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mas-order No.: 19 1414

Testing: Analysis of a rubber product for the Polycyclic Aromatic Hydrocarbons according to the GS-Mark specification AfPS GS 2014:01 PAK (**18 GS-PAHs**)

Sample designation:

Customer's sample designation	Sample matrix	Appearance	mas sample-number
GommAmicA® Powerfill Green Production lot number: S-2806	Rubber granulate product	green rubber granules	19 1414 002

Date of order: 2019-07-10 **Sample arrival:** 2019-07-10

Sampling: The sample was sent to mas gmbh by the client via a commercial carrier.

Start of testing 2019-07-11 **End of testing:** 2019-07-24

Test method: Test method according to the GS-Mark specification AfPS GS 2014:01 PAK. The basic steps of the analysis can be summarised as follows:

- addition of 3 deuterated PAHs as internal standards to an aliquot of the rubber granulate sample material
- ultrasonic extraction of the aliquot with Toluene for 1 h at 60°C
- clean-up of the extract
- addition of a further deuterated PAH as recovery standard
- HRGC/LRMS analysis
- quantification via the three internal deuterated PAH standards (isotope dilution and internal standard method)

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Remarks: The PAH-results can be seen from Table 01. All data refer to the original sample material as delivered.

Comments: An assessment of the analysis results is not matter of this report but is reserved to the customer.

Muenster, July 24th, 2019

Dr. Armin Maulshagen
(Head of R & D / Chemist)

Dr. Stephan Hamm
(Head of project / Chemist)

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Tab. 01: Results of the analysis of a rubber granulate sample for the 18 GS-PAHs according to AfPS GS 2014:01 PAH specification;
Results refer to the original sample material as delivered

Customer's sample designation	**GommAmicA® Powerfill Green Production lot number: S-2806**
Sample matrix	rubber granulate product
mas sample-number	19 1414 002

PAH compound	**Unit**	**Concentration**	**LOQ**	**Test method**
Naphthalene	mg/kg	**nd**	0,3	AfPS GS 2014:01
Acenaphthylene	mg/kg	**0,270**	0,1	AfPS GS 2014:01
Acenaphthene	mg/kg	**nd**	0,1	AfPS GS 2014:01
Fluorene	mg/kg	**nd**	0,1	AfPS GS 2014:01
Phenanthrene	mg/kg	**2,20**	0,2	AfPS GS 2014:01
Anthracene	mg/kg	**0,137**	0,1	AfPS GS 2014:01
Fluoranthene	mg/kg	**5,14**	0,1	AfPS GS 2014:01
Pyrene	mg/kg	**25,2**	0,1	AfPS GS 2014:01
Benzo(a)anthracene	mg/kg	**0,168**	0,1	AfPS GS 2014:01
Chrysene	mg/kg	**0,362**	0,1	AfPS GS 2014:01
Benzo(b)fluoranthene	mg/kg	**0,348**	0,1	AfPS GS 2014:01
Benzo(j)fluoranthene	mg/kg	**nd**	0,1	AfPS GS 2014:01
Benzo(k)fluoranthene	mg/kg	**nd**	0,1	AfPS GS 2014:01
Benzo(e)pyrene	mg/kg	**1,44**	0,1	AfPS GS 2014:01
Benzo(a)pyrene	mg/kg	**1,23**	0,1	AfPS GS 2014:01
Dibenzo(a,h/a,c)anthracene[a]	mg/kg	**nd**	0,1	AfPS GS 2014:01
Benzo(ghi)perylene	mg/kg	**5,58**	0,1	AfPS GS 2014:01
Indeno(1,2,3-cd)pyrene	mg/kg	**0,617**	0,1	AfPS GS 2014:01
Subtotal of 7 PAHs[b]	mg/kg	**32,9**		AfPS GS 2014:01
Total of the 18 GS-PAHs[b]	mg/kg	**42,7**		AfPS GS 2014:01

nd PAH compound not detected at levels above the indicated limit of quantification (LOQ)
nc Subtotal or total not calculated since none of the PAH compounds specified was detected at levels above the LOQ
a co-eluting PAHs
b not detected GS-PAHs were not included in the calculation of the total