

SECTION 3 THE O.N.100 ODOUR NEUTRALISER - HOW IT WORKS IN KITCHEN EXTRACT SYSTEMS

The concept of the O.N.100 was invented and Patented in Germany. Purified Air Limited acquired the licence to manufacture and supply throughout Europe, USA and Canada. The O.N.100 was developed specifically to reduce odour contaminant from commercial kitchens. The unit is designed to deal with the gaseous phase pollutant, which will be present, after the bulk of the particulate phase has been removed.

The O.N.100 will improve the control of odour emissions even with limited particulate phase control; however, optimum results cannot be achieved unless used in conjunction with some form of high efficiency pre-filtration, the preferred type of particulate control is Electrostatic Precipitation.

How The O.N.100 Works

The process combines both Physics and Chemistry. Ambient air is drawn into the O.N.100 unit by means of an integral fan where the air is mixed with a neutralising chemical to form a vapour or gas. The principles of Electrostatic Precipitation are again applied and the vapour is ionised to 15,000 V negative and discharged into the duct by means of a non-conductive flexible hose and venturi spigot. The flow through this is controlled by the velocity within the duct thus once a system is commissioned and balanced the dosage will be correct.

The metal duct is earthed through the same circuit thus making the contents at an opposite electrical potential to the ionised chemical vapour. The Electrostatic difference forces the chemical to combine physically with the contaminants after which a chemical reaction takes place to neutralise the cooking odour.

Efficiency

The neutralisation effect is very good, dependent on the level of activity within the kitchen either a faint cooking odour or faint neutralising chemical will be detected directly at the discharge.

Pressure Loss

The O.N.100 does not exhibit any pressure loss and can therefore be installed into any new or existing system without the necessity to upgrade the fan.

Maintenance

The only maintenance required is regular topping up of the neutralising chemical (approximately once every three to four weeks).

Eliminodor

The odourfoyl concept used in Eliminodor is a system developed by Purified Air Limited to reduce or eliminate the perception of malodorous materials. By using a combination of selected materials, the malodorous molecules are electrostatically entrapped in the air thereby preventing them being recognized by the nose.

The product offered by Purified Air Limited combines the malodour counteractants with materials which impart an odour to the air. Flexibility within the system enables the design of a wide choice of odour styles to suit the needs of the application. For example fine fragrance for personal care products, mood fragrances for household use, fresh air type for industrial use or a medicated odour for institutional use.

The odourfoyl concept works in the vapour phase and the only requirement is that the Eliminodor be effectively released into the air where the malodour is present. Eliminodor fragrance can effectively counteract body odours or residues such as onion and fish that result from handling food.

For household use, air fresheners, dry fabric fresheners, carpet freshener, hard surface cleaners and disinfectants can be fragranced with the concept used in Eliminodor fragrances. In the industrial environment the concept can be incorporated into gas scrubbers, industrial cleanser and concentrated gel systems.

MALODOURS & ODOUR NEUTRALISERS

MALODOURS ARISE IN A VARIETY OF WAYS

Biological degradation and reactions – bathroom, pets
Chemical reactions – smoke, cooking
Natural products – vegetables, spices

CONVENTIONAL MALODOUR COUNTERACTANCY HAS USED ONE OF SEVERAL METHODS AVAILABLE

Biological control

- Ingredients seek to disinfect or stabilise deterioration at source of malodour.

Chemical modification

- Ingredients seek to chemically interact with malodour molecules so as to neutralise or modify the structure to non odorous or acceptable odorous state.

Molecular entrapment

- Use of activated or highly receptive ingredients whose molecular structure will readily act as a receptor for specific malodour molecules.

Odour masking

- Use of positive fragrance technology to cover specific malodours without altering the physical state or source of malodour.

Malodour as a fragrance

- Creation of a fragrance which accepts the malodour as part of component the fragrance.

Desensitisation

- The use of chemicals to temporarily numb or restrict the sense of smell.

No panacea currently exists for all malodours: Each problem area needs its own permutation of solutions to counteract the specific source and/or the resulting malodour.

A realisation of market needs for malodour control, together with segmentation of problem areas will give greater added value to retailer's products. The opportunity for this will come from more efficient odour neutralising systems and the ability to use the full spectrum of fragrance styles.

Through an intensive research program, Purified Air has developed a system that can be rapidly designed to interact with the different permutations demanded by consumers of malodour negation and desired fragrance style.

THE ELIMINODOR SYSTEM

In order to understand the requirements for a molecule capable of malodour neutralisation it is necessary to consider the mechanism of odour perception.

Volatile odoriferous chemicals pass into the nasal passages as the individual inhales odour laden air. They travel to the olfactory epithelium, an area only 2.5cm² in humans. The chemicals dissolve in the mucus which bathes the olfactory cilia. These cilia contain protein based receptor sites.

It was thought that these receptors might correspond to the accepted classification of odour types, e.g. minty, green, woody, etc. This area of research is still active and it is not yet clear how many different types of receptor sites there are. Biochemists now believe there may be as many as 1000 different types.

Though still not proven, it is reasonable to predict that receptor sites have a high degree of specificity and that each receptor will have tunnel vision responding only to odourants of narrowly defined shape, chemical function or dipole moment.

The interaction between an odoriferous chemical and its receptor is per force not one of chemical bonding. Although we experience nasal saturation, this is most likely to be due to nasal sites being 'occupied', and is a passing phase. Chemical bonding would give rise to permanent blocking sites. The interactions we are considering are thus temporary and electrostatic in nature (Van der Waals type forces).

In task in malodour neutralisation is to confound these interactions between malodour and receptor. If we surround the malodour with molecules capable of the very same Van der Waal interactions, adjuncts will be formed. The electrostatically neutralised malodour can then no longer trigger its specific receptor sites.

Malodours of organic nature typically are short chain substituted aliphatics, phenols or molecules containing sulphur or nitrogen. All these chemical types rise to molecules with uneven electron distribution, hence a significant dipole moment. In selecting candidates for malodour neutralisation, the molecule must have an energetic electron orbital capable of moulding its electron cloud around the malodour dipole.

Our fragrance palette was screened for suitable structural components and empirical testing for odour neutralising efficacy was carried out.

RAW MATERIAL ODOUR NEUTRALISING TEST METHOD

Objective

To test specially selected raw materials for their effectiveness against the following malodours:

1. Tobacco Smoke
2. Pet
3. Bathroom
4. Kitchen

Test Procedure

- 1) Malodours used:
 - a) A leading brand of cigarette.
 - b) Cat litter
 - c) A mixture of skatol and iso valeric acid.
 - d) A mixture of synthetic onion, fish and garlic flavours.
- 2) An expert panel of 10 olfactory assessors was used to evaluate the effectiveness of the raw materials on each malodour.
- 3) For the tobacco smoke test, each cigarette was cut to a length of 2.5cm, placed in an ashtray inside a two litre beaker and covered with foil. The cigarette was allowed to completely burn out.
For the other three tests a weighed amount of the malodour was placed into a small beaker inside the two litres beaker and covered with foil.
- 4) A stick-up air freshener pad was dosed with 2g of raw material and placed inside the beaker.
- 5) After two hours, the assessors were asked to score each raw material on its effectiveness in counteracting the malodour.

One beaker was left with only the malodour. This was used as a standard and given a score of 100.

The other samples were scored relative to this:

- | | | |
|-----|---|------------------------------------|
| 100 | - | No raw material detectable |
| 50 | - | Average coverage |
| 0 | - | Excellent – No malodour detectable |

Results Analysis

An average score was taken for each test.

The following examples demonstrate the relative effectiveness of selected raw materials in counteracting the four malodours.

Conclusion

From the results a list of aroma materials in order of the efficacy in covering the malodour was produced. From this list we are able to create a complete range of fragrances styles capable of counteracting all the four malodours.

HEALTH & SAFETY DATA SHEET

1. IDENTIFICATION OF SUBSTANCE / PREPARATION AND COMPANY

COMPOUND NAME : ON 100 DEODORIZING LIQUID

CODE NUMBER : 83750

COMPANY : Purified Air Limited
Lyon House, Lyon Road,
Romford, Essex,
RM1 2BG, England

TELEPHONE NUMBER : 01708 755414

2. COMPOSITION AND INFORMATION ON INGREDIENTS

This is a concentrated fragrance compound, containing a mixture of aroma chemicals and natural essential oils.

3. HAZARDS IDENTIFICATION

GENERAL : When undiluted and not properly handled this may cause irritation to skin and eyes or by inhalation.

HAZARD SYMBOL : This product is not regulated as dangerous.

RISK CODES : None required.

ENVIRONMENT : Keep away from drains, surface and ground water, and soil to avoid possible contamination.

4. FIRST AID MEASURES

INHALATION : Remove from the exposure area to fresh air. Contact a doctor if necessary. If breathing has stopped start resuscitation.

INGESTION : Obtain medical advice immediately.

SKIN CONTACT : Remove contaminated clothing. Wash with plenty of soap and water.

EYE CONTACT : Flush with plenty of water and seek medical advice if necessary.

5. FIRE-FIGHTING MEASURES

- EXTINGUISHING MEDIA : Carbon dioxide, foam or dry powder – DO NOT USE A DIRECT WATER JET.
- COMBUSTION PRODUCTS : Carbon dioxide and unidentified organic compounds.
- SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS ONLY : Wear protective clothing and avoid inhalation of vapours.

HEALTH & SAFETY DATA SHEET

6. ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition. Ensure proper ventilation. Avoid inhalation, skin and eye contact. Soak up spillage with sand or other inert absorbent material such as earth or vermiculite. Transfer used material to a suitable waste container, and dispose in accordance with local regulations. Any absorbent cloth used for mopping up should be treated as oily waste and disposed of promptly.

7. HANDLING AND STORAGE

- HANDLING PROCEDURES : Maintain good occupational and personal hygiene. Avoid inhalation and contact with skin and eyes.
- STORAGE CONDITIONS : Store in tightly sealed containers, of amber glass, aluminium or lacquered steel away from ignition sources and in a cool place, preferably 10-20 degC with good ventilation.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

- EXPOSURE CONTROLS : Maintain adequate ventilation.
- PERSONAL PROTECTION :
- Respiratory Protection - Not generally required.
 - Hand Protection - Wear chemically resistant disposable gloves.
 - Eye Protection - Not normally required. Where there is a risk of splashing wear safety glasses.
 - Skin Protection - Wear overalls. Always wash routinely before breaks, meals and at the end of the work period.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: LIQUID
Odour	: According to standard
Colour	: YELLOW
PH	: Not determined
Viscosity	: Mobile liquid
Freezing Point degC	: Not determined
Melting Point degC	: Not determined
Flash Point degC	: 65
Auto Flammability	: Not determined
Explosive Properties	: Not expected
Oxidising Properties	: Not expected
Vapour Pressure	: Not determined
Relative Density @ 25 degC	: 0.8020
Solubility in water	: INSOLUBLE
Partial Coefficient (n-octanol / water)	: Not determined
Refractive Index @ 20 degC	: 1.4443

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HEALTH & SAFETY DATA SHEET

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID conditions as	: Extreme temperatures and This may spoil the product.
MATERIALS TO AVOID may products and	: Highly reactive chemicals, such as Concentrated sulphuric acid, which produce unknown reaction so cause additional hazards.

HAZARDOUS DECOMPOSITION PRODUCTS : Not determined

11. TOXICOLOGY INFORMATION.

This product is a mixture and has not been tested as a whole.
No further data is available.

12. ECOLOGICAL INFORMATION

None available.

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with the law and local regulations.

14. TRANSPORT INFORMATION

	Class	Packing	Group
UN No	:		
ADR/RID (Road)	:		
IMDG (Sea)	:		
IATA (Air)	:		

15. REGULATORY INFORMATION

HAZARD SYMBOLS	:	This product is not regulated as dangerous
RISK CODES	:	None required
SAFETY PHRASES	:	
CONTAINS	:	

16. OTHER INFORMATION

The information in this HSDS is correct to the best of our knowledge. However the accuracy of this information cannot be guaranteed by the company as the data has been obtained from different sources. We will not therefore accept liability for misuse of this data resulting in damage or loss.