EN1279: TECHNICAL INFORMATION

Technical Description of EN 1279 part 2

The Standard

This section is designed to explain why some of the tests and procedures have come about. It will also help in designing your insulating glass units to meet the new requirements, which, while requiring management time should not increase production costs. If you currently make units that do not meet the BS 5713 standard, or only just meet the requirements, then a change of design will be inevitable. For the purposes of EN1279 the design includes sealant type, sealant depth, desiccant type (and amount) and other parameters, which will be identified in the following text.
Details given in the following section appear in the same order as they do in the standard.

Scope

This defines the products covered by the standard, i.e. standard insulating glass units (IGUs). It excludes structural glazing, exposed curtain walling, and products having artistic value only. There is also a note stating that compliance with Part 2 also requires knowledge and compliance with other parts of the standard.

The clear meaning is that, unlike BS 5713, where meeting the type test was the only requirement, with EN1279 meeting the type test also requires having the sealant tested to Part 4, and having a factory production control system based on Part 6. You will also have to submit a system description indicating the materials used and the cutting tolerances of the glass, spacer inserts etc.
See Part I of EN 1279
See Part 4 of EN 1279
See Part 6 of EN 1279

Definitions

The definitions in the standard are an attempt to make comparisons more meaningful; the definitions also rnake understanding the standard less liable to misinterpretation. The standard laboratory condition is defined precisely, and requires a properly equipped laboratory to maintain such conditions.
Similarly the standard moisture absorption capacity of a desiccant is a defined measure that will allow comparison without using manufacturer's data. This is not an attack on the desiccant manufacturers, but an attempt to allow users to compare information, and thus make decisions based on fact rather than suggestion.

Moisture penetration index

This index is a measure of the integrity of the insulating glass unit edge seal. It defines how much moisture enters the IGU during the test, and is therefore a measure of the moisture penetration properties and adhesion of the edge seal.
The older Dew Point test has a limited value and does not indicate the rate at which water is entering the IGU. Failure by dew point measurement usually indicates a catastrophic failure or a poorly manufactured unit.

Requirements

The Moisture Penetration lndex (MPl) is quoted as O.20 average, with the worst lGU having an MPl of O.25. Thus the requirement is that on average only 20% of the available capacity is consumed during the test. It also means that all IGUs within a batch must be made to the same standard. Thus if the desiccant is incorrectly stored or used, or the time the filled frames are left before unit assembly is too long, then the units can fail part 2 even when o good quality sealant is used, It is also worth noting that as the test has a degree of inter-laboratory variation, producing units to just meet the standard could lead to failure at the official test house.

Specialist opinion is that the assembled spacer bar should be used within 2 to 3 hours, and the desiccant should have a minimum temperature rise of 30°C. Whatever limits are set in the factory, it is the management's responsibility to ensure that the IGUs can meet the standard under the worst-case scenario.
The MPI also differentiates between IGUs, which is better than having a weak pass/fail system. As a consequence of the increased use of molecular sieve desiccants to produce higher performing IGU's, the results meant that most met the requirements of BS 5713 even when the units were poorly made. Thus there was the perception, borne out in reality, that units claiming to meet BS 5713 were of variable quality from very good to poor. The new standard will still allow variations, but the worst acceptable units

should still give a reasonable service life. It is noted in the standard that comparison of results is not feasible unless you are qualified to interpret the data.

Climate conditions in cabinet

These are accurately defined and, unlike the old BS 5713 where the units are only cycled between moderate ambient temperatures, EN 1279 measures the real temperature of the cabinets and the IGUs being tested, and hence the stress imposed on those IGUs. Thus a poorly bonded sealant will rapidly fail.

The thermal cycle always starts with the cooling phase. This tests the IGU production where faults could be concealed, which could happen if the heating phase occurs first. The theory here is that if the sealant is relying on physical contact for the bond, and the IGU has been incorrectly made, having the heating phase first could soften the sealant and repair the bond. In reality most IGUs are fitted during the day and are subjected to a cooling phase overnight.

It is also noticeable that the rate of heating and cooling is defined very precisely, as is the tolerance of the IGU temperatures. This close control is designed to prevent artificial cold cracking for higher modulus sealants, and also ensures all IGUs are tested under identical conditions.

Following the thermal cycling phase of the test, the units are subject to a constant high temperature/high humidity phase (heat soaking).

The reason for the above is that although a number of standards existed with high humidity/thermal cycling as part of the test regime, they all gave different results due to lack of accurate controls.

Description of lnsulating Glass Unit for test purposes

The IGUs are defined as being 502+/-2mm x 35+/-2mm in size, and being constructed of 2 panes of 4mm clear float glass with a 12mm cavity. If you do not manufacture a 12mm cavity unit, the nearest size to that is taken. Therefore those manufacturers who only manufacture 18/20mm cavity IGUs would have them tested ' as made' , rather than purchase 12mm spacer especially for test purposes. For Part 2 it is normal to only use ordinary air filled units, but if you only manufacture gas filled units these can be submitted. The intention is to use as closely as possible products representing actual manufacture, and not an artificial construction.

The size and shape also yields a test unit having high stresses at the corners, and thus the type test is indicative of the IGUs ability to withstand seasonal and diurnal thermal changes. Remember that the standard is for IGUs to be used anywhere in Europe, and they must demonstrate performance capabilities for cold as well as hot climates.

You will have noted in Part 1 that a system description is required. This will define the type of spacer you use and the quantity of desiccant, among other details. The test units must conform to this description, The system description will also contain details of spacer return, sealant depth and PIB width. Your defined tolerances form part of your specification. If you produce a description with wide tolerances, you will be required to show that IGUs at both extremes are capable of passing Part 2.

Your system description will also detail acceptable/unacceptable criteria for butyl application, glass condition, bubbles in sealants and quality of mix with two part systems, plus any other quality consideration. You are advised in the standard to stipulate the basic glass product standards for visual quality, and not claim ' defect free' as this will require all units to meet your description.

See Part I EN 1279

Fifteen units are made for the test; and all of them must have a dew point of within 10°K of your anticipated maximum. If the desiccant used is molecular sieve and sufficient is used, then the anticipated dew point should be below -60°C. Note here that anything below -60degC is counted as being the same. The manufacturer is strongly advised that a minimum of two long sides is filled for 12mm cavity units, and all 4 sides filled for smaller cavities. You will also note in Part 6 there is a requlrement for the desiccant to have no more than 3% water. It will not be acceptable to use the desiccant manufacturer' s assurance that a temperature rise of 25 or 30°C meets the requirements unless they can show that it relates to 3% or less water content. Consequently there is also an emphasis on the way the desiccant is stored and used prior to unit assembly.

See Part 6 of EN 1279

Measurement of dew point

The method described is very specific and requires the correct piece of apparatus. However, for those who have measured dew points for BS 5713 qualification purposes, then providing that your method of test can be verified against the standard, you will be able to continue using your current method. Those manufacturers wanting to carry out dew point tests for the first time should obtain or make a test piece as defined.

It is permissible to reduce the temperature to -60°C rapidly and hold for 3 minutes where sufficient desiccant is used to ensure the dew point is below that level. If however a dew point is observed, then the lGU will have to be stored for 24 hours and the dew point measured as defined. This is a slow process, and the time spent carrying it out could far outweigh the cost of using a good quality and quantity of desiccant.

In Part 2 the dew point is only used to grade the IGU' s for further tests, and is not in itself part of the standard, unless the partial pressure method for determining water contents is used. The dew point ranking could have an effect on the results if there is a wide variation; however the variation is limited (see above).

Measurement of moisture content

The first point that needs to be mentioned is that values for moisture content cannot be mixed, and, with the exception of the final result, they cannot be compared.

There are three methods used for measuring moisture content. The first, which will be most commonly used, is the drying at 950°C method, whereby the desiccant taken from the IGUs is totally desiccated.

This will give results for water content which is different from published data, as the technique also removes water not normally considered part of the drying matrix. At temperatures of 950°C the desiccant is also rendered inactive. When the method is used correctly the values of moisture content are reproducible for that product. Where desiccants have been bulked up for commercial reasons using inert filler, the method for determining water content is more complex, and extreme care is required in the interpretation of results. In this test the entire desiccant is used from the IGU, and therefore any variation around the edge due to variable airflow, or a corner break down, is eliminated.

The second deals with the moisture content of desiccant incorporated in an organic spacer, which is more complex than high temperature drying, and can only be carried out by laboratory personnel. It is called the Karl Fischer method. In this method the temperature at which the water Is removed is lower, to prevent the organic matrix thermally decomposing. However the test takes longer than for desiccant in a spacer, and this may be reflected in the test price.

In the Karl Fischer method the water is removed by passing a dry nitrogen stream over thee sealant sample that has been heated to 200°C. The water is chemically absorbed by the Karl Fischer reagent and then back-titrated, using a well established technique for determining water presence in a sample. By calculating the weight of water present and knowing the weight of the sample of sealant, the water content of the desiccant can be computed.

The final method is the measurement of partial vapour pressures in units without desiccant. Such units usually have a non-polymeric seal normally of soldered metal. Although the calculations are given in the standard, unless you are used to calculating partial pressures it is better to let the test laboratory carry it out.