SAFETY DATA SHEET

Product Identifier: CyTOF® Tuning Solution
Catalog ID number: 201072

SECTION 1 - IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Contact information

General	Fluidigm Corporation 7000 Shoreline Court Suite 100, South San Francisco, CA 94080 Main (U.S.): +1 (650) 266-6000 E-mail: techsupport@fluidigm.com
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Product identifier	CyTOF® Tuning Solution, 250 mL
Synonyms	None identified
Trade names	None identified
Chemical family	Mixture - contains nitric acid
Relevant identified uses of the substance or mixture and uses advised against	For research use only. Not for use in diagnostic procedures.
Note	This SDS is written to address potential health and safety issues associated with the handling of the formulated product.
Issue Date	23 June 2015

SECTION 2 - HAZARDS IDENTIFICATION

Classification of the substance or mixture

Globally Harmonized System [GHS]	Oxidizing liquid - Category 3. Corrosive (skin) - Category 1
AU Hazard Classification	Hazardous substance. Hazardous goods.

Label elements

CLP/GHS hazard pictogram	
CLP/GHS signal word	Danger
CLP/GHS hazard statements	H272 - May intensify fire; oxidizer. H314 - Causes severe skin burns and eye damage
CLP/GHS precautionary statements	P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking. P220 - Keep away from clothing/combustible materials. P221 - Take any precaution to avoid mixing with combustibles. P260 - Do not breathe mist/vapors/ spray. P264 - Wash hands thoroughly after handling. P280 - Wear protective gloves/eye protection/face protection. P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303 + P361 + P353 - If on skin or hair: Remove/Take off immediately all contaminated clothing. Rinse skin with water/ shower. P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 - Immediately call a Poison Center or doctor/ physician. P363 - Wash contaminated clothing before reuse. P370 +P378 - In case of fire: Use water spray (fog), foam, dry powder or carbon dioxide

for extinction. P405 - Store locked up. P501 - Dispose of contents/container to location in accordance with local/regional/national/international regulations.

Other hazards The most common adverse effects reported with exposure to nitric acid include fever, weakness, dizziness, coughing, vomiting, burns to skin, rapid pulse, reduced blood pressure, shortness of breath, severe abdominal pain, and difficulty breathing.

Note This mixture is classified as hazardous according to Regulation EC No 1272/2008 (EU CLP) and Hazard Communication Standard No. 1910.1200 (US OSHA). The pharmacological, toxicological and ecological properties of this mixture have not been fully characterized.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS #	EINECS/ ELINCS#	Amount	GHS Classification
Nitric Acid	7697-37-2	231-714-2	2%	SC1A: H314; OL3: H272

Note The ingredients listed above are considered hazardous. The remaining components are non-hazardous and/or present at amounts below reportable limits. See Section 16 for full text of GHS classifications.

SECTION 4 - FIRST AID MEASURES

Description of first aid measures

Immediate Medical Attention Needed Yes

Eye Contact If easy to do, remove contact lenses, if worn. Immediately flush eyes with copious quantities of water for at least 15 minutes. If irritation occurs or persists, notify medical personnel and supervisor.

Skin Contact Wash exposed area with soap and water and remove contaminated clothing/shoes. If irritation occurs or persists, notify medical personnel and supervisor.

Inhalation Immediately move exposed subject to fresh air. If not breathing, give artificial respiration. If breathing is labored, administer oxygen. Immediately notify medical personnel and supervisor.

Ingestion Do not induce vomiting unless directed by medical personnel. Do not give anything to drink unless directed by medical personnel. Never give anything by mouth to an unconscious person. Notify medical personnel and supervisor.

Protection of first aid responders See Section 8 for Exposure Controls/Personal Protection recommendations.

Most important symptoms and effects, both acute and delayed See Sections 2 and 11.

Indication of immediate medical attention and special treatment needed, if necessary Medical conditions aggravated by exposure: None known or reported. Treat symptomatically and supportively.

SECTION 5 - FIREFIGHTING MEASURES

Extinguishing media Use water spray (fog), foam, dry powder, or carbon dioxide, as appropriate for surrounding fire and materials.

Specific hazards arising from the substance or mixture No information identified. May emit toxic nitrogen-containing compounds.

Flammability/Explosivity	Oxidizing - Keep from contact with other combustible materials
Advice for firefighters	Wear full protective clothing and a self-contained breathing apparatus with a full facepiece operated in the pressure demand or other positive pressure mode. Decontaminate all equipment after use.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	If product is released or spilled, take proper precautions to minimize exposure by using appropriate personal protective equipment (see Section 8). Area should be adequately ventilated. Do not breathe mist/vapors/spray.
Environmental precautions	Do not empty into drains. Avoid release to the environment.
Methods and material for containment and cleaning up	Dike area to contain spill. Maintain ventilation until all vapors have been eliminated. Take precautions as necessary to prevent contamination of ground and surface waters. If vials are crushed or broken, DO NOT CAUSE MATERIAL TO BECOME AIRBORNE. For small spills, soak up material with absorbent, e.g., paper towels. For large spills, cordon off spill area and minimize the spreading of spilled material. Soak up material with absorbent. Collect spilled material, absorbent, and rinse water into suitable containers for proper disposal in accordance with applicable waste disposal regulations (see Section 13). Decontaminate the area twice.
Reference to other sections	See Sections 8 and 13 for more information.

SECTION 7 - HANDLING AND STORAGE

Precautions for safe handling	Follow recommendations for handling pharmaceutical agents (i.e., use of engineering controls and/or other personal protective equipment if needed). Avoid breathing vapor or mist. Do not permit eating/drinking/smoking near this material. All materials used for transferring or preparing this product must be considered contaminated and disposed of properly.
Conditions for safe storage including any incompatibilities	Keep from contact with clothing and other combustible materials. Store at 2-8°C in tightly closed container. Avoid strong oxidizers. Store in sealed containers that are appropriately labeled. Do not store in metal or glass containers. Do not store in direct sunlight. Do not store near organic substances.
Specific end use(s)	No information identified.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Note	Dispose of broken vials/syringes in a sharps container.

Control Parameters/Occupational Exposure Limit Values

Compound	Issuer	Type	OEL
Nitric Acid	ACGIH, Bulgaria	TLV-TWA (8-Hr)	2 ppm
	ACGIH	TLV-STEL	4 ppm
	Austria, Denmark	MAK - TWA (8-Hr)	1 ppm (2.6 mg/m³)
	Belgium	STEL	1 ppm (2.6 mg/m³)
	EU (2009/161/EU)	STEL	1 ppm (2.6 mg/m³)
	Finland	8-hour TWA	0.5 ppm (1.3 mg/m³)
	Finland, United Kingdom	STEL	1 ppm (2.6 mg/m³)
	France	VME	2 ppm (5 mg/m³)
	France	VLE	4 ppm (10 mg/m³)
	Hungary	8-hour TWA	5 mg/m³
	Hungary	STEL	5 mg/m³
	Poland	MAC (8-Hr TWA)	5 mg/m³

	Poland	MAC(STEL)	10 mg/m³
	Sweden	8-hour TWA	2 ppm (5 mg/m³)
	Sweden	STEL	5 ppm (13 mg/m³)
	US OSHA	PEL-TWA (8-Hr)	2 ppm (5 mg/m³)
	US OSHA	PEL - STEL (vacated)	4 ppm (10 mg/m³)
	NIOSH	IDLH (immediately dangerous to life or health)	25 ppm
	NIOSH	REL - TWA	2 ppm (5 mg/m³)
	NIOSH	REL - STEL	4 ppm (10 mg/m³)

Exposure/Engineering controls

If handling bulk product or vials are opened/crushed/broken: Selection and use of containment devices and personal protective equipment should be based on a risk assessment of exposure potential. Open handling should not be performed when handling potent substances, or substances of unknown toxicity. Material should be handled inside a closed process, ventilated enclosure, isolator or device of equivalent or better control that is suitable for dusts and/or aerosols.

Respiratory protection

If handling bulk product or vials are opened/crushed/broken: Choice of respiratory protection should be appropriate to the task and the level of existing engineering controls. For routine powder handling tasks, an approved and properly worn air- purifying respirator equipped with HEPA filters or combination filters should provide ancillary protection based on the known or foreseeable limitations of existing engineering controls. Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, when exposure levels are not known, or in any other circumstances where air purifying respirators may not provide adequate protection.

Hand protection

Wear nitrile or other impervious gloves if skin contact is possible. Double gloves should be considered. When the material is dissolved or suspended in an organic solvent, wear gloves that provide protection against the solvent.

Skin protection

Wear appropriate gloves, lab coat, or other protective overgarment if skin contact is likely. Base the choice of skin protection on the job activity, potential for skin contact and solvents and reagents in use.

Eye/face protection

Wear safety glasses with side shields, chemical splash goggles, or full face shield, if necessary. Base the choice of protection on the job activity and potential for contact with eyes or face. An emergency eye wash station should be available.

Environmental Exposure Controls

Avoid release to the environment and operate within closed systems wherever practicable. Air and liquid emissions should be directed to appropriate pollution control devices. In case of spill, do not release to drains. Implement appropriate and effective emergency response procedures to prevent release or spread of contamination and to prevent inadvertent contact by personnel.

Other protective measures

Wash hands in the event of contact with this product/mixture, especially before eating, drinking or smoking. Protective equipment is not to be worn outside the work area (e.g., in common areas or out-of-doors).

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Clear liquid
Color	Colorless
Odor	Odorless.
Odor threshold	No information identified.
pH	No information identified.

Melting point/freezing point	0°C (32°F)
Initial boiling point and boiling range	100°C (212°F)
Flash point	No information identified.
Evaporation rate	No information identified.
Flammability (solid, gas)	No information identified.
Upper/lower flammability or explosive limits	No information identified.
Vapor pressure	No information identified
Vapor density	No information identified.
Relative density	No information identified.
Water solubility	Fully soluble in water.
Solvent solubility	No information identified.
Partition coefficient (*n-octanol/water*)	No information identified.
Auto-ignition temperature	No information identified.
Decomposition temperature	No information identified.
Viscosity	No information identified.
Explosive properties	No information identified.
Oxidizing properties	No information identified.

Other information

Molecular weight	Not applicable (Mixture)
Molecular formula	Not applicable (Mixture)

SECTION 10 - STABILITY AND REACTIVITY

Reactivity	Nitric acid is a corrosive and oxidizing chemical which reacts explosively with organic materials and combustibles.
Chemical stability	Stable under normal temperatures and pressures.
Possibility of hazardous reactions	No information identified.
Conditions to avoid	Keep away from high temperatures and incompatible materials.
Incompatible materials	Reducing agents, bases, alkalis, cyanides, iron, copper, carbides, sulfides, alcohols, hydrogen sulfide, turpentine and amines.
Hazardous decomposition products	No information identified.

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on toxicological effects

Route of entry May be absorbed by inhalation, skin contact and ingestion.

Acute toxicity

Compound	Type	Route	Species	Dose
Nitric Acid	LC_{50} (30 minutes)	Inhalation	Rat	260 mg/m³
	LC_{50} (4 hour)	Inhalation	Rat	130 mg/m³

Irritation/Corrosion No studies identified.

Sensitization No studies identified.

STOT-single exposure No studies identified.

STOT-repeated exposure/Repeat-dose toxicity No studies identified.

Reproductive toxicity No studies identified.

Developmental toxicity No studies identified.

Genotoxicity No studies identified.

Carcinogenicity No studies identified. This mixture is not listed by NTP, IARC, ACGIH or OSHA as a carcinogen.

Aspiration hazard No data available.

Human health data See Section 2 - "Other hazards"

SECTION 12 - ECOLOGICAL INFORMATION

Toxicity

Compound	Type	Species	Concentration
Nitric Acid	LC_{50} (48h)	Carcinus maenas (shore crab)	180 mg/L
	LC_{50} (48h)	Cerastoderma edule (cockle)	330 - 1000 mg/L
	LC_{50} (48h)	Asterias rubens (starfish)	100-300 mg/L
	LC_{50} (48h)	Agonus cataphractus (pogge)	100-330 mg/L

Persistence and Degradability No data identified.

Bioaccumulative potential No data identified.

Mobility in soil No data identified.

Results of PBT and vPvB assessment Not performed.

Other adverse effects No data identified.

Note The environmental characteristics of this product/mixture have not been fully investigated. Releases to the environment should be avoided.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste treatment methods Dispose of wastes in accordance to prescribed federal, state, and local guidelines, e.g., appropriately permitted chemical waste incinerator. Do not send down the drain or flush down the toilet. All wastes containing the material should be properly labeled. Rinse waters resulting from spill cleanups should be discharged in an environmentally safe manner, e.g., appropriately permitted municipal or on- site wastewater treatment facility.

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SECTION 14 - TRANSPORT INFORMATION

Transport	Based on the available data, this product/mixture is regulated as a hazardous material/dangerous good under EU ADR/RID, US DOT, Canada TDG, IATA, or IMDG.
UN number	3264
UN proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s. (contains nitric acid)
Transport hazard classes and packing group	Hazard Class - 8; Packing Group III.
Environmental hazards	Based on the available data, this product/mixture is not regulated as an environmental hazard or a marine pollutant.
Special precautions for users	Avoid release to the environment.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Hazardchem Code/HIN	2X; 80

SECTION 15 - REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture	This SDS complies with the requirements under US, EU and GHS (EU CLP - Regulation EC No 1272/2008) guidelines. Consult your local/regional authorities for more information.
Chemical safety assessment	Not conducted.
WHMIS classification	OL3: H272; SC1A: H314
TSCA status	Not listed
SARA section 313	Nitric acid is listed.
California proposition 65	Not listed.
Component Analysis – State	Nitric acid is listed as hazardous in AR, CA, CT, FL, HI, IL, IN, IO, MA, MI, MN, NV, NJ, NM, PA, RI, SC, TN, TX, UT, VT, VA, and WY.
Component Analysis – Chemical Inventory	Nitric acid is listed in the chemical inventory of the following countries: Australia, Canada, China, and the EU.
Additional information	No other information identified.

SECTION 16 - OTHER INFORMATION

NFPA Ratings	**Nitric acid**	**Health:** 4	**Fire:** 0	**Reactivity:** 0

Full text of H phrases and GHS classifications	SC1A - Skin corrosion Category 1A. H314 - Causes severe skin burns and eye damage. OL3 - Oxidizing Liquid Category 3 H272 - May intensify fire; oxidizer.
Sources of data	Information from published literature and internal company data.

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Abbreviations

ACGIH - American Conference of Governmental Industrial Hygienists; ADR/RID - European Agreement Concerning the International Carriage of Dangerous Goods by Road/Rail; AIHA - American Industrial Hygiene Association; CAS# - Chemical Abstract Services Number; AR – Arizona; CA – California; CLP - Classification, Labelling, and Packaging of Substances and Mixtures; CT – Connecticut; DNEL - Derived No Effect Level; DOT - Department of Transportation; EINECS - European Inventory of New and Existing Chemical Substances; ELINCS - European List of Notified Chemical Substances; EU - European Union; FL – Florida; GHS - Globally Harmonized System of Classification and Labeling of Chemicals; HI – Hawaii; IARC - International Agency for Research on Cancer; IDLH - Immediately Dangerous to Life or Health; IATA - International Air Transport Association; IL – Illinois; IMDG - International Maritime Dangerous Goods; IN – Indiana; IO – Iowa; LOEL - Lowest Observed Effect Level; LOAEL - Lowest Observed Adverse Effect Level; MA – Massachusetts; NI – Michigan; MN – Minnesota; NIOSH - The National Institute for Occupational Safety and Health; NJ – New Jersey; NM – New Mexico; NOEL - No Observed Effect Level; NOAEL - No Observed Adverse Effect Level; NTP - National Toxicology Program; OEL - Occupational Exposure Limit; NV – Nevada; OSHA - Occupational Safety and Health Administration; PA – Pennsylvania; PNEC - Predicted No Effect Concentration; RI – Rhode Island; SARA - Superfund Amendments and Reauthorization Act; SC – South Carolina; STEL - Short Term Exposure Limit; TDG - Transportation of Dangerous Goods; TN – Tennessee; TSCA - Toxic Substances Control Act; TX – Texas; TWA - Time Weighted Average; UT – Utah; VT – Vermont; WHMIS - Workplace Hazardous Materials Information System; WY - Wyoming

Revisions

This is the first version of this SDS.

Disclaimer

The statements contained herein are offered for informational purposes only and are based upon technical data. Fluidigm Corporation believes them to be accurate at the date of publication, but does not purport to be all-inclusive. The above-stated product is intended for use only by persons having the necessary technical skills and facilities for handling the product at their discretion and risk. Since conditions and manner of use are outside our control, we (Fluidigm Corporation) make no warranty of merchantability or any such warranty, express or implied with respect to information and we assume no liability resulting from the above product or its use. Users should perform their own investigations to determine suitability of information and product for their particular purposes.