Starting with the onset of polymerization, apparent from the increased internal temperature, the remaining monomer mixture consisting of 1950 g of butyl acrylate and 1150 g of styrene was metered in continuously at an 885 g/h rate of addition over 3.5 h. Three hours after onset of the polymerization, the rate of addition of the initiator was continuously raised to 60 g/h over 1 h. The polymerization was carried on until no further heat of polymerization was released. To remove residual monomers, the polymerization was completed with 10 g of tert-butyl hydroperoxide (10% in water) and 20 g of Brüggolit (10% in water) after cooling down to 30°C.
The dispersion obtained had a solids content of 53.7%, a Brookfield viscosity (spindle 2) of 680 mPas, a pH of 4.3 and a Dw particle size diameter of 800 nm. On sieving through a sieve of 250 µm mesh size, 2 g of sieve residue were obtained. The free residual monomer content was < 100 ppm.

Preparation of polymer powders:

Comparative Powder 1 (CPowder 1):
90 wt% of the dispersion of the base polymer was admixed with 10 wt% (solids/solids) of Mowiol 4/88 polyvinyl alcohol having a hydrolysis level of 88 Mol% and a Höppler viscosity of 4 mPas, and diluted with water to a Höppler viscosity of 250 mPas. The dispersion was spray dispensed through a two-material nozzle. The atomizing component used was compressed air at 4 bar, while the droplets formed were concurrently dried with heated air at 125°C. The dry powder obtained was admixed with 10 wt% of commercially available antiblocking agent (mixture of calcium magnesium carbonate and magnesium hydrosilicate).

Comparative Powder 2 (CPowder 2):
Identical to CPowder 1 except that 80 wt% of the dispersion of the base polymer (solids/solids) was used and the dispersion was additionally admixed with 10 wt% of Epilox P 13-31 (triglycidyl ether based on trimethylolpropane from Leuna-Harze).

Powder 3:
Identical to CPowder 1 except that the Mowiol 4/88 polyvinyl alcohol was replaced by the corresponding amount (solids/solids) of the modified water-soluble polymer from Example 1.

Powder 4:
Identical to Powder 3 except that 80 wt% of the dispersion of the base polymer (solids/solids) was used and the dispersion was additionally admixed with 10 wt% of Epilox P 13-31 (triglycidyl ether based on trimethylolpropane from Leuna-Harze).

Testing of strength of films from polymer powders:

Determination of breaking strength:
The (comparative) powders were converted 50 g at a time into redispersions having a solids content of 50% by addition of water. The particular redispersion was optionally admixed with Jeffamine T-403 hardener, in the amount reported in table 3. Some of the particular redispersion was applied to a glass plate and dried for one week under normal conditions pursuant to DIN50014 to obtain a polymer film 0.2 mm in thickness. The particular polymer film was then stored in water at 21°C for three days and subsequently subjected to a DIN 5304 tensile test. The test results are itemized in table 3.

Determination of stain resistance:
Polymer films were prepared as described under the heading of "Determination of breaking strength". The particular dried polymer film was pipetted with coffee and/or redcurrant juice and then stored overnight under standard conditions (DIN 50014 23/50). Thereafter, the polymer films were washed with warm water at 23°C and visually evaluated as follows: