

THE TREATMENT AND DISPOSAL OF SEWAGE SCREENINGS AND GRIT

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1.0 INTRODUCTION

From 30 October 2007, non-hazardous waste (such as sewage screenings and grit) must be treated before it can be landfilled. This requirement stems from the EU Landfill Directive, which in the UK was implemented by the Landfill Regulations of 2002 (amended in 2004 and 2005). The Landfill Directive is now applied by the Environmental Permitting (England and Wales) Regulations 2010. The Regulations transpose the requirements of the Landfill Directive and an associated Council Decision (2003/33/EC) into law in England and Wales, with Scotland and Northern Ireland also having equivalent waste strategies.

In anticipation of the change in regulation, a report published in 2006 by United Kingdom Water Industry Research Ltd (UKWIR) – Report Ref 06/WW/23/4 – included a review of waste streams generated by the Water Industry, and provided a characterisation dataset on the priority waste streams of sewer grit and sewage screenings. A UK-wide sampling and testing programme was carried out to encompass the major sources of variability in these waste streams and provide basic characterisation information as required for landfill acceptance. In addition, an assessment of existing treatment processes was undertaken to identify those that could meet pre-treatment requirements for landfill.

In parallel and in addition to this work, the UK Environment Agency prepared Guidance regarding the treatment of non-hazardous wastes for landfill, which was published in February 2007, and updated in November 2011.

2.0 UK ENVIRONMENT AGENCY GUIDANCE (FEB 2007, REVISED NOV 2011)

The document relates to non-hazardous waste in general, and makes specific reference to sewage screenings (European Waste Code EWC 19 08 01) but not sewer grit (EWC 19 08 02). The document states (Pg 22) - *Sewage screenings usually consist of a mixture of materials from the foul sewer and surface water systems. As these materials entered the treatment works combined with waste water it is not Directive waste on entry to the works. It is however, Directive waste when it is disposed of. We consider this waste to be non-hazardous waste that will require appropriate treatment in accordance with the 3-point test prior to landfill.*

A PDF version of the document is available on the Environment Agency web site, thus:

<http://publications.environment-agency.gov.uk/PDF/GEHO1111BVDF-E-E.pdf>

(Link information correct as at January 2012).

The guidance details the concept of the 'Three Point Test' (Section 3 - Page 8) by which treatment options must be assessed to determine whether they meet the definition of treatment, thereby complying with the appropriate regulations.

The 'Three Point Test' is detailed as follows:

1. It must be a physical, thermal, chemical or biological process (including sorting).
2. It must change the characteristics of the waste, and
3. It must do so in order to
 - (a) reduce its volume, or
 - (b) reduce its hazardous nature, or
 - (c) facilitate its handling, or
 - (d) enhance its recovery

2.0 UK ENVIRONMENT AGENCY GUIDANCE (FEB 2007, REVISED NOV 2011) – (CONT)

The document states (Pg 10) - *The intent of the Landfill Directive is to reduce the quantity of waste landfilled. Examples of processes that change the characteristics of the waste in order to reduce the quantity landfilled include: the incineration of waste; the sorting of waste to divert a stream from landfill; or the composting of waste to remove organic matter. Reducing volume is therefore most likely to be achieved by removing an element of the waste for preparation for re-use, recycling or other forms of recovery.*

The document interpretation of the 'Three Point Test' includes advice that '*Compaction is not an acceptable treatment, as it does not change the characteristics of the waste*' (Section 3 - Page 8).

However, compaction of sewage screenings includes dewatering, thereby '*removing an element of the waste*', so being subject to a process of dewatering, liquid effluent is '*diverted from landfill*', compaction including dewatering is therefore an acceptable form of pre-treatment.

The 'Example of Pre-Treatment Confirmation Form' – given in Annex 1 - Page 35 of the guidance should also be noted. It is presumed that if such a form is used, '*compaction / dewatering*' would be entered under '*other*' within the section '*What processes are employed?*'

The inclusion of 'Screenings from wastewater treatment' in Table A1 – Annex 2 – Page 48 of the guidance should also be noted. In apparent contradiction with the above, this describes screenings as not '*already treated*' and recommends incineration as a treatment method.

To confirm and clarify the regulatory / industry requirements specific to sewage screenings and grit, a joint Environment Agency / Water UK 'Task & Finish' Group was established in February 2007. The output from this Group was a 'Joint Position Statement' issued in October 2007.

3.0 ENVIRONMENT AGENCY / WATER UK JOINT POSITION STATEMENT (OCT 2007)

A copy of the full statement is appended to this Technical Note. A summary follows:

The statement acknowledges that from 30 October 2007, non-hazardous waste must be pre-treated before it can be land-filled, and advises that any waste in liquid form shall not be accepted at a landfill site (Landfill Regulation 9(1)(a)). Liquid waste is defined as being '*any waste that near-instantly flows into an indentation void made in the surface of the waste, or free draining liquid in excess of 250 litres or 10% of the load volume, whichever is the less*'. Although sewage screenings and grit are not liquid wastes, this definition is important in relation to liquid content criteria (see later).

The statement confirms that '*there are no specific Waste Acceptance Criteria (WAC) limits for substances in non-hazardous waste*', and concludes that '*the sorting or de-watering of sewer grit and sewage screenings arising from crude sewage are acceptable forms of pre-treatment that meet the "Three Point Test".*'

The statement further concludes that, '*from a regulatory point of view, there is no justification for a landfill operator to refuse acceptance of sewer grits and sewage screenings at a non-hazardous landfill site, as long as the grit and screenings meets the liquid content criteria*' (see above).

4.0 PRACTICAL APPLICATION OF PUBLISHED GUIDANCE

4.1 Screenings Treatment

4.1.1 UK (WIMES) Definitions

In the UK, mechanical equipment used in the Water Industry is defined, specified and procured via a series of product-specific Water Industry Mechanical & Electrical Specifications (WIMES).

The WIMES applicable to screenings treatment is WIMES 6.03 – ‘Screenings Handling Equipment’ - Issue 3, published Spring 2012. WIMES 6.03 identifies and defines three generic types of screenings treatment equipment, as follows:

- *Screw Compactors* are basic units incorporating a single, one-directional screw, with only minimal washwater, which could be primarily intended for equipment cleansing (drainage deck clearance, etc) rather than screenings washing.
- *Washer Compactors* have additional features or facilities intended to provide a screenings washing function. These could include multi-spiral units, additional and / or higher pressure spray bars, a forward / reverse cyclic screw operation to provide agitation, an impellor to provide agitation in the feed hopper, a grinder to provide conditioning in the feed hopper, etc.
- *Tank Wash Systems* are an assembly of proprietary components where a holding / conditioning tank is both the first process stage and the most prominent individual item. Such systems can include screw (or washer) compactors as part of the overall equipment assembly.

WIMES 6.03 also includes examples of each type of equipment currently available within the UK market, although the list is not intended to be comprehensive, or to indicate preferred suppliers.

4.1.2 Practical Application of Guidance – TRPM Opinion

It should be made clear, and noted by the reader, that the text that follows is the opinion of Thompson RPM Ltd, and is not in any way an attempt to define, describe or influence any regulatory requirement or industry practice.

It is suggested that given that compaction of screenings inherently includes dewatering, then the use of a correctly functioning and well maintained *Screw Compactor* can be taken as the minimum requirement in order to comply with the Regulations and fulfil the pre-treatment requirement.

Although the Guidance detailed above does not require screenings to be washed, it is recognised that for comparatively little additional capital and operational expense, the use of a correctly functioning and well maintained *Washer Compactor* would be expected to produce a cleaner, less odorous, more acceptable product.

It is further recognised that the use of *Tank Wash Systems*, if correctly functioning and well maintained, can give a superior product in terms of screenings cleanliness, etc, and these therefore remain a viable option when identifying solutions, particularly for locations with odour issues, difficult waste disposal routes, etc.

Although some individual UK Water Companies are yet to form a policy and procurement strategy in response to changes in legislation, it is the considered opinion of TRPM that, in light of all the above discussion, industry attention is most likely to focus on the procurement and utilisation of *Washer Compactors* for screenings treatment in the foreseeable future.

4.0 PRACTICAL APPLICATION OF PUBLISHED GUIDANCE (CONT)

4.2 Grit Treatment

4.2.1 UK (WIMES) Definitions

The WIMES applicable to grit removal / treatment is WIMES 2.02 – ‘Grit Removal and Treatment Equipment’ - Issue 4, published Spring 2012. WIMES 2.02 identifies and defines grit treatment as being achieved by either *Rake Classifier* or *Screw Classifier*, with additional ‘bolt-on’ grit *Washer-Dewaterers* also available if required.

4.2.2 Practical Application of Guidance – TRPM Opinion

As with section 4.1.2 above, it should again be made clear, and noted by the reader, that the text that follows is the opinion of Thompson RPM Ltd, and is not in any way an attempt to define, describe or influence any regulatory requirement or industry practice.

It is suggested that given that the classification of grit from its carrier water inherently includes dewatering, then the use of a correctly functioning and well maintained *Rake Classifier* or *Screw Classifier* can be taken as the minimum requirement in order to comply with the Regulations and fulfil the pre-treatment requirement.

Although the Guidance detailed above does not require grit to be washed, it is recognised that the use of a correctly functioning and well maintained *Washer Dewaterer* would be expected to produce a cleaner, less odorous, more acceptable product. These should therefore remain a viable option when identifying solutions, particularly for locations with odour issues, difficult waste disposal routes, etc.

Although some individual UK Water Companies are yet to form a policy and procurement strategy in response to changes in legislation, it is the considered opinion of TRPM that, in light of all the above discussion, industry attention is most likely to focus on the procurement and utilisation of *Rake Classifiers* and *Screw Classifiers* for grit treatment in the foreseeable future, with only a minimal requirement for any *Washer / Dewaterer* equipment.

5.0 THE NATIONAL SCREENINGS TREATMENT EQUIPMENT (STE) TEST FACILITY

The National Screenings Treatment Equipment Test Facility (NSTETF) has been constructed at Netheridge STW, Gloucester (Severn Trent Water) in order to increase Water Industry knowledge regarding the performance of equipment designed to treat sewage screenings.

The Facility has been created by modifying the existing screenings handling equipment on site to create two 'test areas', each suitable for the temporary installation of screenings compacting, washing, and / or dewatering equipment for evaluation.

The Facility was commissioned in June 2010 with the installation of two units for an evaluation lasting six months. Following this, further units have been installed in pairs in an overall programme expected to be of over three year's duration. Equipment evaluated / programmed to date is as follows:

- Spirac Miniwasher
- Spirac Spiropress
- Huber WAP/L
- Huber WAP/SL
- M & N Kuhn Wash Press
- Hydro Int Meva SWP / CPS

All the other major UK Screenings Treatment Equipment suppliers have also indicated their interest in submitting units for future evaluation, including CSO Technik, Ham Baker Adams, Haigh Eng, JWCi, Longwood Eng and Ovivo.

ThompsonRPM, who also operate as the independent third-party evaluator at similar facilities for Inlet Screens at the NSEF (Chester-le-Street STW) and CSO Screens at the Warrington Test Facility, conduct and project manage the evaluation work.

Each evaluation comprises several elements, including structural and mechanical equipment inspections, equipment capacity assessments, screenings quality analysis, and the identification of any Operational and / or Maintenance interventions required.

The primary evaluation output is a detailed report which includes certified comparators such as:

- Screenings % Volume Reduction
- Screenings % Moisture Content Reduction
- Treated Screenings – Average % Dry Solids Content
- Treated Screenings – average BOD (mg/l)

The most recent version of WIMES 6.03 requests suppliers to state their results from these valuations when and where available.

As the individual evaluations are funded by the equipment suppliers, they therefore retain ownership of their individual test reports. It is envisaged, however, that at some future time a comparative report, possibly published by an organisation such as UKWIR, may be produced.

The project has attracted both national and international interest, being the first truly comparative and quantitative assessment of this generic type of equipment ever conducted at the same location and to a universal test procedure.

APPENDIX 'A'

EA / WATER UK JOINT POSITION STATEMENT – OCTOBER 2007

**Landfill Regulations – Pre-Treatment Requirements
for Sewer Grit & Sewage Screenings Going to Landfill**

Introduction

From 30th October 2007, changes in the Landfill Regulations will mean that non-hazardous waste must be pre-treated before it can be land-filled, and liquid waste can no longer be taken to landfill.

The two main water industry waste streams that will be most affected by these changes are sewer grit (EWC Code 19 08 02) and sewage screenings (EWC Code 19 08 01). Concerns were raised within the Water Industry by what is meant by “Prior Treatment” in Regulation 10(1) and how this applies to grit and screenings.

A joint Environment Agency / Water UK Task & Finish Group was therefore established to clarify the pre-treatment requirements of water industry operational waste destined for landfill. The regulatory approach set out in this statement was agreed by the Task & Finish Group.

Liquid Waste

Regulation 9(1)(a) states that any waste in liquid form shall not be accepted at a landfill site. Defra guidance¹ states that this applies to any waste that near-instantly flows into an indentation void made in the surface of the waste, or free draining liquid in excess of 250 litres or 10% of the load volume, whichever is the less.

Pre-treatment of Waste

Treatment is defined in Regulation 2 as meaning “*physical, thermal, chemical or biological processes (including sorting) that change the characteristics of waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery*”.

Defra’s view¹ is that to meet the definition of “Prior treatment”, waste treatment must meet the criteria of the “Three Point Test”:

1. *It must be a physical, thermal, chemical or biological process (including sorting).*
2. *It must change the characteristics of the waste.*
3. *It must do so in order to:*
 - a. *Reduce its volume, or*
 - b. *Reduce its hazardous nature, or*
 - c. *Facilitate its handling, or*
 - d. *Enhance its recovery.*

Grit and screenings produced on a wastewater treatment works are themselves a product of waste treatment. Dewatering of grit and screenings is an acceptable form of pre-treatment.

There are no specific Waste Acceptance Criteria (WAC) limits for substances in non-hazardous waste destined for non-hazardous waste landfills.

Conclusion

The sorting or de-watering of sewer grit and sewage screenings arising from crude sewage are acceptable forms of pre-treatment that meet the “Three Point Test”.

From a regulatory point of view, there is no justification for a landfill operator to refuse acceptance of sewer grits and sewage screenings at a non-hazardous landfill site, as long as the grit and screenings meets the liquid content criteria.

¹ DEFRA (2005) “Government Interpretation of the Landfill (England and Wales) Regulations 2002 (As Amended)”, November 2005