

THE DISPOSAL OF USED OIL ABSORBENT MATERIALS SUMMARY OF THE NSW DISPOSAL REGULATION

Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal. In NSW, six waste classes are now used:

- Special waste
- Liquid waste
- Hazardous waste
- Restricted solid waste
- General solid waste (putrescible)
- General solid waste (non-putrescible)

Wastes classified as 'hazardous', in accordance with the DECC Waste Classification Guidelines (Part-1, 2008) due to high levels of contaminants, are generally not suitable for disposal to landfill in NSW. However, if the contaminants are 'immobilised' so that they will not be released into the landfill (as leachate) at levels of concern, then DECC may grant an immobilisation approval to enable the waste to be landfilled. Immobilisation approvals will only be issued where it is not possible to reuse, recycle or reprocess the waste.

The types of immobilisation are:

- *Natural immobilisation*, where the contaminant(s) are already present in an immobilised form and the waste is suitable for landfilling without additional treatment.
- *Chemical fixation* where the contaminant(s) are chemically converted to a stable form.
- *Microencapsulation*, where the waste is treated to physically lock up the contaminant(s) in the structure of the treated waste.
- *Macroencapsulation*, where a physical barrier is placed between the contaminated waste and the surrounding landfill environment.

Where DECC has assessed wastes as either being naturally immobilised or able to be immobilised using well established techniques, it issues general immobilisation approvals for these wastes. General immobilisation approvals include conditions which must be met for the waste to be classified as suitable for landfill disposal.

DECC issues immobilisation approvals in accordance with Clause 50 of the Protection of the Environment Operations (Waste) Regulation 2005. An application is not required to dispose of waste under a general immobilisation approval.

DECC issues general immobilisation approvals by way of a notice published in the NSW Government Gazette. DECC can also vary or revoke general immobilisation approvals by way of a notice published in the Gazette. A person wanting to classify waste in accordance with a general immobilisation approval should check that the approval is still valid. A list of valid general immobilisation approvals is maintained on the DECC website.

Used Oil Absorbents

Certain commonly generated wastes have been pre-classified as hazardous waste, general solid waste (putrescible) or general solid waste (non-putrescible). Wastes that have been classified by the EPA cannot be reclassified by any other party. Specifically, the DECC have pre-classified the following materials as General Solid Waste (non-putrescible):

- *drained oil filters (mechanically crushed) and rags **and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids***

However, where the waste contains C₁₀-C₃₆ petroleum hydrocarbons in excess of 1% (by weight), the waste is classified as Restricted Solid Waste, or if in excess of 4%, a Hazardous Waste - **unless DECC approves immobilisation.**

Used oil absorbents, where used to their maximum absorption capacities will most likely contain in excess of 4% petroleum hydrocarbon (PHC). In fact, even the poorest sorbents report an absorption capacity of at least 10% by weight, and many can hold 200-1000 % PHC by weight (ie: 2 to 10 times their own weight). Thus, these materials would normally need to be disposed as Hazardous Wastes. However, in the case of used oil absorbent materials, the NSW DECC have approved these materials for disposal to General Solid Waste via Immobilisation Approval 06/99 (see attached). This approval pertains to any material that meets the listed criteria (shaded), as follows:

C) CONTAMINANTS APPROVED AS IMMOBILISED

Total petroleum hydrocarbons C10 - C36

1. The liquid being absorbed and disposed of has to be a C₁₀-C₃₆ petroleum hydrocarbon. Anything outside this range must be treated as a separate type of waste and this General Immobilisation Approval does not apply.

E) MECHANISM OF IMMOBILISATION

Oil absorbent materials for cleaning up spilled Total Petroleum Hydrocarbons C10 - C36 are capable of securely containing more than 100% of their own mass of such hydrocarbons.

2. The absorbent material must be able to absorb more than 100% of its own mass in hydrocarbons. This effectively removes the "clay and zeolites based sorbents from the approval because they typically cannot absorb their own weight in hydrocarbons. Some of the "chunkier" saw-dust based sorbents will probably also fail this requirement. This absorption capacity must be proven using an appropriate test method and by an independent third party laboratory.

Enretech KleenSweep was tested by an independent laboratory using the ASTM 726-99 Method, with sump oil, and found to have a maximum absorption capacity of 290%, or close to 3:1 (oil:sorbent). The third party lab report is available upon request.

This is due to the high surface area and special physical/chemical properties of these absorbent materials, which favour the adsorption and absorption of oily hydrocarbons compounds in a stable manner.

3. This statement appears to *recommend* that the absorbent material should have both absorption and adsorption properties.

Adsorption is the gathering of substances over the surface of the adsorbing material. The affinity of the liquid for this outer surface (adsorption) is primarily a molecular phenomenon and is a function of multiple chemical, physical, electro-static mechanisms, including:

- van der Waals (physical)
- coulombic attractive forces (electrostatic)
- charge transfer (ionic)
- ligand exchange (covalent)

Absorption is the incorporation of a substance throughout the body of the absorbing material. Thus absorption is a function of the liquid's surface tension, density and the effective internal radius of a given fibre or pore.

Sorption: Any of these mechanisms may operate dependent upon the nature of the organic chemical, and the properties of the sorbent. The sum of all adsorption and absorption mechanisms accounts for the total effect of sorption.

We have proven that Enretech KleenSweep has both absorption and adsorption properties as tested via the ASTM 716-82 Method and ISO particle size analysis. Almost every sorbent on the market refers to themselves as an “absorbent”. Yet very few can in fact support this claim with test data. Thus, although most products are actually only adsorbents, the term “absorbent” is still commonly and generically used, as most do not understand the technical difference.

F) CONDITIONS OF APPROVAL

Packaging Requirements

Powdery used oil absorbent materials must be bagged or drummed or otherwise contained to facilitate safe handling and disposal.

4. The used oil absorbent materials must be bagged or drummed or otherwise contained. They cannot be discarded in a loose form.

Waste Assessment Requirements

The total concentration (SCC) limits for Total Petroleum Hydrocarbons C₁₀ - C₃₆ listed in Table A4 of the Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (Waste Guidelines – EPA 1999) do not apply to the assessment of used oil absorbent materials.

5. This statement simply means that used oil absorbent materials are not governed by the SCC limits (% by weight) for C₁₀-C₃₆ PHC in waste, as they are exempt via their General Immobilisation Approval. Otherwise, they would be classed as Restricted or Hazardous wastes.

Any contaminants listed in Table A4 of the Waste Guidelines (other than Total Petroleum Hydrocarbons C₁₀ - C₃₆) that are contained within used oil absorbent materials must be assessed in accordance with Technical Appendix 1 of the Waste Guidelines.

6. This clause prevents the co-disposal of other listed pollutants such as heavy metals and pesticides. If these compounds exist in the used oil, then they need to be evaluated as if they were on their own.

The used oil absorbent materials must not contain any free liquids as defined in the Waste Guidelines.

7. This is a very important requirement of the disposal approval and is where a lot of confusion comes from. Landfills that accept General Solid Waste (non-putrescible) cannot accept liquids, as they are not designed to do so. Thus, to meet the General Immobilisation Approval 99/06, the used oil absorbent must not have released its absorbed oil. The approval defines “free oil” as that which is released under its own weight. There is a very simple test to show this, called USEPA 9095 Method. Note that this is a method and NOT a standard, as so commonly stated. The method simple says to place the solid/liquid mixture (in this case, used oil absorbents) into a funnel (lined with a paper filter) and see if any liquid seeps out after a set amount of time.

To meet this “Free Liquid” requirement, many sorbent suppliers ask their customers to simply use more sorbent until there’s no visible liquid remaining. In some cases, this can require an enormous amount of sorbent. However, the previous clause, requiring at least 100% absorption capacity, restricts this behaviour. The responder must use a suitable amount of sorbent such that there is no free liquid remaining, yet he can use only those sorbents that, as a minimum, meet the 100% absorption capacity. This essentially prevents huge amounts of bulky, ineffective sorbents (ie: sand or clay sorbents) from filling up our landfills.

It is worth noting here that, when placed on an oil spill, absorbent pads have a tendency to over-saturate with oil and can release this oil under their own weight. All pads easily meet the 100% absorption capacity requirement, so the user only now needs to make sure that the disposal bag they’re throwing the used pads into doesn’t end up with a pool of liquid in the bottom. This is best accomplished through the addition of KleenSweep in the bottom of the bag to absorb any released liquid.

Disposal Restrictions

Used oil absorbent materials subject to this approval that meet the requirements of the Waste Guidelines for classification as ‘inert waste’ or ‘solid waste’ may only be disposed of at solid waste landfills or industrial waste landfills which have currently operating leachate management systems and which are licensed to receive that particular class of waste, and that have licence conditions to receive waste subject to immobilisation approvals with this type of disposal restriction. Used oil absorbent materials subject to this approval that are classified as ‘industrial waste’ must be disposed of at industrial waste landfills.

8. This clause has been superseded by the new Guidelines, but essentially says that any landfill accepting Used Oil Absorbents under this General Immobilisation Approval, must still be licensed and must meet certain design criteria (ie: leachate catchment systems, etc.). If in doubt, check with your local General Solid Waste Landfill or with the NSW DECC Waste Technical division (02 9995 5700).

Record keeping requirements

The responsible person is required to keep records of the management and disposal used oil absorbent materials that are classified as industrial waste or hazardous waste for a period of at least 3 years from the date which these wastes are disposed of off site.

9. For those used absorbents that do not meet the General Immobilisation Approval requirements, the generator of the waste must keep records of the management and disposal that was conducted on these materials.

In summary, those organisations and businesses in NSW that have been using ineffective, but cheap, inorganic sorbents (and some organic sorbents) to clean up their spilled hydrocarbons (oils and fuels), **cannot** simply dispose of them into the regular garbage. They must be disposed of as either Restricted or Hazardous Wastes (depending on their oil content), collected by appropriately licensed waste contractors capable of handling these types of special wastes and they must keep appropriate records for 3 years from .

Only those sorbents that have proven absorption capacities (>100%) can be used. And then, a suitable amount of sorbent must be used such that no free liquid is present in the waste. Only then, can the used absorbent material be disposed to solid waste (regular garbage).

References:

1. Waste Classification Guidelines (Part 1: Classifying Waste), State of NSW and the Department of Environment and Climate Change, DECC 2008/202 April 2008
2. <http://www.environment.nsw.gov.au/waste/immobilisation.htm>
3. ASTM F726-99 Std Test Method for Sorbent Performance of Adsorbents
4. ASTM F716-82 (2001) Std Test Methods for Sorbent Performance of Absorbents
5. Test Method 9095, Paint Filter Test, USEPA
6. General Immobilisation Approval 1999-06 Used Oil Absorbent Materials, *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes* (Waste Guidelines – EPA 1999)

Dated: July 21, 2008

© Note: This document was written by Christopher Aebi of Enretech Australasia P/L, to assist our stakeholders with the interpretation of the waste disposal guidelines in NSW and summarises the pertinent details of the waste regulations to the best of our knowledge. Each waste generator must review this document in the context of their own specific waste criteria and take appropriate care in their waste's disposal.

This document is based on published documentation and verbal discussions with NSW DECC personnel. For more information, contact Chris Aebi at 02 4869 3261 or the NSW DECC Waste Technical Division (02 9995 5700).

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GENERAL APPROVAL OF THE IMMOBILISATION OF CONTAMINANTS IN WASTE

Pursuant to the provisions in Clause 28 of the *Protection of the Environment Operations (Waste) Regulation 1996* the New South Wales Environment Protection Authority has authorised the following general approval of the immobilisation of contaminants in waste:

A) APPROVAL NUMBER

1999/06

B) SPECIFICATION OF WASTE STREAM

Used oil absorbent materials.

C) CONTAMINANTS APPROVED AS IMMOBILISED

Total petroleum hydrocarbons C₁₀ - C₃₆

D) TYPE OF IMMOBILISATION

Natural

E) MECHANISM OF IMMOBILISATION

Oil absorbent materials for cleaning up spilt Total Petroleum Hydrocarbons C₁₀ - C₃₆ are capable of securely containing more than 100% of their own mass of such hydrocarbons. This is due to the high surface area and special physical/chemical properties of these absorbent materials, which favour the adsorption and absorption of oily hydrocarbons compounds in a stable manner. Total Petroleum Hydrocarbons C₁₀ - C₃₆ that are contained within the used oil absorbent materials are immobilised and will not be released as free liquids during handling, transportation and disposal.

F) CONDITIONS OF APPROVAL

- *Packaging Requirements*

Powdery used oil absorbent materials must be bagged or drummed or otherwise contained to facilitate safe handling and disposal.

- *Waste Assessment Requirements*

The total concentration (SCC) limits for Total Petroleum Hydrocarbons C₁₀ - C₃₆ listed in Table A4 of the *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes* (Waste Guidelines – EPA 1999) do not apply to the assessment of used oil absorbent materials.

Any contaminants listed in Table A4 of the Waste Guidelines (other than Total Petroleum Hydrocarbons C₁₀ - C₃₆) that are contained within used oil absorbent materials must be assessed in accordance with Technical Appendix 1 of the Waste Guidelines.

The used oil absorbent materials must not contain any free liquids as defined in the Waste Guidelines.

- *Disposal Restrictions*

Used oil absorbent materials subject to this approval that meet the requirements of the Waste Guidelines for classification as 'inert waste' or 'solid waste' may only be disposed of at solid waste landfills or industrial waste landfills which have currently operating leachate-management systems and which are licensed to receive that particular class of waste, and that have licence conditions to receive waste subject to immobilisation approvals with this type of disposal restriction. Used oil absorbent materials subject to this approval that are classified as 'industrial waste' must be disposed of at industrial waste landfills.

The interpretation of the above disposal restrictions should be referred to Part 5 of Technical Appendix 2 of the Waste Guidelines.

- *Record keeping requirements*

The responsible person is required to keep records of the management and disposal used oil absorbent materials that are classified as industrial waste or hazardous waste for a period of at least 3 years from the date which these wastes are disposed of off site.

- *Waste Management Requirements*

The responsible person should ensure the landfill is permitted by conditions in its licence to receive waste subject to immobilisation approvals with the above disposal restrictions.

1.1.1 G) RESPONSIBLE PERSON

The person or class of persons to whom this general approval relates is the person who carries out the assessment and classification for the purpose of this approval. The responsible person must comply with the conditions of this approval.

Environment Protection Authority

Per: Roz Hall
Manager Waste Policy

By Delegation