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## Determining the Gel Content of Ethylene Vinyl Acetate (EVA)

*As the extraction might involve the use of hazardous and hot solvent it is strongly recommended to use protective glasses and gloves. The SoxROC Operation Manual chapter 3 Safety should be read before starting any work.*

### INTRODUCTION

The gel content (insoluble fraction) produced in ethylene vinyl acetate (EVA) plastics by cross-linking can be determined by extracting with toluene. A simple and fast procedure for the gel determination in ethylene vinyl using SoxROC Extraction Unit is introduced below. The gel content is determined gravimetrically after the extract is dried to a constant weight.

### EXPERIMENTAL

#### Apparatus

- Scissors
- Analytical balance
- SoxROC Extraction Unit SX-360-A or SX-320-A
- Extraction cups Ø 54 mm, aluminum, compatible with the solvent extraction system
- Drying oven
- Desiccator
- Paper thimbles (33x80 mm)

#### Reagents and accessories

- Toluene
- Boiling stones
- Cotton wool

#### Procedure

Cut the EVA film into small pieces using a pair of scissors. Weigh the sample into a paper thimble and place a piece of cotton wool on top of the sample. Carry out the extraction with SoxROC Extraction Unit using the parameters shown in Table 1. Dry the extracts to constant weight in an oven at 100°C for 60 minutes and let cool to room temperature in desiccator. Calculate the extractable matter.

Table 1. Extraction parameters (SoxROC Extraction Unit)

Sample weight	≈0,4-0,9 g
Solvent	Toluene
Solvent volume	90 ml
Temperature	170°C
Boiling /number of reduces	20 min / 4
Rinsing / number of reduces	40 min / 5
Drying	5 min

## CALCULATIONS

Calculate the extractable matter using the formula below.

$$\% \text{ Crosslinked Material} = (W_3 - W_2) \times 100 / W_1$$

- W<sub>1</sub> = Sample weight (g)  
W<sub>2</sub> = Extraction cup weight (g)  
W<sub>3</sub> = Extraction cup + residue weight (g)

## REFERENCES

This Application Note should be used in conjunction with Application Note LA1002 "Application Guide SoxROC Solvent Extraction"

OG1012 SoxROC Operation Guide