



MÜKI LABOR Műanyag Vizsgáló és Fejlesztő Kft.
Műanyagipari Vizsgálólaboratórium
1119 Budapest, Thán Károly utca 17.
Tel/Fax: +36-1-226-2819
mukilabor@mukilabor.hu
www.mukilabor.hu

Testing laboratory accredited by NAH under No NAH-1-1508/2024.

INTERIM TEST REPORT

Client's name: Global Refuse Metal Kft.

Client's address: 5600 Békéscsaba, Kinizsi utca 4-6.

Contact person: Szekeres Marietta
Adminisztrátor
Tel.: +36-66/442-342
Mobil: +36-20/362-98-78
E-mail: brad.gyorgy@grmkft.hu

Date of receipt of the sample: 01.06.2025

P. O. number: E-mail (11.06.2025)

Date of order: 11.06.2025

IDENTIFICATION OF SAMPLE: APPEARANCE OF SAMPLE
PP granulate See Table 1

CODE: 16289A



Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Table of Contents

Identification and appearance of samples.....	3
Determination of Melting Peak Temperature (T_m), Glass Transition Temperature (T_g) of Plastics, Material Identification ¹	4
<i>Diagram 1 - DSC curves of the material of the sample (2. Heating-up).....</i>	5
Density ¹	6
Ash content ²	7
Determination of Melt Volume Rate (MVR) ¹	8
Determination of Water content ^{1*}	9

The report copied only in full extent is valid!

Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Identification and appearance of samples

Table 1 – Identification and appearance of samples

Identification of sample	Appearance of sample
PP granulate	

The report copied only in



Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Determination of Melting Peak Temperature (T_m), Glass Transition Temperature (T_g) of Plastics, Material Identification¹

MEASURING EQUIPMENT:	TYPE:	NUMBER OF CALIBRATION CERTIFICATE:
Differential scanning calorimeter (DSC) instrument	Mettler Toledo DSC 822e	MÜKI-2-2024
Analytical balance	Sartorius R 200 D	2024/2123
SPECIMEN/SAMPLE:	METHOD OF PREPARATION:	DATE OF PREPARATION:
A little piece of the sample's material.	Cut from a sharp blade.	13.06.2025
TEST DESCRIPTION:		
Date:	13.06.2025	
Standard:	MSZ EN ISO 11357-2,3:2020,2018	
Conditioning:	Before the test, the specimens were conditioned at 23°C, 50%RH for 24 hours.	
Procedure:	According to MSZ EN ISO 11357-2,3:2020,2018	
Test parameters:	[1] -50,0 °C - 350 °C, 20,00 K/min [2] 350,0 °C, 2,00 min [3] 350,0 - -50 °C, -20,00 K/min [4] -50,0 °C, 2,00 min [5] -50,0 °C - 350 °C, 20,00 K/min	
TEST RESULTS:	See Diagram 1 and Table 2.	

Table 2 – Determination of material

Sample	Material
PP granulate	PE+PP+PA66**

Testing laboratory accredited by NAH under No NAH-1-1508/2024.

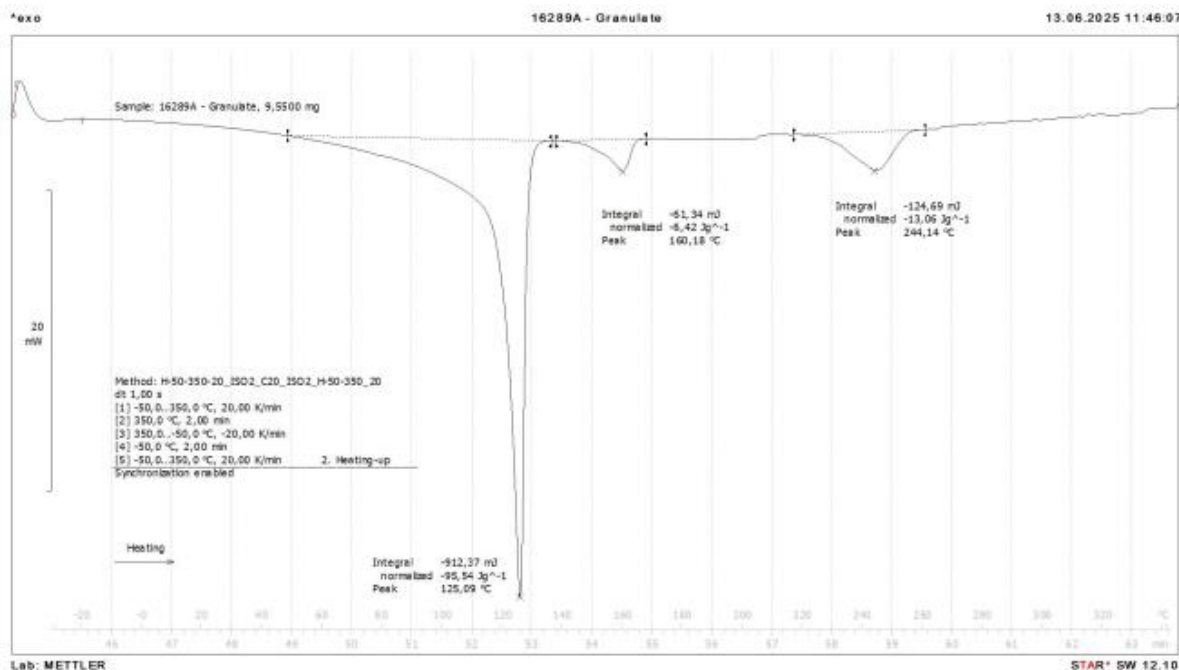


Diagram 1 - DSC curves of the material of the sample (2. Heating-up)



Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Density¹

MEASURING EQUIPMENT:	TYPE:	NUMBER OF CALIBRATION CERTIFICATE:
Analytical balance	Kern&Sohn GmbH ABS 220-4N	2024/2125

SPECIMEN/SAMPLE:	METHOD OF PREPARATION:	DATE OF PREPARATION:
PP granulate	-	-

TEST DESCRIPTION:

Date of test: 11.06.2025

Standard: MSZ EN ISO 1183-1:2019 Method B

Conditioning: Before the test, the specimens were conditioned at 23°C, 50%RH for 24 hours.

Test conditions:

Test room atmosphere: 23± 2°C, 50% RH

Immersion liquid: ethanol ($\rho=0,786 \text{ g/cm}^3$)

Number of specimens: 5 pieces

Procedure:

According to MSZ EN ISO 1183-1:2019 Method B

Requirements: No requirements.

TEST RESULTS:

See Table 3

Table 3 – Determination of density

Sample	Density		
	Single values	Mean	Std.Dev.
	[g/cm ³]		
PP granulate	1,040	1,034	0,005
	1,036		
	1,037		
	1,026		
	1,033		



Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Ash content²

MEASURING EQUIPMENT:	TYPE:	NUMBER OF CALIBRATION CERTIFICATE:
Analytical balance	Sartorius BA 210S	2025/983
Muffle furnace	DENKAL 6-K/1100	MÜKI-28-2024
Drying oven	Pol-Eko SLW 115 ECO	MÜKI-55-2025

SPECIMEN/SAMPLE:	METHOD OF PREPARATION:	DATE OF PREPARATION:
PP granulate	-	-

TEST DESCRIPTION:

Date of test: 10-11.06.2026

Standard: MSZ EN ISO 3451-1:2019 Method A

Conditioning: Before the test, the specimens were conditioned at 23°C, 50%RH for 24 hours.

Test parameters:

Test room atmosphere: 23°C, 50% RH

Calcination temperature: 650°C

Number of specimens: 3-3 samples

Specimen weight: 1-3 g

Procedure: According to DIN EN ISO 3451-1:2019, direct calcination was performed

Requirements: No requirements.

TEST RESULTS:

See Table 4

Table 4 – Determination of Ash content

Sample	Ash content			Conformity to the requirements
	Single values	Mean	St.Dev.	
	[%]			
PP granulate	2,49 2,49 2,45	2,48	0,03	In conformity

Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Determination of Melt Volume Rate (MVR)¹

MEASURING EQUIPMENT:	TYPE:	NUMBER OF CALIBRATION CERTIFICATE:
Melt flow tester	CEAST 6936	E202092223080112
Analytical balance	Kern&Sohn GmbH ABS 220-4N	2024/2125
Drying Oven	Pol-Eko SLN 15 SMART	MÜKI-135-2025
SPECIMEN/SAMPLE:	METHOD OF PREPARATION:	DATE OF PREPARATION:
PP granulate	Drying	12.06.2026
TEST DESCRIPTION:		
Date of test:	12.06.2026	
Standard:	MSZ EN ISO 1133-1,2:2012	
Conditioning:	Before the test, the specimens were conditioned at 23°C, 50%RH for 24 hours.	
Test parameters:		
Drying:	2 h at 90 °C	
Test temperature:	230 °C	
Load:	2,16 kg	
Sample quantity:	~5,0 g	
Requirements:	No requirements.	
TEST RESULTS:		
See Table 5-6		

Table 5 – Results of the Melt Flow Test

Sample name	MVR	
	Mean	Std.Dev.
	[cm ³ /10 min]	
PP granulate	3,90	0,26

Table 6 – Results of the Melt Flow Test

Sample name	MFR	
	Mean	Std.Dev.
	[g/10 min]	
PP granulate	3,37	0,23



Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Determination of Water content^{1*}

MEASURING EQUIPMENT:	TYPE:	NUMBER OF CALIBRATION CERTIFICATE:
Aboni Hydro Tracer	FMX Hydrotracer	MÜKI-85-2023
Analytical balance	Kern&Sohn GmbH ABS 220-4N	2024/2125
SPECIMEN/SAMPLE:	METHOD OF PREPARATION:	DATE OF PREPARATION:
PP granulate	-	13.06.2026
TEST DESCRIPTION:		
Date of test:	13.06.2026	
Standard:	MSZ EN ISO 15512:2019 Method E	
Conditioning:	Before the test, the specimens were conditioned at 23°C, 50%RH for 24 hours.	
Test parameters:		
Heating temperature:	150°C	
Procedure:	According to MSZ EN ISO 15512:2019 Method E, calcium hydride method was performed	
Requirements:	No requirements.	
TEST RESULTS:		
See Table 7		

Table 7 – Results of the Water content Test

Sample name	Water content		
	Single values	Avg	Std.Dev.
	[m/m%]		
PP granulate	0,107	0,111	0,005
	0,110		
	0,116		



MÜKI LABOR Műanyag Vizsgáló és Fejlesztő Kft.
Műanyagipari Vizsgálólaboratórium
1119 Budapest, Thán Károly utca 17.
Tel/Fax: +36-1-226-2819
mukilabor@mukilabor.hu
www.mukilabor.hu

Testing laboratory accredited by NAH under No NAH-1-1508/2024.

Location of performance of the test:

¹: 1119 Budapest, Thán Károly utca 17.

²: 1117 Budapest, Budafoki út 187-189.

*: Non-accredited test. (The test(s) were done according to the given standard or customer's request, which is outside of the laboratory's scope of accreditation.)

**: Measurement of IR spectra would be recommended for accurate material analysis.

Notes: Test results relate only to the tested sample(s).

Data / information supplied by customer can influence the validity of results.

The samples were taken by the customer.

Budapest, 13 June 2025

The test report was made by:

Was inspected by:

Dániel Bartus
Project Engineer

MÜKI LABOR
Műanyag Vizsgáló és Fejlesztő Kft.
1119 Budapest, Thán Károly u. 17.
Adószám: 13738949-2-43
Cégjegyzékszám: 01-09-870725

Levente Kovács
Head of the Quality Laboratory