CERTIFICATION & TESTING FOR INSULATING GLASS UNITS

ASTM E 2190

If you have been used to seeing ASTM E 773/E 774 (CBA) or CAN/CGSB 12.8 … there is a new standard!

Specifically, the ASTM harmonized standards are:

E 2188 Standard Test Method for Insulating Glass Unit Performance
E 2189 Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units
E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation (specification for the evaluation of the durability of sealed insulating glass units)

The IGCC (Insulating Glass Certification Council) and IGMA (Insulating Glass Manufacturer's Alliance) have endorsed and agreed to move forward toward certification and testing to the ASTM E 2190 standard ONLY.

In 1996 a group of leaders in the Insulating Glass Industry recognized a need for the North American insulating glass (IG) testing and certification processes to harmonize requirements. The harmonization of insulating glass standards (commonly referred to as HIGS) initiative was formed in early 1997, and the ASTM E 2190 standard was finally approved in June 2002. In a continuing effort to harmonize global standards, the North American ASTM harmonized standards and the European EN 1279 standards are both proposed for the ISO insulating standard as acceptable methods for insulating glass testing and evaluation methods. These are under review as a draft ISO standard at this time.

As a user, buyer or specifier of insulating glass units, it should be recognized that IG units tested and certified to the ASTM E 2190 should be equal to or improved over ASTM E 774 (CBA) or CGSB 12.8 IG units.

There are some minor differences in some of the temperatures used and sample sizes in the ASTM E 2190. These differences are mostly attributable to conversions from English to metric units. However, the main differences can best be described by separating the standards into three parts: the high humidity test, the accelerated weathering test, and the volatile fog test.

High Humidity Test

In this test, IG samples are subjected to high humidity and temperature. The objective is to force moisture into the hermitically sealed cavity of the IG unit. All three standards use the same type of box and similar high temperatures. The CAN 12.8 cycles the units from 22°C to 55°C. E 773 and the ASTM E 2190 test method have no cycling. However, both the ASTM E 2190 and E 773 have 50% more time in the high humidity box. Furthermore, the CAN 12.8 uses separate samples for the high humidity test and the accelerated weathering. The ASTM E 2190 and E 773 tests require that the same samples be used in both high humidity and accelerated weathering.

Accelerated Weather Cycling

This test is used to simulate weather cycling from hot to cold extremes with moisture added during the hot cycle. The cycling boxes are essentially the same for all three methods. However, both ASTM E 2190 and E 773 have UV radiation during cycling. The CAN 12.8 test has no UV. As previously noted ASTM E 2190 and E 773 are required to test the same units in both the high humidity and accelerated weather cycling, while the CAN 12.8 allows separate samples for each test. CAN 12.8 have more cycles (320 vs. 252) but the cycles are of shorter duration than ASTM E 2190 and E 773. As a result, the total time under test is longer for ASTM E 2190 and E 773 (63 days vs. 53.3 days). The criterion for passing this test is a frost point of -40°C for both ASTM E 2190 and CAN 12.8. For E 773 the criterion is warmer, -20°C.

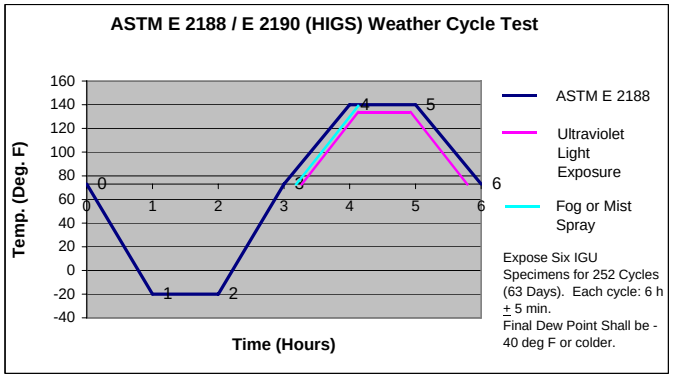
Volatile Fog Test

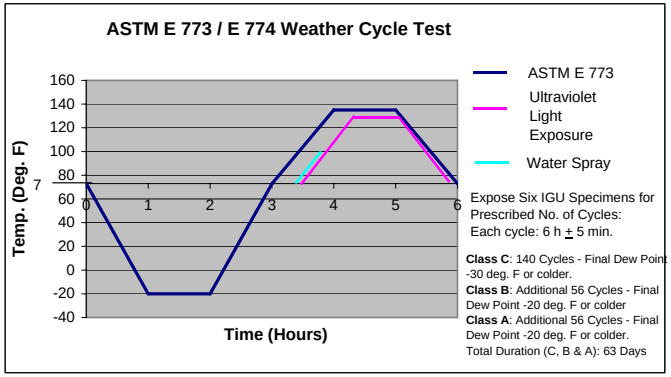
This test is used to show that the components in an insulating glass unit will not out-gas a volatile fog, which could result in a deposit on the interior glass surfaces. All three tests use UV radiation and elevated temperatures to accelerate the

effects. ASTM E 1887 has a higher UV output than ASTM E 2190 or CAN 12.8, but it does not place the test samples in a box. In ASTM E 1887 only one corner of the sample sees the UV radiation and elevated temperature. ASTM E 2190 and CAN 12.8 use the same test box and fully "immerse" all test samples in the heated box. CAN 12.8 uses a temperature that is 10°C higher than ASTM E 2190 (60 vs. 50°C). However, ASTM E 2190 uses a stricter evaluation criteria for viewing of the fog. ASTM E 2190 has the observer view the fog at any angle with the sample at arms length. CAN 12.8 uses a complicated viewing box with the observer at 2 m from the sample looking "normal" to the glass surface.

As can be seen in the preceding discussion, one set of standards may prescribe a stricter aspect to a given test than the others. However, this is offset by a more liberal position in other areas of the same test. In other words, there has been a "give and take" approach to harmonizing the standards of the two countries without compromising the previous standards.

Accelerated Weather Test – Schematic Drawings According to ASTM E 2188/ E 2189 and ASTM E 773/E 774





Harmonized IG Standards Comparison

	US Standards	Canadian Standards	HIGS
	ASTM E 773, E 1887, E 774	CAN 12.8	ASTM E 2188, E 2189, E 2190
High Humidity Test			
Max temp.	60+/- 3 C	55+/- 3 C	60+/- 3 C
Min. temp.	(constant temperature)	22+/- 3 C	(constant temperature)
%RH	95% +/-5%	constant water mist	95% +/-5%
total time	42 days*	28 days**	42 days (14 days + 28 days)*
Accel. Weather Cycle test			
high temp	57+/-3 C	50+/-3 C	60+/- 3 C
low temp	-30+/-3 C	-32+/-3 C	-29+/-3 C
UV source	F72T12BL/HO	none	F72T12BL/HO
UV output	10 W/m^2	n/a	10 W/m^2
moisture	30 min. spray	5 min. spray	30 min. spray
time per cycle	6 hr.	4 hr.	6 hr.
# of cycles	252	320	252
total time	63 days	53.3 days	63 days
Volatile Fog Test			
type	corner UV exposure	full immersion box	full immersion box
glass temp at corner	65 C +/- 3C(at corner only)	60 +/-3 C	50 +/-3 C
glass temp other locations	24 C min.	60 +/-3 C (full immersion)	50 +/-3 C
cooling plate temp	21 +/-3 C	22 +/-3 C	21 +/-3 C
cooling plate area	0.016m² (127 x 127 mm)	0.018m² (150mm dia)	0.018m² (150mm dia)
UV lamp	Osram Ultra Vitalux 300w	Osram Ultra Vitalux 300w	Osram Ultra Vitalux 300w
lamp output	2.0 mW/cm² @ glass surface [2000μW/cm2]	0.4 mW/cm^2 @ 300 nm [400 μW/cm2]	400 μW/cm^2 @ 355 nm
Evaluation criteria			
Frost point test	E546 w/ dry ice	brass cup w/ dry ice &alcohol	E546 w/ dry ice or CGSB 12.8 method
max. frost point	-29 C	-40 C	-40 C
visible fog	no fog at arms' length	no fog at 2m normal to view box	no fog at arms' length
Additional CAN 12.8 tests:		Initial Seal Test (optional) argon concentration water immersion test (argon)	

* Both E774 and E2190 use same units in both in accelerated weathering and high humidity

** CAN 12.8 uses separate samples for accelerated weathering and high humidity

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