

Symposium on On-Site Wastewater Treatment systems.

EN Certification and the National Annex

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Background.

The development of biological systems as small onsite wastewater treatment systems in Ireland occurred in the mid nineties. At that time there was no applicable national standard. The only standard pertaining to on-site wastewater treatment systems was the SR 6 1991 which dealt with Septic Tanks and their associated percolation systems.

Biological treatment systems were considered “Innovative” products and compliance with the regulations and proof of suitability for use in Ireland was, largely, done by Irish Agreement Board certification (IAB). In this system of certification the “Royal Standard” for effluent previously applied to municipal treatment systems was used. This required that the effluent emerging from the treatment system had a Bio-chemical Oxygen Demand (BOD) concentration < 20 mg/l and Suspended Solids (SS) concentration < 30 mg/l.

Construction Products Directive (CPD) and Harmonised standards.

At that time, and indeed currently for many products, local authorities relied on *national standards for showing compliance with* Building Regulations or writing Specifications for Public Works/ Supplies contracts. These standards are generally Irish Standards (I.S.) or British Standards (BS) or standards of a Member State of the EEA which provide in use an “equivalent” level of safety and suitability.

While these national standards have helped to achieve quality in building, they vary widely from one Member State to the next and have acted as a technical barrier to international trade in construction products. Such barriers must be removed if there is to be more effective competition in the construction supply chain and on construction prices, within the EU Internal Market. Ireland has one of the most open construction markets in the EU-it is estimated that about 40% of construction materials and products are imported.

To address the problem of technical barriers to international trade caused by varying national standards, the EU adopted the **Construction Products Directive (CPD)-89/106/EEC-** for the harmonisation of construction product standards. The CPD was legally implemented in Ireland by the **European Communities (Construction Products) Regulations 1992 (SI No. 198 of 1992).**

The EU adopted a second **Directive (93/68/EEC)** amending the prescribed format of **CE marking** to be used on, inter alia, construction products complying with the CPD. This Directive was legally implemented in Ireland by the **European Communities (Construction Products) (Amendment) Regulations 1994 (S.I. 210 of 1994).**

The CPD aims to remove technical barriers to trade in construction products between Member States in the European Economic Area (EEA). To achieve this, the CPD provides for the following four main elements:

- a system of harmonised technical specifications (products standards and technical approvals);
- an agreed system of Attestation of Conformity (AOC) for each product family (with the product specifications);
- a framework of Notified Bodies; and
- the CE marking of construction products.;

The CPD does not aim to harmonise Building Regulations across Europe. Member States are free to set their own requirements on the performance of building works and, therefore, construction products. What the CPD harmonises are the methods of test, the methods of declaration of product performance values, and the method of conformity assessment. The choice of required values for the chosen intended uses is left to the national regulators in each Member State.

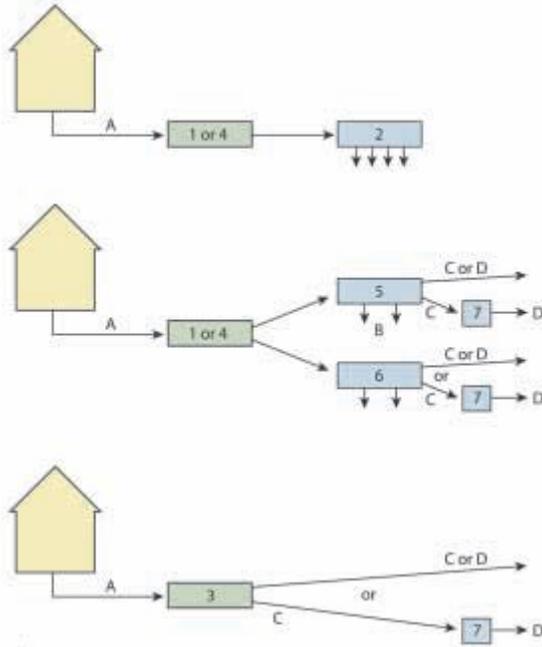
The national Building Regulations of Ireland and/or the related Technical Guidance Documents are amended, on a phased basis, to take account of new European classifications and standards.

The purpose of the harmonised technical specification for a product is to cover all the performance characteristics required by Regulations in any Member State. In this way, manufacturers can be sure that the methods of test and methods of declaration of results will be the same for any Member State, (although the *values* chosen by regulators may be different from one Member State to another). Currently, there are over 400 hENs covering a broad range of construction products. hENs are progressively becoming the norm as conflicting national standards (e.g. Irish and British Standards commonly used here) are being withdrawn.

EN 12566 Standards

The standard EN 12566 is a suite of standards relating to wastewater treatment products. The seven sections of this standard are listed below:

- IS EN12566-1 Prefabricated Septic tanks
- ISEN12566-2 Soil infiltration systems - Technical Report (TR)
- ISEN12566-3 Packaged and/or site assembled domestic wastewater treatment plants
- ISEN12566-4 Septic tanks built in situ from prefabricated kits
- ISEN12566-5 Pre-treated effluent filtration systems - TR
- ISEN12566-6 Prefabricated treatment units used for septic tanks effluent
- ISEN12566-7 Prefabricated tertiary treatment unit.



METHODS OF WASTEWATER TREATMENT IN LINE WITH EN 12566.

Parts 1, 3 & 4 are Harmonised standards while parts 2 and 5 are technical reports. Parts 6 and 7 are currently nearing publication and will be harmonised standards.

With the adoption of the EN 12566 standards and the withdrawal of existing conflicting standards the national Building Regulation Part H / Technical Guidance Document (TGD) H *Drainage and Waste Water disposal* was revised to reflect this change and call-up the EN standard. IS EN12566-3 *Packaged and/or site assembled domestic wastewater treatment plants* is the standard applicable to biological treatment systems.

This Standard specifies requirements, test methods, the marking and evaluation of conformity for packaged and/or site assembled domestic wastewater treatment plants (including guest houses and businesses) used for populations up to 50 inhabitants. Small wastewater treatment plants according to this European Standard are used for the treatment of raw domestic wastewater.

It covers plants with tanks made of concrete, steel, PVC-U, Polyethylene (PE), Polypropylene (PP) and Glass Reinforced Polyester (GRP-UP).

The unit is tested for the essential characteristics:

- Treatment efficiency,
- Treatment Capacity,
- Watertightness
- Crushing resistance and
- Durability.

The standard specifies various methods of testing depending on the tank material. For example the watertightness test can be done by a Water Test, Vacuum test or Pneumatic pressure test and the crushing resistance test has 6 different methods of testing with the pit test being the only one applicable to all tank materials.

The treatment efficiency test is a complex and lengthy testing procedure taking over 38 weeks with the exact test sequence specified within the standard. Raw domestic wastewater is used but must have the following quality:

- a) BOD₅ or BOD₇(ATU): 150 mg O₂/l to 500 mg O₂/l or COD 300 mg O₂/l to 1000 mg O₂/l;
- b) SS: 200 mg/l to 700 mg/l;
- c) KN: 25 mg/l to 100 mg/l or NH₄ - N: 22 mg/l to 80 mg/l; .

The following core parameters are then monitored during the test for both the influent and the effluent:

- a) total chemical oxygen demand (COD)¹⁾ and total biochemical oxygen demand (BOD)²⁾; after a certain period, BOD of the influent only can be calculated from COD value;
- b) suspended solids (SS);
- c) temperature (liquid phase);
- d) total power consumption of the product if applicable;
- e) daily hydraulic flow.

The following parameters may also be measured if required:

- f) pH;
- g) conductivity;
- h) nitrogen parameters;
- i) total phosphorus;
- j) hourly hydraulic flow;
- k) dissolved oxygen concentration;
- l) sludge production;
- m) ambient air temperature.

National Annexes

With the exception of watertightness or durability, these standards (en12566 series) only required that a value for the product be declared and thus there was no minimum value. The standard harmonized how the product should be tested and specifies parameters for which performance should be measured and declared by the manufacturer inline with the CPD but sets no performance criteria unlike traditional standards. This is recognized in the text where it states:

“NOTE: The ratios obtained do not automatically mean that the regulatory requirements on effluent qualities in a given country are met. A calculation should be made to indicate the final effluent qualities which should be compared to the requirements valid in the place of use.”

Ireland, in order to give the same protection to the public and the environment that it had with its original requirements developed national annexes to the harmonised parts of the standard. These set down the minimum criteria to be achieved by the product for use in Ireland.

National Annexes to the Harmonised parts of EN 12566, namely Part 1: Prefabricated Septic Tanks, Part 3: Packaged and/or site assembled domestic wastewater treatment plants and Part 4: Septic tanks assembled in situ from prefabricated kits have now been published by the National Standards Authority of Ireland (NSAI) in conjunction with the Dept. of the Environment Community and Local Government and other organisations.

The following table gives the performance levels to be achieved by packaged Wastewater treatment plants for use in Ireland:

EN 12566-3: Packaged and/or site assembled domestic wastewater treatment plants

Essential Characteristics		Requirement Value
Effectiveness of Treatment (Treatment efficiency ratios)		BOD ₅ < 20mg/l ^A SS < 30mg/l NH ₄ -N < 20mg/l ^B
Treatment Capacity (Nominal designation)	Nominal hydraulic daily flow	To be Declared (Expressed in Cubic Metres per day)
	Nominal organic daily load	To be Declared (Expressed in Kg of BOD _x per day)
Watertightness		Pass
Structural behaviour		Pass
Durability		Pass
Electric Consumption		To be Declared (Expressed in kWh per day)
A For an average BOD influent of 300mg/l or greater.		
B In nutrient sensitive areas the local authority may require a lower limit.		

The treatment values chosen by Ireland for the Part 3 systems are the original values used by local authorities for the municipal plants, and the Irish Agreement Board in assessing small wastewater treatment plants ie 20BOD, 30SS, 20NH₄N.

In an amendment to EN12566 part 3 (Amendment A2 2012 currently being finalized by the CEN) Ireland requested that nitrogen be included as a parameter to be declared.

It should be noted that the treatment efficiency expressed as a percentage reduction, in the standard, does not give the information necessary to confirm the suitability of the final effluent unless there is acceptable national influent values. As Ireland does not have agreed influent characteristics for one-off dwellings the method of showing suitability is to declare the average final effluent values under the treatment efficiency tests within the standard.

The Certificates now produced by the Notified bodies have been revised to show the average effluent after treatment based on the 20 normal loadings and also the average value

of the influent with regard to BOD. (see excerpt below) These must be less than those given in the National Annex if the plant is to be suitable for use in Ireland.

Nominal organic daily load	0.26	kg BOD ₅ /d	
Nominal hydraulic daily load	0.90	m ³ /d	
Material	glass reinforced plastic (GRP)		
Watertightness	pass		
Crushing resistance	pass		
Treatment efficiency (nominal sequences)		Efficiency	Effluent
	COD	91.6 %	52 mg/l
	BOD ₅	95.9 %	11 mg/l
	SS	95.3 %	16 mg/l
	NH ₄ -N	56.7 %	15 mg/l
Electrical consumption	1.1	kWh/d	

Ireland, in the current review of EN 12566 part 3 standard, will be recommending that the average resultant effluent be declared.

Examples of the certificates can be seen on PIA notified Body website:

http://www.pia-gmbh.com/index.php?option=com_content&view=article&id=56&Itemid=44&lang=ga

It should be noted that the **Construction Products Directive Council Directive 89/106/EEC** has now been replaced by the **Construction Products Regulation (EU) No 305/2011**. One of the main impacts of the CPR is that from **July 2013, CE MARKING** of construction products covered by harmonised European Standards is mandatory. As such waste water treatment plants conforming with EN12566 series will be required to have a Declaration of performance in line with what has been discussed above and bear a ce mark.