



**AMANNGIRRBACH**

## MATERIAL SAFETY DATA SHEET

### Girotan and Girotan L

1. Product

Titanium metal and Titanium alloys.

2. Form

Billet, bar, rod, wire, plate, sheet, foil, tube, extrusions, forgings, castings, including turnings and other process residues.

3. Uses

Fabrication of finished articles for aerospace, general engineering, chemical engineering and medical use. Production of titanium castings. Alloying addition to other metals.

4. Composition

Titanium 75%-99.8%. Chemical symbol Ti.

Details of alloy composition are given in the purchase specifications or test certificate and may include percentages of Aluminium, Copper, Chromium, Iron, Manganese, Molybdenum, Nickel, Niobium, Palladium, Ruthenium, Tin, Vanadium, Zirconium or other additions.

5. Physical and Chemical Properties

Appearance - similar to stainless steel.

Specific gravity 4.42g/cm<sup>3</sup> (Timetal 6-4) to 4.84g/cm<sup>3</sup> (Timetal 679).

Melting point 1668°C.

Titanium metal is rapidly dissolved by hydrofluoric acid or hydrofluoric-nitric acid mixtures.

Titanium enters into thermite type reactions with iron oxides. Explosive reactions have been reported whilst attempting to use titanium metal or powder in red fuming nitric acid and are possible in other strongly oxidising environments.

6. Health Hazard

Titanium and Titanium base alloys are non toxic and safe to handle in solid forms.

Finely divided process residues such as sludges may contain oil, acids or other harmful process contaminants and should not be ingested, inhaled or allowed to come into contact with the skin or eyes.

If processed in such a manner as to produce fine dust or metal fume, it is recommended that adequate ventilation be provided to keep the airborne content of the metal and alloying elements within the limits set out in guidance note EH40 issued by the Health and Safety Executive (Ref 1&2).



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## 7. Fire Hazard

### 7.1 High Surface Area/Finely Divided Material

Forms such as foil, fine wire, turnings, millings, grindings, powder and dust etc are flammable.

Once ignited titanium burns fiercely giving off intense heat and is difficult to extinguish.

Metal powder or dust forms an explosive mixture with air or an oxidiser.

Water reacts with burning titanium to release hydrogen.

Titanium will burn in an atmosphere of carbon dioxide or nitrogen.

### 7.2 Solid Forms

Solid metal will not ignite.

## 8. Storage

### 8.1 Foil, Fine Wire, Turnings, Millings

Avoid sources of ignition.

Store away from other combustible materials.

### 8.2 Powder Residues, Grindings, Dust Extractor Sludges

Keep separate in closed drums.

Do not store. Dispose of as soon after arising as possible.

## 9. Transport

Consult regulations of the appropriate transport authority.

Transport within UK - Department of Transport European Agreement concerning the international carriage of dangerous goods by road - ADR.

Transport Overseas - By Sea - Inter Government Marine Consultative Organisation - IMCO  
By Air - International Air Transport Association - IATA

## 10. Handling/Use Precautions

- Use of gloves advisable to avoid cuts.

Use eye protection when machining or grinding etc.

Do not accumulate large quantities of fines or machining residues. Dispose of these materials daily.

Avoid accumulation of dust. Wet dust arrestors are advisable.

Personnel handling dry titanium powder should wear non sparking shoes, non combustible or flame retardant clothing and goggles or face shields (Ref. 3).

## 11. Disposal Precautions

Fines, sludge residue and similar non-recyclable scrap should be burned in small quantities under controlled conditions or made safe by dilution with inert material (1 part sludge to 5 parts sand - Ref 3).

## 12. Emergency Action

### 12.1 Spillage (of swarf, powder, fines etc)

Sweep material into clean drums.

Avoid sparks and all other forms of ignition.

Hose down with water any small amounts of material remaining.

### 12.2 Fire

Do not use water, foam, chemical liquid, gas or dry powder extinguishers.

Smother with large quantities of dry sand or salt.

Remove any nearby combustible material.

### 12.3 First Aid

Remove any clothing impregnated with titanium dust.

Eye or skin contact. Normal procedure for foreign object, wash with water.

## 13. Additional Information

Precaution When Melting Titanium - Users whose process involves melting the metal in water cooled furnaces should note that molten titanium and water can react with explosive violence and should take precautions to avoid failure of the cooling system and provide protection for personnel in the event of an explosion. (Ref 3).

Low melting point eutectics may form when titanium or its alloys are in contact with metals such as iron, nickel or copper at higher temperature.

Titanium will burn in the presence of dry chlorine at room temperature. (Ref. 3).

Titanium should not be melted or welded other than under a protective argon atmosphere or under vacuum.

## 14. Reference

1. Occupational Exposure Limits - Guidance Note EH40 Department of Employment (HMSO).
2. Documentation of the Threshold Limit for substances in Workroom Air Values - American Conference of Government Industrial Hygienists.
3. Production, Processing, Handling and Storage of Titanium Leaflet NFPA 481, National Fire Protection Associations (USA).



**AMANNGIRRBACH**

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This information is prepared from the best knowledge available; no responsibility is accepted that the information is sufficient or correct in all cases.

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