Safety Assessment of Polyacrylate Crosspolymer-6 as Used in Cosmetics

Status: Scientific Literature Review for Public Comment
Release Date: November 13, 2025
Earliest Possible Review: March 12-13, 2026

*All interested persons are provided 60 days from the above release date (i.e., **January 12, 2026**) to comment on this safety assessment, and to identify additional published data that should be included or provide unpublished data which can be made public and included. Information may be submitted without identifying the source or the trade name of the cosmetic product containing the ingredient. All unpublished data submitted to CIR will be discussed in open meetings, will be available for review by any interested party, and may be cited in a peer-reviewed scientific journal. Please submit data, comments, or requests to the CIR Executive Director, Dr. Bart Heldreth.*

The Expert Panel for Cosmetic Ingredient Safety members are: Chair, Wilma F. Bergfeld, M.D., F.A.C.P.; Donald V. Belsito, M.D.; David E. Cohen, M.D.; Samuel M. Cohen, M.D., Ph.D.; Curtis D. Klaassen, Ph.D.; Allan E. Rettie, Ph.D.; David Ross, Ph.D.; Paul W. Snyder, D.V.M., Ph.D.; and Susan C. Tilton, Ph.D. The Cosmetic Ingredient Review (CIR) Executive Director is Bart Heldreth, Ph.D., and the Senior Director is Monice Fiume, M.B.A. This safety assessment was prepared by Temima Nguyen, M.S., Scientific Analyst/Writer, CIR.

555 13th Street, NW, Suite 300W, Washington, DC 20004
cirinfo@cir-safety.org

ABBREVIATIONS

CIR	Cosmetic Ingredient Review
Council	Personal Care Products Council
Dictionary	*International Cosmetic Ingredient Dictionary and Handbook*
FDA	Food and Drug Administration
HET-CAM	hen's egg test on the chorioallantoic membrane
HRIPT	human repeated-insult patch test
l.o.	leave-on
MoCRA	Modernization of Cosmetics Regulation Act
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NR	not reported
OECD	Organisation for Economic Co-operation and Development
Panel	Expert Panel for Cosmetic Ingredient Safety
RLD	Registration and Listing Data
r.o.	rinse-off
TG	test guideline
US	United States

INTRODUCTION

This assessment reviews the safety of Polyacrylate Crosspolymer-6 as used in cosmetic formulations. According to the web-based *International Cosmetic Ingredient Dictionary and Handbook* (*Dictionary*), Polyacrylate Crosspolymer-6 is reported to function as an emulsion stabilizer and viscosity increasing agent (aq.).[1]

This safety assessment includes relevant published and unpublished data that are available for each endpoint that is evaluated. Published data are identified by conducting an extensive search of the world's literature; a search was last conducted September 2025. A listing of the search engines and websites that are used and the sources that are typically explored, as well as the endpoints that the Expert Panel for Cosmetic Ingredient Safety (Panel) typically evaluates, is provided on the Cosmetic Ingredient Review (CIR) website (https://www.cir-safety.org/supplementaldoc/preliminary-search-engines-and-websites; https://www.cir-safety.org/supplementaldoc/cir-report-format-outline). Unpublished data are provided by the cosmetics industry, as well as by other interested parties.

Much of the data included in this safety assessment was found on the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) website.[2] (Please note that the NICNAS website provides summaries of information generated by industry, and it is those summary data that are reported in this safety assessment when NICNAS is cited.)

CHEMISTRY

Definition and Structure

According to the *Dictionary*, Polyacrylate Crosspolymer-6 is a vinyl-type copolymer comprising the ammonium salt of 2-acrylamido-2-methylpropane sulfonic acid (ammonium AMPS), dimethylacrylamide, lauryl methacrylate, and laureth-4 methacrylate monomer residues, and is crosslinked with trimethylolpropane triacrylate; this crosslinker is tridentate, linking 3 chains of the polymer per residue.[1] This ingredient has the following idealized chemical structure as shown in Figure 1.

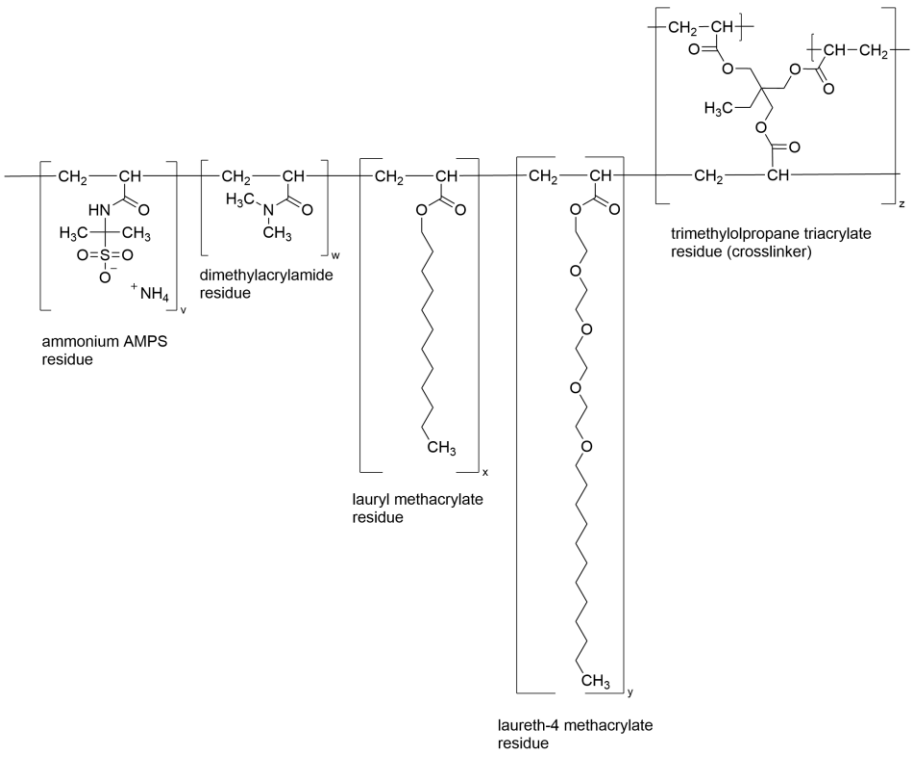

Figure 1. Polyacrylate Crosspolymer-6 (idealized structure; drawn as a block copolymer for convenience of depiction)[CIR Staff]

Chemical Properties

Polyacrylate Crosspolymer-6 is reported to be a white powder.[2] The number average formula weight of Polyacrylate Crosspolymer-6 is > 10,000 Da. Other chemical properties can be found in Table 1.

Method of Manufacture

Methods of manufacture data were not found in the published literature, and unpublished data were not submitted.

Impurities

Specific impurities data were not found in the published literature, and unpublished data were not submitted. The NICNAS report stated that Polyacrylate Crosspolymer-6 that was assessed contained the notified polymer at > 90% concentration, and that it contained only "low concern functional groups".[2]

USE

Cosmetic

The safety of the cosmetic ingredient addressed in this assessment is evaluated based on data received from the US Food and Drug Administration (FDA) and the cosmetics industry on the expected use of Polyacrylate Crosspolymer-6 in cosmetics. Registration and Listing Data (RLD) obtained from the FDA report frequency of use, and responses to a survey conducted by the Personal Care Products Council (Council) indicate maximum reported concentrations of use; it is these values that define the present practices of use and concentration that are assessed by the Panel. Since 2024, as a result of the Modernization of Cosmetics Regulation Act (MoCRA) of 2022, manufacturers and processors are required to register facilities and list their products (and ingredients therein) with the FDA (i.e., RLD). An exception is made for small businesses (average gross annual sales in the US of cosmetic products for the previous 3-yr period is less than $1,000,000, adjusted for inflation), which are exempt from MoCRA reporting for most cosmetic product categories. Eye area products, injected products, internal use products, or products that alter appearance for more than 24 h, and the facilities that manufacture these products, are not included in this exemption.[3]

According to RLD submitted to CIR in 2024, Polyacrylate Crosspolymer-6 is reported to be used in 1515 formulations; the majority of applications are leave-on (Table 2).[4] According to the results of the Council survey that was conducted in 2025 using MoCRA product categories, the highest reported maximum concentration of use was 5%, in mascaras.[5]

Polyacrylate Crosspolymer-6 is used in products that are applied near the eye (e.g., mascaras up to 5%), that can be incidentally ingested (e.g., lipsticks and lip glosses at up to 1.6%), and in products that may result in mucous membrane exposure (e.g., bath soaps and body washes at up to 0.7%; lipsticks and lip glosses at up to 1.6%). Additionally, Polyacrylate Crosspolymer-6 is used in sprays (e.g., cologne and toilet waters at up to 0.89%; deodorants, concentration of use not reported) and could therefore be incidentally inhaled. In practice, as stated in the Panel's respiratory exposure resource document (https://www.cir-safety.org/cir-findings), most droplets/particles incidentally inhaled from cosmetic sprays would be deposited in the nasopharyngeal and tracheobronchial regions and would not be respirable (i.e., they would not enter the lungs) to any appreciable amount. There is some evidence indicating that deodorant spray products can release substantially larger fractions of particulates having aerodynamic equivalent diameters in the range considered to be respirable. However, the information is not sufficient to determine whether significantly greater lung exposures result from the use of deodorant sprays, compared to other cosmetic sprays.

Some products containing Polyacrylate Crosspolymer-6 may be marketed for use with airbrush delivery systems. With the advent of MoCRA and the current product categories outlined by the FDA, it is now mandatory that cosmetic products used in airbrush delivery systems be reported as such for some, but not all, product categories in the RLD. In other words, a reliable source of frequency of use data regarding the use of cosmetic ingredients in conjunction with airbrush delivery systems is now available, in some instances. Additionally, the concentration of use surveys are conducted based on product categories as stated in the RLD. None of the reported product categories for this ingredient as listed in the RLD include a designation using airbrush application, so it is possible that this ingredient is used with airbrush delivery systems, but not reported as such. Additionally, no concentration of use data were provided indicating airbrush application. Nevertheless, no consumer habits and practices data or particle size data are publicly available to evaluate the exposure associated with this use type, thereby preempting the ability to evaluate risk or safety. Without information regarding the consumer habits and practices data or product particle size data (or other relevant particle data, e.g., diameter) related to this use technology, the data profile is incomplete, and the Panel is not able to determine safety for use in airbrush formulations. Accordingly, the data are insufficient to evaluate the exposure resulting from cosmetics applied via airbrush delivery systems.

Polyacrylate Crosspolymer-6 is not restricted from use in any way under the rules governing cosmetic products in the European Union.

Non-Cosmetic

Non-cosmetic uses were not found in the published literature, and unpublished data were not submitted.

Toxicokinetic Studies

Toxicokinetics studies were not found in the published literature, and unpublished data were not submitted.

TOXICOLOGICAL STUDIES

Acute Toxicity Studies

Acute toxicity studies were not found in the published literature, and unpublished data were not submitted.

Repeated-Dose Toxicity Studies

Short-term, subchronic, and chronic toxicity studies were not found in the published literature, and unpublished data were not submitted.

DEVELOPMENTAL AND REPRODUCTIVE TOXICITY STUDIES

Developmental and reproductive toxicity studies were not found in the published literature, and unpublished data were not submitted.

GENOTOXICITY STUDIES

In Vitro

The genotoxicity of Polyacrylate Crosspolymer-6 was assessed using a bacterial reverse mutation test according to Organisation for Economic Co-operation and Development (OECD) test guideline (TG) 471.[2] There were no effects observed, and the results were negative. No additional information was provided.

CARCINOGENICITY STUDIES

Carcinogenicity studies were not found in the published literature, and unpublished data were not submitted.

DERMAL IRRITATION AND SENSITIZATION STUDIES

Irritation

Animal

The dermal irritation of Polyacrylate Crosspolymer-6 was tested in rabbits according to OCED TG 404.[2] There were no effects observed, and the substance was considered non-irritating at > 90%. No additional information was given.

Sensitization

Human

Polyacrylate Crosspolymer-6 was used in a human repeated-insult patch test (HRIPT) using the Marzulli-Maibach method.[2] The test substance was considered non-sensitizing and non-irritating in humans at ~5%. No additional information was provided.

OCULAR IRRITATION STUDIES

In Vitro

One study evaluated the ocular irritation potential of Polyacrylate Crosspolymer-6 in vitro using the hen's egg test on the chorioallantoic membrane (HET-CAM).[2] At 2%, the substance was considered to be non-irritating.

Animal

The ocular irritation potential of Polyacrylate Crosspolymer-6 was tested in 3 rabbits (concentrations not stated) according to OCED TG 405.[2] The substance resulted in chemosis and redness of the conjunctiva (grade 2) and slight discharge (grade 1) in all the rabbits; all effects resolved by day 6 in 2 animals and day 7 in the third animal. Polyacrylate Crosspolymer-6 was considered to be slightly irritating to the eye based on the results of the study.

SUMMARY

The safety of Polyacrylate Crosspolymer-6 as used in cosmetics is reviewed in this safety assessment. Polyacrylate Crosspolymer-6 is reported to function in cosmetics as an emulsion stabilizer and viscosity increasing agent (aq.).

According to RLD submitted to CIR in 2024, Polyacrylate Crosspolymer-6 is reported to be used in 1515 formulations. The results of the concentration of use survey conducted by the Council in 2025 indicated the highest reported maximum concentration of use is 5%, in mascaras.

The toxicity of Polyacrylate Crosspolymer-6 was evaluated in various studies. The substance was not mutagenic in an Ames test. Polyacrylate Crosspolymer-6 was non-irritating at > 90% in a dermal irritation study completed in rabbits, and was non-sensitizing at ~5% in an HRIPT (details not provided). It was predicted to not be an ocular irritant at 2% in an in vitro HET-CAM. However, when tested in 3 rabbits, the substance was considered to be slightly irritating at an unknown concentration.

INFORMATION SOUGHT

The following information on Polyacrylate Crosspolymer-6 is being sought for use in the resulting safety assessment:

- Chemical properties data
- Method of manufacturing data pertaining to use in cosmetic formulations
- Impurities data
- Dermal toxicity data
- Additional genotoxicity data
- Dermal irritation and sensitization data at maximum concentration of use
- Ocular irritation data at maximum concentration of use

TABLES

Table 1. Chemical properties of Polyacrylate Crosspolymer-6

Property	Value	Reference
Physical Form (@ 20 ºC and 101.3 kPa)	Powder	2
Color	White	2
Formula Weight (number average; Da)	> 10,000	2
Density (kg/m^3, @ 25 ºC)	230	2
Glass Transition Temperature (ºC)	> 200 (decomp.)	2
Water Solubility (@ 20 ºC)	Fully soluble in water, forms a gel at high concentration.	2
Particle Size Distribution (µm)	Laser diffraction: < 371 90% < 43 50% < 0.8 10% Sieve analysis: < 2 000 98% < 150 25% < 80 7%	2

Table 2. Frequency and concentration of use of Polyacrylate Crosspolymer-6 according to likely duration and exposure and by product category

	# of Uses	Max Conc of Use
	RLD (2024)[4]	% (2025)[5]
Totals*	**1515**	**0.008-5**
summarized by likely duration and exposure**		
Duration of Use		
Leave-On	*1468*	*0.008-5*
Rinse-Off	*248*	*0.7-2.9*
Diluted for (Bath) Use	*6*	*0.02*
Permanent Tattoo Ink	*NR*	*NR*
Unknown	*10*	*NR*
Exposure Type		
Baby Products	5	1
Children's Makeup	NR	NR
Eye Area	73	0.49-5
Incidental Ingestion	105	0.34-1.6
Mucous Membrane	130	0.02-1.6
Incidental Inhalation-Spray	14; 459[a]; 821[b]	0.39-0.89; 1[a]; 0.39-1.9[b]
Incidental Inhalation-Airbrush	NR	NR
Incidental Inhalation-Powder	821[b]; 3[c]	0.39-1.9[b]; 0.4-1.6[c]
Dermal Contact	1548	0.008-2.9
Deodorant (underarm)	22 (not spray); 1 (spray)	NR
Hair - Non-Coloring	44	0.4
Hair-Coloring	7	NR
Nail	3	NR
Tattoo Preparations	NR	NR
Other Preparations (Unknown Exposure Type)	10	NR
as reported by product category		
Baby Products		
Baby Lotions/Oils/Powders/Creams	3	NR
Other Baby Products	2 (r.o.)	1 (r.o.)
Bath Preparations		
Bubble Baths	4	NR
Bath Capsules	NR	0.02
Other Bath Preparations	2	NR
Eye Makeup Preparations (other than children's eye makeup preparations)		
Eyeliner	7	NR
Eye Shadow	21	0.49
Eye Lotion	9	0.5-0.8
Eye Makeup Remover	1	NR
Mascara	15	5
Eyelash and Eyebrow Preparations (primers, conditioners, serums, fortifiers)	10	NR
Eyelash Cleansers	2	NR
Other Eye Makeup Preparations	8	NR
Fragrance Preparations		
Cologne and Toilet Water	3	0.89
Perfumes	8	0.39
Other Fragrance Preparation	1	NR

Table 2. Frequency and concentration of use of Polyacrylate Crosspolymer-6 according to likely duration and exposure and by product category

	# of Uses	Max Conc of Use
	RLD (2024)[4]	% (2025)[5]
Hair Preparations (non-coloring)		
Hair Conditioners	5 (l.o.); 1 (r.o)	0.4 (l.o.)
Hair Straighteners	1	NR
Shampoos (non-coloring)	2 (r.o.)	NR
Tonics, Dressings, and Other Hair Grooming Aids	13	NR
Other Hair Preparations	20 (l.o.); 2 (r.o.)	NR
Hair Coloring Preparations		
Hair Lighteners with Color	**7**	NR
Makeup Preparations (not eye; not children's)		
Blushers and Rouges (all types)	9	NR
Foundations	22 (traditional application)	0.5 (traditional application)
Leg and Body Paints	6 (traditional application)	NR
Lipsticks and Lip Glosses	105	0.34-1.6
Makeup Bases	19 (traditional application)	0.008-0.05 (traditional application)
Makeup Fixatives	3	NR
Other Makeup Preparations	16 (traditional application)	NR
Manicuring Preparations		
Other Manicuring Preparations	3	NR
Personal Cleanliness		
Bath Soaps and Body Washes	19	0.7
Deodorants (underarm)	22 (not spray); 1 (spray)	NR
Shaving Preparations		
Aftershave Lotions	6	NR
Beard Softeners	2	NR
Pre-shave Lotions (all types)	2	NR
Shaving Creams (aerosol, brushless, and lather)	1	NR
Skin Care Preparations (creams, lotions, powder, and sprays)		
Cleansing (cold creams, cleansing lotions, liquids, and pads)	66	1-2
Face and Neck (excluding shaving preparations)	651 (l.o.), 83 (r.o.)	Not spray: 0.4-1.6 (l.o.), 0.8-1.4 (r.o.)
Body and Hand (excluding shaving preparations)	55 (l.o.), 7 (r.o.)	Not spray: 0.7 (l.o), 2.4 (r.o.)
Foot Powders and Sprays	1	NR
Moisturizing	211	0.85 (not spray)
Night	67	0.5 (not spray)
Paste Masks (mud packs)	20	1.2-2.9
Skin Fresheners	17	NR
Other Skin Care Preparations	81 (l.o.); 32 (r.o.)	0.39-1.9 (l.o.); 1 (r.o.)
Suntan Preparations		
Suntan Gels, Creams, and Liquids	38	0.5 (not spray)
Indoor Tanning Preparations	7 (traditional application); 2 (spray)	NR
Other Suntan Preparations	1	NR
Other Preparations (i.e., those preparations that do not fit another category)	10	NR

NR – not reported
l.o. – leave-on; r.o. – rinse-off
*The sum of all exposure types or for all product categories may not equal the sum of total uses because each ingredient may be used in cosmetics with multiple exposure types and because each formulation may be reported for multiple product categories.
**Likely duration and exposure are derived from survey data based on product category (see Use Categorization https://www.cir-safety.org/cir-findings)
[a] It is possible these products are sprays, but it is not specified whether the reported uses are sprays.
[b] Not specified whether a spray or a powder, but it is possible the use can be as a spray or a powder, therefore the information is captured in both categories
[c] It is possible these products are powders, but it is not specified whether the reported uses are powders.

REFERENCES

1. Nikitakis J, Kowcz A. 2025. Web-Based *International Cosmetic Ingredient Dictionary and Handbook*. https://incipedia.personalcarecouncil.org/winci/. Date Accessed: September 26th, 2025.
2. National Industrial Chemicals Notification and Assessment Scheme (NICNAS). 2006. Polymer of low concern full public report: Polyacrylate Crosspolymer-6 (Sepimax Zen). https://www.industrialchemicals.gov.au/sites/default/files/PLC977%20Public%20Report%20PDF.pdf. Date Accessed: Aug 27th, 2025.
3. U.S. Food and Drug Administration. Federal Food, Drug, and Cosmetic Act Section 612 Title 21.
4. US Food and Drug Administration Office of the Chief Scientist. 2024. Registration and Listing Data - Frequency of Use of Cosmetic Products. College Park, MD [Obtained under the Freedom of Information Act from the Division of Freedom of Information; requested as "Frequency of Use Data" July 17, 2024; received July 30, 2024].
5. Personal Care Products Council. 2025. Concentration of Use by FDA Product Category: Polyacrylate Crosspolymer-6. [Unpublished data submitted by the Personal Care Products Council on March 31st, 2025].