

# APPLICATION SHEET

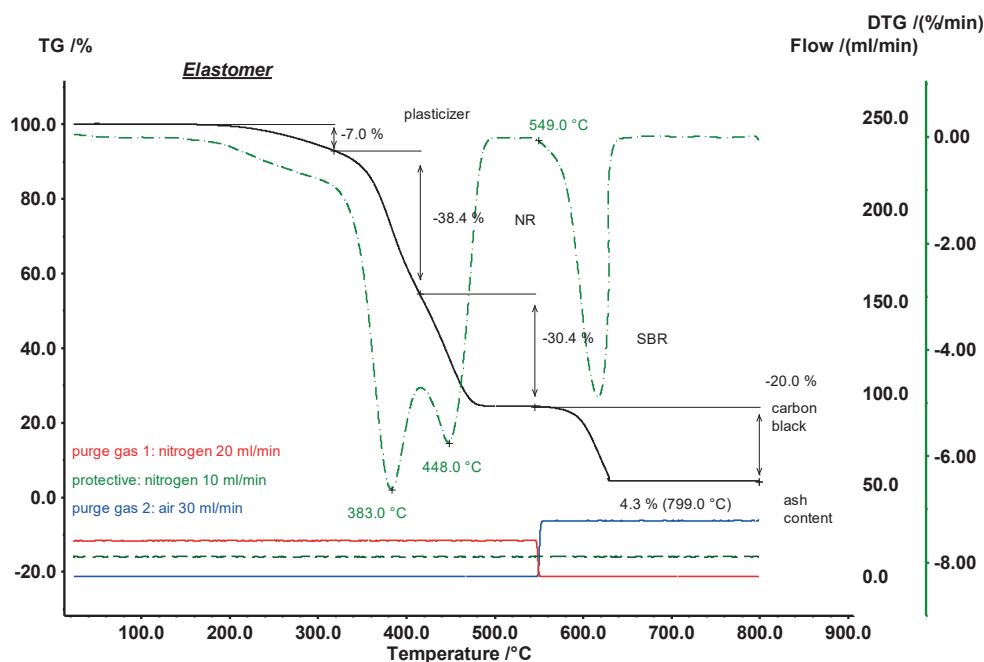
Polymers · Polymer Manufacturing  
TG 209 **F1 Libra**®

## Decomposition Behavior of a Rubber Mixture

### Introduction

Aside from a few natural product impurities, natural rubber (NR) is essentially a polymer of isoprene units, a hydrocarbon diene monomer. Synthetic rubber can be made as

a polymer of isoprene or various other monomers. Styrene-Butadiene (SBR) is an elastomeric copolymer consisting of styrene and butadiene. It has a good abrasion resistance and good aging stability. SBR is stable in mineral oils, fats, aliphatic, aromatic and chlorinated hydrocarbons.



### Test Conditions

Temperature range: RT... 800°C  
Heating/cooling rates: 10 K/min  
Atmosphere to 550°C: Nitrogen at 30 ml/min  
Sample mass: 14.85 mg  
Crucible: Aluminum oxide  
Atmosphere to 800°C.: Air at 30 ml/min

### Test Results

The results for the temperature-dependent mass loss of a rubber mixture are depicted in the figure. The black closed line represents the relative mass loss; the dashed green line its first derivative (DTG). At 550°C, the purge gas was changed from nitrogen to air indicated by the red and green line, respectively. Several mass-loss steps are detected indicating the release of volatiles such as additives (plasticizers) and several polymer compounds up to 550°C. After the gas change, both the pyrolytic carbon and the added carbon react with the oxygen to form CO<sub>2</sub>. Its release is determined as a mass-loss step. The residual mass represents the ash content (4.3%)