CLAIMS

1. Copolymer compositions having a copolymer content of ~~98.5~~99.0 wt.-% or more and comprising lower critical solution temperature (LCST) compounds in an amount of from 1 ppm to 5,000 ppm, wherein the LCST compounds are selected from the group consisting of methyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxyethyl methylcellulose and hydroxypropyl methylcellulose.

~~2. Copolymer compositions according to claim 1, wherein the copolymer content is 99.0 wt.-% or more.~~

2~~3~~. Copolymer compositions according to claim 1~~ or 2~~, comprising 550 ppm or less of salts of mono- or multivalent metal ions calculated on their metal content.

3~~4~~. Copolymer compositions according to ~~one of~~ claim~~s~~ 1 ~~to 3~~or claim 2, comprising 5000 ppm or less of non-LCST compounds, wherein the non-LCST compounds are selected from the group consisting of ionic or non-ionic surfactants, emulsifiers, and antiagglomerants.

4~~5~~. Copolymer compositions according to claim 3~~4~~, wherein the non-LCST compounds are selected from the group consisting of calcium and zinc stearates or palmitates.

5~~6~~. Copolymer compositions according to one of claims 1 to 4~~5~~, comprising salts of multivalent metal ions in an amount of 500 ppm or less calculated on their metal content.

6~~7~~. Copolymer compositions according to one of claims 1 to 5~~6~~, comprising antioxidants.

7~~8~~. Copolymer compositions according to claim 6~~7~~, comprising antioxidants in an amount of from 50 ppm to 1000 ppm.

8~~9~~. Copolymer compositions according to one of claims 1 to 7~~8~~, comprising LCST compounds in an amount of from 5 ppm to 500 ppm.

~~10~~9. Copolymer compositions according to one of claims 1 to 8~~9~~, comprising LCST compounds in an amount of from 5 ppm to 100 ppm.

10~~11~~. Copolymer compositions comprising

I) 100 parts by weight of a copolymer (phr)

II) 0.0001 to 0.5 parts by weight of a least one lower critical solution temperature (LCST) compound, wherein the LCST compounds are selected from the group consisting of methyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxyethyl methylcellulose and hydroxypropyl methylcellulose, and

III) no or from 0.0001 to 3.0 parts by weight of salts of mono- or multivalent metal ions and

IV) no or from 0.005 to 0.3 parts by weight of antioxidants

V) from 0.005 to 1.5 parts by weight of volatiles having a boiling point at standard pressure of 200°C.

11~~12~~. Copolymer compositions according to one of claims 1 to 10~~11~~ whereby the copolymers comprise repeating units derived from at least one isoolefin and at least one multiolefin.

12~~13~~. Copolymer compositions according to one of claims 1 to 11~~12~~, whereby the copolymers comprise repeating units derived from isobutylene and isoprene.

13~~14~~. Copolymer compositions according to one of claims 1 to 12~~13~~, whereby the copolymers consist of repeating units derived from isobutylene and isoprene.

14~~15~~. Copolymer compositions according to one of claims 1 to 13~~14~~, whereby the copolymers have a multiolefin content of 0.1 mol-% or more.

15~~16~~. Copolymer compositions according to one of claims 1 to 14~~15~~, wherein the weight average molecular weight of the copolymer is in the range of from 100 to 1000 kg/mol.

16~~17~~. Copolymer compositions according to one of claims 1 to 15~~16~~, wherein the polydispersity of the copolymers is in the range of 1.8 to 4.2 as measured by the ratio of weight average molecular weight to number average molecular weight and as determined by gel permeation chromatography.

17~~18~~. Copolymer compositions according to one of claims 1 to 16~~17~~, wherein the copolymer has a Mooney viscosity of at least 10 (ML 1 + 8 at 125°C, ASTM D 1646).

18~~19.~~ Blends or compounds obtainable by blending or compounding the copolymer compositions according to one of claims 1 to 17~~18~~.

~~20~~19. Use of the copolymer compositions according to one claims 1 to ~~18~~ 17 or the blends and compounds of claim ~~19~~ 18 for innerliners, bladders, tubes, air cushions, pneumatic springs, air bellows, accumulator bags, hoses, power belts, conveyor belts and pharmaceutical closures, automobile suspension bumpers, auto exhaust hangers, body mounts, shoe soles, tire sidewalls and tread compounds, belts, ~~hoses, shoe soles,~~ gaskets, o-rings, wires/cables, membranes, rollers, ~~bladders,~~ inner liners of tires, tire treads, shock absorbers, machinery mountings, balloons, balls, golf balls, ~~protective clothing,~~ medical tubing, storage tank linings, electrical insulation, bearings, pharmaceutical stoppers, adhesives, a container, ~~storage tank,~~ a container closure or lid; a seal or sealant; a material handling apparatus; a cooling tower; a metal working apparatus, or any apparatus in contact with metal working fluids; an engine component; a membrane, for fluid filtration or tank sealing, appliances, baby products, bathroom fixtures, bathroom safety, flooring, food storage, garden, kitchen fixtures, kitchen products, office products, pet products, ~~sealants and~~ grouts, spas, water filtration and storage, equipment, food preparation surfaces and equipments, shopping carts, surface applications, storage containers, footwear, protective wear, sporting gear, carts, dental equipment, door knobs, clothing, telephones, toys, catheterized fluids in hospitals, surfaces of vessels and pipes, coatings, food processing, biomedical devices, filters, additives, computers, ship hulls, shower walls, tubing, pacemakers, implants, wound dressing, medical textiles, ice machines, water coolers, fruit juice dispensers, soft drink machines, piping, storage vessels, metering systems, valves, fittings, attachments, filter housings, linings, and barrier coatings.

~~21~~20. Innerliners, bladders, tubes, air cushions, pneumatic springs, air bellows, accumulator bags, hoses, power belts, conveyor belts and pharmaceutical closures, automobile suspension bumpers, auto exhaust hangers, body mounts, shoe soles, tire sidewalls and tread compounds, belts, ~~hoses, shoe soles,~~ gaskets, o-rings, wires/cables, membranes, rollers, ~~bladders,~~ inner liners of tires, tire treads, shock absorbers, machinery mountings, balloons, balls, golf balls, ~~protective clothing,~~ medical tubing, storage tank linings, electrical insulation, bearings, pharmaceutical stoppers, adhesives, a container, ~~storage tank,~~ a container closure or lid; a seal or sealant; a material handling apparatus; a cooling tower; a metal working apparatus, or any apparatus in contact with metal working fluids; an engine component; a membrane, for fluid filtration or tank sealing, appliances, baby products, bathroom fixtures, bathroom safety, flooring, food storage, garden, kitchen fixtures, kitchen products, office products, pet products, ~~sealants and~~ grouts, spas, water filtration and storage, equipment, food preparation surfaces and equipments, shopping carts, surface applications, storage containers, footwear, protective wear, sporting gear, carts, dental equipment, door knobs, clothing, telephones, toys, catheterized fluids in hospitals, surfaces of vessels and pipes, coatings, food processing,

biomedical devices, filters, additives, computers, ship hulls, shower walls, tubing, pacemakers, implants, wound dressing, medical textiles, ice machines, water coolers, fruit juice dispensers, soft drink machines, piping, storage vessels, metering systems, valves, fittings, attachments, filter housings, linings, and barrier coatings made from or comprising copolymer compositions according to one claims 1 to ~~18~~ 17 or the blends and compounds of claim ~~19~~18.

~~22~~21. Use of sulfur-based curing system, resin cure systems and peroxide based curing systems and their specific components singly and jointly for curing blends or compounds according to claim ~~20~~19.