

1. PRODUCT IDENTIFICATION

<u>TRADE NAME (AS LABELED):</u>	Trifluoroacetic Acid (TFA)
<u>CHEMICAL NAME/CLASS/SYNONYMS:</u>	Perfluoroacetic Acid / Trifluoroacetic Acid / TFA / 2,2,2-Trifluoroacetic acid
<u>PRODUCT NUMBER:</u>	TFA
<u>U.N. NUMBER:</u>	UN2699
<u>U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK:</u>	Hazard Class 8 Packing group I
<u>MANUFACTURER'S NAME:</u>	NuGeneration Technologies, LLC
<u>ADDRESS:</u>	100 Professional Center Drive, Rohnert Park, CA 94928 USA
<u>EMERGENCY PHONE:</u>	(800) 424-9300 (CHEMTREC)
<u>BUSINESS PHONE:</u>	(707) 820-4080 (Product Information)
<u>DATE OF PREPARATION:</u>	October 12, 2009
<u>DATE OF LAST REVISION:</u>	New

2. COMPOSITION and INFORMATION ON INGREDIENTS

Hazardous Ingredients:	CAS #	EC #	ICSC #	WT %	Hazard Symbol; Risk Phrases
Trifluoroacetic Acid (TFA)	76-05-1	200-929-3	607-091-00-1	100%	HAZARD CLASSIFICATION: RISK PHRASES: R 20, 35, 52 and 53

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

See Section 3 for full text of Risk Phrases and Safety Phrases

3. HAZARD IDENTIFICATION

EU LABELING AND CLASSIFICATION: This product meets the definition of the following hazard class as defined by the European Economic Community Guidelines.

EU CLASSIFICATION: Harmful; Corrosive; Dangerous for the Environment

EU RISK PHRASES: R 20, 35, 52 and 53.

EU SAFETY PHRASES: S 9, 26, 27, 28, 45, 61.



EMERGENCY OVERVIEW: DANGER!

CORROSIVE TO EYES, SKIN, RESPIRATORY TRACT AND METALS.

HARMFUL IF SWALLOWED. REACTS WITH METAL TO PRODUCE FLAMMABLE, EXPLOSIVE HYDROGEN GAS. COMBUSTIBLE LIQUID.

VERY ACIDIC PRODUCT HARMFUL TO AQUATIC ORGANISMS.

MATERIAL SAFETY DATA SHEET

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases

INHALATION: Harmful if inhaled. Causes shortness of breath, a burning sensation, serious damage to lung tissue and respiratory tract, Can cause chemical pneumonia.

CONTACT WITH SKIN or EYES: Corrosive. Causes burns, tissue destruction, irreversible eye damage.

INGESTION: Toxic if ingested. Causes corrosion, burns to mouth and esophagus, Aspiration of the swallowed or vomited product can cause severe pulmonary complications.

HEALTH EFFECTS OR RISKS FROM EXPOSURE:

ACUTE: Toxic if ingested. Causes corrosion, burns to mouth and esophagus, Aspiration of the swallowed or vomited product can cause severe pulmonary complications.

CHRONIC: This product does not contain any ingredient designated by IARC, NTP, ACGIH or OSHA as probable or suspected human carcinogens.

TARGET ORGANS: **Acute:** Skin, eyes, respiratory system and target organs. **Chronic:** n/a.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD		(BLUE)	3
FLAMMABILITY HAZARD		(RED)	2
PHYSICAL HAZARD		(YELLOW)	0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8
For Routine Industrial Use and Handling Applications			

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate
3 = Serious **4** = Severe * = Chronic hazard

4. FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

SKIN EXPOSURE: Wash affected areas thoroughly with soap and water. Immediate medical attention required.

EYE EXPOSURE: In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

INHALATION: Remove contaminated individual to fresh air. If breathing is difficult, give oxygen. Seek medical attention.

INGESTION: If victim is conscious and alert, give 2-3 glasses of water to drink and do not induce vomiting. Material may enter lungs and cause severe damage. Do not give anything by mouth to an unconscious victim. Seek immediate medical attention. Do not leave victim unattended. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. Persons attending the victim should avoid direct contact with heavily contaminated clothing and vomitus. Wear impervious gloves while decontaminating skin and hair.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin contact may aggravate existing skin disease. Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis.

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RECOMMENDATIONS TO PHYSICIANS: All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

This material is an acid. The primary toxicity of this product is due to its irritant effects on mucous membranes.

INHALATION: If cough or shortness of breath occurs, evaluate the possibility of bronchitis or pneumonitis. Chest x-ray and arterial blood gases can be used to determine the presence of pulmonary edema. In severe cases, use of humidified oxygen and assisted ventilation including positive end expiratory pressure (PEEP) may be needed. Parenteral steroids may be useful in limiting the extent of pulmonary damage.

SKIN: Wash exposed area thoroughly with soap and water. Chemical burns from strong acids are generally treated the same as thermal burns.

EYES: Irrigate eyes for 15 minutes with sterile saline. If irritation, pain, swelling, photophobia or lacrimation persist, examination by an ophthalmologist is recommended.

INGESTION: If not already performed by first aid personnel, irrigate mouth with large amounts of water and dilute the acid by having victim drink 4 to 8 ounces of water or milk. DO NOT induce vomiting. Use of gastric lavage is controversial. The advantage of removal of acid must be weighted against the risk of perforation or bleeding. If a large amount of acid (> 1 ml/kg body weight) has been recently ingested, cautious gastric lavage is generally advised if the patient is alert and there is little risk of convulsions. Consultation with a gastroenterologist and/or surgeon is advised. Serious complications such as perforation or stricture of the esophagus may occur requiring care by specialists. Laryngeal edema may develop requiring intubation or tracheostomy.

5. FIRE-FIGHTING MEASURES

FLASH POINT: >95 C (203 F)

AUTOIGNITION TEMPERATURE: No Data

FLAMMABLE LIMITS (in air by volume, %): No Data

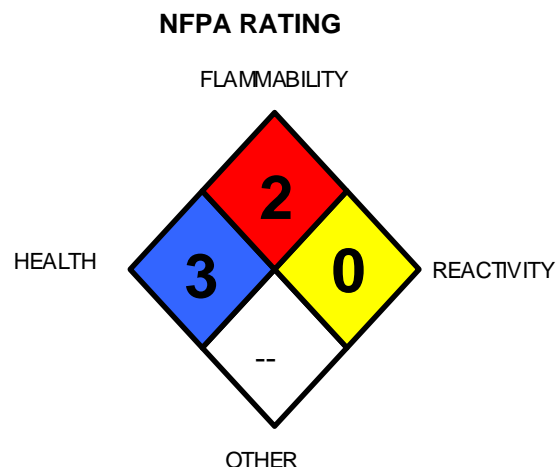
FIRE EXTINGUISHING MATERIALS: Use fire extinguishing materials appropriate for surrounding fire.

Water Spray: Yes
Foam: Yes
Halon: Yes

Carbon Dioxide: Yes
Dry Chemical: Yes
Other: Any "C" Class

UNUSUAL FIRE AND EXPLOSION HAZARDS: Product will burn under fire conditions. Containers may explode (due to the build-up of pressure) when exposed to extreme heat. Under fire conditions, toxic, corrosive fumes are emitted. Smoke and fumes are extremely irritating to eyes, nose, throat and lungs. In the presence of water acidic solutions are formed. Hydrogen gas, which is flammable and can form explosive mixtures with air, may be released on contact with many metals.

SPECIAL FIRE-FIGHTING PROCEDURES: Firefighters should wear NIOSH/MSHA approved positive pressure breathing apparatus with full face-piece and full acid-resistant protective clothing. Structural firefighters' protective clothing is NOT effective for fires involving this product. Evacuate residents who are downwind of fire. Cool closed containers exposed to fire with water. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later. Persons who may have been exposed to contaminated smoke should be immediately examined by a physician and checked for symptoms of poisoning. The symptoms should not be mistaken for heat exhaustion or smoke inhalation.





MATERIAL SAFETY DATA SHEET

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used.

Remove all sources of ignition. Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate protective equipment as specified in section 8.

Spills Pick up and place in suitable container for reclamation or disposal, using a method that does not generate dust. U.S. Regulations (CERCLA) requires porting spills and releases o soil, water and air in excess of reportable quantities. Prevent entry into sewers, basements or confined areas, dike if needed. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations; those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations).

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing fumes generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid contact with eyes, skin, and clothing. Empty drums should be completely drained (triple rinsed), properly bunged, and promptly returned to a drum reconditioner, or disposed of properly. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Storage areas of this product should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store containers in a cool, dry location away from direct sunlight at temperatures between 39°F - 120°F. Keep product from freezing. Keep container tightly closed when not in use. Observe all warnings and precautions listed for this product. NEVER ADD WATER TO ACID.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use a chemical fume hood or local exhaust ventilation, and process enclosure if necessary, to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR									
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELS		NIOSH	AIHA WEELs		OTHER
		TWA ppm	STEL ppm	TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	TWA ppm	STEL ppm	ppm
TFA	76-05-1	NE	NE	NE	NE	NE	NE	NE	NE	NE	

NE = Not Established.

NIC = Notice of Intended Change

See Section 16 for Definitions of Terms Used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.



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RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under U.S. Federal OSHA's Respiratory Protection Standard (1910.134-1998) or the regulations of various U.S. States, Canada, EU Member States, or those of Japan. Air-purifying respirators with dust/mist/fume filters are recommended if operations may produce mists or sprays from this product.

EYE PROTECTION: Safety goggles. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards. Maintain eye wash fountain and quick drench facilities in the work area.

HAND PROTECTION: Use chemically-resistant gloves when handling this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards.

BODY PROTECTION: Use body protection appropriate for task (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

BULK DENSITY: 7.9 lbs/gallon

SPECIFIC GRAVITY @ 20°C: 1.484 (water=1)

SOLUBILITY IN WATER: Soluble

VAPOR PRESSURE, mmHg @ 20°C (68°F): 111

ODOR: Pungent

APPEARANCE and COLOR: Colorless Liquid

EVAPORATION RATE (n-BuAc=1): No Data

MELTING/FREEZING POINT: -15°C (5F)

BOILING POINT: 72° C (162F)

pH: <2 @10% by weight

10. STABILITY and REACTIVITY

STABILITY: Stable under normal conditions.

DECOMPOSITION PRODUCTS: hydrogen fluoride, toxic, corrosive fumes when heated to decomposition.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: metals, strong bases.

HAZARDOUS POLYMERIZATION: Not know to occur.

CONDITIONS TO AVOID: open flame, spark, and aqueous alkaline conditions.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:



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WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute toxicity of the vapor (LC50): 5000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:

Extremely hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Very hazardous in case of skin contact (corrosive).

Hazardous in case of skin contact (sensitizer, permeator).

TOXICITY DATA:

Acute Eye Irritation:

This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

Acute Skin Irritation:

This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

Acute Dermal Toxicity:

This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

Acute Respiratory Irritation:

This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

Acute Inhalation Toxicity:

Toxicological Information and Interpretation:

LC50 - lethal concentration 50% of test species, 10000 mg/cu m/2 hr, rat.

LC50 - lethal concentration 50% of test species, 13500 mg/cu m/2 hr, mouse.

Acute Oral Toxicity:

Toxicological Information and Interpretation:

LD50 - lethal dose 50% of test species, > 200 mg/kg, rat.

LD50 - lethal dose 50% of test species, < 400 mg/kg, rat.

Chronic Toxicity:

This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be "probable" or "suspected" human carcinogens.

Toxicological Information and Interpretation - MUTAGENICITY, Salmonella. Ames Test: Negative.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ecotoxicological Information and Interpretation:

EC50 - effective concentration 50% of test species, 55 mg/l/24 hr, Daphnia.

LC50 - lethal concentration 50% of test species, > 1000 mg/l/96 hr, fish: Brachydanio rerio.

Chemical Fate Information:

Not degradable.

13. DISPOSAL CONSIDERATIONS

Waste disposal of substance:



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Must be dumped or incinerated in accordance with local regulations. Incinerate or dispose of in a RCRA-licensed facility. Do not discharge into waterways or sewer systems without proper authorization.

Container disposal:

Empty containers with less than 1 inch of residue may be land filled at a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

RCRA: "C" Corrosive

14. TRANSPORTATION INFORMATION

US DOT, IATA, IMO, ADR:

PROPER SHIPPING NAME: TRIFLUOROACETIC ACID
HAZARD CLASS NUMBER: 8
UN IDENTIFICATION NUMBER: UN2699 PACKING GROUP: I
DOT LABEL(S) REQUIRED: Dangerous Goods



NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2004: 154

MARINE POLLUTANT: This product **is** designated as a marine pollutant by the Department of Transportation (49 CFR 172.101, Appendix B).

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is considered as dangerous goods.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is considered as dangerous goods.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is considered by the United Nations Economic Commission for Europe to be dangerous goods.

15. REGULATORY INFORMATION

ADDITIONAL UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, and are listed as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
TFA	NO	NO	NO

ADDITIONAL UNITED STATES REGULATIONS (continued):

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): 100

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): This product is NOT on the Proposition 65 Lists.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL or NDSL Inventories

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: E



EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU CLASSIFICATION: Harmful; Corrosive; Dangerous for the Environment

EU RISK PHRASES: **R20** (Harmful by inhalation), **R35** (Causes severe burns), **R52** (Harmful to aquatic organisms) and **R53** (May cause long-term adverse effects in the aquatic environment).

EU SAFETY PHRASES: **S 9** (Keep container in a well-ventilated place), **S26** (In case of contact with eyes, rinse immediately with plenty of water and seek medical advice), **S27/28** (After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water), **S45** (In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)), **S61** (Avoid release to the environment. Refer to special instructions/safety data sheet).



EUROPEAN ECONOMIC COMMUNITY INFORMATION FOR CONSTITUENTS: The following information is available for the components of this product. **TFA:** EU EINECS/ELINCS NUMBER: 200-929-3

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: The components of this product are listed on the AICS.

HAZARDOUS SUBSTANCES INFORMATION SYSTEM: TFA is listed by the Hazardous Substances Information System as a Hazardous Substance.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

LABELING AND CLASSIFICATION: The product is regulated, based a review of the regulation [NOHSC: 10005 (1994-Current)]:

Australian Hazchem Code: 2X

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

JAPANESE ENCS INVENTORY: The components of this product are on the ENCS Inventory as indicated in the section on International Chemical Inventories, below.

POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: No component of this product is a listed Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

TFA is listed on the following inventories:

Asia-Pac: Listed

Australian Inventory of Chemical Substances (AICS): Listed

Korean Existing Chemicals List (ECL): Listed

Japanese Existing National Inventory of Chemical Substances (ENCS): Listed

Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed

Swiss Giftlist List of Toxic Substances: Listed

U.S. TSCA: Listed

16. OTHER INFORMATION

PREPARED BY: Donato Polignone

[MSDS Authoring Services](#)

DATE: October 12, 2009



MATERIAL SAFETY DATA SHEET

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of NuGeneration Technologies, LLC. The data on this sheet are related only to the specific material designated herein. NuGeneration Technologies, LLC assumes no legal responsibility for use or reliance upon this data.

End of MSDS