

Determination of Extractables from Rubber

Extraction System B-811 :

Determination of Solvent Extract of Rubber using the Extraction System B-811

Extractables from rubber were extracted with Soxhlet using Extraction System B-811. 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). In the ISO standard, a Soxhlet extraction for 16 h with at least 5 cycles per hour is required.

A simple and fast procedure for the determination of extractables in rubber, according to ISO 1407 is introduced below. The samples were extracted with an automated Soxhlet extraction method carried out on the Extraction System B-811.

2. Experimental

Equipment: Extraction system B-811

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 extraction was done on the Extraction System B-811 (Figure 1). The method parameter are shown in Table 1. The total extraction time was approx. 4.5 h.



Figure 1: Extraction System B-811

Table 1: Parameters for the extraction using the Extraction System B-811.

Extraction method	Soxhlet standard
Step 1: Extraction	80 cycles, heating level 11
Step 2: Rinse	5 min, heating level 11
Step 3: Drying	5 min, heating level 6
Solvent	Acetone
Solvent volume	100 ml

The extracts were dried to constant weight in a drying oven at 102°C. The solvent extract is determined gravimetrically.

3. Results and Discussion

The determined extractable contents obtained with the Extraction System B-811 are shown in Table 2. The determined values are within the expected range for both samples.

Table 2: Determined extractable contents with the Extraction System B-811 in sample A and sample B (n = 2)

	Sample A [%]	Sample B [%]
Mean value	20.62	19.29
rsd [%]	4.00	0.08

The higher relative standard deviation for sample A can be explained by the incomplete homogenization of the sample. The standard deviation for Sample B is significantly lower.

4. Conclusion

The rubber samples can be extracted with the Extraction System B-811. The extraction time can be significantly reduced to 4.5 h comparing to the extraction time with manual soxhlet as required by the ISO standard method.

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. 233/2016.