programme must consider between-worker variability. It is not permissible to offset the low exposure of one worker against the high exposure of another; all must comply.

If the compliance test failed, you must advise the employer to improve control measures to reduce the exposure, particularly on the work practices or improvement of engineering control measures. You may also look at sources of exposure and the efficiency of control measures, using direct-reading instruments.

CEM FAQ

SOALAN

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No. of sample		
Raj	Ali	Chin
Result (mg/m3)		
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Calculated U	1.643		
Limiting value of U	2.035		

The calculated U is less than the limiting value of U with 9 measurements. Hence, PEL is not complied with and the compliance test is considered fail in this case.

Semua keputusan adalah di bawah PEL. Walau bagaimanapun, nilai U yang dikira adalah kurang daripada nilai had, yang bermaksud PEL tidak dipatuhi. Bagaimana kita akan menjelaskan keputusan akhir dalam laporan sedangkan kesemua 9 pengukuran adalah di bawah PEL?

JAWAPAN

A3 : Sila rujuk kepada Rajah 4: Prosedur Pemantauan Udara apabila ujian pematuhan gagal. Anda juga boleh merujuk kepada rujukan sebagai panduan dalam Garis Panduan Pemantauan Bahan Kimia Berbahaya di Udara kepada Kesihatan 2022 seperti Testing Compliance with Occupational Exposure Limits for Airborne Substances [British Occupational Hygiene Society & Nederlandse Vereniging voor Arbeidshygiëne (2011)].

PEL terpakai kepada semua pekerja, bukan hanya kepada satu kumpulan sahaja, jadi mana-mana program pemantauan mesti mengambil kira variabiliti antara pekerja. Ia tidak dibenarkan untuk mengimbangi pendedahan rendah seorang pekerja dengan pendedahan tinggi pekerja lain; semua mesti mematuhi.

Jika ujian pematuhan gagal, anda mesti menasihati majikan untuk memperbaiki langkah kawalan bagi mengurangkan pendedahan, terutamanya dari segi amalan kerja atau penambahbaikan langkah kawalan kejuruteraan. Anda juga boleh melihat kepada sumber pendedahan dan keberkesanan langkah kawalan menggunakan instrumen bacaan terus.

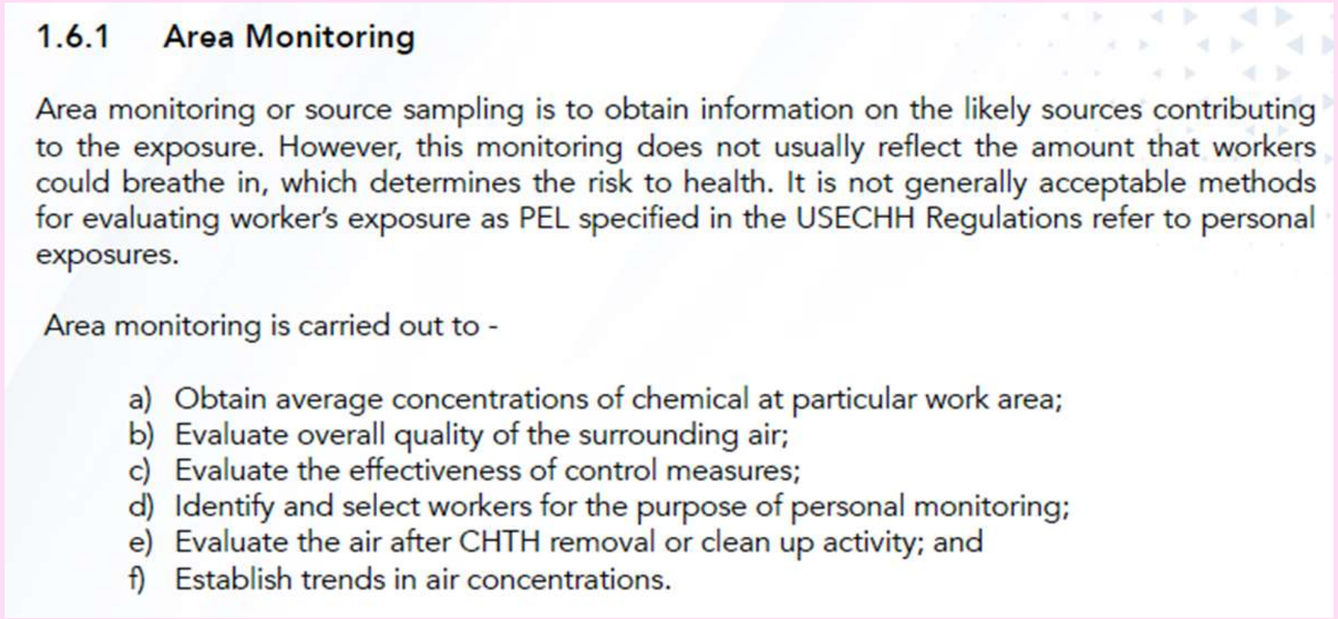
CEM FAQ

QUESTION

Q4 : It is informed that in the new “Guidelines,” three worker samples need to be taken for each chemical. If we conduct “Area Monitoring,” is it also necessary to take three samples? If yes, do we need to take samples over three days, or is it sufficient if the samples are taken from different locations?

ANSWER

A4 : It is not necessary to take 3 samples for “Area Monitoring.” “Area Monitoring” does not always require 3 samples. “Area Monitoring” is conducted depending on the original objective/purpose of the monitoring. You may refer to item 1.6.1 “Area Monitoring” on page 4 (Guideline on Monitoring of Airborne Chemical Hazardous to Health 2022).
To clarify the question, the number of samples does not have to be 3; it depends on the purpose of the monitoring.



1.6.1 Area Monitoring

Area monitoring or source sampling is to obtain information on the likely sources contributing to the exposure. However, this monitoring does not usually reflect the amount that workers could breathe in, which determines the risk to health. It is not generally acceptable methods for evaluating worker's exposure as PEL specified in the USECHH Regulations refer to personal exposures.

Area monitoring is carried out to -

a) Obtain average concentrations of chemical at particular work area;
b) Evaluate overall quality of the surrounding air;
c) Evaluate the effectiveness of control measures;
d) Identify and select workers for the purpose of personal monitoring;
e) Evaluate the air after CHTH removal or clean up activity; and
f) Establish trends in air concentrations.

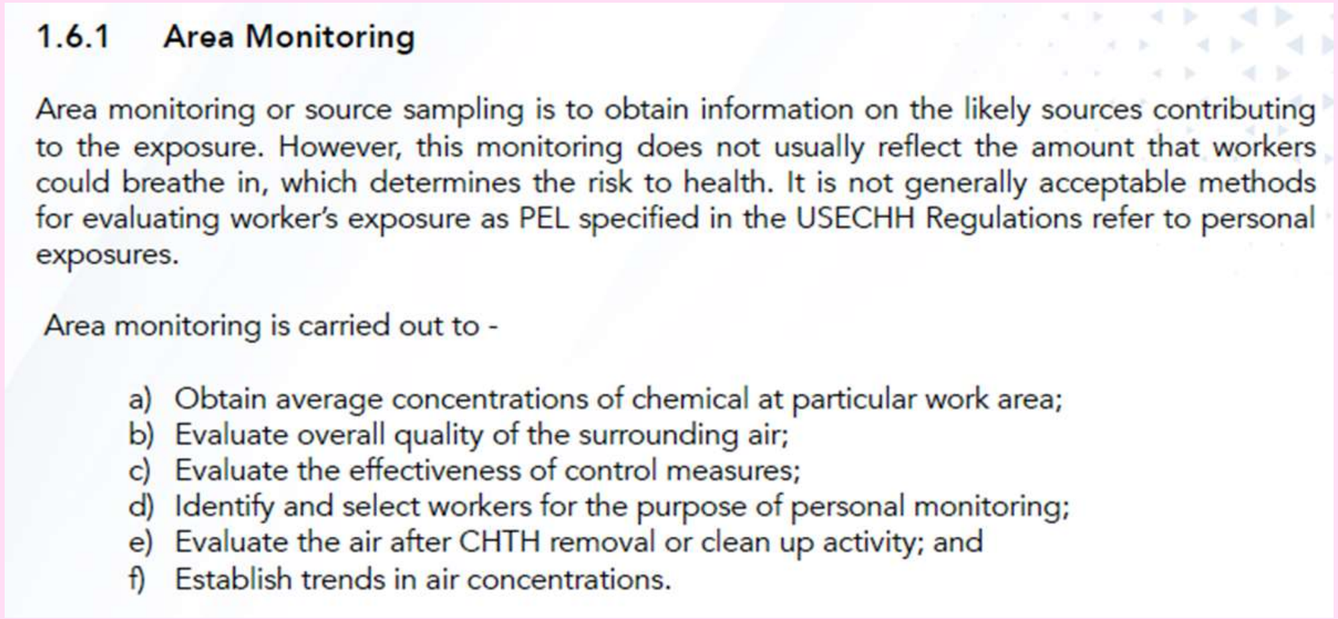
CEM FAQ

SOALAN

JAWAPAN

Q4 : Dimaklumkan dalam "Guidelines" baru perlu mengambil 3 sampel pekerja untuk setiap chemical, sekiranya kami membuat "Area Monitoring" adakah perlu untuk mengambil 3 sampel juga. Sekiranya ya, adakah kami perlu mengambil sampel selama 3 hari atau memadai jika kedudukan sampel yang berbeza?

A4 : Tidak perlu mengambil 3 sampel untuk "Area Monitoring". "Area Monitoring" tidak semestinya diambil 3 sampel. "Area Monitoring" hanya dijalankan bergantung kepada objektif/tujuan asal pemonitoran. Boleh merujuk kepada item 1.6.1 "Area Monitoring" mukasurat 4 (Guideline on Monitoring of Airborne Chemical Hazardous to Health 2022).
Jelas bagi soalan, dimana jumlah sampel tidak semestinya 3, bergantung kepada tujuan pemonitoran.



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e) Evaluate the air after CHTH removal or clean up activity; and
f) Establish trends in air concentrations.

QUESTION	ANSWER
Q5 : Regarding the laboratory for sample analysis, is it necessary to find a laboratory that has accreditation for each chemical, or is it sufficient for the laboratory to have general accreditation?	A5 : The chemical analysis methods and laboratories must obtain accreditation from the Department of Standards Malaysia under the Malaysia Laboratory Accreditation Scheme (SAMM) or from any internationally recognized body of equivalent status.

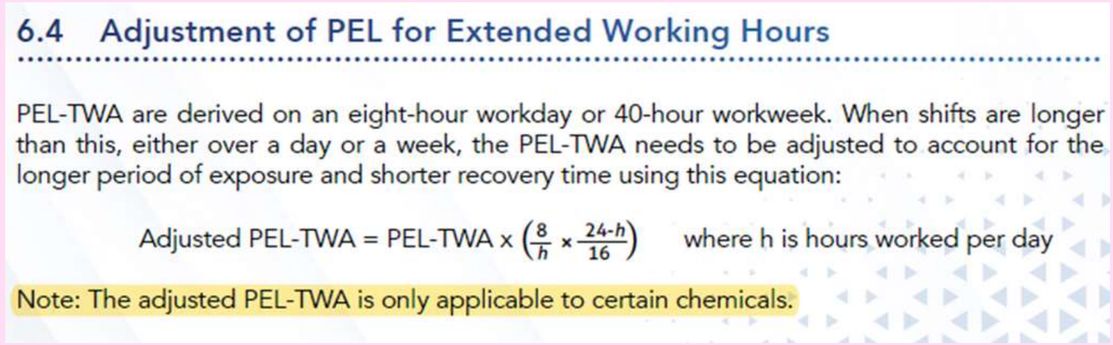
CEM FAQ

SOALAN	JAWAPAN
Q5 : Berkenaan makmal untuk analisis sampel, adakah perlu mencari makmal yang mempunyai akreditasi untuk setiap chemical atau makmal yang mempunyai akreditasi sahaja?	A5 : Kaedah analisis bahan kimia dan makmal perlu mendapatkan akreditasi daripada Jabatan Standard Malaysia di bawah Skim Akreditasi Makmal Malaysia (SAMM) atau mana-mana badan antarabangsa yang diiktiraf setaraf dengannya.

CEM FAQ

QUESTION

Q6 : Could you please explain the sentence that is highlighted below?



6.4 Adjustment of PEL for Extended Working Hours

PEL-TWA are derived on an eight-hour workday or 40-hour workweek. When shifts are longer than this, either over a day or a week, the PEL-TWA needs to be adjusted to account for the longer period of exposure and shorter recovery time using this equation:

$$\text{Adjusted PEL-TWA} = \text{PEL-TWA} \times \left(\frac{8}{h} \times \frac{24-h}{16}\right) \quad \text{where h is hours worked per day}$$

Note: The adjusted PEL-TWA is only applicable to certain chemicals.

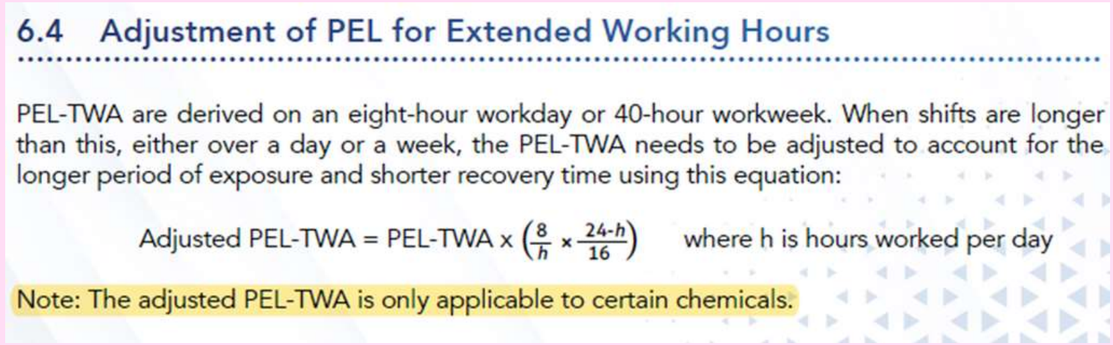
ANSWER

A6 : The meaning of “The adjusted PEL-TWA is only applicable to certain chemicals” is that not all chemicals can have an “adjusted PEL-TWA,” for example, chemicals that have a Ceiling Limit such as Formaldehyde cannot have an “adjusted PEL-TWA.”
For this question, it is clear that all chemicals that fall under a ceiling limit do not have an “adjusted PEL.”

CEM FAQ

SOALAN

Q6 : Boleh jelaskan mengenai ayat yang di highlight di bawah?



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Note: The adjusted PEL-TWA is only applicable to certain chemicals.

JAWAPAN

A6 : Maksud bagi “The adjusted PEL-TWA is only applicable to certain chemicals” adalah tidak semua chemical boleh dibuat “adjusted PEL-TWA” sebagaicontoh chemical yang tidakboleh “adjusted PEL-TWA” yang mempunyai Ceiling Limit seperti Formaldehyde.
Bagi soalan ini jelas, maksudnya semua bahan kimia yang jatuh di bawah ceiling limit tiada “adjusted PEL”

CEM FAQ

QUESTION

ANSWER

Q7 : To determine the frequency of “additional monitoring,” is it based on the result from the adjusted PEL-TWA or the result after using the APF (Compliance with PEL using a respirator)?

A7 : The frequency of “additional monitoring” is not based on the result from the adjusted PEL-TWA or the result after using the APF (Compliance with PEL using a respirator). To determine the frequency of “additional monitoring,” it is based on items a) and b) as follows:
The frequency of air monitoring should be based on the level of exposure which are:
a) Not more than six months for exposure at or above the permissible exposure limit; or
b) Not more than twelve months for exposure at or above half of the eight-hour TWA but below the eight-hour TWA.

The frequency of air monitoring should be based on the level of exposure which are:

a) Not more than six months for exposure at or above the permissible exposure limit; or

b) Not more than twelve months for exposure at or above half of the eight-hour TWA but below the eight-hour TWA.

CEM FAQ

SOALAN

JAWAPAN

Q7 : Bagi menentukan frekuensi “addition monitoring” adakah berdasarkan result daripada adjusted PEL-TWA atau result selepas menggunakan APF (Compliance with PEL using respirator)?

A7 : Frekuensi “addition monitoring” adalah tidak berdasarkan kepada result daripada adjusted PEL-TWA atau result selepas menggunakan APF (Compliance with PEL using respirator). Untuk menentukan frekuensi “addition monitoring” adalahberdasarkan item a) dan b) seperti berikut :
The frequency of air monitoring should be based on the level of exposure which are:

a) Not more than six months for exposure at or above the permissible exposure limit; or
b) Not more than twelve months for exposure at or above half of the eight-hour TWA but below the eight-hour TWA.

The frequency of air monitoring should be based on the level of exposure which are:

a) Not more than six months for exposure at or above the permissible exposure limit; or

b) Not more than twelve months for exposure at or above half of the eight-hour TWA but below the eight-hour TWA.

CEM FAQ

QUESTION

Q8 : For the calculation of the “Compliance Test,” if it is “not complied,” how do we determine the frequency of “additional monitoring”?

If calculated U is more than the limiting value of U, PEL is complied. The PEL is not complied with, if U calculated from equation 3 is less than the limiting value given.

Table 6: Limiting Values of U

Number of exposure measurements	Limiting value of U
9	2.035
10	2.005
11	1.981
12	1.961
13	1.944
14	1.929
≥ 15	1.917

Note: It assumes that the exposures are log-normally distributed.

If the PEL is not complied with, employer should review and improve the existing control measures to ensure the exposure is below the PEL assigned for the chemical or to as low as reasonably practicable (ALARP). Refer to the Guidelines on The Control of Chemicals Hazardous to Health for controlling the exposure. The exposure should be continuously and periodically monitored, with frequency depending on the monitoring results (x):

a) For action level < x ≤ PEL, at interval of not more than 12 months; or
b) For x > PEL, at interval of not more than 6 months.
Note : Action level is equal to 50% of PEL-TWA.

ANSWER

A8: If the “Compliance Test” is a “Fail,” the next step is “Improve Control by Employers” (Referring to Figure 4: Air Monitoring Procedure). Employers must improve control measures to reduce exposure, particularly regarding work practices or improvements in engineering control measures. After the employer has improved the control measures to reduce exposure, the Health Technician (HT) can re-examine the sources of exposure and the efficiency of the control measures, for example by using “Direct-reading instruments,” and the HT needs to conduct monitoring again. Information on control measures can be referred to in the Guidelines on Control of Hazardous Chemicals to Health 2002 or its amendments.

If “complied,” but the “level of exposure” exceeds the “action level,” the frequency for “Periodic Monitoring” is as stated in “Step Three” 3, 6.3.2 Compliance test, as follows:

a) For action level < x ≤ PEL, at intervals of not more than 12 months; or
b) For x > PEL, at intervals of not more than 6 months.
Note: Action level is equal to 50% of PEL-TWA.

CEM FAQ

SOALAN

Q8 : Untuk pengiraan “Compliance Test” sekiranya “not complied”, bagaimana cara untuk menentukan frekuensi “additional monitoring”?

If calculated U is more than the limiting value of U, PEL is complied. The PEL is not complied with, if U calculated from equation 3 is less than the limiting value given.

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Note: It assumes that the exposures are log-normally distributed.

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a) For action level < x ≤ PEL, at interval of not more than 12 months; or
b) For x > PEL, at interval of not more than 6 months.
Note : Action level is equal to 50% of PEL-TWA.

JAWAPAN

A8: Sekiranya “Compliance Test” adalah “Fail”, langkah seterusnya adalah “Improve Control by Employers” (Merujuk kepada Figure 4: Air Monitoring Procedure). Majikan mesti menambah baik langkah kawalan untuk mengurangkan pendedahan, khususnya mengenai amalan kerja atau penambahbaikan langkah kawalan kejuruteraan. Selepas majikan menambahbaik langkah kawalan untuk mengurangkan pendedahan, HT boleh melihat semula sumber pendedahan dan kecekapan langkah kawalan contohnya dengan menggunakan “Direct-reading instruments” dan HT perlu menjalankan semula pemonitoran. Maklumat mengenai langkah kawalan boleh dirujuk kepada Garis Panduan Kawalan Bahan Kimia Berbahaya kepada Kesihatan 2002 atau seperti yang dipinda. Sekiranya “complied”, tetapi “level of exposure” melebihi “action level”, frekuensi bagi “Periodic Monitoring” adalah seperti yang dinyatakan dalam “Step Three” 3, 6.3.2 Compliance test, seperti berikut:

a)For action level < x ≤ PEL, at interval of not more than 12 months; or
b)For x > PEL, at interval of not more than 6 months.
Note : Action level is equal to 50% of PEL-TWA.

THANK YOU