

Aggregates from inert waste

End of waste criteria for the production of aggregates from inert waste



This Quality Protocol was funded by Defra, the Welsh Government and the Northern Ireland Environment Agency (NIEA) as a business resource efficiency activity. It was developed by the Environment Agency and WRAP (Waste & Resources Action Programme) in consultation with Defra, the Welsh Government, industry and other regulatory stakeholders. The Quality Protocol is applicable in England, Wales and Northern Ireland. It sets out the end of waste criteria for the production and use of aggregates from inert waste.

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Foreword

Background

Uncertainty over the point at which waste has been fully recovered and ceases to be waste within the meaning of Article 3(1) of the EU Waste Framework Directive (2008/98/EC) has inhibited the development and marketing of materials produced from waste which could otherwise be used beneficially without damaging human health and the environment. In some cases, this uncertainty has also inhibited the recovery and recycling of waste and its diversion from landfill.

Interpretation of EU legislation is ultimately a matter for the Courts and there is now a substantial body of case law on the interpretation of the definition of waste. Drawing on the principles established in this case law, it is possible to identify the point at which certain wastes can be regarded as having ceased to be waste and thus when the Directive's waste management controls should no longer apply. This identification is the purpose of the Waste Protocols Project.

What is a Quality Protocol?

A Quality Protocol sets out end of waste criteria for the production and use of a product from a specific waste type. Compliance with these criteria is considered sufficient to ensure that the fully recovered product may be used without undermining the effectiveness of the Waste Framework Directive and therefore without the need for waste management controls.

A Quality Protocol indicates how compliance should be demonstrated and points to good practice for the storage, transportation and handling of the fully recovered product. The Quality Protocol further aims to provide increased market confidence in the quality of products made from waste and so encourage greater recovery and recycling.

1. Introduction

Definitions of terms that appear in italics when they are first used in this Quality Protocol are given in Appendix A.

1.1. What is this Quality Protocol?

- 1.1.1 This Quality Protocol has been developed by the *Environment Agency*, the *Northern Ireland Environment Agency (NIEA)* and *WRAP (Waste & Resources Action Programme)* in consultation with industry and other regulatory stakeholders. It is applicable in England, Wales and Northern Ireland.
- 1.1.2 The Quality Protocol sets out end of waste criteria for the production and use of *aggregates* from *inert* waste. It supersedes ‘Quality Protocol for the production of aggregates from inert waste’, revised edition (ISBN 1-84405-217-6). If the criteria set out are met, the resulting outputs will normally be regarded as having been fully recovered and to have ceased to be waste.
- 1.1.3 Producers and users are not obliged to comply with the Quality Protocol. If they do not, the aggregate will normally be considered to be waste¹ and *waste management controls* will apply to its handling, transport and use.
- 1.1.4 This Quality Protocol does not affect the obligation of producers to hold an *environmental permit* (including an exemption) and to comply with its conditions when storing and processing waste.
- 1.1.5 This Quality Protocol does not affect permitting or any other legal requirements that do not depend on the status of the material as a waste.

1.2 The purpose of the Quality Protocol

- 1.2.1 The Quality Protocol has four main purposes:
 - i. clarifying the point at which waste management controls are no longer required;
 - ii. providing users with confidence that the aggregate they purchase conforms to an approved industry specification defined in accordance with an appropriate European aggregate standard;
 - iii. providing users with confidence that the aggregate is suitable for a use within a *designated market sector(s)* including by conforming with the industry standard; and
 - iv. protecting human health and the environment (including soil).
- 1.2.2 In addition, the Quality Protocol describes acceptable good practice for the transportation, storage and handling of aggregate (see Appendix D).

1.3 Complying with the Quality Protocol

- 1.3.1 Aggregate will normally be regarded as having ceased to be waste, and therefore no longer subject to waste management controls, provided:
 - it conforms to the requirements of the European standard appropriate to the use it is destined for as set out in Section 2;
 - the aggregate is produced under *Factory Production Control* as required by the European standard and as set out in Section 2;
 - within *Factory Production Control*, inputs are limited and controlled as set out in Section 2;
 - it requires no further processing, including size reduction, for the use it is destined for as set out in Section 2;

¹ Unless on a case-by-case basis it can be demonstrated that the material is non-waste.

- it is destined for a use within the designated market sectors set out in Section 4; and
- it conforms with CE conformity marking requirements contained in the Construction Products Regulations, which will apply to all aggregates placed on the market to harmonised European Aggregates Standards from July 2013.

1.3.2 Producers must demonstrate that these criteria have been met. They should do this in the ways set out in Section 3.

1.3.3 This Quality Protocol will be adopted as a technical regulation under *Technical Standards and Regulations Directive (98/34/EC)* as amended. We recognise that there may be codes of practice which apply in the *European Economic Area (EEA)* States other than the UK setting out requirements for the use of aggregate. We accept that aggregate may cease to be waste provided it has been produced in compliance with:

- a relevant code of practice of a national standards body or equivalent body of any EEA State; or
- any relevant international standard recognised for use in any EEA State; or
- any relevant technical regulation with mandatory or de facto mandatory application for marketing or use in any EEA State.

These must give levels of product performance and protection of human health and the environment which are equivalent to those required by this Quality Protocol.

1.3.4 An outline of the main stages and control mechanisms of the Quality Protocol is presented in Figure 1. These are described further in Sections 2 and 3.

1.4 When Quality Protocol compliant material may become waste

1.4.1 Producers and users of aggregate should note that, even if the Quality Protocol is complied with, the material will become waste again and subject to waste management controls at any stage it is discarded or there is an intention or requirement to discard, for example if it is:

- disposed of; or
- stored indefinitely with little prospect of being used.

1.4.2 In addition, if Quality Protocol compliant material is mixed with waste materials, the resulting mix will be considered to be a waste and subject to waste management controls. If Quality Protocol compliant material is mixed with non-waste materials, the resulting mix will not, as a result, be waste.

1.5 Failure to comply with the Quality Protocol

1.5.1 Where this Quality Protocol is not complied with, for example the aggregate does not conform to the requirements of the European standard or the producer cannot demonstrate evidence of compliance, the aggregate produced will normally be considered to be waste. In such circumstances, the producer or user must comply with the appropriate waste management controls² for the transportation, storage and use of the aggregate and may be committing an offence if they do not do so.

1.5.2 Detailed guidance on waste management controls can be obtained from the Environment Agency's National Customer Contact Centre on 08708 506 506, from its website (www.environment-agency.gov.uk/subjects/waste/), from Natural Resources Wales website (enquiries@naturalresourceswales.gov.uk) or from NIEA's website (www.ni-environment.gov.uk/waste-home/authorisation.htm).

² For example, in compliance with Article 23 of the Waste Framework Directive, the user might need to obtain a permit from the Environment Agency or Natural Resources Wales (or in Northern Ireland a waste management licence or PPC permit from the NIEA).

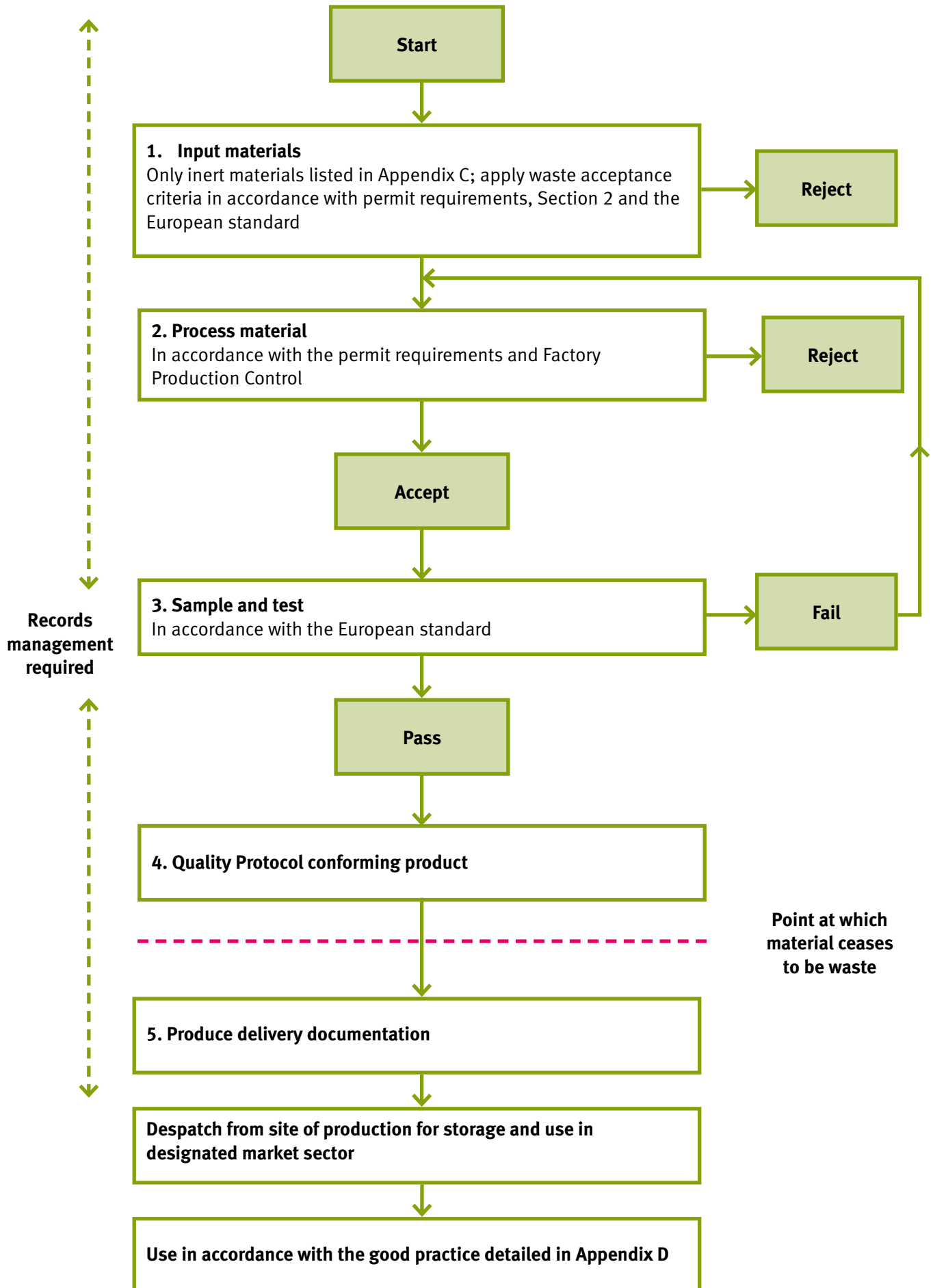
1.6 Updating the Quality Protocol

- 1.6.1 We will review and update this document as we consider appropriate.
- 1.6.2 Triggers for a review could include:
- pollution incidents;
 - development in scientific understanding;
 - a change in the market;
 - a change in legislation or case law; or
 - a change to the agreed European standard.
- 1.6.3 This Quality Protocol may be withdrawn if it becomes apparent that it is generally being misapplied and/or misused.

1.7 Importing and exporting Quality Protocol compliant material

- 1.7.1 Producers intending to export material that has been produced in compliance with this Quality Protocol should be aware that, although the material may cease to be waste in England, Wales and Northern Ireland, the country of destination may take a different view. If the competent authority in the country of destination considers the material to be waste, the shipment will be subject to the controls set out in the Waste Shipment Regulation (EC No. 1013/2006).
- 1.7.2 Those intending to import Quality Protocol compliant material into England, Wales or Northern Ireland should be aware that, if the country of despatch regards the material as waste, the controls set out in the Waste Shipment Regulation will apply to the shipment. This is the case even though the material may be regarded as having ceased to be waste in England, Wales and Northern Ireland.
- 1.7.3 Before importing or exporting such material it is prudent to check with the competent authority for the country of despatch or destination. A list of the competent authorities can be found at: http://ec.europa.eu/environment/waste/shipments/pdf/list_competent_authorities.pdf

Figure 1: Main stages and control mechanisms of the Quality Protocol



2. Producing aggregates from inert waste

2.1 Regulating the production process

2.1.1 The process of turning inert waste material into a product is classified as a waste recovery operation and is subject to the waste management controls set out in the Waste Framework Directive and domestic legislation. This Quality Protocol does not affect the obligation on producers to hold an environmental permit (including exemptions) (in Northern Ireland a waste management licence or exemption or a PPC permit is required) that authorises the storage and processing of inert waste and to comply with its conditions.

2.2 Criteria for producing aggregate that has ceased to be waste

2.2.1 To comply with this Quality Protocol, aggregate must be produced in compliance with the criteria outlined in Sections 2.3 to 2.5. In addition, the material should be destined for use in the designated market sector described in Section 4.

2.3 Input materials

2.3.1 The only acceptable input materials are the inert waste materials specified in Appendix C.

2.3.2 To ensure that only inert waste is accepted, producers must have acceptance criteria which meet, as a minimum, the requirements set out in Appendix C.

2.4 Processed in accordance with the approved standard including a Factory Production Control system

2.4.1 The producer must comply with all the requirements of a BS EN aggregates standard (for example, BS EN 12620), appropriate for the use for which the aggregate is destined, at the time it is produced, to comply with this Quality Protocol. Appendix B details the main standards and specifications relating to aggregates at the time of publishing this Quality Protocol.

2.4.2 The specifications (for example, the Highways Agency's Specification for Highway Works (SHW)) summarised in Appendix B have properties selected from the BS EN aggregates standards. The requirements for evaluation of conformity from the relevant BS EN apply in all cases.

2.4.3 The standards and specifications summarised in Appendix B are subject to review and producers should ensure they work to the latest version. Any changes to the agreed standards and specifications may trigger a review of the Quality Protocol (see Section 1.6.2).

2.4.4 Producers must set up and produce the aggregate under a system for Factory Production Control as set out in the relevant BS EN aggregates standard listed in Appendix B.

2.5 Requires no further processing

2.5.1 The aggregate must require no further processing, including size reduction, for the use for which it is destined at the time it is produced to comply with this Quality Protocol.

3 Providing evidence of compliance with the Quality Protocol

- 3.1 Producers must be able to demonstrate compliance with all the requirements of this Quality Protocol.
- 3.2 Some of the records specified below may already be required as part of the producer's environmental permit conditions (waste management licence or PPC permit conditions if in Northern Ireland). This Quality Protocol does not affect the obligations on producers to comply with environmental permit conditions (waste management licence or PPC permit conditions if in Northern Ireland).

3.3 Records management

- 3.3.1 To be able to demonstrate compliance with the Quality Protocol, producers must maintain *delivery documentation* for every load of *recycled aggregate* despatched.
- 3.3.2 This delivery documentation must include:
- date of supply;
 - customer's name and contact details;
 - product description to aggregates standard and customer specification;
 - the name and contact details of the producer, including the address of the site of production;
 - quantity supplied by weight/volume; and
 - a statement that the product was produced in compliance with this Quality Protocol.

Where requested by the purchaser further documentation should also include:

- test results and procedures in accordance with the standard or specification in Appendix B and for any further tests required to assess suitability for a particular end use;
 - outline details of the Factory Production Control manual; and
 - information on good practice relating to the storage, transportation and handling of aggregate (as set out in Appendix D).
- 3.3.3 These requirements are additional to any statutory record-keeping obligations. However, some records may be used to fulfil both a regulatory obligation and evidence of compliance with this Quality Protocol.
- 3.3.4 For the purposes of this Quality Protocol the producer, must:
- keep and retain specified records for a minimum of two years; and
 - make them available for inspection by the regulator (if requested).

4. Storage and use of recycled aggregates

4.1 As for all aggregate, users of recycled aggregate that complies with this Quality Protocol should take full account of any environmental impact resulting from its use.

4.2 Storage of recycled aggregate

4.2.1 Aggregate produced in compliance with the requirements of this Quality Protocol, which is therefore regarded as having ceased to be waste, may need to be stored temporarily either before delivery to the customer or at the customer's premises. The materials will not be waste at that point, so waste management controls will not apply.

4.2.2 If it appears that the material is being stored indefinitely with no certainty of use, the material will revert to being a waste and waste management controls will apply as specified in Section 1.4.

4.2.3 Producers, distributors and users should follow good practice for the transportation, storage and handling of aggregate, details of which are included in Appendix D.

4.3 Use of recycled aggregate – designated market sectors

4.3.1 To comply with this Quality Protocol, aggregate must be destined for use in unbound or bound applications in civil engineering and construction (as set out below) and appropriate product descriptions must be used on delivery documentation.

- Unbound – including sub-base, capping, general fill, pipe bedding and drainage;
- Bound – including hydraulically bound applications, concrete and asphalt.

Appendix A Definitions

In this Quality Protocol, the words and phrases below have the following meanings.

Agent: An agent acts like a broker, putting buyer and seller together. The agent does not take possession of the aggregate but is paid commission while the buyer is invoiced directly.

Aggregate: A granular material used in construction. For the avoidance of doubt, clays and soils are not considered to be aggregates for the purposes of this Quality Protocol.

Defra: Defra is the UK government department responsible for policy and regulations on the environment, food and rural affairs.

Delivery documentation: Record of who the aggregate is supplied to, including the documentation accompanying each load of aggregate. It details the standard to which the product complies and states that the product was produced in compliance with this Quality Protocol.

Designated market sector(s): The sector(s) listed in Section 4 to which this Quality Protocol applies.

Environment Agency: The Environment Agency is the leading public body for protecting and improving the environment in England. Its job is to make sure that air, land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner, healthier world.

Environmental permit: Environmental permits issued or exemptions registered under the Environmental Permitting (England and Wales) Regulations 2010.

European Economic Area (EEA): The EEA States consist of the members of the EU (Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the UK) together with Iceland, Liechtenstein, Norway. Switzerland is not part of the EEA, but linked through a series of bilateral agreements. Although the Channel Islands and the Isle of Man are UK Crown dependencies, they are not part of the EU and businesses registered there are subject to different licensing legislation.

European Waste Catalogue (EWC): European Waste Catalogue (EWC 2002 and amendments) – a comprehensive list of waste codes and descriptions based on waste source and type (Commission Decision 2000/532/EC amended by Commission Decisions 2001/118/EC and 2001/119/EC and Council Decision 2001/573/EC).

Factory Production Control: A management system focusing mainly on the production process which aims to ensure that product quality is consistently maintained to the required specifications. Factory Production Control (FPC) for the production of aggregates is specified in BS EN 16236 Evaluation of conformity of aggregates – Initial Type Testing and Factory Production Control.

Inert: Waste is inert if:

- (a) it does not undergo any significant physical, chemical or biological transformations;
- (b) it does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and
- (c) its total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater.

Northern Ireland Environment Agency (NIEA): NIEA is the leading public body in Northern Ireland responsible for protecting, conserving and promoting the natural environment and built heritage.

Natural Resources Wales (NRW): NRW is the public body in Wales and its purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.

PPC permit (Northern Ireland): A permit issued under the Pollution Prevention and Control Regulations (Northern Ireland) S.R. 2003/46. Establishes a pollution control regime for certain installations or mobile plants and includes combustion activities.

Producers: The operator(s) undertaking aggregate processing.

Quality Protocol: A Quality Protocol sets out criteria for the production of a product from a specific waste type. Compliance with these criteria is considered sufficient to ensure that the recovered product can be regarded as having ceased to be waste and that therefore no longer subject to waste management controls. In addition, the Quality Protocol indicates how compliance may be demonstrated and points to good practice for transportation, storage and handling of the recovered product.

Recycled aggregate: Aggregate produced in compliance with the Quality Protocol for the production of aggregate from inert waste (version applicable at the time of production).

Technical Standards and Regulations Directive 98/34/EC: Seeks to ensure the transparency of technical regulations and is intended to help avoid the creation of new technical barriers to trade within the European Community.

User(s): User means construction companies, manufacturers, contractors and all those organisations or individuals responsible for the end use of aggregate.

Waste management controls: Controls under legislation that govern the treatment, handling, containment, transportation storage use and disposal of waste.

Waste management licence or exemption (Northern Ireland): An authorisation issued in Northern Ireland under the Waste Management Licensing Regulations (Northern Ireland) 2003 (as amended), or registered exemption. The Regulations provide for applications in Northern Ireland for waste management licenses authorising the deposit, disposal and treatment of controlled waste. This includes exemptions from waste management licensing.

WRAP (Waste & Resources Action Programme): WRAP's vision is a world without waste, where resources are used sustainably. It works with businesses and individuals to help them reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way.

Appendix B Approved industry standards and Factory Production Control

B1 Approved industry standards

B1.0 The producer must comply with all the requirements of a BS EN aggregates standard appropriate to the use for which the aggregate is destined for at the time it is produced to comply with this Quality Protocol. Table B1 details the standards and main specifications relating to aggregates at the time of publishing this Quality Protocol.

Table B1: Standards, specifications and quality controls for the use of aggregates

| Product and Use | Standard | Specification | Quality controls |
|--|--|---|--|
| 1 Unbound recycled aggregate: Pipe bedding Drainage | BS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction | Highways Agency Specification for Highway Works (SHW): Series 500 Highway Authorities and Utilities Committee (HAUC): Specification for the reinstatement of openings in highways (SROH) | BS EN 13242: Level 4 Attestation Evaluation of Conformity to BS EN 16236* SHW: Quality Control procedures in accordance with the Quality Protocol for the production of aggregates from inert waste SROH: Compliance with SHW |
| 2 Unbound recycled aggregate: Granular fill General fill Capping | BS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction | Highways Agency Specification for Highway Works: Series 600 HAUC: Specification for the reinstatement of openings in highways BS EN 13285: Unbound mixtures: Specifications | BS EN 13242: Level 4 Attestation Evaluation of Conformity to BS EN 16236* SHW: Quality Control procedures in accordance with the Quality Protocol for the production of aggregates from inert waste SROH: Compliance with SHW |
| 3 Unbound recycled aggregate: sub base | BS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction | Highways Agency Specification for Highway Works: Series 800 HAUC: Specification for the reinstatement of openings in highways BS EN 13285: Unbound mixtures: Specifications | BS EN 13242: Level 4 Attestation Evaluation of Conformity to BS EN 16236* SHW: Quality Control procedures in accordance with the Quality Protocol for the production of aggregates from inert waste SROH: Compliance with SHW |

| | | | |
|--|--|---|---|
| 4 Recycled aggregate for concrete | BS EN 12620: Aggregates for concrete | Highways Agency Specification for Highway Works: Series 1000 BS 8500-2: Concrete | BS EN 12620: Level 4 Attestation Evaluation of Conformity to BS EN 16236* SHW: Quality Control procedures in accordance with the Quality Protocol for the production of aggregates from inert waste |
| 5 Recycled aggregate for asphalt | BS EN 13043: Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas | Highways Agency Specification for Highway Works: Series 900 HAUC: Specification for the reinstatement of openings in highways | BS EN 13043: Level 4 Attestation Evaluation of Conformity to BS EN 16236* SHW: Quality Control procedures in accordance with the Quality Protocol for the production of aggregates from inert waste SROH: Compliance with SHW |
| 6 Recycled aggregate for hydraulically bound mixtures | BS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction | Highways Agency Specification for Highway Works: Series 800 HAUC: Specification for the reinstatement of openings in highways BS EN 14227-1 to 5 Hydraulically Bound Mixtures: Specifications | BS EN 13242: Level 4 Attestation Evaluation of Conformity to BS EN 16236* SHW: Quality Control procedures in accordance with the Quality Protocol for the production of aggregates from inert waste SROH: Compliance with SHW |
| 7 Reclaimed asphalt for use in bituminous mixtures | BS EN 13108-8 Bituminous mixtures – Material specifications – Part 8: Reclaimed asphalt. | Highways Agency Specification for Highway Works: Series 900 BS EN 13108-1 to 5 Bituminous mixtures – Material specifications | BS EN 13108-8 NHSS Sector Scheme 14 SHW: Quality Control procedures in accordance with the Quality Protocol for the production of aggregates from inert waste SROH: Compliance with SHW |

*BS EN 16236 Evaluation of conformity of aggregates – Initial Type Testing and Factory Production Control.

The British Standards Institute (BSI) publishes guidance documents that explain how the European Aggregate Standards are applied within the UK, the ones relevant to table B1 are:

- PD 6682-1 Aggregates for concrete. Guidance on the use of BS EN 12620
- PD 6682-2 Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas. Guidance on the use of BS EN 13043
- PD 6682-6 Aggregates for unbound and hydraulically bound materials for use in civil engineering works and road construction. Guidance on the use of BS EN 13242

All aggregates PDs and BS ENs can be purchased from BSI: <http://shop.bsigroup.com>

B2 Factory Production Control

B2.0 Production and standards/specification requirements

- Factory Production Control (FPC) must be set up. This is mandatory when producing to BS EN aggregate standards and to this Quality Protocol.
- The requirements set out in B2.1 to B2.9 are complementary to the evaluation of conformity requirements of BS EN 16236, which must be implemented in full.
- The FPC is required to include the following quality management requirements set out below. These, which must be implemented.

B2.1 General points about the procedures

- A FPC manual must be produced which documents how the FPC is implemented and sets out procedures for establishing the approval, issue, distribution and administration of documentation and data for internal and external use.
- A management representative must be nominated as responsible for ensuring the FPC is implemented.
- The FPC must be reviewed periodically by management to ensure its continuing suitability and effectiveness. Records of such reviews must be kept.
- Controls on sub-contractors must be defined.

B2.2 Waste acceptance criteria

- To ensure only inert waste is accepted, the producer must develop 'acceptance criteria' specific to each site/location. These criteria must be followed at all times.
- The acceptance criteria must incorporate all statutory requirements relating to the receipt of incoming waste shall be observed and included in the Acceptance Criteria. These requirements include those arising from an environmental permit, waste management licence or a waste exemption, and the duty of care.
- The acceptance criteria must also include:
 - a list of the types of waste that are accepted (including waste codes);
 - source/place of origin of the waste;
 - supplier and transporting agent; and
 - method of acceptance.
- Every load must be inspected visually, both on initial receipt and after tipping, to ensure compliance with the acceptance criteria.
- A procedure for dealing with non-conforming incoming waste must be set up, for example, rejection of loads, quarantine or disposal. Records must be kept of how the procedure has been implemented.

B2.3 Production and testing

- The manner in which processing equipment is maintained and adjusted during production must be defined.
- Input materials must be stocked in a controlled manner in clearly identified locations.
- Material taken from stock for processing must be checked for deterioration.
- The finished product must be identifiable up to the point of sale.
- Procedures must be in place and implemented to maintain the quality of the product during handling, storage, transport and delivery.
- Procedures for the use, control, calibration and maintenance of inspection, measuring and test equipment must be setup and followed. Equipment must be uniquely identified.

B2.4 Training

- All personnel must be trained on the FPC including:
 - acceptance criteria;
 - procedures for non-compliant input wastes and output products;
 - sampling;
 - testing; and
 - inspection.

B2.5 Records

- Records of relevant controls and inspections, calibrations, changes and training must be maintained for a suitable period of time. This period must be defined.
- A Method Statement of Production (MSP) must be produced and maintained. The MSP represents the recovery process for the incoming waste and it is part of the FPC. It must contain a description or representation of the production process for each product type including:
 - input materials;
 - equipment used; and
 - actions undertaken at each stage from acceptance of waste to allocation to product stockpiles.
- The aggregates must be produced to a recognised standard and/or specification. This specification will define the properties and characteristics of the product, as suitable for its application.

B2.6 Documentation

- Delivery documentation must:
 - record the type of aggregate product despatched;
 - state the site at which the product was produced;
 - state that the aggregate was produced under a quality management scheme conforming to the aggregates Quality Protocol.
- If requested, purchasers must be provided with the results from the testing regime undertaken on each product.
- Historical records of test results must be kept and/or made available as summary results (for example, a graph of test results over time).

B2.7 Testing

- Procedures for the use, control, calibration and maintenance of inspection, measuring and test equipment must be set up and followed. Equipment must be uniquely identified.
- A test plan for production must be defined that includes:
 - the type of testing for each product; and
 - sampling and testing frequency (see B2.8 below for information about minimum test frequencies).
- Table B2 provides a summary of the frequencies required for the minimum testing requirements set out in the main standards.
- The test procedures must be appropriate to the end use of the recycled aggregates and testing frequencies must comply with the standards/specifications for the aggregate produced.
- Producers must have in place testing procedures to meet the testing requirements for each product. A summary of the frequencies required for the minimum testing requirements within the mainstream standards is provided in Table B2 (below).
- More detailed testing requirements are defined within the aggregate standards and specifications.

B2.8 Minimum testing requirements – frequencies

- Tables B2 and B4 collate the minimum test frequencies required by common standards and specifications, including the minimum requirements of the FPC for a range of routine tests.
- Frequencies are defined in terms of ‘production week’ or similar and/or ‘production day’. These periods should be defined by the producer depending on the throughput of the plant/equipment.
- Production week can be defined as the period of seven consecutive days comprising at least five production days or the period taken to complete five production days, whichever is longer.

B2.9 Departure from minimum test frequencies

- Where materials are known to be marginal or if initial test results show them as such, the frequency of testing should be increased.
- The producer must prepare a schedule of test frequencies taking into account the minimum requirements of the relevant FPC.
- Under special conditions the test frequencies may be reduced below those given in the FPC annex of the standards. Possible reasons include:
 - highly automated production equipment;
 - long-term experience with consistency of special properties;
 - sources of high conformity; and
 - running a Quality Management System with exceptional measures for surveillance and monitoring of the production process.
- Reasons for reducing test frequencies must be stated in the FPC manual.

Table B2: Summary of testing requirements associated with particular end uses and standards (Note: Testing frequencies should be increased where variability is identified through Factory Production Control and where the measured value is close to the specified limit.)

| End use | Standard and Specifications | Test | BS test reference | Minimum test frequency (see B2.8) |
|-------------------------|-----------------------------|--|-------------------|-----------------------------------|
| All end uses | BS EN 13242 BS EN 12620 | Particle size Distribution | EN 933-1 | 1 per week |
| | | Particle density | EN 1097-6 | 1 per month |
| | | Resistance to fragmentation (LA) | EN 1097-2 | 2 per year |
| | | Classification of constituents(see table B3) | EN 933-11 | 1 per month |
| | | Water soluble sulfate | EN 1744-1 | 1 per month |
| Aggregates for concrete | BS EN 12620 | Particle density and water absorption | EN 1097-6 | 1 per month |
| | | Sulfur containing compounds | EN 1744-1 | 2 per year |
| | | Chlorides | EN 1744-5 | 2 per year |
| | | Influence on setting time of cement | EN 1744-6 | 2 per year |

Tests listed are not exhaustive and reference should be made to relevant standards and specifications for additional requirements. Tests for BS EN 13043 and additional minimum test frequencies for other aggregate standards are tabled in EN 16236.

Table B3: Classification of constituents: testing to BS EN 933-11, classification groups

| Code | Constituents |
|-----------|---|
| Rc | Concrete, concrete products, mortar, concrete masonry units |
| Ru | Unbound aggregate, natural stone, hydraulically bound aggregate |
| Rb | Clay masonry units (i.e. bricks and tiles), calcium silicate masonry units, aerated non-floating concrete |
| Ra | Bituminous materials |
| Rg | Glass |
| FL | Floating material in volume |
| X | Cohesive (e.g. clay and soil), metals, wood, plastic, rubber, gypsum plaster |

Notes: Maximum permitted for constituent **X**: 1% by mass

Maximum permitted for constituent **FL**: $\leq 10 \text{ cm}^3/\text{kg}$ unbound, $\leq 5 \text{ cm}^3/\text{kg}$ aggregates for concrete

Table B4: Example of supplementary testing to meet Specification requirements

| End Use | Standard and Specifications | Test | BS Test Reference | Minimum test frequency (see section B2.7) |
|----------|-------------------------------|--------------------------|-------------------|--|
| Unbound: | SHW Series 600, & 800 SROH | California Bearing Ratio | 1377: part 4 | 1 per month |
| Fills | | Plasticity of fines | 1377: part 2 | 1 per week |
| Capping | | Frost Heave | 812: part 124 | 1 per year |
| Sub-base | | | | |

Tests listed are not exhaustive and reference should be made to relevant standards and specifications for additional requirements.

Appendix C: Wastes considered to be inert waste for the purpose of this Quality Protocol and to be acceptable for the production of recycled aggregates

General restrictions

This QP only applies to aggregates i.e. a granular material used in construction, which is processed from inert waste. For the avoidance of doubt, clays and soils are not considered to be aggregates for the purposes of this Quality Protocol.

- C1 Table C1 lists all the input materials and their relevant ‘waste code’³ or European Waste Catalogue (EWC) code considered inert and acceptable for the production of recycled aggregate under this Quality Protocol. The table includes notes to clarify any limits and restrictions relating to specific waste types. Waste inputs must not contain or be contaminated with dangerous substances as described in the List of Wastes (England) Regulations 2005, List of Wastes (Wales) Regulations 2005 and List of Wastes (Northern Ireland) 2005, as amended. Incidental quantities of inert physical contaminants (such as soils, peat, clays, silts, wood, plastics, rubber, metal) may be present with the input material but must be removed during the processing of the waste to comply with the constituent requirements of aggregates standards and table B3 of this Quality Protocol.

Table C1: Acceptable inert waste input materials

Wastes from physical and chemical processing of non-metalliferous minerals

| Type and exclusions | Waste code |
|---|-----------------|
| Waste gravel and crushed rocks other than those mentioned in 01 04 07 May include excavation from mineral workings. | 01 04 08 |
| Waste sand and clays Waste sand only. Must not include contaminated sand. | 01 04 09 |

Wastes from manufacture of glass and glass products

| Type and restrictions | Waste code |
|--|-----------------|
| Waste glass-based fibrous materials Allowed only if: Wastes without organic binders | 10 11 03 |

³ ‘Waste code’ refers to the six digit code for a type of waste in accordance with the List of Wastes (England) Regulations 2005, List of Wastes (Wales) Regulations 2005 and List of Wastes (Northern Ireland) Regulations 2005, as amended. Where it refers to hazardous waste, the code includes an asterisk.

Packaging (including separately collected municipal packaging waste)

| Type and restrictions | Waste code |
|------------------------|-----------------|
| Glass packaging | 15 01 07 |

Construction and demolition waste – concrete, bricks, tiles and ceramics

| Type and restrictions | Waste code |
|--|-----------------|
| Concrete Must not include concrete slurry. | 17 01 01 |
| Bricks | 17 01 02 |
| Tiles and ceramics | 17 01 03 |
| Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 | 17 01 07 |

Construction and demolition waste – wood, glass and plastic

| Type and restrictions | Waste code |
|---|-----------------|
| Glass Must not include fibreglass or glass fibre. | 17 02 02 |

Construction and demolition waste – bituminous mixtures, coal tar and tarred products

| Type and restrictions | Waste code |
|--|-----------------|
| Bituminous mixtures other than those mentioned in 17 03 01 | 17 03 02 |
| <p>Allowed only if: Bituminous mixtures from the repair and refurbishment of the asphalt layers of roads and other paved areas (excluding bituminous mixtures containing coal tar and classified as waste code 17 03 01). Must not include coal tar or tarred products. Must not include freshly mixed bituminous mixtures.</p> | |

Construction and demolition waste – soil (including excavated soil from contaminated sites), stones and dredging spoil

| Type and restrictions | Waste code |
|--|-----------------|
| Soil and stones other than those mentioned in 17 05 03 Must not contain any contaminated soil or stone from contaminated sites. | 17 05 04 |
| Dredging spoil other than those mentioned in 17 05 05 Allowed only if: Inert aggregate from dredgings. Must not contain contaminated dredgings. Must not contain fines. | 17 05 06 |
| Track ballast other than those mentioned in 17 05 07 Allowed only if: Does not contain soil and stones from contaminated sites. | 17 05 08 |

Construction and demolition waste – other construction and demolition wastes

| Type and restrictions | Waste code |
|---|-----------------|
| Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03 | 17 09 04 |
| Allowed only if: The waste is generated from utilities trenchings. The waste consists of sub base aggregates i.e. granular material. The waste contains only materials that would be described by entries 17 01 01, 17 03 02 and 17 05 04 in this appendix if the waste was not mixed. | |

Wastes from the mechanical treatment of waste not otherwise specified (for example sorting, crushing, compacting, pelletising)

| Type and restrictions | Waste code |
|---|-----------------|
| Glass Does not include glass from cathode ray tubes. | 19 12 05 |
| Minerals (for example sand, stones) Must not contain contaminated concrete, bricks, tiles, sand, stone or gypsum from recovered plasterboard. | 19 12 09 |

Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions

| Type and restrictions | Waste code |
|---|-----------------|
| Glass Must not include fibreglass. | 20 01 02 |
| Garden and park wastes (including cemetery waste) – soil and stones Must not contain contaminated stones from garden and parks waste. | 20 02 02 |

Appendix D Good practice for the transportation, storage and use of recycled aggregates

- D1 Pollution prevention and environmental good practice
- Follow the pollution prevention guidance developed in partnership with the industry to help those working on construction and demolition sites to prevent pollution.

Pollution Prevention Guidelines PPG6: Working at construction and demolition sites (April 2011), <http://publications.environment-agency.gov.uk/pdf/PMHO0410BSGN-e-e.pdf>

- Follow the guidance produced by CIRIA which provides practical advice for minimising environmental impacts on construction sites.

CIRIA, Environmental good practice on site (C692)

- D2 Health and safety
- All applications of aggregates should comply with recommendations from the Health and Safety Executive (HSE) such as using appropriate personal protective equipment (PPE) and dust suppression measures.
- D3 Transportation, storage and handling
- Aggregates should be handled and stored to minimise the creation of airborne dust.
 - Engineering control measures such as containment, enclosed silos/bins/hoppers, local exhaust ventilation, sprays suppression systems, etc. should be used where there is a risk of airborne dust creation.
 - Open conveyor handling systems should be provided with wind boards or other protection to prevent wind-whipping.
 - Manual handling of the aggregates should be minimised through the use of mechanical aids wherever possible. Account should be taken of the Manual Handling Regulations and care should be taken when lifting by hand.
 - Aggregates are inert, but dust and fine particles should be prevented from entering watercourses and drains. Deposition of dust on vegetation and surrounding property should be avoided by controlling the release of dust at source.

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