

Determination of Extractables in Rubber

SpeedExtractor E-916, Multivapor P-6:

Determination of Solvent Extract of Rubber samples using the SpeedExtractor E-916

Extractables from rubber were extracted using Pressurized Solvent Extraction (PSE). The PSE method is carried out on the SpeedExtractor E-916 under elevated temperature and pressure. In comparison to the norm ISO 1407 the extraction time can be significantly reduced. The determined contents were in the expected range.

1. Introduction

Extractables are chemical compounds that migrate from rubber or plastic material under forced conditions (high temperature, solvents). Extractables from rubber samples are determined following the norm ISO 1407 [1]. This norm requires a Soxhlet extraction with an extraction time of 16 h with at least 5 cycles per hour.

In this Short note, the samples were extracted with a pressurized solvent extraction (PSE) under high temperature and pressure using the SpeedExtractor E-916.

2. Experimental

Equipment: SpeedExtractor E-916, Multivapor™ P-6

Samples: Rubber, already homogenized. Sample A: expected value: 18 - 22 %, Sample B: expected value: 19 - 24 %

Determination: The samples were weighed into paper thimbles. For the extractions about 0.5 g of samples were used. The extractions were carried out on the SpeedExtractor E-916, see Figure 1. The extraction parameters are shown in Table 1. Total extraction time was approx. 1 h.



Figure 1: SpeedExtractor E-916

Table 1: Extraction parameters for SpeedExtractor E-916

Parameter	Value
Temperature	100 °C
Pressure	100 bar
Solvent	Acetone 100 %
Cells	40 mL
Vials	240 mL
Cycles	3
Heat-up	1 min
Hold	10 min
Discharge	3 min
Flush with solvent	2 min
Flush with gas	5 min

The extracts were dried using parallel evaporation with Multivapor P-6, according to the parameters shown in Table 2.

Table 2: Parameters for solvent evaporation

Parameter	Value
Bath temperature	45 °C
Rotation	7
Pressure	500 mbar

After evaporation of the solvent, the extracts were dried to constant weight in a drying oven at 102°C. The solvent extract is then determined gravimetrically.

3. Results and Discussion

The determined extractables obtained with the SpeedExtractor E-916 are shown in Table 3.

Table 3: Determined extractable contents with SpeedExtractor E-916 for sample A and sample B (n = 3)

	Sample A [%]	Sample B [%]
Mean value	20.61	18.84
rsd [%]	1.48	0.49

4. Conclusion

The rubber samples can be extracted with the SpeedExtractor E-916. The extraction time can be significantly reduced to 1 h.

5. References

[1] ISO 1407:2011: Rubber-Determination of Solvent Extract.

For more detailed information and safety considerations please refer to the Application Note No. 232/2016.