

I Concentration of Offensive Odor Substances

“Offensive Odor Substances” is stipulated by the law to denote a group of chemical substances that could constitute unpleasant odors and possibly impair the living environment of residents. Currently, 22 substances have been designated as Offensive Odor Substances and local governments determine each standard value within the range described below. The regulation is enforced to ensure that their concentrations in air or water do not exceed the standard values.

Substance	Concentration(ppm)
Ammonia	1-5
Methyl mercaptan	0.002-0.01
Hydrogen sulfide	0.02-0.2
Dimethyl sulfide	0.01-0.2
Dimethyl disulfide	0.009-0.1
Trimethylamine	0.005-0.07
Acetaldehyde	0.05-0.5
Propionaldehyde	0.05-0.5
Butyl aldehyde	0.009-0.08
Isobutyl aldehyde	0.02-0.2
Valeraldehyde	0.009-0.05
Isovaleraldehyde	0.003-0.01
Isobutyl alcohol	0.9-20
Ethyl acetate	3-20
Methyl isobutyl ketone	1-6
Toluene	10-60
Styrene	0.4-2
Xylene	1-5
Propionic acid	0.03-0.2
Butyric acid	0.001-0.006
Valeric acid	0.0009-0.004
Isovaleric acid	0.001-0.01

II Odor Index

“Odor Index” is an index that quantifies the intensity of odors. Local governments determine the standard value by odor index within the range of 10-21.

$$\text{Odor Index} = 10 \times \log (\text{Odor Concentration})$$

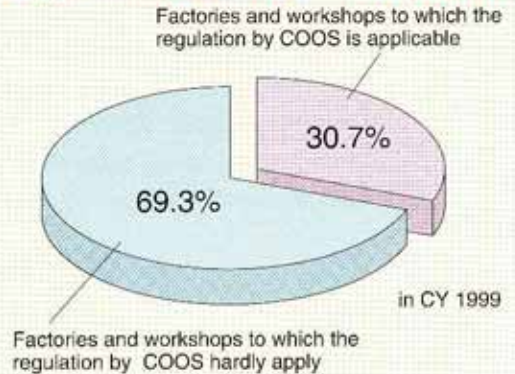
Comparison between Regulation Systems

	Concentration of Offensive Odor Substances	Odor Index
Advantages	<ul style="list-style-type: none"> • can assure accuracy relatively easily • can be measured continuously for some substances • can quantify the concentration for each substance 	<ul style="list-style-type: none"> • can deal with diverse (more than 400,000) odorants • can evaluate additive and multiplicative effects of odorants • can help us imagine the intensity of odor through measurement results • can meet residents' sense of suffering from offensive odors

Why was the odor index regulation introduced into the law ?

When the Offensive Odor Control Law was enacted, the regulation was focused on the concentration of offensive odor substances (COOS). However, as complaints about offensive odors became more diversified, this regulation was no longer sufficient to deal with the increasing number of complaints caused by unregulated substances or complex odors. To improve those situations, the Offensive Odor Control Law was revised in 1995 and the odor index regulation was newly introduced.

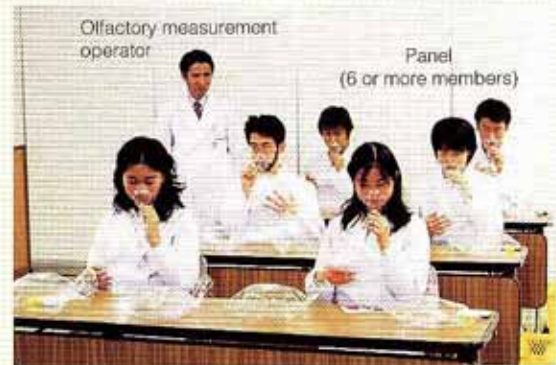
Applicability of the regulation by COOS



How to measure the odor index?

Olfactory measurement is used to determine the odor index. The officially adopted method in Japan is the "Triangular Odor Bag Method". In this method, 6 or more members of the panel are given a set of 3 bags; 1 with a sample in it and 2 with odor-free air and asked to choose the odorous bag. The odor is then gradually diluted and the test is continued until it becomes impossible to identify the bag with odor. The odor index is calculated by the dilution rate at which the panel can no longer tell the correct bag.

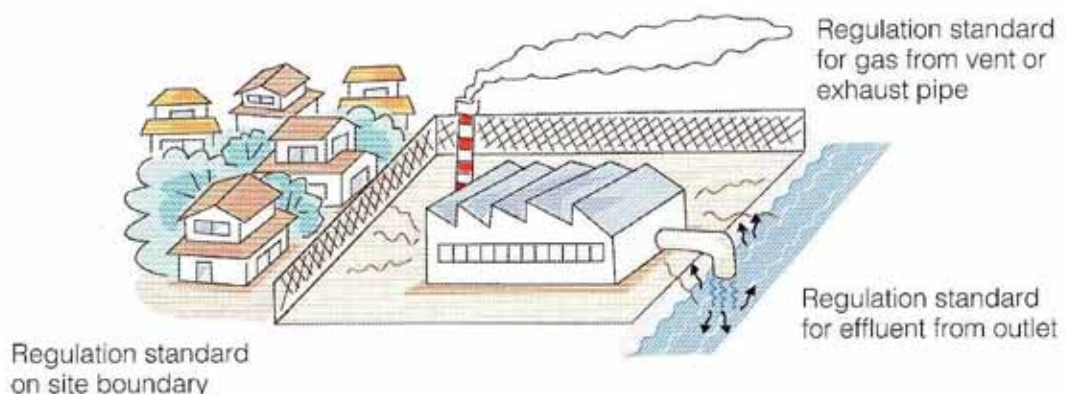
Scene of olfactory measurement



※ For liquid samples, flasks are used instead of bags.

Regulation Standards

The following 3 types of odor emissions from factories and workshops are regulated. Local governments could establish 3 applicable regulation standards corresponding to these emission types. Business proprietors within regulated areas are obligated to comply with these regulation standards.



3 types of odor emissions from factories and workshops

Report and Inspection

Local governments are entitled to demand a report and to conduct an on-site inspection of operating conditions and preventive measures at odor emitting facilities.

Measurement

Local governments should conduct measurement of offensive odors for the purpose of preserving the living environment of residents. Measurement can also be commissioned to certificated corporations or persons such as an "Olfactory Measurement Operator".

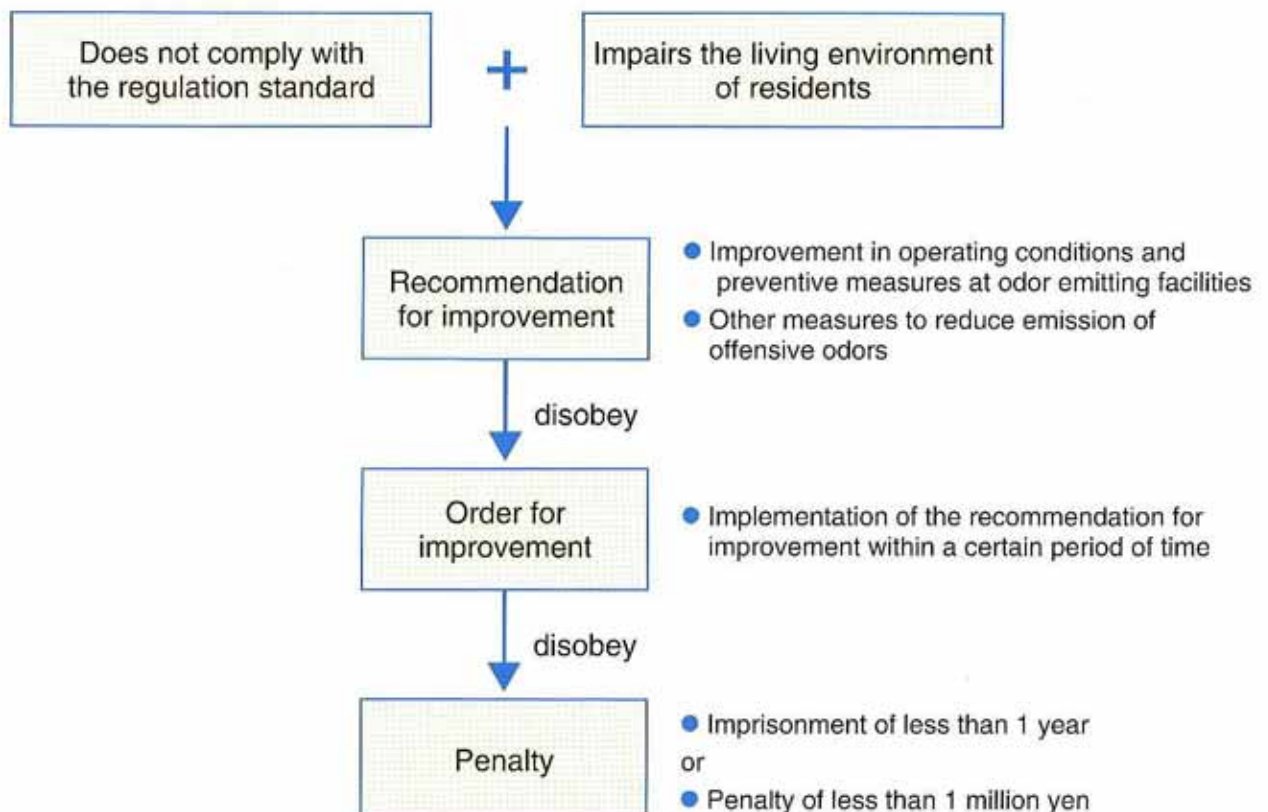
Olfactory Measurement Operator

An olfactory measurement operator is a person in charge of management and organization of entire series of olfactory measurement from panel selection, sampling, performance of tests and summarizing the results based on the Triangular Odor Bag Method.

This is a National Certification granted to those who passed both the written examination and an aptitude test using five standard odorants. Currently, there are 2,081 certified operators nationwide (as of March 2003).

Recommendation, Order and Penalty

When offensive odor from a factory within a regulated area exceeds the regulation standard and simultaneously impairs the living environment of residents, local government shall recommend or order the business proprietor of the factory to improve operating conditions and preventive measures of odor emitting facilities. Penalty shall be imposed on violator.





Promotion of Preventive Measures against Offensive Odors

In addition to regulatory measures, the Offensive Odor Control Law stipulates the role of citizens, governments and business proprietors for promoting measures to prevent offensive odors.

Responsibility of Citizens

Citizens have the responsibility of:

- a) making efforts to prevent the generation of offensive odors in daily life in densely populated areas
- b) not incinerating outside large amounts of material that could generate offensive odors

Responsibility of National/Local Governments

National government has the responsibility of:

- a) promoting education and disseminating information on offensive odors
- b) advising local governments
- c) mediating funds and technical assistance for business proprietors
- d) promoting researches on the prevention of offensive odors

Local governments have the responsibility of:

- a) providing support and information for local residents
- b) planning and implementing measures to preserve the local living environment

Obligations of Business Proprietors

Business proprietors are under obligation to:

- a) comply with the applicable regulation standards
- b) in case of accident, adopt appropriate measures against the emission of offensive odors and report the situation to local governments

Contact address for inquiries or comments regarding this brochure

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