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 Carson, CA 90746
 Phone: 800-374-3872
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www.evroberts.com

RESIN FORMULATORS Material Safety Data Sheet

Section 1 – Chemical Product and Company Identification

Product Name: RFC-2329 Part A
 Product Use: Filled Epoxy Resin System
 Date Effective: 9-11-2009
 Manufactured by:

E.V. Roberts
 Resin Formulators
 18027 Bishop Ave.
 Carson, CA 90746
 (800) 374-3872

In an emergency call CHEMTREC @ 800-424-9300

Section 2 – Composition/Information on Ingredients

Hazardous Ingredients(s)	%(by wt.)	ACGIH TLV	CAS NO.
(1) Bis A/Epichlorohydrin Resin	< 50%	None established	25068-38-6
(2) N-butyl Glycidyl Ether (silica deficient, sodium-potassium alumina silicate, < 0.1% free crystalline silica)	<5 %	25 ppm	2426-08-6
(3) Silica, amorphous	>30%	20 mppcf	7631-86-9

(see Section 12, Acute Toxicity Data)

Section 3 – Hazards Identification

EMERGENCY OVERVIEW

Health Hazards: Moderately irritating to skin. May cause sensitization by continuous contact with skin or vapors (especially if heated). Moderately irritating to eyes.

Physical Hazards: Reacts with strong oxidizing agents, amines, acids (Lewis of mineral). Will exotherm when reacting. This reaction accelerates at higher temperatures.

Appearance: Tan colored

Odor: Negligible odor

Read the entire MSDS for a more thorough evaluation of the hazards.

Section 4 - First Aid Measures

General:	In case accident or if you feel unwell. Seek medical advice immediately (Show the label where possible).
Inhalation:	Remove patient from exposure, keep warm and at rest. Obtain medical attention. Treatment is symptomatic for primary irritation or bronchospasm. If breathing is labored, qualified personnel should administer oxygen. Apply artificial respiration if breathing has ceased or shows signs of failing.
Skin Contact:	Remove contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, <u>obtain medical advice</u> . Contaminated clothing should be thoroughly cleaned before reuse. Contaminated leather articles <u>can not be decontaminated</u> and should be destroyed.
Eye Contact:	Immediately flush eyes with running water for a minimum of 15 minutes. Hold eyelids open during flushing. If irritation persists repeat flushing and <u>obtain medical attention IMMEDIATELY</u> .
Ingestion:	<u>Do NOT induce vomiting</u> . In general, no treatment is necessary unless large quantities of product are ingested. However, if conscience, wash out their mouth with water then give 1 or 2 glasses of water to drink. Refer person to medical personnel for immediate attention.
Note to Physicians:	In general, emesis induction is unnecessary in high viscosity, low volatility products, e.g. Neat Epoxy Resins. However, symptomatic and supportive therapy may be needed following severe exposure. In such cases, medical follow-up should be maintained for at least 48 hours.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards:	Containers may burst under intense heat Due to reaction with water, a hazardous build-up of pressure could result if contaminated containers are re-sealed.
Extinguishing Media:	Carbon dioxide, dry chemical, or appropriate foam. If water is used, very large quantities are required. Reaction between water and hot isocyanate may be vigorous. Contain runoff water with temporary barriers.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and full protective clothing (Bunker gear).
Flash Point:	164 F (setaflash)
Flammable Limits (Lower):	Not available.
Flammable Limits (Upper):	Not available.
Auto Ignition Temperature:	Not Available
Decomposition Temperature:	~600°F (315°C)
Rate of Burning:	Not available.
Explosive Power:	None.
Sensitivity to Mechanical Impact:	None.
Sensitivity to Static Discharge:	None.
Decomposition Products:	Carbon monoxide, Aldehydes, Acids, and other organic substances may be formed during the combustion or thermal or oxidative decomposition. Reaction with some curing agents may produce considerable heat (exotherm). Run-a-way cure reaction may char and decompose the resin system, generating unidentified fumes and vapors, which may be toxic.

Section 6 – Accidental Release Measures

For major spills call Chemtrec (800) 424-9300.

Spills, Leaks, or Releases: Clean up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including respiratory protection. Evacuate the area. Prevent further leakage, spillage or entry into drains. Contain and absorb large spillages onto an inert, non-flammable adsorbent carrier (such as earth or sand). Shovel into open-top drums or plastic bags for further decontamination, if necessary. Wash the spillage area clean with liquid decontaminant. Remove and dispose of residues. Notify applicable government authorities if release is reportable. **Small Spills:** Take up with an absorbent material and dispose of properly.

Section 7 – Special Precautions

Emptied containers can contain hazardous product residues. Handle in accordance with the hazard potential of curing agent (s) used. Avoid contact with eyes, avoid prolonged or repeated contact with skin. Wash thoroughly after handling. Launder contaminated clothing before reuse. Contaminated leather articles, including shoes, can not be decontaminated and should be destroyed.

Warning: may cause skin and eye irritation. May cause skin sensitization. Minimize bodily contact. Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Heating this material above 300°F in the presence of air may cause slow oxidative decomposition. Above 500°F, polymerization may occur. Some curing agents, eg. Aliphatic amines can produce exothermic reactions which in large masses can cause runaway polymerization and charring of the reactants. Fumes and vapors from these thermal and chemical decompositions vary widely in composition and toxicity. **DO NOT BREATHE FUMES.** Use a NIOSH-approved respirator

Section 8 – Handling and Storage

Handling: Avoid personal contact with the product or reaction mixture. Use only with adequate ventilation to ensure that the defined occupational exposure limit is not exceeded. The efficiency of the ventilation must be monitored regularly because of the possibility of blockage. Avoid breathing aerosols, mists and vapors. When the product is sprayed or heated, an approved MSHA/NIOSH positive-pressure, supplied-air respirator may be required.

Storage Requirements: Keep containers properly sealed and when stored indoors, in a well ventilated area. Keep contents away from open flames and high temperatures.

Storage Temperature: Ideal storage temperature is 16-38°C (60-100°F)

Shelf life: 12 months @ 77°F (25°C) .

Section 9 – Exposure Controls/Personal Protection

PREVENTIVE MEASURES:

Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

Engineering Controls: Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. Follow guidelines in the ACGIH publication "Industrial Ventilation".

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Chemical safety goggles. If there is a potential for splashing, use a full-face shield.

Skin Protection: The following protective materials are recommended. Gloves - neoprene, nitrile-butadiene rubber, butyl rubber. Thin disposable gloves should be avoided for repeated or long term use. Protective clothing should be selected and used in accordance with "Guidelines for the Selection of Chemical Protective Clothing" published by ACGIH.

Respiratory protection: Not ordinarily required

Protective Clothing: Avoid contact with eyes, wear safety goggles as appropriate. Wear chemical resistant clothing as required to minimize contact

Section 10 – Chemical and Physical Properties

Chemical Name: Bisphenol A/Epichlorohydrin Epoxy Resin
Chemical Family: Filled Epoxy Paste
Molecular Formula: Not applicable (mixture)
Appearance: Tan Paste
Odor: Sweet Odor
Vapor Pressure (mm Hg at 20°C): Negligible
Vapor Density (Air=1): Heavier than air
Percent Volatiles by Weight: Negligible
Boiling Point: >400°F
Melting Point: Below 77°F (25°C)
Solubility (Water): Negligible
Bulk Density: 10.0-11.8 Lbs. Per Gallon
Specific Gravity: 1.2 – 1.4

Section 11 – Stability and Reactivity

Hazardous Decomposition Products: Carbon monoxide, aldehydes, acids, and other organic substances may be formed during the combustion or thermal or oxidative decomposition. Reaction with some curing agents may produce considerable heat (exothermic). Run-A-Way cure reactions may char and decompose the resin system, generating unidentified fumes and vapors which may be toxic.

Chemical Stability: Stable at room temperature.

Conditions to Avoid: Can react vigorously with strong oxidizing agents, strong Lewis or mineral acids, and strong mineral and organic bases, especially primary and secondary aliphatic amines.

Section 12 – Toxicology Information

TOXICOLOGICAL INFORMATION & FIRST AID MEASURES
ACUTE TOXICITY DATA

	<u>Acute Oral LD50</u>	<u>Acute Dermal LD50</u>	<u>Acute Inhalation LD50</u>
(1) Bis A epichlorohydrin:	11.4g/kg (rat)	<20g/kg (Rabbit)	No Deaths, SAT. Air, 8 Hr

POTENTIAL HEALTH EFFECTS:

Inhalation: Not expected to be relevant route of exposure. However, high vapor or aerosol mist concentrations may be irritating to the nose, throat and upper respiratory tract.

Skin Contact: Moderate irritant. Repeated and/or prolonged contact may cause skin sensitization.

Eye Contact: The aerosol, vapor or liquid will irritate human eyes following contact.

Ingestion: Ingestion may cause irritation of the gastrointestinal tract. This product is considered to have a low order of acute oral toxicity.

Chronic Effects: Repeated contact can cause skin sensitization. Preexisting skin, eye, and respiratory may be aggravated by exposure to this product.

Carcinogenicity: This product may contain trace quantities Epichlorohydrin, CAS 106-89-8, an impurity in this product, (< 50 PPM). It has been reported to produce cancer in laboratory animals and to produce mutagenic changes in bacteria and cultured human cells. It has been established by the International Agency for Research on Cancer (IARC) as a probable human carcinogen (IARC Group 2A) based on the following conclusions: Human evidence-inadequate; animal evidence – sufficient. It has been classified as an anticipated human carcinogen by the National Toxicology Program (NTP).

Mutagenicity: There is no substantial evidence of mutagenic potential.
Reproductive Effects: No adverse reproductive effects are anticipated.
Teratogenicity and Fetotoxicity: No information is available and no adverse teratogenic embryotoxic effects are anticipated.

Section 13 – Ecological Information

Environmental Release Information: Keep out of surface waters, sewers, and waterways entering or leading to surface waters. Notify authorities if any exposure to the general public or environment occurs or is likely to occur.

Section 14 – Disposal Considerations

The generation of waste should be avoided or minimized wherever possible.

Disposal should be in accordance with local, state, provincial or national regulations. This material is not a hazardous waste under RCRA 40 CFR 261. Small quantities should be treated with a liquid decontaminant. The treated waste is not a hazardous material under RCRA 40 CFR 261. Chemical waste, even small quantities, should never be poured down drains, sewers or waterways.

Empty containers should be decontaminated and either passed to an approved drum recycler or destroyed.

Section 15 – Transportation Information

DOT: Not hazardous by DOT regulations
DOT Proper Shipping Name: None
Other Requirements: None

Section 16 – Regulatory Information

This product is listed on the EPA / TSCA inventory of chemical substances. Protection of stratospheric ozone (pursuant to Section 611 of the Clean Air Act Amendment of 1990): Per 40 CFR Part 82, this product does not contain nor was it directly manufactured with any Class I or Class II ozone depleting substances.

SARA Title III Section 313 Information

Component	CAS #	Wt %
Epichlorohydrin	106898	<2 ppm

The State of California regulation, Proposition 65, requires the State to identify and list specific chemicals known to cause cancer or birth defects/reproductive harm. Proposition 65 requires a disclosure for products sold within the State of California containing any Proposition 65 listed chemical. The requirement for disclosure is independent of concentration, thus disclosure is required for any detectable amount. Federal regulations require disclosure for carcinogens if the concentration is 0.1% or higher. The following information is required by the State of California for this product:

This product contains chemicals known to the State of California to cause cancer.

None

Section 17 -- Other Information

HMIS Rating: Health: 2 Flammability: 1 Reactivity: 0

0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

***NOTICE:** While the descriptions, designs data, and information contained herein are presented in good faith and believed to be accurate, it is provided for your guidance only. It is provided independently of any sale of the product for purpose of hazard communication as part of E.V. Roberts' product safety program. Many factors may affect processing or application/use. We recommend you make tests to determine the suitability of a product for your particular purpose prior to use. No warranties of any kind, either expressed or implied, including warranties or merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth, or that the products, designs, data or information may be used without infringing the intellectual property rights of others. In no case shall the descriptions, information, data or designs provided be considered a part of our terms and conditions of sales. Further, you expressly understand and agree that the descriptions, designs, data and information furnished by E.V. Roberts hereunder are given gratis and E.V. Roberts assumes no obligation or liability for the description, designs, data and information given or results obtained, all such being given and accepted at your risk.*

To determine applicability or effects of any law or regulation with respect to the product, user should consult his legal advisor or the appropriate government agency. E.V. Roberts does not undertake to furnish advice on such matters.

Prepared by Kelvin Zilvar, Technical Service Chemist
Reviewed by Wayne Chen
Title: Sr. Research Chemist
Rev Date: 9-11-2006

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E.V. ROBERTS

RESIN FORMULATORS
Material Safety Data Sheet

Section 1 – Chemical Product and Company Identification

Product Name: RF-2329 Part B
 Chemical family/description: Curing Agent
 Date Effective: Sept. 11, 2009

Manufactured by:

E.V. Roberts
 Dba Resin Formulators
 18027 Bishop Ave.
 Carson, CA 90746
 (800) 374-3872

In an emergency call CHEMTREC @ 800-424-9300

Section 2 – Composition/Information on Ingredients

Hazardous Ingredients(s)	%(by wt.)	OSHA TLV(ACGIH)	CAS NO.
Fatty acids, C18-unsat., dimers, reaction products			
With polyethylenepolyamines	<50%	Not determined	68410-23-1
Triethylenetetramine	<10%	1 ppm; 6 mb/m3 (TWA) WEEL	112-24-3

Section 3 – Hazards Identification

Emergency Overview

Toxic in contact with skin.
 Corrosive.
 Moderate respiratory irritant.
 Severe skin irritant.
 Severe eye irritant.
 May cause sensitization by skin contact.

Potential Health Effects

Inhalation : Can cause severe eye, skin and respiratory tract burns. May cause nose, throat, and lung irritation. Inhalation of vapors and/or aerosols in high concentration may cause irritation of respiratory system.

Eye contact : Causes eye burns. May cause blindness. Severe eye irritation.

Skin contact : Toxic in contact with skin. Causes skin burns.

Ingestion : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Chronic Health Hazard : This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater. Prolonged contact may result in chemical burns and permanent damage. Repeated or prolonged

contact causes sensitization, asthma and eczemas.

Exposure Guidelines

- Target Organs** : Skin.
Eyes.
Respiratory system.
- Symptoms** : Repeated and/or prolonged exposure to low concentrations of vapors and/or aerosols may cause: Sore throat.

Aggravated Medical Condition

Eye disease Skin disorders and Allergies. Adverse skin effects (such as rash, irritation or corrosion). Adverse eye effects (such as conjunctivitis or corneal damage). Adverse respiratory effects (such as cough, tightness of chest or shortness of breath). Asthma.

Section 4 – First Aid Measures

- General advice** : Seek medical advice. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately.
- Eye contact** : Rinse immediately with plenty of water also under the eyelids for at least 20 minutes. Remove contact lenses.
- Skin contact** : Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay. Wash off immediately with plenty of water for at least 20 minutes. Cover wound with sterile dressing. Take off contaminated clothing and shoes immediately. **NOTE TO PHYSICIANS:** Application of corticosteroid cream has been effective in treating skin irritation.
- Ingestion** : Do not induce vomiting without medical advice. Drink 1 or 2 glasses of water. If a person vomits when lying on his back, place him in the recovery position. Prevent aspiration of vomit. Turn victim's head to the side.
- Inhalation** : If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Move to fresh air.

Section 5 – Fire Fighting Measures

- Suitable extinguishing media** : Alcohol-resistant foam.
Carbon dioxide (CO₂).
Dry chemical.
Dry sand.
Limestone powder.
- Specific hazards** : May generate ammonia gas. May generate toxic nitrogen oxide gases. Use of water may result in the formation of very toxic aqueous solutions. Do not allow run-off from fire fighting to enter drains or water courses. Incomplete combustion may form carbon monoxide. Downwind personnel must be evacuated. Burning produces obnoxious and toxic fumes.
- Special protective equipment for fire-fighters** : Avoid contact with the skin. A face shield should be worn. Use personal protective equipment. Wear self contained breathing apparatus for fire fighting if necessary.
- Further information** : Do not allow run-off from fire fighting to enter drains or water courses.

Section 6 – Accidental Release Measures

MSDS – RF-2329 Part B

- Personal precautions** : Use self-contained breathing apparatus and chemically protective clothing. Wear suitable protective clothing, gloves and eye/face protection. Evacuate personnel to safe areas.
- Environmental precautions** : Construct a dike to prevent spreading.
- Methods for cleaning up** : Approach suspected leak areas with caution. Contact Air Products' Emergency Response Center for advice. Place in appropriate chemical waste container.
- Additional advice** : if possible, stop flow of product.

Section 7 – Handling and Storage

Handling

Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. Avoid contact with skin and eyes. Emergency showers and eye wash stations should be readily accessible. Adhere to work practice rules established by government regulations. Avoid breathing vapors and/or aerosols. Avoid contact with eyes. Use only in well-ventilated areas. Use personal protective equipment. When using, do not eat, drink or smoke.

Storage

Store in steel containers preferably located outdoors, above ground, and surrounded by dikes to contain spills or leaks. Do not store near acids. Keep containers tightly closed in a dry, cool and well-ventilated place.

Technical measures/Precautions

Do not store in reactive metal containers.

Section 8 – Exposure Controls/Personal Protection

Engineering measures

Provide readily accessible eye wash stations and safety showers.
Provide natural or explosion-proof ventilation adequate to ensure concentrations are kept below exposure limits.

Personal protective equipment

- Respiratory protection** : Wear appropriate respirator when ventilation is inadequate.
- Hand protection** : Neoprene gloves.
Butyl-rubber
Nitrile rubber,
Impervious gloves.
The breakthrough time of the selected glove(s) must be greater than the intended use period.
- Eye protection** : Full face shield with goggles underneath.
Chemical resistant goggles must be worn.
- Skin and body protection** : Impervious clothing.
Full rubber suit (rain gear).
Rubber or plastic boots.
Long sleeve shirts and trousers without cuffs.
Slicker Suit.
- Environmental exposure controls** : Construct a dike to prevent spreading.
- Special instructions for protection and hygiene** : Discard contaminated leather articles. Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Provide readily accessible eye wash stations and safety showers. Wash at the end of each workshift and before eating, smoking or using the toilet.

Section 9 – Chemical and Physical Properties

MSDS – RF-2329 Part B

Form	Liquid
Color	Milky White/Amber
Density	10.8 – 11.8 lb./gal
pH	Alkaline
Solubility in Water	Soluble
Viscosity	130,000 – 230,000 cps
Flash Point	>115C/240F

Section 10 – Stability and Reactivity

Stability	: Stable under normal conditions.
Materials to avoid	: Sodium hypochlorite. Organic acids (i.e. acetic acid, citric acid etc.). Mineral acids. Product slowly corrodes copper, aluminum, zinc and galvanized surfaces. Reaction with peroxides may result in violent decomposition of peroxide possibly creating an explosion. CAUTION! N-Nitrosamines, many of which are known to be potent carcinogens, may be formed when the product comes in contact with nitrous acid, nitrites or atmospheres with high nitrous oxide concentrations. Nitrous acid and other nitrosating agents. Oxidizing agents.
Hazardous decomposition products	: Nitric acid. Ammonia. Nitrogen oxides (NOx). Nitrogen oxide can react with water vapors to form corrosive nitric acid. Carbon monoxide. Carbon dioxide (CO2). Nitrosamine.

Section 11 – Toxicology Information

Acute Health Hazard

Ingestion	: LD50 : 2,500 mg/kg Species : Rat.
Inhalation	: No data is available on the product itself.
Skin.	: LD50 : 805 mg/kg Species : Rabbit.
Eye irritation/corrosion	: Severe eye irritation.
Acute dermal irritation/corrosion	: Severe skin irritation.
Sensitization	: May cause sensitization by skin contact. Sensitization has occurred in laboratory animals after repeated exposures.

Chronic Health Hazard

Results from a battery of short term genotoxicity tests on this material or its components indicate mutagenic activity.

Section 12 – Ecological Information

Ecotoxicity effects

- Aquatic toxicity : No data is available on the product itself.
- Toxicity to other organisms : No data available.

Persistence and degradability

- Mobility : No data available.
- Bioaccumulation : No data is available on the product itself.

Section 13 – Disposal Considerations

- Waste from residues / unused products : Contact supplier if guidance is required.
- Contaminated packaging : Dispose of container and unused contents in accordance with federal, state, and local requirements.

Section 14 – Transportation Information

U.S. Department of Transportation Ground (49 CFR):

Proper Shipping Name: Environmentally Hazardous Substance,Liquid, n.o.s.
Class: 9
UN/ID No.: UN3082
Packing Group: III

International Air Transportation (IATA)

Proper Shipping Name: Environmentally Hazardous Substance,Liquid, n.o.s.
Class: 9
UN/ID No.: UN3082
Packing Group: III

Water transportation (IMDG)

Proper Shipping Name: Environmentally Hazardous Substance,Liquid, n.o.s.
Class: 9
UN/ID No.: UN3082
Packing Group: III

CTC

Proper Shipping Name: Environmentally Hazardous Substance,Liquid, n.o.s.
Class: 9
UN/ID No.: UN3082
Packing Group: III

Package and transport in accordance with 49 CFR 173.154(b)

Section 15 – Regulatory Information

MSDS – RF-2329 Part B

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on EINECS inventory or polymer substance, monomers included on EINECS inventory or no longer polymer.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification:
 Acute Health Hazard Chronic Health Hazard

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level:
 None.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
 This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

WHMIS Hazard Classification
 Toxic Material Causing Immediate and Serious Toxic Effects, Toxic Material Causing Other Toxic Effects, Corrosive Material

Section 16 – Other Information

HMIS Rating: Health: 3 Flammability: 1 Reactivity: 0

The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication as part of E.V. Roberts' product safety program. It is not intended to constitute performance information concerning the product. No warranty, expressed or implied, or merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.

To determine applicability or effects of any law or regulation with respect to the product, user should consult his legal advisor or the appropriate government agency. E.V. Roberts does not undertake to furnish advice on such matters.

Prepared by E.V. Roberts
 D.O. Scott Date: 10-1-2008
 Reviewed by W. Chen Date: 09-11-2009