

Macrogol 6000

Macrogol 6000 is a mixture of polymer of ethylene oxide and water with the molecular formula represented by $\text{HO}(\text{CH}_2\text{CH}_2\text{O})_n\text{H}$, where n is the average number of ethyleneoxy groups.

Description White waxy solids, plates or granular powder, odour, slightly characteristic.

Freely soluble in water and in ethanol, insoluble in ether.

Congealing point 53-58°C <0613>.

Viscosity Dissolve 25.0 g in a 50 ml volumetric flask in water, dilute to volume with water and mix well, the kinetic viscosity at 40°C is 10.5-16.5 mm²/s <0633 method 1>, using a capillary tube of 1.0 mm in internal diameter.

Identification (1) To 0.05 g add 5 ml of dilute hydrochloric acid and 1 ml of barium chloride TS, shake and filter, to the filtrate add 1 ml of 10% phosphomolybdic acid solution, a yellow-green precipitate is formed.

(2) Place 0.1 g in a test tube, add 0.1 g each of potassium thiocyanate and cobaltous nitrate, mix and add 5 ml of dichloromethane, the solution exhibits a blue colour.

Average molecular weight Place about 12.5 g, accurately weighed, in a dry 250 ml conical flask with stopper, add 25 ml, accurately measured, of phthalic anhydride solution in pyridine (dissolve 14 g of phthalic anhydride in 100 ml of anhydrous pyridine and allow it to stand overnight). Mix well and heat for 30-60 minutes in a boiling water bath. Allow it to cool, add 50 ml of sodium hydroxide (0.5 mol/L) VS, accurately measured, and a solution of phenolphthalein in pyridine (1 → 100) as indicator and titrate with sodium hydroxide (0.5 mol/L) VS until a pink colour is produced. Perform a blank determination and make any necessary correction. Multiply the weight (g) of substance being examined by 4000 and divide by the volume (ml) of sodium hydroxide (0.5 mol/L) VS consumed, the average molecular weight is 5400-7800.

Acidity Dissolve 1.0 g in 20 ml water, pH 4.0-7.0 <0631>.

Clarity and colour of solution Dissolve 5.0 g in 50 ml of water, the solution is clear and colourless. Any opalescence produced is not more pronounced than that of reference suspension 2 <0902>. Any colour produced is not more intense than that of reference solution Y₂ <0901 method 1>.

Ethylene glycol, diglycol and triglycol Weigh 400 mg each of ethylene glycol, diglycol and triglycol into a 100 ml volumetric flask, dilute to volume with dehydrated ethanol, mix well as the stock reference solution. Weigh 400 mg internal standard 1, 3-butanol into a 100 ml volumetric flask, dilute to volume with anhydrous ethanol, mix well as the stock internal reference solution. Measure each of solution 1 ml into a 100 ml volumetric flask, dilute to volume with anhydrous ethanol, mix well as the reference solution. Weigh 4.0 g into a 100 ml volumetric flask, add 1 ml of the stock internal reference solution, dilute to volume with anhydrous ethanol, mix well as the test solution. Carry out the method for gas chromatography <0521>, using a column packed with phenyl-polydimethylsiloxane (50 : 50) as the stationary phase, maintain the column temperature at 60°C for 5 minutes, raise the temperature to 170°C by 2°C per minute and maintain for 5 minutes, then to 280°C by 15°C per minute and maintain for 50 minutes. The temperature of injection port is 270°C. The temperature of the detector is 290°C. Carrier gas is high purity nitrogen, the fuel gas is hydrogen, the auxiliary gas is compressed air, the velocity of carrier gas is 4.0 ml per minute. Calculate the content by the internal standard method, the each content of ethylene glycol, diglycol and triglycol is not more than 0.1%.

Ethylene oxide and dioxan Weigh accurately 1 g in a headspace vial, add 1 ml of purified water, accurately measured, seal the vial and mix well as the test solution. Take 300 µl ethylene oxide (equivalent to about 0.25 g) into a 100 ml volumetric flask containing 50 ml of treated polyethylene glycol 400 (using a rotary evaporator remove any volatile components at a temperature of 60°C and pressure of 1.5 to 2.5 kPa for 6 hours), dilute to volume

with the same solvent, mix well as ethylene oxide stock reference solution. Weigh accurately 1 g of cold ethylene oxide stock solution, into a 50 ml volumetric flask containing 40 ml of treated polyethylene glycol 400, dilute to volume with the same solvent. Weigh accurately 10 g into a 50 ml volumetric flask containing 30 ml of water, dilute to volume with water. Transfer accurately 10 ml into a 50 ml volumetric flask, dilute to volume with water, mix well as ethylene oxide reference solution. Dilute a quantity of dioxan, accurately weighed, with water to produce a solution of 0.1 mg per ml, as dioxan reference solution. Weigh accurately 1 g of the substance to be examined, in a headspace vial, add accurately 0.5 ml of ethylene oxide reference solution and 0.5 ml of dioxan reference solution, and seal the vial, mix well as the reference solution. Measure 0.5 ml of ethylene oxide reference solution in a headspace vial, and add 0.1 ml of freshly prepared 0.001% acetaldehyde solution and 0.1 ml of dioxan solution, seal the vial and mix well as the system suitability solution. Carry out the method for gas chromatography <0521>, using a column packed with polydimethylsiloxane as the stationary phase; maintain the column temperature at 35°C for 5 minutes, raise the temperature to 180°C by 5°C per minute, then to 230°C by 30°C per minute and maintain for 5 minutes (adjust if necessary). The temperature of the injection port is 150°C. The temperature of the detector is 250°C. Use the headspace injection method. The equilibration temperature is 70°C and maintain for 45 minutes. Proceed with the system suitability solution under the above operating conditions. Adjust the detection sensitivity so that the peak heights of ethylene oxide and acetaldehyde in the chromatogram are about 15% of the full scale of the chart. The resolution factor between the peaks corresponding to acetaldehyde and ethylene oxide is at least 2.0, the signal-to-noise ratio of the peak of dioxan is not less than 5. Inject separately the gaseous sample each in the test vial and reference vial onto the column. Repeat the procedure at least three times. The relative standard deviation of the three areas of peak of ethylene oxide is not greater than 15% and the relative standard deviation of the three areas of peak of dioxan is not greater than 10%. Calculate the content according to the peak area obtained in the chromatogram by the standard addition method, ethylene oxide is not more than 0.0001% and dioxan is not more than 0.001%.

Formaldehyde To 1 g of the substance being examined, accurately weighed, add 0.25 ml of 0.6% sodium chromophate, cool in an ice water and add 5 ml of sulphuric acid, mix well. Allow to stand for 15 minutes and transfer slowly to a 25 ml volumetric flask containing 10 ml of water, allow to cool and dilute to volume with water, mix well, as the test solution. Dilute 0.81 g of formaldehyde, accurately weighed, to 100 ml with water. Dilute 1 ml of this solution to 100 ml with water. Take accurately 1 ml proceeded with the same procedure, beginning at the words "add 0.25 ml of 0.6% sodium chromophate test solution", and use the resulting solution as the reference solution. Determine the absorbance at 567 nm <0401>, adjusted by a blank solution proceeded with the same procedure. The absorbance obtained with the test solution is not greater than that of the reference solution (0.003%).

Water Not more than 1.0% *<0832 method 1 (1)>*, using 2.0 g.

Residue on ignition Not more than 0.1% *<0841>*.

Heavy metals Dissolve 4.0 g in 5 ml of hydrochloric acid solution (9→1000) and a quantity of water, adjust to pH

3.0-4.0 with dilute acetic acid or ammonia TS, then dilute with water to 25 ml. Carry out the limit test for heavy metals *<0821 method 1>*; not more than 0.0005%.

Category Pharmaceutical excipients, ointment bases and lubricant, etc.

Storage Preserve in tightly closed containers, stored in a dry place.