

1. IDENTIFICATION

Product Name	Triethanolamine 99%
Other Names	2,2',2''-Nitrilotriethanol; ETHANOL, 2,2',2''-NITRILOTRIS-; TEA; Tri[2-Hydroxyethyl]Amine
Uses	Chemical intermediate. Cement grinding aid. Chemical additive.
Chemical Family	No Data Available
Chemical Formula	C6H15NO3
Chemical Name	Triethanolamine 99%
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Pty Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Pty Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	3960 Paramount Boulevard Suite 107 Lakewood CA 90712 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	Level 2, No. 8, Jalan Sapir 33/7 Seksyen 33, Shah Alam Premier Industrial Park 40400 Shah Alam Sengalor, Malaysia	+60-3-5614-2111

Emergency Contact Details

For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766
CHEMTREC	USA & Canada	1-800-424-9300 CN723420 +1-703-527-3887

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust) 5

Globally Harmonised System

Hazard Classification	Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)
Hazard Categories	Serious Eye Damage/Irritation - Category 2A Skin Corrosion/Irritation - Category 2 Specific Target Organ Toxicity (Single Exposure) - Category 3

Pictograms



Signal Word Warning

Hazard Statements	H315	Causes skin irritation.
	H319	Causes serious eye irritation.
	H335	May cause respiratory irritation.
	H336	May cause drowsiness or dizziness.

Precautionary Statements	Prevention	P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
		P264	Wash contacted areas thoroughly after handling.
		P271	Use only outdoors or in a well-ventilated area.
	Response	P280	Wear protective gloves/protective clothing/eye protection/face protection.
		P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
		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.
		P312	Call a POISON CENTER or doctor/physician if you feel unwell.
		P332 + P313	If skin irritation occurs: Get medical advice/attention.
		P337 + P313	If eye irritation persists: Get medical advice/attention.
	Storage	P362	Take off contaminated clothing and wash before reuse.
		P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
	Disposal	P405	Store locked up.
	P501	Dispose of contents/container in accordance with local / regional / national / international regulations.	

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

HSNO Classifications	Health Hazards	6.1E	Substances that are acutely toxic –May be harmful, Aspiration hazard
		6.3B	Substances that are mildly irritating to the skin
		6.4A	Substances that are irritating to the eye
	Environmental Hazards	9.2D	Substances that are slightly harmful in the soil environment

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Triethanolamine	No Data Available	102-71-6	>99.0 %
2,2'-Iminodiethanol; Diethanolamine	No Data Available	111-42-2	<=0.5 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed	No emergency medical treatment necessary.
Eye	Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.
Skin	Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.
Inhaled	Remove victim from exposure to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Seek medical attention if effects occur.
Advice to Doctor	If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Medical Conditions Aggravated by Exposure	No information available on medical conditions which are aggravated from exposure to this product.

5. FIRE FIGHTING MEASURES

General Measures	If safe to do so, remove containers from the path of fire.
Flammability Conditions	Product is a combustible liquid. Slight fire hazard when exposed to heat or flame. May burn but does not ignite readily.
Extinguishing Media	In case of fire, appropriate extinguishing media include water spray/fog, dry chemical, carbon dioxide and alcohol-resistant foam. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective. Do not use direct water stream. May spread fire. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Consider the use of unmanned hose holders or monitor nozzles. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.
Fire and Explosion Hazard	Heating can cause expansion or decomposition of the material, which can lead to the containers exploding.
Hazardous Products of Combustion	Combustible liquid. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Incompatible with oxidizing agents, acids, nitrites, halogenated organic solvents, halogenated hydrocarbons, aluminium and sources of ignition. During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic or irritating including carbon monoxide, carbon dioxide and nitrogen oxides. Heating above 60°C in temperature in the presence of aluminium can result in corrosion and generation of flammable hydrogen gas.
Special Fire Fighting Instructions	Clear fire area of all non-emergency personnel. Stay upwind. Keep out of low areas. Eliminate ignition sources. Move fire exposed containers from fire area if it can be done without risk. Do NOT allow fire fighting water to reach waterways, drains or sewers. Store fire fighting water for treatment.
Personal Protective Equipment	Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves) or chemical splash suit. Clear fire area of all non-emergency personnel. Stay upwind. Keep out of low areas. Eliminate ignition sources. Move fire exposed containers from fire area if it can be done without risk. Do NOT allow

fire fighting water to reach waterways, drains or sewers. Store fire fighting water for treatment.

Flash Point	179 - (Literature) °C Closed Cup
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	324 (Literature) °C
Hazchem Code	No Data Available

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Personnel involved in the clean up should wear full protective clothing as listed in section 8. Eliminate all sources of ignition. Evacuate all unnecessary personnel. Increase ventilation. Stop leak if safe to do so. Avoid walking through spilled product as it may be slippery. Use clean, non-sparking tools and equipment.
Clean Up Procedures	Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. Small spills: Dilute with water. Recover spilled material if possible. Absorb with materials such as: Non-combustible material. Sand. Remove with shovel. Collect in suitable and properly labeled containers. Contain spilled material if possible.
Containment	Stop leak if safe to do so.
Environmental Precautionary Measures	Do not allow product to reach drains, sewers or waterways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste
Evacuation Criteria	Evacuate all unnecessary personnel.
Personal Precautionary Measures	Personnel involved in the clean up should wear full protective clothing as listed in section 8.

7. HANDLING AND STORAGE

Handling	Thaw and mix well before using. Avoid contact with eyes. Wash thoroughly after handling. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.
Storage	Store in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use. Inspect regularly for deficiencies such as damage or leaks. Storage temperature: 30 - 43 °C Protect against physical damage. Store away from incompatible materials as listed in section 10. Protect from direct sunlight, moisture and static discharges. Avoid freezing. Store under an oxygen-free atmosphere. This product is classified as a 'C2' Combustible Liquid for the purpose of storage and handling in accordance with the requirements of AS1940.
Container	Container type/package must comply with all applicable local legislation. Store in original packaging as approved by manufacturer.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	The following exposure standard has been established for this product by The Australian Safety and Compensation Council (ASCC); Triethanolamine cas 102-71-6 TWA = 5mg/m3 (Sen) 2,2'-Iminodiethanol; Diethanolamine cas 111-42-2 TWA 3ppm (13mg/m3) NOTE: The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. Sen: Sensitiser These exposure standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.
Exposure Limits	No Data Available
Biological Limits	No information available on biological limit values for this product.
Engineering Measures	A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.
Personal Protection Equipment	RESPIRATOR: Wear an approved air-purifying respirator with organic vapour cartridge if engineering controls are inadequate (AS1715/1716). EYES: Wear Use safety glasses (with side shields) (AS1336/1337).

HANDS: Wear nitrile or butyl rubber gloves (AS2161).
CLOTHING: Long-sleeved protective clothing and safety footwear (AS3765/2210).

Work Hygienic Practices No Data Available

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Liquid
Odour	Ammoniacal
Colour	Colourless to Yellow
pH	No Data Available
Vapour Pressure	<0.0003 hPa (21°C) torr (@ 20 °C)
Relative Vapour Density	5
Boiling Point	336.1 °C
Melting Point	No Data Available
Freezing Point	20.5 °C
Solubility	>1000g/L (20°C) 20°C
Specific Gravity	1.126
Flash Point	179 - (Literature) °C Closed Cup
Auto Ignition Temp	324 (Literature) °C
Evaporation Rate	0.01
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	No Data Available
Specific Heat	No Data Available
Molecular Weight	149.19 g/mol
Net Propellant Weight	No Data Available
Octanol Water Coefficient	-2.3 Measured
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	934 mPa.s (20°C) (@ No Data Available)
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	No Data Available
Potential for Dust Explosion	Product is a liquid
Fast or Intensely Burning Characteristics	No Data Available
Flame Propagation or Burning Rate of Solid Materials	No Data Available
Non-Flammables That Could Contribute Unusual Hazards to a Fire	No Data Available
Properties That May Initiate or Contribute to Fire Intensity	No Data Available
Reactions That Release Gases or Vapours	Heating >60°C in presence of aluminium may emit hydrogen gas
Release of Invisible Flammable Vapours and Gases	No Data Available

10. STABILITY AND REACTIVITY

Chemical Stability	Product is stable under normal conditions of use, storage and temperature. Combustible liquid. Corrosive when wet.
Conditions to Avoid	Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Avoid moisture.
Materials to Avoid	Avoid contact with: Nitrites. Strong acids. Strong oxidisers. Product may potentially react with various halogenated organic solvents, resulting in temperature and/or pressure increases Corrosive when wet. Heating above 60°C in the presence of aluminium can result in corrosion and generation of flammable hydrogen gas. Avoid unintended contact with: Halogenated hydrocarbons.
Hazardous Decomposition Products	During a fire, smoke may contain the original product in addition to combustion products of varying composition which may be toxic or irritating including carbon monoxide, carbon dioxide and nitrogen oxides. Heating above 60°C in temperature in the presence of aluminium can result in corrosion and generation of flammable hydrogen gas. Decomposition products depend upon temperature, air supply and the presence of other materials.
Hazardous Polymerisation	Hazardous polymerization will not occur. No dangerous reactions known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

General Information	Oral LD50 Rat: 6400mg/Kg Dermal LD50 Rabbit: >2000mg/Kg Repeated Dose Toxicity: Based on available data, repeated exposures are not anticipated to cause significant adverse effects. Carcinogenicity: Findings from a chronic skin painting study by NTP include liver tumors in mice. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. Is not classified as a human carcinogen. Teratogenicity: Has been toxic to the fetus in laboratory animals at doses toxic to the mother. However, the relevance of this to humans is unknown. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use. In vitro genetic toxicity studies were negative. Based on physical properties, not likely to be an aspiration hazard.
Eye/Irritant	May cause slight eye irritation. Corneal injury is unlikely.
Ingestion	Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. Based on physical properties, not likely to be an aspiration hazard.
Skin/Irritant	Prolonged skin contact is unlikely to result in absorption of harmful amounts. Brief contact is essentially non irritating to skin. Repeated exposure may cause irritation, even a burn.
Sensitisation	Skin contact may cause an allergic skin reaction in a small proportion of individuals. Did not cause allergic skin reactions when tested in guinea pigs.
Acute	
Inhalation	At room temperature, exposure to vapor is minimal due to low volatility; single exposure is not likely to be hazardous. Based on the available data, respiratory irritation was not observed. No deaths occurred following exposure to a saturated atmosphere.
Carcinogen Category	No Data Available

12. ECOLOGICAL INFORMATION

Ecotoxicity	Fish Acute & Prolonged Toxicity: LC50, Pimephales promelas (fathead minnow), flow-through test/96hr: 11800mg/L Aquatic Invertebrate Acute Toxicity: EC50, CeriodaphniaDubia (water flea)static test/48hr: Immobilization: 609.9mg/L Aquatic Plant Toxicity: ErC50, alga Scenedesmus sp,static test, Growth rate inhibition/72hr: 512mg/L Toxicity to Micro-organisms: EC50, OECD 209 Test; activated sludge/3hr: >1000mg/L Aquatic Invertebrates Chronic Toxicity Value: Water flea Daphnia magna, semi-static test/21d, number of offspring, NOEC: 16 mg/l, LOEC: 31 mg/L
Persistence/Degradability	Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% biodegradation in OECD test(s) for inherent biodegradability). OECD Biodegradation Tests; Biodegradation Exposure Time Method 10 Day Window 97% 28 days OECD 301A Test PASS 89% 14 days OECD 302B Test Not Applicable
Mobility	Mobility in soil: Potential for mobility in soil is very high (Koc between 0 and 50). Partition coefficient, soil organic carbon/water (Koc): 10 Estimated. Henry's Law Constant (H): 1.91E-04 atm*m3/mole Measured
Environmental Fate	Do NOT let product reach waterways, drains and sewers.

Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species). May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms. Partition coefficient, n-octanol/water (log Pow): -2.3 Measured Bioconcentration Factor (BCF): < 3.9; Cyprinus carpio (Carp); Measured

Bioaccumulation Potential

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): -2.3 at 25 °C Measured
Bioconcentration factor (BCF): < 3.9 Cyprinus carpio (Carp) 42 d Measured

Environmental Impact

No Data Available

13. DISPOSAL CONSIDERATIONS**General Information**

Dispose of in accordance with all local, state and federal regulations.
All empty packaging should be disposed of in accordance with Local, State, and Federal Regulations or recycled/reconditioned at an approved facility.

Special Precautions for Land Fill

Contact a specialist disposal company or the local waste regulator for advice.

14. TRANSPORT INFORMATION**Land Transport (Australia)**

ADG Code

Proper Shipping Name

TRIETHANOLAMINE 99%

Class

C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable

Subsidiary Risk(s)

No Data Available

No Data Available

UN Number

No Data Available

Hazchem

No Data Available

Pack Group

No Data Available

Special Provision

No Data Available

Land Transport (Malaysia)

ADR

Proper Shipping Name

TRIETHANOLAMINE 99%

Class

C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable

Subsidiary Risk(s)

No Data Available

No Data Available

UN Number

No Data Available

Hazchem

No Data Available

Pack Group

No Data Available

Special Provision

No Data Available

Land Transport (New Zealand)

NZS5433

Proper Shipping Name

TRIETHANOLAMINE 99%

Class

C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable

Subsidiary Risk(s)

No Data Available

No Data Available

UN Number

No Data Available

Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available

Land Transport (United States of America)

US DOT

Proper Shipping Name	TRIETHANOLAMINE 99%
Class	C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable
Subsidiary Risk(s)	No Data Available
	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available

Sea Transport

IMDG Code

Proper Shipping Name	TRIETHANOLAMINE 99%
Class	C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available
EMS	No Data Available
Marine Pollutant	No

Air Transport

IATA DGR

Proper Shipping Name	TRIETHANOLAMINE 99%
Class	C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	No Data Available

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)
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15. REGULATORY INFORMATION

General Information	No Data Available
Poisons Schedule (Aust)	5

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

Approval Code HSR002785

National/Regional Inventories

Australia (AICS)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	Not Determined
Europe (REACH)	Not Determined
Japan (ENCS/METI)	Not Determined
Korea (KECI)	Not Determined
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Not Determined
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Not Determined

16. OTHER INFORMATION

Related Product Codes TRETAN1000, TRETAN1001, TRETAN1002, TRETAN2000, TRETAN2810, TRETAN2820, TRETAN3200, TRETAN3300, TRETAN3301, TRETAN3500, TRETAN4700, TRETAN4701, TRETAN4702, TRETAN4800, TRETAN4801, TRETAN4900, TRETAN4901, TRETAN4902, TRETAN5000, TRETAN5001, TRETAN5002, TRETAN5100, TRETAN5101, TRETAN5200, TRETAN7000, TRETAN7049, TRETAN9000, TRETAN9001, TRETAN9800, TRETAN9900, TRETAN9901, TRETAN9902, TRETAN9903, TRETAN9904, TRETAN9905

Revision 2

Revision Date 13 Mar 2015

Reason for Issue Updated SDS

Key/Legend

< Less Than

> Greater Than

AICS Australian Inventory of Chemical Substances

atm Atmosphere

CAS Chemical Abstracts Service (Registry Number)

cm² Square Centimetres

CO₂ Carbon Dioxide

COD Chemical Oxygen Demand

deg C (°C) Degrees Celcius

EPA (New Zealand) Environmental Protection Authority of New Zealand

deg F (°F) Degrees Fahrenheit

g Grams

g/cm³ Grams per Cubic Centimetre

g/l Grams per Litre
HSNO Hazardous Substance and New Organism
IDLH Immediately Dangerous to Life and Health
immiscible Liquids are insoluble in each other.
inHg Inch of Mercury
inH₂O Inch of Water
K Kelvin
kg Kilogram
kg/m³ Kilograms per Cubic Metre
lb Pound
LC₅₀ LC stands for lethal concentration. LC₅₀ is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
LD₅₀ LD stands for Lethal Dose. LD₅₀ is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.
ltr or **L** Litre
m³ Cubic Metre
mbar Millibar
mg Milligram
mg/24H Milligrams per 24 Hours
mg/kg Milligrams per Kilogram
mg/m³ Milligrams per Cubic Metre
Misc or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present.
mm Millimetre
mmH₂O Millimetres of Water
mPa.s Millipascals per Second
N/A Not Applicable
NIOSH National Institute for Occupational Safety and Health
NOHSC National Occupational Health and Safety Commission
OECD Organisation for Economic Co-operation and Development
Oz Ounce
PEL Permissible Exposure Limit
Pa Pascal
ppb Parts per Billion
ppm Parts per Million
ppm/2h Parts per Million per 2 Hours
ppm/6h Parts per Million per 6 Hours
psi Pounds per Square Inch
R Rankine
RCP Reciprocal Calculation Procedure
STEL Short Term Exposure Limit
TLV Threshold Limit Value
tne Tonne
TWA Time Weighted Average
ug/24H Micrograms per 24 Hours
UN United Nations
wt Weight