



Pharmaceutical Excipients Guide

Lubrizol LifeSciences is the world's largest manufacturer of pharmaceutical grade carbomers and polycarbophil, and has been manufacturing pharmaceutical excipients for more than 35 years. Our Carbopol®, Pemulen™, and Noveon® polymers have been successfully used in oral and topical pharmaceutical formulations for rheology modification, mucoadhesion, controlled release, and many other unique properties. Over time, numerous enhancements have been made to address regulatory requirements, meet formulation demands, increase product robustness and improve product handling during processing. For example, the solvent system used to synthesize the polymers has evolved. Specifically, the traditional polymers were polymerized in benzene solvent, and over time the product offering has been expanded to include products polymerized in more toxicologically preferred solvents like ethyl acetate and a cosolvent mixture of ethyl acetate and cyclohexane. Additionally, Carbopol® Ultrez and ETD polymers provide greater versatility in formulating and processing with their improved ease of dispersion.



Topical Applications

All polymers listed in the chart below are approved for use in topical (creams, lotions, gels, ointments and bioadhesive) applications.

Pharmacopeia Monograph Compendial Name				
Product Trade Name	Polymerization Solvent	United States (USP/NF)	Europe (Ph. Eur.) ¹	Japan (JPE) ²
Carbopol® 971P NF	Ethyl Acetate	Carbomer Homopolymer Type A	Carbomers	Carboxyvinyl Polymer
Carbopol® 974P NF	Ethyl Acetate	Carbomer Homopolymer Type B	Carbomers	Carboxyvinyl Polymer
Carbopol® 980 NF	Cosolvent	Carbomer Homopolymer Type C	Carbomers	Carboxyvinyl Polymer
Carbopol® 981 NF	Cosolvent	Carbomer Homopolymer Type A	Carbomers	Carboxyvinyl Polymer
Carbopol® 5984 EP	Cosolvent	Carbomer Homopolymer Type B	Carbomers	Carboxyvinyl Polymer
Carbopol® ETD 2020 NF	Cosolvent	Carbomer Interpolymer Type B	—	—
Carbopol® Ultrez 10 NF	Cosolvent	Carbomer Interpolymer Type A	—	—
Carbopol® 934 NF	Benzene	Carbomer 934	—	Carboxyvinyl Polymer
Carbopol® 934P NF	Benzene	Carbomer 934P	—	Carboxyvinyl Polymer
Carbopol® 940 NF	Benzene	Carbomer 940	—	Carboxyvinyl Polymer
Carbopol® 941 NF	Benzene	Carbomer 941	—	Carboxyvinyl Polymer
Carbopol® 1342 NF	Benzene	Carbomer 1342	—	—
Pemulen™ TR-1 NF	Cosolvent	Carbomer Copolymer Type B	—	—
Pemulen™ TR-2 NF	Cosolvent	Carbomer Copolymer Type A	—	—
Noveon® AA-1 USP	Ethyl Acetate	Polycarbophil	—	—

¹Lubrizol's benzene polymerized polymers do not meet the European Pharmacopeial "Carbomers" monograph because the residual benzene levels exceed the 2 ppm limit stipulated in the monograph.

²Based on customer request, Lubrizol certifies select lots of product against the JPE Carboxyvinyl Polymer monograph.

Oral Applications

All polymers listed in the chart below are approved for use in oral solid, oral liquid and bioadhesive applications.

Pharmacopeia Monograph Compendial Name				
Product Trade Name	Polymerization Solvent	United States (USP/NF)	Europe (Ph. Eur.) ¹	Japan (JPE) ²
Carbopol® Polymers				
71G NF	Ethyl Acetate	Carbomer Homopolymer Type A	Carbomers	Carboxyvinyl Polymer
971 P NF	Ethyl Acetate	Carbomer Homopolymer Type A	Carbomers	Carboxyvinyl Polymer
974 P NF	Ethyl Acetate	Carbomer Homopolymer Type B	Carbomers	Carboxyvinyl Polymer
934 P NF	Benzene	Carbomer 934	—	Carboxyvinyl Polymer
Noveon® Polycarbophil USP				
AA-1 USP	Ethyl Acetate	Polycarbophil	—	—

¹Lubrizol's benzene polymerized polymers do not meet the European Pharmacopeial "Carbomers" monograph because the residual benzene levels exceed the 2 ppm limit stipulated in the monograph.

²Based on customer request, Lubrizol certifies select lots of product against the JPE Carboxyvinyl Polymer monograph.

Reference Information

The following table shows recommended substitutes for the benzene grade Carbopol® products based on viscosity criteria. The substitute products are polymerized in either ethyl acetate or a cosolvent mixture of ethyl acetate and cyclohexane. If a substitution is made in a pharmaceutical formulation, it is recommended that key performance properties be ascertained and regulatory considerations be taken into account. Depending on the desired dosage requirements, other Carbopol® polymers may be suitable alternatives.

Benzene-Grade Carbopol® Polymers	Recommended Non-Benzene Carbopol® or Pemulen™ Polymers
Carbopol® 934 NF polymer	Carbopol® 5984 EP and Ultrez 10 NF polymers
Carbopol® 934P NF polymer	Carbopol® 974P NF polymer
Carbopol® 940 NF polymer	Carbopol® 980 NF and Ultrez 10 NF polymers
Carbopol® 941 NF polymer	Carbopol® 71G NF, 971P NF and 981 NF polymers
Carbopol® 1342 NF polymer	Pemulen™ TR-1 NF and TR-2 NF polymers

Looking for drug delivery solutions? Pathway™ TPU Excipients are designed to be a customizable, reliable choice for drug delivery, making it a smart choice for both new drug development and life cycle management.

Visit <https://www.lubrizol.com/Life-Sciences/Products/Pathway-TPU-Excipients> to learn more.

About Lubrizol LifeSciences

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For more information, visit [Lubrizol.com/LifeSciences](https://www.lubrizol.com/LifeSciences) or email LifeSciences@Lubrizol.com



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