

PARTICLE TESTING AUTHORITY



CERTIFICATE # 3636.01

4356 Communications Drive
Norcross, GA 30093
770-662-3630

www.particletesting.com
mas@particletesting.com

Test Report

Particle Testing Authority is accredited to ISO/IEC 17025 by A2LA. This testing is within the current A2LA Scope of Accreditation and complies with the requirements of ISO/IEC 17025. The results attached to this document relate only to the item(s) tested.

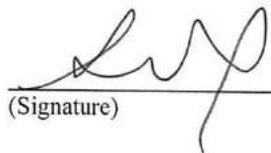
Customer: ehi Dooel-Skopje
ul.3-ta Makedonska Brigada b.b. P.O. Box 723
1000, Skopje, Republic of Macedonia

Project Number: EU190121-002



PTA Sample ID	Customer Sample ID	Test Number (s)
1900206	Sample #1	Physi-02

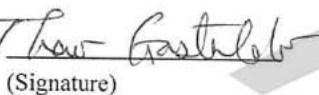
Analyst:


(Signature)

SANISSA XAYAMOUNKHOUM
(Printed Name)

2/13/19
Date

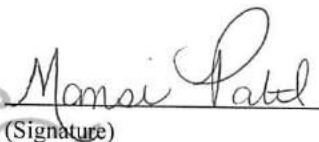
Technical:
Review


(Signature)

Thas Gastalob
(Printed Name)

2/13/19
Date

Quality:
Review


(Signature)

Mansi Patel
(Printed Name)

2/13/19
Date

PARTICLE TESTING AUTHORITY

CERTIFICATE OF ANALYSIS

Date: 2/13/2019

Customer Company Name: ehi Dooel-Skopje

Customer Name: Milivojevic Nenad

Customer Sample ID: Sample #1

PTA Sample ID: 1900206

Product name: Mutag BioChip 30™

Manufacturer: Multi Umwelttechnologie AG Zschorlauer Straße 56, D-08280 Aue (Germany)

Color: white

Shape: round disc

Diameter: 30.0 mm

Material thickness: approx. 1.1 mm

SUMMARY OF TESTING

Test Description	Analysis Date	SOP #	Specification	Result
Physi-02	2/1/2019	001/44001/18	5500 m ² /m ³	6682.5 m ² /m ³

Approval Signature:


Quality Representative

12/18/19
Date

**All measurements performed in accordance with current GMP requirements.



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001/44001/84, Rev. D

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TriStar II Plus 3.00

TriStar II Plus Version 3.00
Serial # 288 Unit 3 Port 1

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Sample: Sample 1
Operator: SX
Submitter: ehi Dooel-Skopje
File: C:\win3020\data\2019\01Jan\1900206C.SMP

Started: 2/1/2019 1:43:09 PM
Completed: 2/1/2019 3:22:19 PM
Report time: 2/13/2019 9:43:50 AM
Sample mass: 0.3748 g
Analysis free space: 50.7571 cm³
Low pressure dose: None
Automatic degas: No

Analysis adsorptive: Kr
Analysis bath temp.: 77.300 K
Thermal correction: No
Ambient free space: 18.2054 cm³ Measured
Equilibration interval: 10 s
Sample density: 1.000 g/cm³

Comments: Sample was under nitrogen at 25C for 960 minutes.
To convert our surface area unit to the customers units we did the following calculation using the provided density;
 $165000 \text{ g/m}^3 \times 0.0405 \text{ m}^2/\text{g} = 6682.5 \text{ m}^2/\text{m}^3$.
Analyzed per ISO 150901-2. Reference material(s) used for instrument performance verification available upon request.
Total pages: 9

Summary Report

Surface Area

Single point surface area at $p/p^\circ = 0.118913845$: 0.0396 m²/g

BET Surface Area: 0.0405 m²/g



Sanissa
Xayamounkhoun

Digitally signed by Sanissa Xayamounkhoun
DN: cn=Sanissa Xayamounkhoun,
o=Micromeritics, ou=Particle Testing
Authority, email=sanissa@particletesting.com,
c=US
Date: 2019.02.13 09:44:40 -05'00'

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Isotherm Tabular Report

Relative Pressure (p/p°)	Absolute Pressure (mmHg)	Quantity Adsorbed (cm ³ /g STP)	Elapsed Time (h:min)	Saturation Pressure (mmHg)
				2.454064
0.007651431	0.018777	0.0055	01:10	
0.026032571	0.063886	0.0063	01:13	
0.047725049	0.117120	0.0070	01:16	
0.061823134	0.151718	0.0072	01:19	
0.080187830	0.196786	0.0075	01:22	
0.099053899	0.243085	0.0077	01:25	
0.118913845	0.291822	0.0080	01:27	
0.137681147	0.337878	0.0081	01:30	
0.155829623	0.382416	0.0083	01:32	
0.175477079	0.430632	0.0084	01:35	
0.194890858	0.478275	0.0086	01:37	



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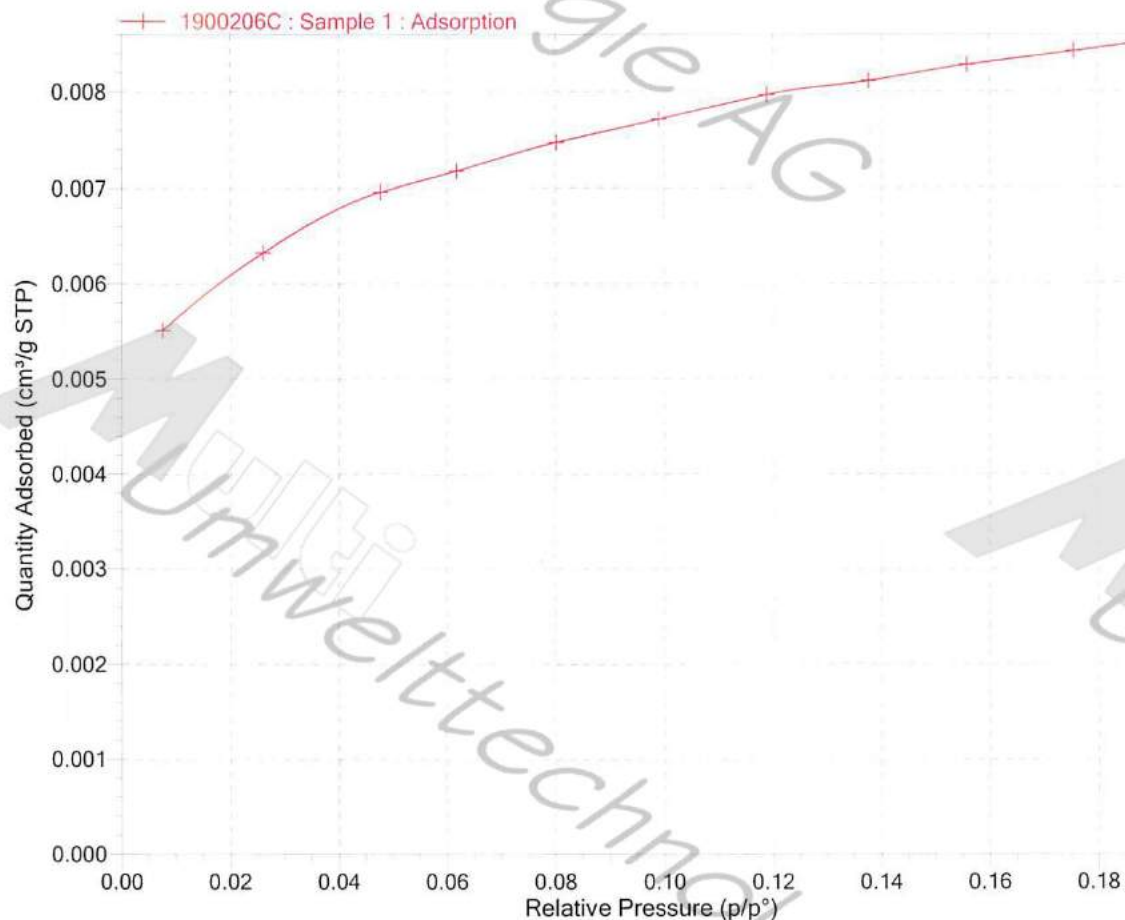
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Isotherm Linear Plot



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BET Report

BET surface area: 0.0405 ± 0.0003 m²/g
Slope: 138.842652 ± 1.144837 g/cm³ STP
Y-intercept: 0.513497 ± 0.083478 g/cm³ STP
C: 271.386251
Qm: 0.0072 cm³/g STP
Correlation coefficient: 0.9998301
Molecular cross-sectional area: 0.2100 nm²

Relative Pressure (p/p°)	Quantity Adsorbed (cm ³ /g STP)	1/[Q(p°/p - 1)]
0.007651431	0.0055	1.399136
0.026032571	0.0063	4.229663
0.047725049	0.0070	7.205068
0.061823134	0.0072	9.185287
0.080187830	0.0075	11.668149
0.099053899	0.0077	14.251995
0.118913845	0.0080	16.938632



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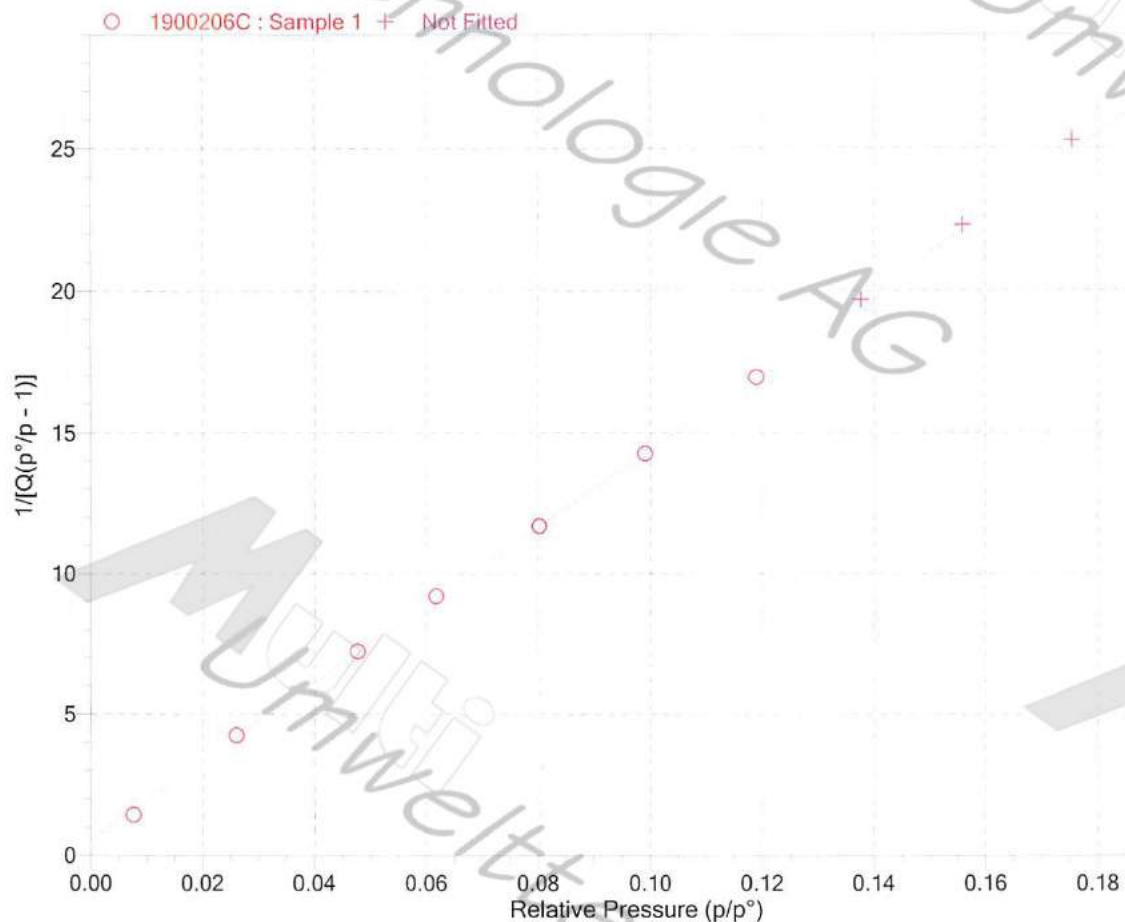
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BET Surface Area Plot



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Sample Information

Method: Default
Sample: Sample 1
Operator: SX
Submitter: ehi Dooel-Skopje
Mass type: Calculated
Empty tube: 25.9371 g
Sample + tube: 26.3119 g
Sample mass: 0.3748 g
Density: 1.000 g/cm³
Type of data: Automatically collected
Instrument type: 3030
Original instrument type: 3030



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Sample Tube

Sample tube: Sample Tube
Ambient free space: 1.0000 cm³
Analysis free space: 1.0000 cm³
Non-ideality factor: 0.0000620
Use isothermal jacket: No
Use filler rod: No
Vacuum seal type: None

Degas Conditions

Degas conditions: Degas Conditions

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Smart VacPrep evacuation

Backfill sample tube: Automatic
Evacuation rate: 5.0 mmHg/s
Unrest. evacuation from: 5.0 mmHg
Vacuum level: 1.000000e-02 mmHg
Evacuation time: 10 min
Temperature ramp rate: 10.0 °C/min
Target temperature: 30 °C
Hold pressure: 100 mmHg

Heating Phase

Sample prep: Stage	Temperature (°C)	Ramp Rate (°C/min)	Time (min)
1	25	10	960



Analysis Conditions

Analysis conditions: Physi-02
Isotherm collection: Target Pressure

Pressure Table

Starting Pressure (p/p°)	Pressure Increment (p/p°)	Ending Pressure (p/p°)
0.00000000		0.00075000
0.00075000		0.00150000
0.00150000		0.00300000
0.00300000		0.00220000
0.00220000		0.00410000
0.00410000		0.00600000
0.00600000		0.00790000
0.00790000		0.00980000
0.00980000		0.01170000
0.01170000		0.01360000
0.01360000		0.01550000
0.01550000		0.01740000
0.01740000		0.01930000

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Preparation

Fast evacuation: No
Evacuation rate: 5.0 mmHg/s
Evacuation time: 0.10 h

Leak test: No
Use TranSeal: No

Free Space

Measured before analysis
Lower Dewar for evacuation: Yes
Evacuation time: 0.50 h
Outgas test: No

p° and Temperature

p° type: Calculated from analysis temperature
Temperature type: Entered
Temperature: 77.300 K

Dosing

Use first pressure fixed dose: No
Use maximum volume increment: No
Target tolerance: 5.0% or 0.050 mmHg

Equilibration

	Relative Pressure (p/p°)	Equilibration Interval (s)
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1	1.000000000	10
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Minimum equilibration delay at p/p° >= 0.995: 600 s

Sample Backfill

Backfill at start of analysis: Yes
Backfill at end of analysis: Yes
Backfill gas: N2



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Adsorptive: Krypton @ 77.35 K (Kr)
Non-condensing adsorptive: No
Maximum manifold pressure: 1.60 mmHg
Therm. tran. hard-sphere diameter: 3.8100 Å
Molecular cross-sectional area: 0.210 nm²
Adsorbate molecular weight: 83.80
Thermal conductivity: 1.00
Non-ideality factor: 0.0000300
Density conversion factor: 0.0012743
Dosing method: From Psat tube

Psat vs. Temperature Table

	Saturation Pressure (mmHg)	Temperature (K)
1	1.578	75.40
2	1.756	75.85
3	1.974	76.35
4	2.241	76.90
5	2.372	77.15
6	2.482	77.35
7	2.596	77.55
8	2.776	77.85
9	3.100	78.35
10	3.457	78.85

