

NEW HIGH PERFORMANCE 3A NANOMOL-C TESTING

DELTA-T MEASUREMENT METHOD INFORMATION

ACCORDING TO prEN1279:6 appendix H the following standardised equipment and method are to be applied.



PRINCIPLE

Adsorption of water on to desiccant releases energy and heat, which can be measured as a relatively quick and reliable method of determining activity. The amount of temperature increase, known as Delta-T, is related to the volume of adsorbed water. It can also be used in conjunction with graphs from the desiccant manufacturer as a quick assessment or remaining available water adsorption capacity [AWAC].

EQUIPMENT

Shown in the photograph above, prEN1279:6 App.H calls for the following:

- 1 thermometer graduated in degrees Celcius
- 1 plastic beaker 150 cc capacity
- 1 graduated plastic beaker 50 cc capacity
- 1 graduated plastic cylinder with cover and holes for funnel and thermometer
- 1 plastic funnel
- 1 set accurate scales

METHOD

1. Accurately weigh **25g of desiccant** in the 150cc beaker
2. Using the dry thermometer, measure the temperature of the desiccant sample, the resulting temperature of the molecular sieve is recorded as [T1s]. It should ideally be at 20 degrees C plus/minus 2 degrees.
3. **50 cc of water** is measured in the second beaker, and the temperature is taken using the thermometer to stir the water six times, and recorded as [T1w]. It too should ideally be at 20 degrees C plus/minus 2 degrees.
4. The start temperature [T1] is calculated by adding [T1s] + [T1w] and dividing the result by 2.
5. Pour the water in to the graduated cylinder. Place the cap on the cylinder and insert the plastic funnel.
6. Pour the desiccant in to the water in the cylinder, via the funnel, **in one quick and smooth motion**. Avoid adding the desiccant to the water slowly, this will result in inaccurate heat generation.
7. Insert the thermometer through the hole in the cap of the cylinder. Stir the water/desiccant mixture at least ten times with the thermometer, and hold the thermometer in place in the mixture until the temperature has peaked. Record the highest temperature peak [T2].
8. The temperature increase, or Delta-T, is calculated by deducting the start temperature [T1] from the peak temperature [T2]. So **$T2 - T1 = \text{Delta T}$** .

WARNING: Always wear gloves and eye protection when testing!

Due to the extremely high performance of NANOMOL-C there must always be a ratio of two parts water to one part desiccant. i.e. 50 cc water to 25g desiccant.

NEVER test at 1:1 ratio or the Delta-T will exceed 80 degrees and rapidly boil the water away, potentially with hot debris spitting out of the test cylinder.

NOTE:

Measured Delta-T should conform with the results on the manufacturer's batch report.

Each desiccant manufacturer must provide correlation graphs which show how the measured Delta-T can be used to relate to pre-loading, or Loss on Ignition [LOI] of freshly opened material, or samples from the IGU production.

In the example below you can see that a Delta-T of 37 degrees equates to an LOI of ca. 1.7 weight % and a Delta-T of 33 degrees C indicates an LOI of 3 weight%.

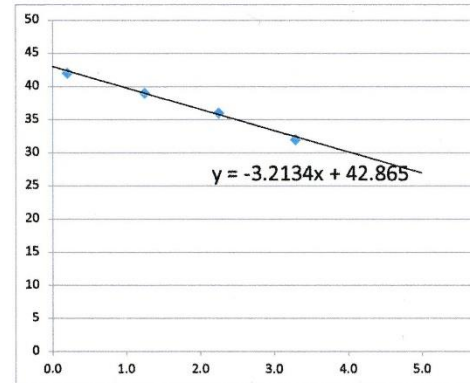
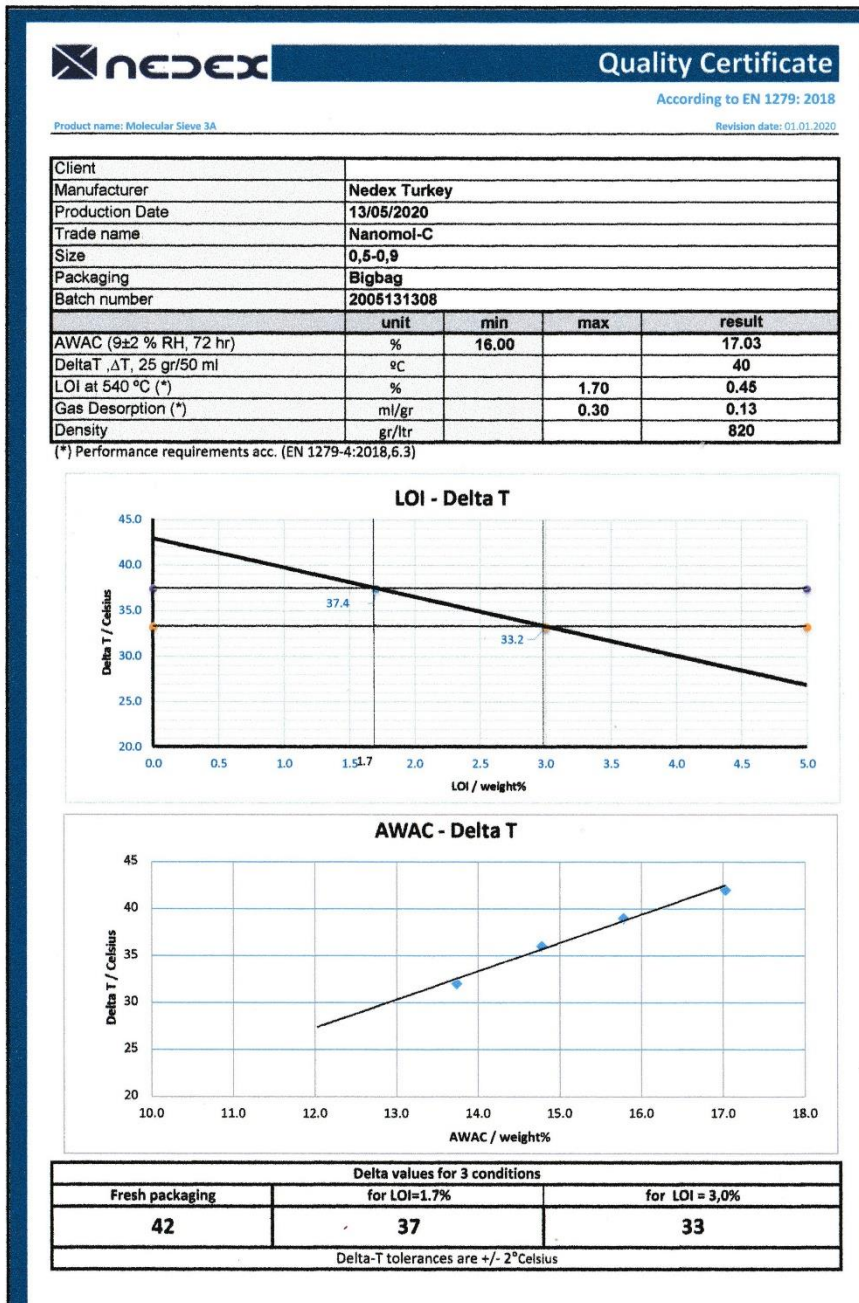
This actual batch shows Delta-T of 42C, LOI at less than 1%, and AWAC close to 17%

In case of negative results, three measurements should be made: if two of the three are non-compliant then the batch should be rejected.

CORRELATION BETWEEN ΔT, AVAILABLE WATER ADSORPTION CAPACITY (AWAC) AND (LOI)

The desiccant supplier shall provide, for an identified type of desiccant, curves that correlate ΔT determined in accordance with EN 1279-6:2018, Annex H with the AWAC and LOI.

Correlation curve for ΔT vs AWAC together with correlation curve for ΔT vs LOI or, alternatively, AWAC vs LOI and a minimum value of ΔT for factory production control in accordance with EN 1279-6 shall be measured by the desiccant manufacturer and provided to the IGU manufacturer. EXAMPLE Typical correlation curves are given below:



-3.2134 42.865	DELTA T	1,7yat	3,0 yat
42.9	36		
42.2	42		
38.8	39		
42.9	36		
37.4	37		37.4
35.6	36		
32.3	32		
33.2	36		33.2
42.9	36		33.2
26.8	36	37.4	33.2

DELTA T	
17.03	42
15.78	39
15.4	36
14.78	36
13.74	32
14.4	36
12.4	36

Figure 3 — Example of correlation for ΔT vs AWAC and AWAC vs LOI

These correlation curves and ΔT values are unique to specific desiccant types and cannot be used for performance comparison of different brands or types.

E&O.E. all information given believed accurate and true at the time of publication.

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