

October 2010

GUIDELINES FOR THE PROTECTION OF EMPLOYEES AGAINST THE EFFECTS OF HAZE AT WORKPLACES

Introduction

The main pollutant of concern to health during a smoke haze is the fine particulate matter or PM10 (particulate of size 10 micron and below). The health effect depends on the severity of the smoke haze as described by the PSI reading. At PSI > 100, the air quality is deemed unhealthy.

Under the Workplace Safety & Health Act (WSH Act), employers have a duty to protect their employees' safety and health at work. When PSI levels exceed 100, employees will be exposed to higher levels of safety and health risk due to poor visibility and/or ill effects of haze. Hence, it is incumbent upon employers to carry out a proper risk assessment and to implement appropriate measures, including specifying when to stop work, so as to ensure that risks identified are minimised or mitigated. In situations where haze poses imminent danger to the safety and health of workers and measures have not been taken to mitigate those risks, the Ministry of Manpower (MOM) may order the affected work to stop. If any individual fails to comply with a stop work order, under the WSH Act he shall be liable on conviction to a fine not exceeding \$500,000 or to imprisonment for a term not exceeding 12 months or to both. Corporate bodies may be liable to a fine not exceeding \$500,000 under the WSH Act.

The PSI levels stated in these guidelines refer to the 24-hour average level issued by the National Environment Agency (NEA).

Preparation

Following announcement of an increased risk of haze by NEA, employers should initiate the following preparations to protect the safety and health of employees against the effects of haze:

- a) Identify susceptible employees¹
- b) Identify types of outdoor work² to be reduced when there is haze
- c) Determine criteria for stopping outdoor work
- d) Conduct respirator fit testing for employees who need to work outdoors
- e) Ensure sufficient stock of disposable N95 respirators
- f) Improve efficiency of air cleaning devices
- g) Implement haze communication system between employer and employees.

Management of susceptible employees

Employees with existing heart or respiratory illness are more susceptible to the effects of haze. When PSI levels exceed 100, these susceptible employees must use respiratory protective devices (or

¹ Employees with heart or respiratory illness

² Outdoor work is work that is carried out outside buildings regularly or most of the time.

respirators) if working outdoors. If they experience breathing difficulty from wearing respirators while working outdoors, employers should deploy them to work indoor where the pollutant concentration is lower. When PSI levels exceed 200, all susceptible employees should be deployed to work indoor, preferably in work that is not physically strenuous.

Minimising outdoor work

At PSI > 100, outdoor work involving strenuous activity should be minimised. Any employee who has difficulty using respirators while working outdoors should be deployed to work indoor.

At PSI > 200, outdoor work involving strenuous activity should be avoided.

At PSI > 300, risk assessments should be conducted to determine whether outdoor lifting operations involving tower and mobile cranes should cease due to the foreseeable risk of poor visibility, so as not to compromise safety of persons at work. Such work can only be carried out when appropriate precautions have been taken to reduce the risk. Employers are reminded of their duties under the WSH Act to provide and maintain for their employees a work environment which is safe, without risk to health, and adequate as regards facilities and arrangements for their welfare at work. In addition to the Workplace Safety and Health Act, failure to implement effective risk management to minimise WSH risks is also an offence under the WSH (Risk Management) Regulations 2006. The maximum penalty for such offence is \$10,000 (for first offence) and \$20,000 or imprisonment for a term not exceeding 6 months or to both (for second and subsequent offences).

At PSI > 400, there will be an increased risk of ill health for all persons, including employees conducting non-strenuous outdoor work. Hence, the risk assessment will need to include the impact of haze on the health of all employees, especially those working outdoors. If the risk of ill health cannot be mitigated, the work activity should stop. For those engaged in emergency and essential services, the risk should be mitigated by wearing suitable respirators.

Provision of suitable respirators

It is the duty of employers to provide suitable respirators to employees when required (please refer to Table A). The correct type of respirator is one which is capable of filtering out about 95% of very fine particles. Disposable N95 respirators, commonly called N95 masks, are preferable as they are more comfortable than cartridge respirators.

Employees who are required to wear respirators should be fit-tested to ensure good fit of the respirator. Employers should ensure sufficient stock of respirators for these employees. Training and supervision should be conducted to ensure correct usage of respirators. Respirators should be changed when soiled/physically damaged or when the wearer finds it hard to breathe.

Enhancing protection for indoor work

Please refer to NEA's website (http://app2.nea.gov.sg/psi_aircleaning.aspx) for information on how you can improve the air quality for both non air-conditioned and air-conditioned workplaces with the use of suitable air cleaning devices.

To enhance the protection offered by remaining indoors, measures should be taken to reduce haze infiltrating indoor air by keeping windows and doors closed most of the time.

Communication on haze

A system should be put in place to update employees regularly on the mitigating measures taken by the organisation to minimise the safety and health effects of haze on employees. The system should include channels for employees to report adverse effects suffered as a result of the haze.

For queries on these guidelines, please contact the Ministry of Manpower.
MOM Contact Centre, Tel: (65) 6438 5122
Email: MOM_OSHD@MOM.GOV.SG.
Website: www.mom.gov.sg

**TABLE A: GUIDELINES FOR THE PROTECTION OF EMPLOYEES
AGAINST THE EFFECTS OF HAZE AT WORKPLACES**

24-Hour PSI Reading	General Health Effects	Measures to be taken by employer	Measures to be taken by employees
81– 100 (moderate)	Few or none for the general population	<ul style="list-style-type: none"> Identify susceptible employees Identify types of outdoor work to be reduced when there is haze Determine criteria for stopping outdoor work Ensure sufficient stock of disposable N95 respirators Improve efficiency of air cleaning devices for enhanced protection of indoor workers Implement haze communication system between employer and employees. Communicate to employees on measures taken to protect their safety and health during haze 	<ul style="list-style-type: none"> All employees carrying out outdoor work to undergo respirator fit testing All employees know when to stop outdoor work
101-200 (unhealthy)	Mild aggravation of symptoms among susceptible people, with irritation symptoms in the healthy population	<ul style="list-style-type: none"> Provide suitable respirators to susceptible employees working outdoors If susceptible employees have difficulty working outdoors, employers should deploy them to work indoor Outdoor work which involves strenuous physical activity should be minimised. 	<ul style="list-style-type: none"> Susceptible employees must use suitable respirators if working outdoor
201-300 (very unhealthy)	Significant aggravation of symptoms and decreased tolerance in persons with heart or respiratory illness; widespread symptoms in healthy population	<ul style="list-style-type: none"> Susceptible employees should be deployed to work indoor, preferably doing work which is not physically strenuous Provide suitable respirators to all employees carrying out outdoor work Outdoor work which involves strenuous physical activity should be avoided. 	<ul style="list-style-type: none"> All employees carrying out outdoor work should use suitable respirators Susceptible employees should work indoor, preferably doing work which is not physically strenuous.
301-400 (hazardous)	Early onset of certain diseases in addition to significant aggravation of symptoms and decreased exercise tolerance in healthy persons	<ul style="list-style-type: none"> Outdoor work which involves strenuous physical activity should be avoided Must provide suitable respirators to all employees carrying out outdoor work Risk assessment* should consider the additional risk posed by poor visibility for work activities such as lifting operations involving tower and mobile cranes. 	<ul style="list-style-type: none"> All employees carrying out outdoor work should wear suitable respirators Susceptible employees should remain indoors and avoid strenuous work
>400 (very hazardous)	May be life threatening to ill and elderly persons. Healthy people experience adverse symptoms that affect normal activity.	<ul style="list-style-type: none"> Outdoor work should be avoided. Risk assessment* should consider the impact of haze on the health of all employees, especially those working outdoors. For those engaged in emergency and essential services, the risk should be mitigated by wearing suitable respirators. 	<ul style="list-style-type: none"> All employees should remain indoors and avoid strenuous work. All employees carrying out emergency and essential services must wear suitable respirators

*** Risk Assessment:**

During haze, employees will be exposed to higher levels of WSH risk due to poor visibility and/or ill effects of haze. Employers should conduct a proper risk assessment and implement appropriate measures, including specifying when to stop work, so as to ensure that risks identified are minimised or mitigated. If the WSH risk cannot be mitigated, such activities should stop. The work should only resume when precautions have been taken to reduce this risk.