

1 Identification

Product identifier

Product name: 4-tert-Butylthiophenol gold nanoparticles, 2% (w/v) soln. in toluene

Stock number: H28235

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

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)



GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS08 Health hazard

Repr. 2 H361 Suspected of damaging fertility or the unborn child.

STOT RE 2 H373 May cause damage to the kidneys, the liver, the heart, the reproductive system, the blood, the brain and the endocrine system through prolonged or repeated exposure. Route of exposure: Inhalative.

Asp. Tox. 1 H304 May be fatal if swallowed and enters airways.



GHS07

Skin Irrit. 2 H315 Causes skin irritation.

STOT SE 3 H336 May cause drowsiness or dizziness.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS02 GHS07 GHS08

Signal word

Danger

Hazard-determining components of labeling:

Toluene

Hazard statements

H225 Highly flammable liquid and vapor.

H315 Causes skin irritation.

H361 Suspected of damaging fertility or the unborn child.

H336 May cause drowsiness or dizziness.

H373 May cause damage to the kidneys, the liver, the heart, the reproductive system, the blood, the brain and the endocrine system through prolonged or repeated exposure. Route of exposure: Inhalative.

H304 May be fatal if swallowed and enters airways.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/...

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

B2 - Flammable liquid

D2A - Very toxic material causing other toxic effects



Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 2 Health (acute effects) = 2

FIRE 3 Flammability = 3

REACTIVITY 1 Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Product name: 4-tert-Butylthiophenol gold nanoparticles, 2% (w/v) soln. in toluene

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3 Composition/information on ingredients	
Chemical characterization: Substances	
CAS# Description: 108-88-3 Toluene	
Identification number(s): EC number: 203-625-9 Index number: 601-021-00-3	
Chemical characterization: Mixtures	
Dangerous components:	
108-88-3 Toluene	98.0%
⚠ Flam. Liq. 2, H225; ⚠ Repr. 2, H361; STOT RE 2, H373; Asp. Tox. 1, H304; ⚠ Skin Irrit. 2, H315; STOT SE 3, H336	
Additional information None known.	
Non-Hazardous Ingredients	
4-tert-Butylthiophenol gold nanoparticles	2.0%

4 First-aid measures	
Description of first aid measures	
After inhalation Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.	
After skin contact Immediately wash with water and soap and rinse thoroughly. Seek immediate medical advice.	
After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.	
After swallowing Seek medical treatment.	
Information for doctor	
Most important symptoms and effects, both acute and delayed No further relevant information available.	
Indication of any immediate medical attention and special treatment needed No further relevant information available.	

5 Fire-fighting measures	
Extinguishing media	
Suitable extinguishing agents Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.	
Special hazards arising from the substance or mixture	
If this product is involved in a fire, the following can be released:	
Carbon monoxide and carbon dioxide	
Sulfur oxides (SOx)	
Metal oxide fume	
Advice for firefighters	
Protective equipment:	
Wear self-contained respirator.	
Wear fully protective impervious suit.	

6 Accidental release measures	
Personal precautions, protective equipment and emergency procedures	
Wear protective equipment. Keep unprotected persons away.	
Ensure adequate ventilation	
Keep away from ignition sources	
Environmental precautions: Do not allow material to be released to the environment without proper governmental permits.	
Methods and material for containment and cleaning up:	
Keep away from ignition sources.	
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).	
Dispose of contaminated material as waste according to section 13.	
Ensure adequate ventilation.	
Prevention of secondary hazards: Keep away from ignition sources.	
Reference to other sections	
See Section 7 for information on safe handling	
See Section 8 for information on personal protection equipment.	
See Section 13 for disposal information.	

7 Handling and storage	
Handling	
Precautions for safe handling	
Keep container tightly sealed.	
Store in cool, dry place in tightly closed containers.	
Ensure good ventilation at the workplace.	
Information about protection against explosions and fires:	
Protect against electrostatic charges.	
Fumes can combine with air to form an explosive mixture.	
Keep ignition sources away.	
Conditions for safe storage, including any incompatibilities	
Storage	
Requirements to be met by storerooms and receptacles: Store in a cool location.	
Information about storage in one common storage facility: Store away from oxidizing agents.	
Further information about storage conditions:	
Keep container tightly sealed.	
Store in cool, dry conditions in well sealed containers.	
Specific end use(s) No further relevant information available.	

8 Exposure controls/personal protection	
Additional information about design of technical systems:	
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.	

Product name: 4-tert-Butylthiophenol gold nanoparticles, 2% (w/v) soln. in toluene

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Control parameters	
Components with limit values that require monitoring at the workplace:	
108-88-3 Toluene (98.0%)	
PEL (USA)	Long-term value: 200 ppm Ceiling limit value: 300; 500* ppm *10-min peak per 8-hr shift
REL (USA)	Short-term value: 560 mg/m ³ , 150 ppm Long-term value: 375 mg/m ³ , 100 ppm
TLV (USA)	Long-term value: 75 mg/m ³ , 20 ppm BEI
EL (Canada)	Long-term value: 20 ppm R
EV (Canada)	Long-term value: 20 ppm

Ingredients with biological limit values:	
108-88-3 Toluene (98.0%)	
BEI (USA)	0.02 mg/L Medium: blood Time: prior to last shift of workweek Parameter: Toluene 0.03 mg/L Medium: urine Time: end of shift Parameter: Toluene 0.3 mg/g creatinine Medium: urine Time: end of shift Parameter: o-Cresol with hydrolysis (background)

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Penetration time of glove material (in minutes) Not determined

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties	
Information on basic physical and chemical properties	
General Information	
Appearance:	
Form:	Liquid
Color:	Dark purple
Odor:	Aromatic
Odor threshold:	Not determined.
pH-value:	Not determined.
Change in condition	
Melting point/Melting range:	ca -93 °C (ca -135 °F)
Boiling point/Boiling range:	111 °C (232 °F)
Sublimation temperature / start:	Not determined
Flash point:	4 °C (39 °F)
Flammability (solid, gaseous)	Not applicable.
Ignition temperature:	480 °C (896 °F)
Decomposition temperature:	Not determined
Auto igniting:	Product is not selfigniting.
Danger of explosion:	
Product is not explosive. However, formation of explosive air/vapor mixtures is possible.	
Explosion limits:	
Lower:	1.1 Vol %
Upper:	7.1 Vol %
Vapor pressure at 20 °C (68 °F):	29 hPa (22 mm Hg)
Density at 20 °C (68 °F):	0.867 g/cm ³ (7.235 lbs/gal)
Relative density	Not determined.
Vapor density	Not determined.
Evaporation rate	Not determined.
Solubility in / Miscibility with	
Water at 20 °C (68 °F):	0.5 g/l
Partition coefficient (n-octanol/water):	
Not determined.	
Viscosity:	
dynamic:	Not determined.
kinematic:	Not determined.
Solvent content:	
Organic solvents:	98.0 %
Solids content:	
2.0 %	
Other information	
No further relevant information available.	

Product name: 4-tert-Butylthiophenol gold nanoparticles, 2% (w/v) soln. in toluene

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10 Stability and reactivity

Reactivity No information known.
Chemical stability Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions No dangerous reactions known
Conditions to avoid No further relevant information available.
Incompatible materials: Oxidizing agents
Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Sulfur oxides (SOx)
Metal oxide fume

11 Toxicological information

Information on toxicological effects
Acute toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.
LD/LC50 values that are relevant for classification:
108-88-3 Toluene

Oral	LD50	636 mg/kg (rat)
Dermal	LD50	14100 µL/kg (rabbit)
Inhalative	LC50/4H	49000 mg/m3/4H (rat)

Skin irritation or corrosion: Causes skin irritation.
Eye irritation or corrosion: Irritating effect.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for components in this product.
Carcinogenicity:
EPA-I: Data are inadequate for an assessment of human carcinogenic potential.
IARC-3: Not classifiable as to carcinogenicity to humans.
ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.
Reproductive toxicity:
Suspected of damaging fertility or the unborn child.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for components in this product.
Specific target organ system toxicity - repeated exposure:
May cause damage to the kidneys, the liver, the heart, the reproductive system, the blood, the brain and the endocrine system through prolonged or repeated exposure. Route of exposure: Inhalative.
Specific target organ system toxicity - single exposure:
May cause drowsiness or dizziness.
May cause respiratory irritation.
Aspiration hazard: May be fatal if swallowed and enters airways.
Subacute to chronic toxicity: No effects known.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
This product contains nanoparticles. Elements or compounds in the form of nanoparticles or nanotubes can exhibit different properties than larger particles of the same element or compound. Many nanoparticles are small enough to cross cell membranes including the blood-brain barrier. Nanoparticles may have greater toxicity than larger particles. Ensure that nanoparticles are not ingested, inhaled or come in contact with the skin.
The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant


12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Additional ecological information:
General notes:
Do not allow product to reach ground water, water course or sewage system.
Do not allow material to be released to the environment without proper governmental permits.
Danger to drinking water if even small quantities leak into the ground.
Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

UN-Number DOT, IMDG, IATA	UN1294
UN proper shipping name DOT IMDG, IATA	Toluene TOLUENE
Transport hazard class(es) DOT	
	
Class Label Class	3 Flammable liquids. 3 3 (F1) Flammable liquids

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USA

Product name: 4-tert-Butylthiophenol gold nanoparticles, 2% (w/v) soln. in toluene

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Label
IMDG, IATA

3



Class
Label

3 Flammable liquids.
3

Packing group
DOT, IMDG, IATA

II

Environmental hazards:
Marine pollutant (IMDG):

No

Special precautions for user

Warning: Flammable liquids

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:

DOT

Marine Pollutant (DOT):

No

UN "Model Regulation":

UN1294, Toluene, 3, II

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS02 GHS07 GHS08

Signal word Danger

Hazard-determining components of labeling:

Toluene

Hazard statements

H225 Highly flammable liquid and vapor.

H315 Causes skin irritation.

H361 Suspected of damaging fertility or the unborn child.

H336 May cause drowsiness or dizziness.

H373 May cause damage to the kidneys, the liver, the heart, the reproductive system, the blood, the brain and the endocrine system through prolonged or repeated exposure. Route of exposure: Inhalative.

H304 May be fatal if swallowed and enters airways.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/...

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations

This product is not listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. Use of this product is restricted to research and development only. This product must be used by or directly under the supervision of a technically qualified individual as defined by TSCA. This product must not be used for commercial purposes or in formulations for commercial purposes.

Some or all of the components of this product are not listed on the Canadian Domestic Substances List (DSL) or the Canadian Non-Domestic Substances List (NDSL).

SARA Section 313 (specific toxic chemical listings)

108-88-3 Toluene

98.0%

California Proposition 65

Prop 65 - Chemicals known to cause cancer

None of the ingredients are listed.

Prop 65 - Developmental toxicity

108-88-3 Toluene

98.0%

Prop 65 - Developmental toxicity, female

108-88-3 Toluene

98.0%

Prop 65 - Developmental toxicity, male

None of the ingredients are listed.

Information about limitation of use:

For use only by technically qualified individuals.

This product is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.

None of the ingredients are listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

None of the ingredients is listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use)

None of the ingredients is listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/24/2015 / -

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USA

Product name: 4-tert-Butylthiophenol gold nanoparticles, 2% (w/v) soln. in toluene

Abbreviations and acronyms:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organization
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)

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