

SAFETY DATA SHEET



The information in this Safety Data Sheet is required pursuant to Hazardous Product Regulations 2023.

Date of issue/Date of revision 11 May 2026

Version 1.04

Section 1. Identification

Product name : 909-20 PPG ADVANTAGE 900 INTERIOR/EXTERIOR ACRYLIC PAINT GLOSS
MIDTONE BASE

Product code : 00428737

Other means of identification : Not available.

Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Consumer applications, Professional applications, Used by spraying.

Use of the substance/mixture : Coating.

Uses advised against : Not applicable.

Supplier : CANADIAN INDUSTRIES
INDUSTRIES CANADIENNES
1550, rue Ampère, bureau 500
Boucherville (Québec) J4B 7L4
Canada

The Pittsburgh Paints Co.
500 Cranberry Woods Drive,
Cranberry Township, PA 16066

Emergency telephone number : 1-833-477-1553 (U.S. and Canada)
SETIQ Interior de la República: 800-00-214-00 (México)

Technical Phone Number : 1-800-441-9695 (U.S. and México)
1-800-387-2253 (Canada)

Section 2. Hazard identification

Classification of the substance or mixture : RESPIRATORY SENSITIZATION - Category 1A
CARCINOGENICITY - Category 2

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Suspected of causing cancer.

**Product name 909-20 PPG ADVANTAGE 900 INTERIOR/EXTERIOR ACRYLIC PAINT GLOSS
MIDTONE BASE**

Section 2. Hazard identification

Precautionary statements

- General** : Keep out of reach of children. If medical advice is needed, have product container or label at hand.
- Prevention** : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves, protective clothing, eye protection, face protection, or hearing protection. Wear respiratory protection. Avoid breathing vapor.
- Response** : IF exposed or concerned: Get medical advice or attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor.
- Storage** : Store locked up.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Supplemental label elements** : Contains isothiazolinones. May cause allergic reaction. Emits toxic fumes when heated.
Percentage of the mixture consisting of ingredient(s) of unknown acute toxicity: 26.7% (oral), 28.9% (dermal), 28.9% (inhalation)
- Other hazards which do not result in classification** : None known.

Section 3. Composition/information on ingredients

- Substance/mixture** : Mixture
- Product name** : 909-20 PPG ADVANTAGE 900 INTERIOR/EXTERIOR ACRYLIC PAINT GLOSS
MIDTONE BASE
- Other means of identification** : Not available.

CAS number/other identifiers

Ingredient name	Synonyms	% (w/w)	CAS number
titanium dioxide	Titanium oxide; Titanium oxide (TiO ₂); CI 77891; Titanium peroxide; Rutile; C.I. Pigment White 6; titanium dioxide, other than those of heading 3206 11 00; C.I. 77891; E 171; titanium(IV) oxide, other than those of heading 3206 11 00	≥5 - ≤10*	13463-67-7
diammonium peroxodisulphate	ammonium persulphate; Peroxydisulfuric acid ([(HO)S(O)2]2O2), ammonium salt (1:2); Peroxydisulfuric acid ([(HO)S(O)2]2O2), diammonium salt; Peroxydisulfuric acid ([(HO)S(O)2]2O2), diammonium salt; Ammonium persulfate ((NH ₄) ₂ S ₂ O ₈); AMMONIUM PERSULFATE; Persulfates, Ammonium persulfate; diammonium peroxodisulfate; Peroxydisulfuric acid, diammonium salt; DIAMMONIUM PEROXYDISULFATE; AMMONIUM PEROXYDISULFATE	≥0.1 - 1*	7727-54-0

Ranges if listed above for hazardous ingredient(s) are prescribed ranges. The actual concentration(s) or actual concentration range(s) are being withheld as a trade secret.

Section 3. Composition/information on ingredients

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First-aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In the event of any complaints or symptoms, avoid further exposure.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- Skin contact** : No known significant effects or critical hazards.
- Ingestion** : No known significant effects or critical hazards.

Over-exposure signs/symptoms

- Eye contact** : No specific data.
- Inhalation** : Adverse symptoms may include the following:
wheezing and breathing difficulties
asthma
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Section 4. First-aid measures

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon oxides
metal oxide/oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Section 6. Accidental release measures

- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Persons with a history of asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Special precautions** : If this material is part of a multiple component system, read the Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Do not store below the following temperature: 5°C (41°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
titanium dioxide	CA Alberta Provincial (Canada, 3/2023) OEL 8 hours: 10 mg/m ³ . CA British Columbia Provincial (Canada, 3/2025) TWA 8 hours: 10 mg/m ³ . CA Ontario Provincial (Canada, 6/2019) TWA 8 hours: 10 mg/m ³ . CA Quebec Provincial (Canada, 2/2024) TWA _{EV} 8 hours: 10 mg/m ³ . Form: total particulate matter. CA Saskatchewan Provincial (Canada, 4/2021) STEL 15 minutes: 20 mg/m ³ . TWA 8 hours: 10 mg/m ³ .
diammonium peroxodisulphate	CA Alberta Provincial (Canada, 3/2023) OEL 8 hours: 0.1 mg/m ³ . CA British Columbia Provincial (Canada, 3/2025) [persulfates] TWA 8 hours: 0.1 mg/m ³ (as persulfate). CA Ontario Provincial (Canada, 6/2019) [Persulfates] TWA 8 hours: 0.1 mg/m ³ (as persulfate). CA Saskatchewan Provincial (Canada, 4/2021) [Persulphates] STEL 15 minutes: 0.3 mg/m ³ (measured as persulphate). TWA 8 hours: 0.1 mg/m ³ (measured as persulphate).

Biological exposure indices

No exposure indices known.

Consult local authorities for acceptable exposure limits.

Appropriate engineering controls

: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls

: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Section 8. Exposure controls/personal protection

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

Appearance

- Physical state** : Liquid.
- Color** : Not available.
- Odor** : Characteristic.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point/freezing point** : Not available.
- Boiling point or initial boiling point and boiling range** : >37.78°C (>100°F)
- Flash point** : Closed cup: Not applicable. [Product does not sustain combustion.]
- Evaporation rate** : Not available.
- Flammability** : Not available.
- Lower and upper explosion limit/flammability limit** : Not available.

Section 9. Physical and chemical properties

Vapor pressure :

Ingredient name	Vapor Pressure at 20°C			Vapor pressure at 50°C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
water	17.5	2.3				

Relative vapor density : Not available.

Relative density : 1.11

Density (lbs / gal) : 9.26

% Solid. (w/w) : 41.747

Solubility(ies) :

Media	Result
cold water	Soluble

Miscible with water : Yes.

Partition coefficient: n-octanol/water : Not applicable.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Dynamic (room temperature): Not available.
Kinematic (room temperature): Not available.
Kinematic (40°C (104°F)): >21 mm²/s (>21 cSt)

Particle characteristics

Median particle size : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Depending on conditions, decomposition products may include the following materials: carbon oxides metal oxide/oxides

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name

titanium dioxide

Result

Rat - Oral - LD50

>5000 mg/kg

OECD 401 [Acute Oral Toxicity]

Rabbit - Dermal - LD50

>5000 mg/kg

Rat - Inhalation - LC50 Dusts and mists

>6.82 mg/l [4 hours]

Rat - Oral - LD50

0.6 g/kg

diammonium peroxodisulphate

Conclusion/Summary [Product] : Not available.

Skin corrosion/irritation

Not available.

Conclusion/Summary [Product] : Not available.

Serious eye damage/eye irritation

Not available.

Conclusion/Summary [Product] : Not available.

Respiratory corrosion/irritation

Not available.

Conclusion/Summary [Product] : Not available.

Respiratory or skin sensitization

Not available.

Skin

Conclusion/Summary [Product] : Not available.

Respiratory

Conclusion/Summary [Product] : Not available.

Germ cell mutagenicity

Not available.

Conclusion/Summary [Product] : Not available.

Section 11. Toxicological information

Carcinogenicity

Not available.

Conclusion/Summary [Product] : Not available.

Classification

Product/ingredient name	IARC	NTP	ACGIH
titanium dioxide	2B	-	A3

Reproductive toxicity

Not available.

Conclusion/Summary [Product] : Not available.

Specific target organ toxicity (single exposure)

Product/ingredient name

diammonium peroxodisulphate

Result

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure

Not available.

Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- Skin contact** : No known significant effects or critical hazards.
- Ingestion** : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : No specific data.
- Inhalation** : Adverse symptoms may include the following:
wheezing and breathing difficulties
asthma
- Skin contact** : No specific data.
- Ingestion** : No specific data.

Section 11. Toxicological information

Delayed and immediate effects and also chronic effects from short and long term exposure

Conclusion/Summary : There are no data available on the mixture itself. Contains isothiazolinones. May cause allergic reaction. This product contains TiO₂ which has been classified as a GHS Carcinogen Category 2 based on its IARC 2B classification. For many products, TiO₂ is utilized as a raw material in a liquid coating formulation. In this case, the TiO₂ particles are bound in a matrix with no meaningful potential for human exposure to unbound particles of TiO₂ when the product is applied with a brush or roller. Sanding the coating surface or mist from spray applications may be harmful depending on the duration and level of exposure and require the use of appropriate personal protective equipment and/or engineering controls (see Section 8). If splashed in the eyes, the liquid may cause irritation and reversible damage. Ingestion may cause nausea, diarrhea and vomiting. This takes into account, where known, delayed and immediate effects and also chronic effects of components from short-term and long-term exposure by oral, inhalation and dermal routes of exposure and eye contact.

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

Conclusion/Summary [Product] : Not available.

General : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
909-20 PPG ADVANTAGE 900 INTERIOR/ EXTERIOR ACRYLIC PAINT GLOSS MIDTONE BASE	84617.2	N/A	N/A	N/A	N/A
diammonium peroxodisulphate	600	N/A	N/A	N/A	N/A

Section 11. Toxicological information

Section 12. Ecological information

Toxicity

Product/ingredient name

titanium dioxide

Result**Acute - LC50 - Fresh water**Daphnia - *Daphnia magna*

>100 mg/l [48 hours]

Conclusion/Summary [Product] : Not available.

Persistence and degradability

Not available.

Conclusion/Summary [Product] : Not available.

Bioaccumulative potential

Not available.

Mobility in soil

**Soil/Water partition
coefficient**

: Not available.

Other adverse effects

No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods

: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Product code 00428737	Date of issue 11 May 2026	Version 1.04
Product name 909-20 PPG ADVANTAGE 900 INTERIOR/EXTERIOR ACRYLIC PAINT GLOSS MIDTONE BASE		

Section 14. Transport information

	DOT	TDG	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-
Class(es)	-	-	-	-
Packing group	-	-	-	-
Environmental hazards	No.	No.	No.	No.
Marine pollutant substances	Not applicable.	Not applicable.	Not applicable.	Not applicable.

Additional information

DOT : None identified.
TDG : None identified.
IMDG : None identified.
IATA : None identified.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not applicable.

Section 15. Regulatory information

Inventory list

Australia : All components are listed or exempted.
Canada : At least one component is not listed in DSL but all such components are listed in NDSL.
China : All components are listed or exempted.
Eurasian Economic Union : **Russian Federation inventory:** Not determined.
Japan : **Japan inventory (CSCL):** At least one component is not listed.
Japan inventory (ISHL): Not determined.
New Zealand : Not determined.
Philippines : At least one component is not listed.
Republic of Korea : At least one component is not listed.
Taiwan : Not determined.
Thailand : Not determined.
Turkey : Not determined.
United States : All components are active or exempted.
Viet Nam : Not determined.

Section 16. Other information

Please refer to Section 2 of this document for GHS hazard classifications.
The customer is responsible for determining the PPE code for this material.

Date of issue/Date of revision 11 May 2026

Organization that prepared the SDS : EHS

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973
as modified by the Protocol of 1978. ("Marpol" = marine pollution)
N/A = Not available
SGG = Segregation Group
UN = United Nations

Indicates information that has changed from previously issued version.

Disclaimer

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein or from failure to observe the recommended measures for storage and handling of the products. Final determination of suitability of any material is the sole responsibility of the user. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. All materials may present unknown hazards and should be used with caution.