Draft S.R. 66:2014

Draft for public enquiry

Title: Guidance on the selection, installation and use of small wastewater treatment systems for domestic wastewater up to 50PE

Public enquiry commences: 18th August 2014
Public enquiry closes: 3rd October 2014

Readers are warned that this draft is subject to ongoing development and change.

Any comments or proposed changes submitted will be considered by the relevant technical panel.

Contents

Foreword

This Standard Recommendation (S.R.) was prepared by a committee of technical experts including members of the National Standards Authority of Ireland Wastewater Engineering Standards Committee.

The objective of this S.R. is to provide guidance to designers, manufacturers and installers when selecting a wastewater treatment system for domestic applications for populations of up to 50 PE in Ireland.

This S.R. provides guidance on the criteria that should be considered when selecting a wastewater treatment plant for installation in Ireland.

This S.R. should be used in conjunction with the appropriate part of the I.S. EN 12566 series of standards and the Code of Practice entitled Wastewater Treatment and Disposal Systems Serving Single Houses (PE < 10) published by the Environmental Protection Agency in 2009.

This S.R. does not provide guidance on suitable tertiary treatment for wastewater from domestic applications for Ireland.

This is the first edition of this S.R.

Guidance on the selection, installation and use of small wastewater treatment systems for domestic wastewater up to 50PE

1 Scope

This Standard Recommendation (S.R.) provides guidance on the selection of wastewater treatment plants for use in Ireland to treat domestic wastewater in areas without a public sewer.

This S.R. provides guidance on the minimum performance required for wastewater treatment plants that have been tested to I.S. EN 12566 (Parts1, 3, 4 and 6) standards.

This S.R. provides guidance on the scaling parameters and sludge capacity necessary to achieve the minimum performance required for wastewater treatment plants that have been scaled up from the original plant.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

I.S. EN 12566-1, *Small wastewater treatment systems for up 50 PT – Part 1: Prefabricated septic tanks*

I.S. EN 12566-3, *Small wastewater treatment systems for up to 50 PT – Part 3: Packaged and/or site assembled domestic wastewater treatment plants*

I.S. EN 12566-4, *Small wastewater treatment systems for up to 50 PT – Part 4: Septic tanks assembled in situ from prefabricated kits*

I.S. EN 12566-6, *Small wastewater treatment systems for up to 50 PT – Part 6: Prefabricated treatment units for septic tank effluent*

Environmental Protection Agency Code of Practice (EPA CoP): *Wastewater Treatment and Disposal Systems Serving Single Houses (pe ≤ 10)*

3 Terms and definitions

For the purposes of this Standard Recommendation the following terms and definitions apply.

baffle
device used in a tank to reduce eddies and promote a more uniform flow through the tank

Biological Oxygen Demand (BOD)
concentration of dissolved oxygen consumed under specific conditions (*t* at 20^0C with or without nitrification inhibition) by the biological oxidation of organic and/or inorganic matter in water

design capacity (load)
flow and load of influent that the facilities are designed to treat while conforming to specified requirements

domestic wastewater
wastewater of a composition and concentration (biological and chemical) normally discharged by a household, and which originates from human metabolism or from day to day domestic activities including washing and sanitation but does not include fats, oils and grease or food particles discharged from a premises in the course of, or in the preparation for, providing a related service or carrying on a related trade

domestic wastewater treatment plant
prefabricated factory built wastewater treatment installation which accepts domestic wastewater and treats it to a declared quality

floation
raising of suspended matter in liquid to the surface by the entrainment of gas

flow rate
volume of fluid passing a certain cross section per unit of time

influent
liquid flowing into the wastewater treatment plant

invert
lowest point of the internal surface of the barrel of a pipe or channel at any cross section

maintenance
routine work undertaken to ensure the continuing performance of an asset

main backfill
fill between the initial backfill and the surface construction

nominal
expression of the magnitude of a parameter related to the appropriate rounded value used to designate a component,unit or a device

nominal capacity
numerical designation of the design capacity

nominal loading
numerical designation of the design load

population equivalent (pe)
conversion value which aims at evaluating non domestic pollution reference to a domestic pollution related to a specific BOD_5 load of one inhabitant

primary treatment
stage of treatment involving the removal of suspended solids from raw wastewater after preliminary treatment

raw wastewater
untreated wastewater from normal domestic activities

septic tank
closed tank receiving wastewater for sedimentation and sludge digestion

secondary treatment
stage of treatment by biological processes

site assembly
assembling of prefabricated components at the final location of the structure

sludge
mixture of water and solids separated from various types of wastewater

system
a wastewater treatment system that includes a septic tank/wastewater treatment plant infiltration method and pipe network

tightness testing
non-destructive test to measure leakage of a structure

treatment capacity
maximum flow and loads of wastewater in various combinations that can be treated by an existing plant so that it delivers a treated effluent that conforms to the specified consent effluent standard

treated wastewater
wastewater discharged from a treatment plant

wastewater treatment products
consist of products, systems and plants

4 Performance levels for wastewater treatment plant for up 50 PE

4.1 General

Wastewater treatment plants suitable for use in Ireland should be tested in accordance with the requirements of the I.S. EN 12566 series of standards and should be CE marked by the manufacturer. Where a plant has been tested in accordance with I.S. EN 12566 claims may only be made for the treatment performance of the plants as stated in the test report from the notified test house.

The performance levels set out in 4.2 to 4.6 apply to wastewater treatment plants conforming to all parts of I.S. EN12566. The requirement to declare electric consumption (see 4.5) applies specifically to products that comply with Parts 3 and 6 of I.S. EN 12566.

All wastewater treatment products should be designed to have a service life appropriate to their intended lifetime and the materials used to manufacture all wastewater treatment products should be suitable for use in a wastewater environment.

4.2 Watertightness

4.2.1 Minimum limit

Where appropriate, all tanks used for wastewater treatment should be watertight and where the tank is buried any extensions/access manholes etc. should also be watertight.

4.2.2 Compliance

The tank should comply with the requirements for watertightness in the relevant part of I.S. EN12566 series of standards.

4.2.3 Declaration of results

The result of watertightness test is declared as Pass or Fail, on the test report. Only plants that have passed the watertightness test are suitable for use in Ireland.

4.3 Structural behaviour

4.3.1 Minimum limit

The tank should be capable of resisting loads and stresses resulting from handling, installation, including desludging and maintenance during its intended lifetime.

4.3.2 Compliance

The tank should comply with the requirements for structural behaviour in the relevant part of the I.S. EN12566 series of standards.

4.3.3 Declaration of results

The load bearing capacity of all small wastewater treatment plant should be declared as:

— maximum permitted inlet invert depth (in metres),

— suitability of the plant for installation in wet or dry sites, expressed as WET with the indication of the maximum height of the water table measured from the base of the plant or DRY.

The test report should state maximum permitted inlet invert depth from the finished ground level to the bottom of the inlet pipe at which it is permissible to install the tank. This information should be made available to the installer and user of the tank.

4.4 Durability test

The result of the durability test is declared as Pass or Fail, on the test report. Only plants that have passed the test are suitable for use in Ireland. The tank should “pass” the durability test specified in the appropriate part of I.S. EN 12566.

4.5 Electrical power consumption

The electrical consumption should be declared in kWh/day for products conforming to Part 3 and Part 6 of I.S. EN 12566.

4.6 Sludge storage capacity

4.6.1 General

All wastewater treatment plants should have an appropriate sludge storage capacity refer to Table 4.

4.6.2 Septic tanks

Septic tanks that have been tested in accordance with I.S.EN 12566-1 or I.S. EN 12566-4 should have a volume that is in compliance with the minimum size requirements of the EPA CoP.

4.6.3 Wastewater treatment plants

Wastewater treatment plants that are tested in accordance with I.S. EN I2566-3 or I.S. EN 12566-6 should have a declaration on the test report that states the number of times the plant was desludged during the test.

4.6.3.1 Compliance

A plant that was desludged more than once, during the 38 week test period by the notified test house, is not suitable for use in Ireland. A plant that will require desludging more than once per year is not suitable for installation in Ireland

5 Treatment effectiveness of wastewater treatment systems

5.1 General

Products selected for the treatment of wastewater suitable for use in Ireland should be tested in accordance with the requirements of the relevant parts of the I.S. EN 12566 series of standards.

The testing is dependent on the type of product and these are specified in the relevant parts of I.S. EN 12566

5.2 Prefabricated septic tanks (I.S. EN12566-1)

5.2.1 General

The septic tank should be tested by a notified test house in accordance with the requirements of I.S. EN 12566-1.

The product test report from the notified test house should be used to declare the capacity and the hydraulic efficiency of the tank.

5.2.2 Capacity

The capacity of the tank should be measured as specified in I.S. EN 12566-1 and the nominal and usable capacity should be declared.

The usable capacity of the tank should be suitable for the population of the dwelling it is serving as defined in the in EPA CoP.

5.2.3 Hydraulic efficiency

The plant should have a minimum hydraulic efficiency of 99.5 %.

The result should be declared as a percentage, which indicates the percentage of beads retained during the hydraulic efficiency test.

5.2.4 Inlet and outlet pipes

There should be at least 25 mm or at least 2 % drop from the inlet invert to the outlet invert. This will prevent stranding in the inlet pipe.

NOTE 2 % (1:50) of the linear distance between the inlet and the outlet.

The inlet pipe should terminate at one third of the liquid depth but not more than 350 mm below the liquid level in the tank. This will minimise the effect of turbulence.

The outlet pipe should terminate at one third of the liquid depth but not more than 350 mm below the liquid in the tank. This will maximise the retention of floating scum from the tank.

5.2.5 Ventilation

All liquid surfaces should be ventilated locally through the tank body or through the incoming sewer back to the soil vent stack. This will prevent the accumulation of dangerous gases.

All liquid surfaces should be open to the ventilation point and there should be at least 300 mm of freeboard measured from the outlet invert to the underside of the tank cover.

Where the septic tank is ventilated through a sewer, baffles or T-pieces open to the freeboard should be provided at the inlet and outlet of the septic tank and there should be at least 100 mm of clear space above the baffles in the septic tank.

5.2.6 Use of filters

Where a filter was used on the outlet during the testing of the septic tank for compliance with I.S. EN 12566-1, it is considered part of the system and should be supplied in order to claim compliance. The method and frequency of filter cleaning should be included in the operator manual.

5.3 Packaged or site assembled domestic wastewater treatment plants (I.S. EN12566-3)

5.3.1 General

The wastewater treatment plant should be tested by a notified test house in accordance with the requirements of I.S. EN 12566-3.

The product test report from the notified test house should be used to declare the performance of the wastewater treatment plant.

5.3.2 Compliance criteria

When selecting a plant for use in Ireland, the plant should be capable of achieving the effluent values for the specific parameters as set out in Table 1.

The values should be determined by the notified test house from the average of the 20 nominal test sequences (samples) that are required by the efficiency test in I.S. EN 12566-3.

The declared treatment efficiency for ammonium nitrogen (NH_4N) should be based on samples taken at a liquid temperature of at least 12 ^{0}C.

The average BOD influent concentration used when determining the treatment efficiencies should not be less than 300 mg BOD/litre. This value is calculated based on the average influent of the 20 nominal test samples.

NOTE For plants tested prior to 2009 the average of 16 sets of sample results may be used to determine the BOD value of 300 mg/l.

Table 1 — Treatment Performance Limits

Parameter	Final effluent quality
BOD_5 mg/l	< 20[A]
Suspended solids mg/l	< 30
Ammonium nitrogen mg/l NH_4-N	< 20
[A] For an average BOD influent of 300 mg/l or greater.	

5.3.3 Treatment Performance

The treatment performance for the required parameter should be declared as average treatment efficiency in % and as an average final effluent value in mg/l.

5.4 Septic Tanks assembled in situ from prefabricated kits (I.S. EN12566-4)

5.4.1 General

The septic tank should be tested by a notified test house in accordance with the requirements of I.S. EN 12566-4.

The product test report from the notified test house should be used to declare the capacity and the hydraulic efficiency of the tank and should be supplied with the tank.

The information provided in the user manual or other documentation should be obtained from the test report.

The tank should be assembled in accordance with the manufacturer's instructions.

5.4.2 Capacity

The capacity of the tank should be measured as specified in I.S. EN 12566-4 and the nominal and usable capacity should be declared.

The usable capacity of the tank should be suitable for the population of the dwelling it is serving as defined in the EPA CoP.

5.4.3 Hydraulic efficiency

The plant should have a minimum hydraulic efficiency of 99.5 %.

The result should be declared as a percentage, which indicates the percentage of beads retained during the hydraulic efficiency test.

5.4.4 Inlet and outlet pipes

There should be at least 25 mm or at least 2 % drop from the inlet invert to the outlet invert. This will prevent stranding in the inlet pipe.

NOTE 2 % (1:50) of the linear distance between the inlet and the outlet.

The inlet pipe should terminate at one third of the liquid depth but not more than 350 mm below the liquid level in the tank. This will minimise the effect of turbulence.

The outlet pipe should terminate at one third of the liquid depth but not more than 350 mm below the liquid in the tank. This will maximise the retention of floating scum from the tank.

5.4.5 Ventilation

All liquid surfaces should be ventilated locally through the tank body or through the incoming sewer back to the soil vent stack. This will prevent the accumulation of dangerous gases.

All liquid surfaces should be open to the ventilation point and there should be at least 300 mm of freeboard measured from the outlet invert and the underside of the tank cover.

Where the septic tank is ventilated through a sewer, baffles or T-pieces open to the freeboard should be provided at the inlet and outlet of the septic tank and there should be at least 100 mm of clear space above the baffles in the septic tank.

5.4.6 Use of filters

Where a filter was used on the outlet during the testing of the septic tank for compliance with I.S. EN 12566-4, it is considered part of the system and should be supplied in order to claim compliance. The method and frequency of filter cleaning should be included in the operator manual.

5.5 Pre-fabricated treatment units for septic tank effluent (I.S. EN12566-6)

5.5.1 General

I.S. EN 12566-6 plants are used to provide secondary treatment for effluent for up to 50 PE from septic tanks that comply with I.S EN 12566-1 or I.S. EN 12566-4.

EN 12566-6 plant may also be used to provide secondary treatment for equivalent septic effluent produced by existing septic tanks i.e. tanks that were in place before I.S. EN 12566-1 and I.S.EN 12566-4 were published.

The sizing of the septic tank used in conjunction with the I.S. EN 12566-6 plant should be not less than the size specified by the EPA CoP for the relevant PE.

The plant should be assembled in accordance with the manufacturer's instructions e.g. sealing of joints to ensure it is watertight.

The wastewater treatment plant should be tested by a notified test house in accordance with the requirements of I.S. EN 12566-6.

The product test report from the notified test house should be used to declare the performance of the wastewater treatment plant.

The manufacturer should confirm that the product information provided in the user manual and/or other documentation was obtained following testing of the product by the notified test house where the product was tested in accordance with the requirements of I.S. EN 12566-6.

The supplier of the certified I.S. EN 12566-6 plant should provide where available the following information on the septic tank that was used during the testing of the plant:

— efficiency,

— size,

— presence of a filter,

— desludging during testing.

5.5.2 Compliance criteria

The plant should be capable of achieving the effluent values for specific parameters as set out in Table 2.

Table 2 — Treatment Performance Limits

Parameter	Final effluent quality
BOD_5 mg/l	< 20[A]
Suspended solids mg/l	< 30
Ammonium nitrogen mg/l NH_4-N	< 20
[A] For an average BOD influent of 300 mg/l or greater.	

The values should be determined by the notified test house from the average of the 20 nominal test sequences (samples) that are required by the efficiency test in the standard.

The declared treatment efficiency for ammonium nitrogen (NH_4-N) should be based on samples taken at a liquid temperature of at least 12 ^{0}C.

The average BOD influent concentration used when determining the treatment efficiencies should not be less than 300 mg BOD/litre. This value is calculated based on the average influent of the 20 nominal test samples.

5.5.3 Treatment performance

The treatment performance for the required parameter should be declared as average treatment efficiency in % and as an average final effluent value in mg/l.

When available the capacity and the hydraulic efficiency of the septic tank used during the treatment efficiency test should be declared.

5.6 Use of I.S. EN 12655-6 treatment systems with uncertified septic tanks

Where it is proposed to retain a septic tank that was installed prior to the requirement to use tanks certified to I.S. EN 12566-1 and I.S. EN 12566-4 with a secondary treatment system certified to I.S. EN 12566-6, the septic tank to be retained should comply with following:

— structurally sound,

— watertight,

— capacity in conformance with the EPA CoP for the size of the dwelling.

The retained septic tank should be fitted with a suitable filter on the outlet.

6 Scaling up for small WWTS

6.1 General

The I.S. EN 12566 series allows the certification of a family of products. This certification is normally based on the hydraulic/treatment efficiency of the smallest unit, the structural integrity of the largest unit and the water tightness of each unit.

For plants in the family that have not been tested, the treatment efficiency achieved in the original Initial Type Testing (ITT) can only be claimed when the plant is scaled in accordance with the requirements in 6.2 or 6.3 and 6.4 of this S.R.

6.2 Compliance for plants tested to I.S. EN 12566-1 and I.S. EN 12566-4

Where a family of plants are sized in accordance with section 7.1.1 of the EPA CoP and comply with the criteria in Table 3 then the hydraulic efficiency achieved by the model tested may be claimed for all the models in the range.

Table 3 — Requirements for Scaled up Septic Tanks

Treatment type	Parameters of test model	Requirements
Septic tank	Configuration of inlets, outlets(with or without filter), pipework & connections (except diameter)	Similar to model tested
	Number of chambers	Not less than model tested
	Arrangement of internal components (e.g. position of a deflector presence of a bend, a partition etc..)	Similar to model tested
	Shape of plant	Identical to model tested

6.3 Compliance for plants tested to I.S. EN 12566-3 and I.S. EN 12566-6

When scaling the family of plants, allowance is made for sludge storage requirements depending on the PE of the model being sized. Therefore, when scaling plants from the model tested the information provided in Table 4 should be used to determine the minimum required sludge storage capacity.

Table 4 — Sludge storage capacity

Plant size	Scaling ratio
Up to 10 PE plant	Pro rata*
11PE to20 PE plant	Pro rata */2.0
21PE to 30 PE plant	Pro rata*/2.5
31PE to 50 PE plant	Pro rata*/3
*pro rata when scaling up from the model tested to size required (PE)	

Where the plant is sized in accordance with Tables 4 to 7 then the treatment efficiency achieved by the model tested may be claimed for all the models in the family.

6.4 Scaling requirements based on type of treatment in use

The Tables 5, 6, 7 and 8 set out the requirements based on the tested parameters depending on the technology being utilised in the plant

Table 5 — Requirements for Primary Settlement Stage of plant

Treatment type	Parameters of test model	Requirements
Primary Settlement	Configuration of inlets, outlets, internal pipework & connections (except diameter)	Similar to model tested
	Number of compartments	Not less than model tested
	Arrangement of components (e.g. position of the deflector & pre filter, presence of a bend, a partition)	Similar to model tested
	Retention time per PE	Not less than model tested
	Flow to surface ratio	Not greater than model tested
	Geometry of plant	Similar to model tested
	Sludge storage capacity	Refer to Table 4/Clause 6

Table 6 — Requirements for Reactor Stage of plant

Treatment type	Parameters of test model	Requirements
Reactor Stage	Configuration of inlets, outlets, internal pipework & connections (except diameter)	Similar to model tested
	Arrangement of components (e.g. position of the deflector & pre filter, presence of a bend, a partition)	Similar to model tested
	Aeration Technology	Identical to model tested
	Oxygenation cycle (intermittent/continuous)	Similar to model tested
	Media Charactisitics (shape,type,ratio of surface area to unit volume)	Identical to model tested
	Treatment technology (see Table 7)	Identical to model tested

Table 7 — Requirements based on treatment technologies of plant

Technology	Parameters of test model	Requirements
Media filter	Loading rate on surface of filter L/m^2 Depth of filter Distribution method	Not greater than model tested Not less than model tested Similar to model tested
Fixed film (e.g. RBC)	Grms $BOD/m^2.day$	Not greater than model tested
Submerged Aerated filters (BAF/SAF)	Volume of media/PE Blower discharge rate/PE Usable volume of reactor/PE	Not less than model tested
Activated Sludge	Blower discharge rate/PE Reactor volume for plants with no pre treatment Depth of liquor	Not less than model tested Refer to Table 3 Not less than model tested
SBR systems	Batch time reactor Volume/PE Blower discharge rate/PE	Not less than model tested Not less than model tested Not less than model tested
Membrane	Blower discharge rate/PE Loading rate on surface of membrane L/m^2 Volume /PE	Not less than model tested Not greater than model tested Not less than model tested

Table 8 — Requirements based on clarification stage of plant

Treatment type	Parameters of test model	Requirements
Components of Clarification	Configuration of inlets, outlets, internal pipework & connections (except diameter)	Similar to model tested
	Number of compartments	Not less than model tested
	Arrangement of components (e.g. presence of a bend, filters)	Similar to model tested
	Retention time	Not less than model tested
	Upward velocity (Flow to surface area ratio)	Not more than model tested
	Liquid depth	Not less than model tested
Components of recirculation (if applicable)	Conditions of recirculation of sludge & water/liquor	Similar to model tested
	(Ratio)Volume/PE	Similar to model tested
Components for the addition of chemicals (if applicable)	Technology (e.g. material) conditions, point of injection etc	Identical to model tested

7 Cascading Technology of WWTS or Shared Initial Type Testing (ITT)

7.1 General

Where a wastewater treatment plant consists of a tank manufactured by one party and the treatment equipment manufactured by another party which has been tested in accordance with the appropriate part of I.S. EN 12566, the combined system is referred to as cascading technology or shared initial type testing (ITT)

7.1.1 Initial Type Testing (ITT)

Initial Type Testing (ITT) can be classified as:

— tank related performance characteristics, and

— treatment related performance characteristics .

7.1.2 Tank related performance characteristics

The notified body should determine the tank related performance characteristics in accordance with the appropriate part of the I.S. EN 12566 series of standards and the declared performance should meet the requirements of Clause 4.

7.1.3 Treatment related performance characteristics

A comparability check of the geometry of the tank under assessment should be undertaken by a notified test house to confirm that it is comparable with the tank that was tested.

In order to use the treatment related characteristics of another plant, the proposed tank and the tested tank should be evaluated using the criteria listed in the template provided in Annex A. The template should be used to compare Plant A which has been tested with Plant B which is being assessed. There should be no more than a 10% difference i.e. [(B-A) / A] x100 for the criteria listed in the template between the values for Plant A and Plant B.

7.2 Declaration of results

The results should be declared stating that the plant has shared ITT. The plant should comply with the requirements of Clauses 4 and 5 of this S.R. The results should declare the plant has shared ITT and provide the name of the notified test house(s) where the testing was completed and the name of the notified test house that carried out the treatment efficiency tests.

Note: In some cases the testing may have been carried out by more than one notified test house.

Annex A
(informative)
Template to be used to assess (Plant A) and untested plant (Plant B)

Criteria/parameter assessed	Plant A	Plant B	Difference [%]*	Conformity yes/no
Process for the biological treatment	has to be the same		-	yes
Shape/Geometry of the compared tanks	has to be the same		-	yes
Total number of chambers (primary + biological + clarifier)				
Length Lp of the primary treatment [m]				
Width Wp of the primary treatment [m]				
Height Hp of primary treatment [m]				
Number of chambers of primary treatment				
ratio volume chamber 1 / volume chamber 2 (if more than one chamber)				
Total nominal capacity of primary settlement *(according I.S. EN 12566-1 Annex A)*				
Water level of primary settlement [mm]				

Surface of primary settlement at working water level [m²]				
Surface loading rate of primary settlement [m / h]				
Hydraulic efficiency of primary settlement ***(according EN 12566-1 Annex B)***				
Number of chambers of biological treatment				
Volume of the biological treatment [m³]				
Length Lb of the biological treatment [m]				
Width Wb of the biological treatment [m]				
Height Hb of biological treatment [m]				
Sludge loading [kg BOD_5/kg ML * d] **Volumetric loading [kg BOD_5/m³ * d]** **Surface loading rate**				
For SBR: **Height reactor, min [mm] / Height reactor, max [mm]**				
Volume of the clarifier / **secondary settlement [m³]**				
Surface of the clarifier / secondary settlement [m²]				

Length Lc of the clarifier [m]				
Width Wc of the clarifier [m]				
Height Hc of clarifier [m]				
Surface loading rate of clarifier / secondary settlement [m / h]				
Water level clarifier / secondary settlement [mm]				
Dip pipes, scum boards	**has to be the same**		**-**	**yes**
Using the formula [(B-A)/A] x100 there should be no more than a 10 % difference for the criteria listed in the template.				