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**RATING STANDARD
for the
CERTIFICATION
of
DRIFT ELIMINATORS**

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Véronique NOËL
Jean FOURCROY
Compliance Committee for Drift Eliminators
CPPC

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No.	Modifications	Section	Page
1	Editorial changes following merge between Eurovent Certification Company and Certita into Eurovent Certita Certification	various	
2	Clarification in the definition of the break through air velocity	III	4
3	Clarification regarding the sampling time correction for the discharge angle described in ATC-140 for cross flow DE which shall not apply	IV.2 IV.3	5 6
4	Specification of the eliminator slope to adjust the exhaust box to the same angle	IV.3	6
5	Clarification of the § relative to consistency of conductivity measurement points	V.2	7
6	Addition of a § for clarification regarding final results of drift rate	V.3	7

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Published by *Eurovent Certita Certification SAS*
48-50 rue de la Victoire - 75009 Paris, France
Tel: +33 1 7544 7 71
E-mail: v.noel@eurovent-certification.com

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I. PURPOSE

The purpose of this standard is to describe the test procedure and the criteria to qualify for certification of Evaporative Cooling Equipment Drift Eliminators in accordance with the Operation Manual OM-14.

II. SCOPE

The Eurovent Certified Performance programme for Drift Eliminators applies to Drift Eliminators used for evaporative water-cooling equipment.

III. DEFINITIONS

Drift Eliminator: Inertial water droplet stripping devices used to reduce the amount of circulating water that can be entrained in the unit airflow and leave the equipment.

Evaporative cooling equipment: Any equipment that uses water distribution and generates aerosols for the purpose of heat transfer.

Drift Rate: Proportion of the drift volumetric flow rate to the circulating water flow rate entrained in the airflow and exiting at the discharge of the eliminator, expressed as a percentage.

Drift Concentration: Mass ratio of drift to the air leaving the eliminator, expressed in $\text{mg}_{\text{water}}/\text{m}^3_{\text{air}}$.

Break-through air velocity: *Three stages can be observed: first, small droplets leave the DE then fall back down almost immediately; second, the small droplets float above the DE without leaving, then third, droplets are carried away by the airflow and leave the DE. The breakthrough velocity corresponds to the beginning of the third stage. Velocity shall be expressed in m/s.*

Maximum air velocity: Maximum air speed at which the drift eliminator will be tested, expressed in m/s.

IV. TESTING REQUIREMENTS

Standards ratings shall be established at standard rating conditions specified in section below.

All standard ratings shall be verified by isokinetic tests conducted in accordance with the Cooling Technology Institute test code ATC-140. Measurements shall be made at discharge of the DE.

IV.1 Counter flow testing laboratory

For counter flow testing, the following specifications shall be respected:

- The test section shall be 1.8 m x 1.8 m (6' x 6') fill media plan dimensions. If the test cell is larger, then a box has to be built inside the cell walls extending from the bottom of the fill to the bottom of the drift eliminator.
- Water loading shall be 20 m³/hr/m² ($\pm 5\%$).
- Bete nozzles, model IS88, shall be installed according to sketch (see Appendix) in a linear pattern; the pressure shall be defined at 40 kPa (0.4 bar).
- 1.2 m fill height, using 12 mm spacing cross-corrugated fill model (cf. 1200 AT or equivalent) shall be respected.
- The test shall be conducted with a spray height above the fill media of 0.3 m (1') from the bottom of the nozzle to the top of the fill.
- The height from spray nozzle discharge to eliminators shall be equal to 0.7 m.
- The drift eliminator support shall have maximum 25 mm width, located in the centre of the test section (see Appendix).
- 5 points shall be tested, following the sequence of 3.5, 3, 2.5, 2, and 3.5 m/s air speed at the eliminator discharge gross area.
- Velocities will be rounded with 3 digits.

IV.2 Cross flow testing laboratory for splash-type fill with drift eliminators

For cross flow testing of splash-type fill with drift eliminators, the following specifications shall be respected:

- For a splash-type fill, the drift eliminator face area shall be minimum 0.8 m width x 1.7 m height.
- The fill media shall be the same or slightly less than the drift eliminator size, with approximately 1 m air travel.
- Water loading shall be 50 m³/hr/m² ($\pm 5\%$).
- 9 nozzles SPX/Marley, model P/N 71-3462-084, shall be installed according to sketch (see Appendix); the pressure shall be defined at 90 mm of basin head ($\pm 20\%$). Top of hot water basin floor to top of first splash bar shall be 300 mm.
- Fill media shall be V bars on 4 in vertical x 8 in horizontal centres in a staggered arrangement, parallel to airflow. A 300 mm space between fill bars and eliminators shall be used. The fill faces shall be placed at approximately a 12 degree slope. The slope of the fill may be increased in case of water flooding the bottom of the eliminator.
- The minimum distance between the centreline of the last distribution points and the closest eliminator face shall be 550 mm.
- The eliminator slope shall be specified by the Participant.
- *Sampling time correction for the discharge angle as described in ATC-140 shall not be applied.*
- 5 points shall be tested, following the sequence of 3, 2.5, 2, 1.5 and 3 m/s air speed at the eliminator discharge gross area.

IV.3 Cross flow testing laboratory for film-type fill with drift eliminators

For cross flow testing of film-type fill with drift eliminators, the following specifications shall be respected:

- Drift eliminator face area shall be minimum 0.6 m width x 1.2 m height.
- The fill media shall be the same or slightly less than the drift eliminator size, with approximately 1 m of functional air travel (between eliminator and louver).
- Water loading shall be 70 m³/hr/m² (\pm 5 %).
- 18 nozzles SPX/Marley, model P/N 68-3738-060, shall be installed according to sketch (see Appendix); the pressure shall be defined at 125 mm of basin head (\pm 20%). Top of hot water basin floor to top of film-type fill shall be 140 mm.
- For air travels less than or greater than 1 m, add or subtract rows of nozzles as necessary starting from louver side. Nozzle quantity may change with the actual air travel used.
- Combined fill and eliminator installation shall be as used in the relevant product.
- For installation with non-integral eliminators the space between film-type fill and eliminators shall be 150 mm.
- *For integrated cross-flow products, the eliminator slope shall be specified by the Participant so as to adjust the exhaust box to the same angle. Sampling time correction for the discharge angle as described in ATC-140 shall not be applied.*
- The minimum distance between the centreline of the last distribution points and the closest eliminator face shall be 254 mm for integral eliminators, and 404 mm for non-integral eliminators.
- 5 points shall be tested, following the sequence of 3.5, 3, 2.5, 2 and 3.5 m/s air speed at the eliminator discharge gross area.

IV.4 Break-through velocity measurement

For Break-through velocity measurement, the following specifications shall be respected:

- If needed, the effective area of the drift eliminators may be reduced to be able to reach the break-through air velocity with the existing fan.
- The blockage must be done symmetrically along all the walls of the test cell on both sides of the drift eliminator.
- Enough light (minimum 1000 W halogen lamps) must be installed in the test cell about 1 m downstream of the drift eliminators.
- Two video cameras are installed across the two axes of the test cell just above the top edge of the drift eliminator.
- The test is done with the same water flow as for the drift losses test without heat load to avoid plume.
- The air velocity is increased slowly until the operator notices a large amount of visible droplets passing through the drift eliminators. This average test

cell air velocity is recorded. For a subsequent test, the air velocity is reduced to about 50% of the previously measured break-through velocity.

- The procedure is repeated 5 times or more if large (more than 25%) discrepancies are observed in the measurements. It is recommended to have several operators making the measurement independently.
- The break-through air velocity is the average of the 5 valid tests.

V. RATING REQUIREMENTS

V.1 Standard

Rating requirements are in accordance with the Cooling Technology Institute test code ATC-140.

V.2 Consistency of *conductivity* measurement points

If one of measured *conductivity measurement* points differs more than 50% from the apparent trend, then the testing point should be repeated once *before the drift eliminator has been removed from the test cell. Only one repeated point will be accepted in order to maintain the schedule.*

V.3 Final results of drift rate

Final average drift rate is to be based on the average of the two test points of the Li tracer only (neither resistivity nor Na tracer). If one of the two Li points is out of 50 % of the trend, then it will not be taken into account for the final result of drift rate.

VI. CERTIFIED CHARACTERISTICS

The following characteristics of Drift Eliminators shall be certified by tests:

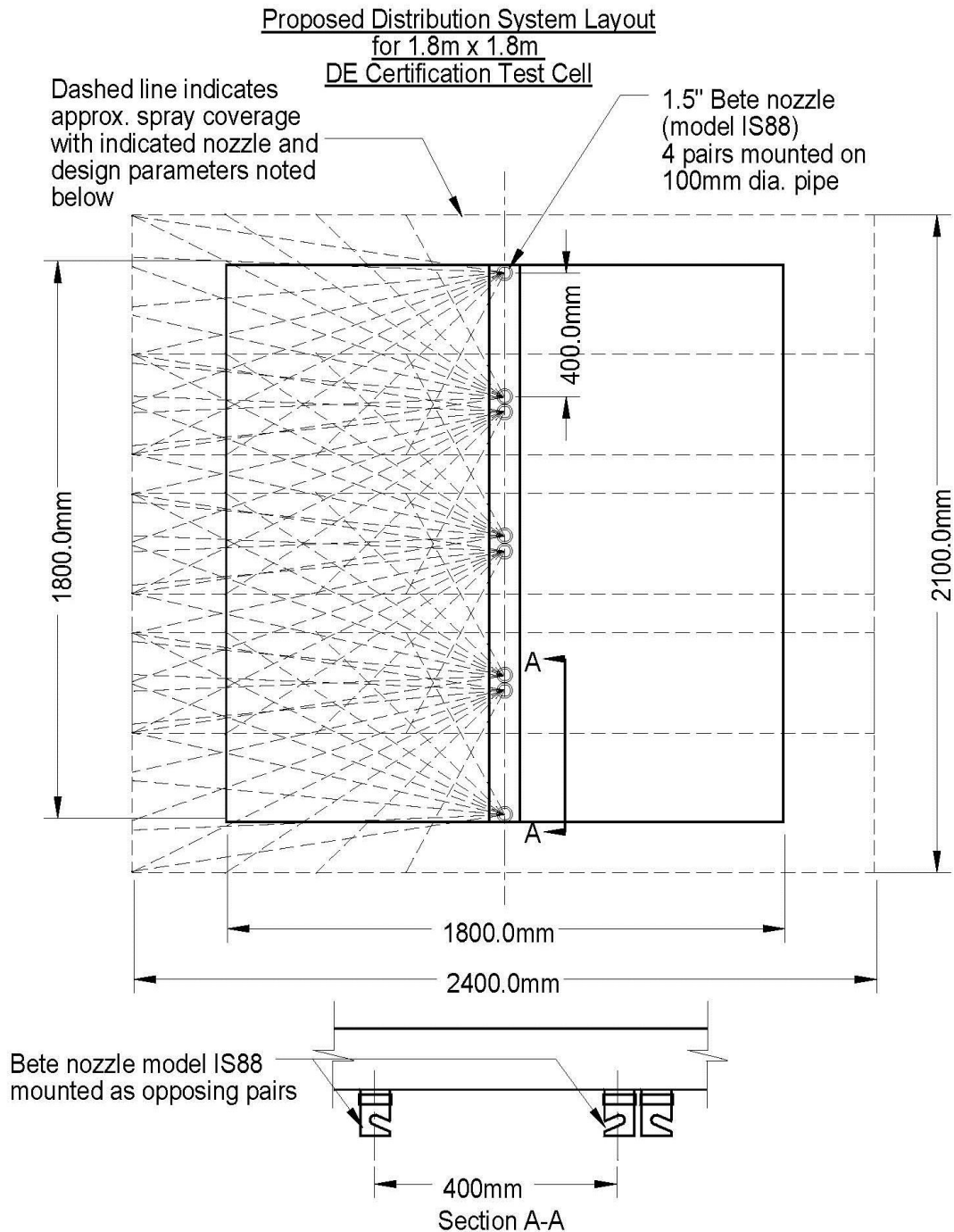
- For counter-flow and cross-flow film fill, the average drift losses of the two tests at 3.5 m.s⁻¹ are less than 0.007 % of circulating water flow rate.
- For cross-flow splash fill, the average drift losses of the two tests at 3 m.s⁻¹ are less than 0.007 % of circulating water flow rate.

VII. TOLERANCES

No tolerance will be applied on the average drift losses (example: 0.0074 passes and 0.0075 fails).

APPENDIX A. DISTRIBUTION SYSTEM LAYOUTS

A.I. For Counter flow testing



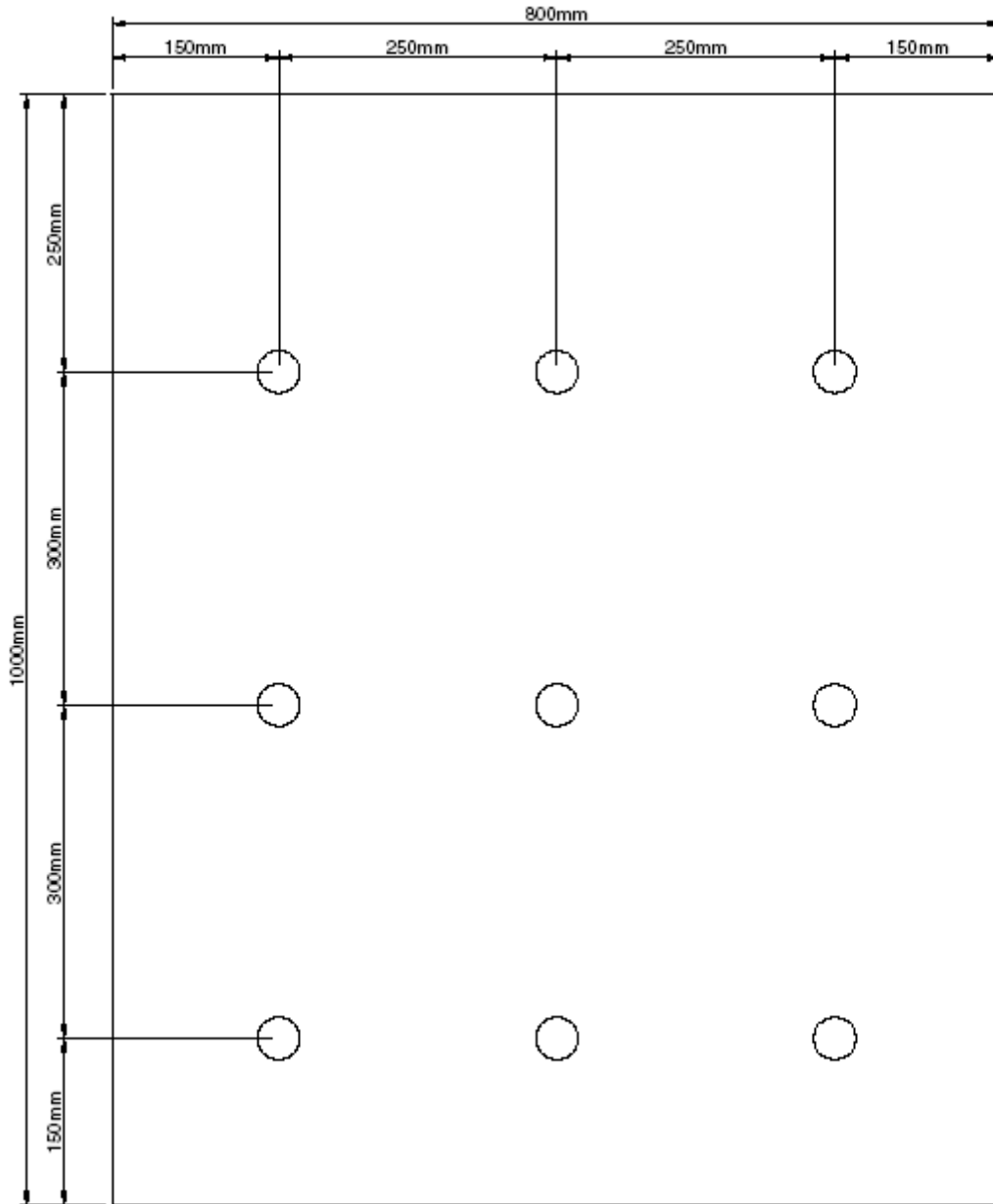
Notes:

- System designed for 20 m³/hr/m² over 3.24m²
- Total flow rate 64.8 m³/hr (16.2 m³/hr per nozzle pair)
- Design nozzle pressure: 0.4 bar
- Nozzle discharge to top of fill: 300mm
- Spray pattern omitted on right half of cell for clarity

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A.II. For Cross flow testing of splash-type fill with drift eliminators

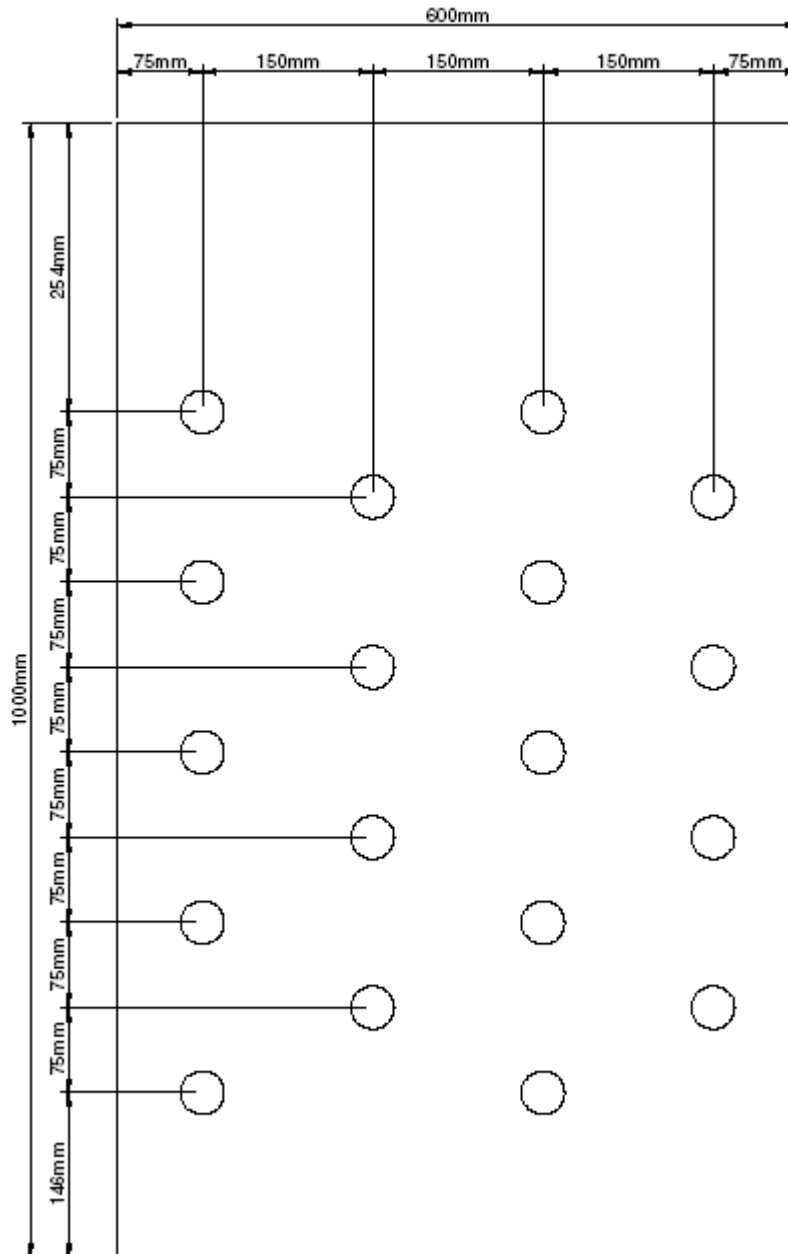
Eliminator Face



Louver Face

A.III. For cross flow testing of film-type fill with drift eliminators

Eliminator Face



Louver Face