MATERIAL SAFETY DATA SHEET (MSDS)

MSDS No. : 1001 **Issued Date: NOV.01, 2007**

1. CHEMICAL, PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME :	**Titacon GF930,GF925,GF920,GF915,GF910,GF905,GF525,GF520, GT930**
MANUFACTURER :	TITAN PLASTICS COMPOUNDS CO., LTD.
SECTION IN CHARGE :	Quality Management
ADDRESS :	No.8, S. 1st Rd., Pingtung Export Processing Zone, Pingtung City, 90093, Taiwan, R.O.C
TELEPHONE NUMBER :	886-8-7522966
FACSIMILE NUMBER :	886-8-7522066

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPOSITION:	Polyoxymethylene (Polyacetal) POM ≧68%, Stabilizers etc. ≦2%, Glass Fiber 5~30%
STRUCTURAL FORMULA:	Polyoxymethylene (Polyacetal) $-(-CH_2O-)_n-$
CAS No. :	24969-26-4（base resin）.
INGREDIENTS CONTRIBUTING TO THE HAZARD :	Formaldehyde.

3. HAZARDS IDENTIFICATION

MOST IMPORTANT HAZARDS:	Incomplete combustion leads to generation of toxic gases such as carbon monoxide, in addition to carbonic acid gas and water. Decomposition of polymer also leads to generation of formaldehyde.
HUMAN HEALTH EFFECTS:	Not applicable.
ENVIRONMENTAL EFFECTS:	Not applicable.
PHYSICAL AND CHEMICAL HAZARDS:	It is inflammable substance and combustible if an igniting source is existent. Neither dangerous reaction, fire nor explosion can be caused under normal conditions.
THE CLASSIFICATION:	Not applicable.

4. FIRST-AID MEASURES

EYE CONTACT:	Cool and rinse the eye with clean water for at least 15 minutes when the eyes had contact with molten polymer. In case of wearing contact lenses, remove the lenses as soon as possible, and ask a physician for advice. When the eye had contact with the polymer in an ordinary solid form, rinse the eye with clean water without delay. If the discomfort persists, ask a physician for advice.
SKIN CONTACT:	Cool the contacted skin with clean water without delay, if a contact with the polymer In a molten form. Do not force to remove the solid resin on the skin. If any burns are observed on the skin, ask a physician for advice.
INHALATION:	When a gas generated from the molten polymer has been inhaled, remove fresh air without delay and wait until the victim is recovered. If sick feeling continues, ask a physician for advice.

INGESTION :	Help to vomit as much as possible. If sick feeling continues, and ask a physician for advice.
MELT PROCESSING:	For molten plastic skin contact, cool affected area rapidly with water and immediately seek medical attention. WARNING: Do not attempt removal of plastic without medical assistance. Do not use solvent for removal If inhalation of processing fumes causes irritation, leave contaminated area and breathe fresh air. If coughing , difficult breathing or any other symptoms develop, seek medical attention at once, even if symptoms develop at a later time.

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5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA :	Water, form fire-extinguishing agent, powder fire-extinguishing agent, and carbon dioxide gas.
SPECIFIC METHODS :	Extinguish the fire with water. A method of extinguishing an ordinary fire may be applied. Do not apply water directly to processing machines.
SPECIFIC HAZARDS :	Incomplete combustion leads to generation of toxic gases such as carbon monoxide or formaldehyde, in addition to carbonic acid gas and water.
SPECIAL EQUIPMENT FOR THE PROTECTION OF FIREFIGHTERS	In case the fire gained force, use a gas mask or other protective equipment.

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6. ACCIDENTAL LEAKAGE MEASURES

PERSONAL PRECAUTIONS :	When pellets were spilled on the road or floor, wipe them off with a besom or cleaner not to cause slipping.
ENVIRONMENTAL PRECAUSION :	Handle the spillage in accordance with provisions given in the "Resin pellet spillage preventive manual", in order to prevent intakes by marine animals and birds.

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7. HANDLING AND STORAGE

HANDLING 1:	Polyacetal resin in a pellet form will neither ignite nor explode at room temperatures, but it falls under the inflammables designated by the Fire Service Law. Keep it away from the igniting sources, as it quickly gains force once it is ignited.
HANDLING 2:	Polyacetal resin in a powdered form is likely to cause dust explosion and is therefore designated in the Guideline for Hazard of Dust Explosion in U.S. Bureau of Mines. Effective earthing means or use of inert gas like N_2 are required for dust handling equipment to eliminate static electricity.
HANDLING 3:	Polyacetal pellets spilled on the floor are likely to cause slipping. Remove such spillage at any times.
HANDLING 4:	For molding work, effective means for local exhaust are required to discharge gases generated by melt processing.
HANDLING 5:	Avoid inhaling of gases generated in molding work. Do not directly touch resin of high temperature.
HANDLING 6	Avoid retaining hot resin in the processing machines for many hours.
HANDLING 7:	Avoid mixed extrusion with strong acid, oxidizing agents and PVC.

HANDLING 8:	Glass fibers are not generally exposed in a single substance under normal processing and handling conditions as they are compounded in pellets. However, the following measures will be necessary to minimize the exposure to glass fibers or dusts containing glass fibers, when pellets or molded parts containing glass fibers are cut, ground or burnt, depending on environmental and operational conditions. Those who are sensitive in skin to glass fiber should wear suitable (protective) clothes to minimize the exposure of their skin. Wash working clothes apart from other laundry, so that the latter will not cause contamination with glass fibers. Provide the workshop with partitions to prevent diffusion of glass fiber dusts. Pay precautions not to rub face, neck or arms with hands. Wash hands and gargle after working without fall. Keep dust sources totally enclosed. Provide local air exhausters and implement periodical inspections and adjustments at least once a year. Reduce cutting and grinding processes to the possible minimum, and devise working procedures to minimize dust generation. Provide dust-preventive masks, protective glasses and gloves for personal hygiene. Determine the operational environment at indoor working places and confirm the effects of environmental improvement. Note)Glass fibers are, like road dusts, told to be least hazardous to human bodies, but proper measures are required to avoid useless inhaling.
STORAGE 1:	Keep the substance away from any fire or heat sources for the sake of safe storage.
STORAGE 2:	This polymer is a synthetic resin designated as an inflammable substance by the Fire Service Law and should be handled in accordance with municipal rules and regulations (concerning firefighting equipment, indoor storage, for instance).
RECOMMENDED PACKAGING MATERIALS:	No information.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONTROL CONCENTRATION	None at present.
PERMISSIBLE CONCENTRATION:	OSHA PEL/1985 Max. permissible concentration of inactive powder 15mg/m^3 - ditto - (Aspiration) 5mg/ m^3 ACGIH TLV/1992 1993 Exposure limit of the powder TWA 10 mg/ m^3 (Reference) Human exposure to formaldehyde - Ministry of Health & Welfare/2002 Guideline value 0.08 ppm OSHA Parameter/1992 TWA 0.75 ppm STEL 2 ppm ACGIH TLV/1992 1993 TWA 0.3 ppm
ENGINEERING MEASURE:	When handling dust: Use totally enclosed containers resisting dust explosion. When heat melted in molding: Effective local ventilation must be provided.

RESPIRATORY PROTECTION:	Wear a dust-proof mask.
EYE PROTECTION:	Wear protective glasses or goggles.
HAND PROTECTION:	Wear heat-resisting gloves against burns, when handling molten polymer.
SKIN & BODY PROTECTION:	Wear long sleeve clothes against burns, when handling molten polymer.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE :	Pellet.
BOILING POINT:	Not applicable.
VAPOUR PRESSURE :	Not applicable.
VOLATILITY:	Not applicable.
SUBLIMATION :	None
MELTING POINT :	165 ℃ (329 deg. F) .
DENSITY:	1.59
SOLUBILITY:	Insoluble in water.
FLASH POINT:	320℃ or higher.
IGNITION POINT:	400℃ or higher.
EXPLOSION PROPERTY:	Not applicable.
INFLAMMABILITY:	Inflammable (Designated as inflammable resin by the Fire Service Law).
REACTIVITY WITH WATER:	None.
OXIDIZABILITY:	None.
SELF-REACTIVITY:	None.
DUST EXPLOSIVENESS	Upper explosion limit: Not applicable. Lower explosion limit: 35g/ m^3 .

10. STABILITY AND REACTIVITY

STABILITY AND REACTIVITY	Stable for normal storage or handling.
CONDITIONS TO AVOID:	Avoid contacts with strong acid, oxidizing agent or PVC under hot melt conditions.
HAZARDOUS DECOMPOSITION PRODUCTS :	Formaldehyde will be generated when heated (for drying or melting) or burnt.

11. TOXICOLOGICAL INFORMATION

SKIN CORROSIVE PROPERTIES :	No finding
SENSITIZING & IRRITANT EFFECTS:	Gas generated in drying or melting is irritating eyes and skins.
ACUTE TOXICITY (INCLUDING LD_{50})	No finding

SUBACUTE TOXICITY :	No finding
CHRONIC TOXICITY :	No finding
CARCINOGENECITY:	No finding
MUTAGENECITY (Micro organisms, chromosomal aberration):	No finding
REPRODUCTIVE TOXICITY :	No finding
TERATOGENICITY :	No finding
OTHERS (Including generation of hazardous gases by reaction with water, for example) :	No finding in this report means that there will be no hazard in general, but no proving data available at the time of reporting.
OTHER CAUTIONS 1:	With regard to dust, the maximum permissible concentration and limits are fixed by OSHA and ACGIH.
OTHER CAUTIONS 2:	Formaldehyde will be generated when heated (for drying or melting) or burnt.
OTHER CAUTIONS 3:	Information on hazards of glass fibers as filler. (Effects on Human Bodies) (1) Effects on skin Stimulation to the skin with glass fibers may be caused when glass fibers diameter is larger then 4.5~5 μm. They give mechanical stimulation followed by itchiness to the skin, but further continuous exposure reportedly results in extinction of stimulation. It may sometimes leads to irritable dermatitis complicated with urticaria or eczema-like reaction. It is, however reported that such dermatitis is not so serious in general and dose not last too long . Therefore, skin stimulation can be prevented by proper use of glass fibers. (2) Effects on Tumor Investigations made on glass fibers till today reveal that there is neither increase in mortality of glass fibers production workers due to lung cancer or mesothelioma nor such cases reported. (Animal Test Report) It is suggested that carcinogenicity of mineral fibers is dependent on their shapes rather than on their constituents. According to a report on experiments using 17 kinds of artificial mineral fibers in various sizes prepared by Dr.Stanton of National Cancer Institute, in USA, statistical studies on correlations between the diameter and length of fibers and the coincidence of mesothelioma have revealed that mineral fibers having a diameter smaller than 0.25 μm and a length larger than 8 μm are closely related to the coincidence of cancers. Since these experiments were performed by artificially dosing the subject animals with a large quantity of glass fibers and consequently they are quite different from the actual exposures to human bodies to human bodies, it is told to be problematic to make a conclusion that mineral fibers are hazardous to human health, basing on the results obtained from these experiments. Upto the present time, there is no result to demonstrate a mechanism of glass fibers causing lung cancers in spite of experiment by long exposure to glass fibers with high concentration.
OTHER CAUTIONS 4:	Carcinogenicity class of formaldehyde, which may be generated if overheated. IARC(International Agency for Research on Cancer):Group1

12. ECOLOGICAL INFORMATION

BIODEGRADABILITY:	No finding.
BIOACCUMULATION :	No finding.
FISH TOXICITY:	No finding.

13. DISPOSAL CONSIDERATION

WASTE FROM RESIDUES 1 :	This is designated as waste plastics among industrial wastes by the Wastes Disposal Law. Disposal waste through licensed wastes handlers or local autonomous bodies if they are handling wastes disposal.
WASTE FROM RESIDUES 2 :	When disposed by incineration, use the well controlled incinerators in accordance with the Wastes Disposal Law, Air Pollution Control Law and Water Pollution Prevention Law.

14. TRANSPORT CONSIDERATION

UN CLASSIFICATION NUMBER:	Not applicable.
OTHER CAUSIONS 1:	Handle with care so as not to give damages to containers or not to be subjected to wetting.
OTHER CAUSIONS 2:	Secure the containers firmly so as not to cause collapsing.

15. REGULATORY INFORMATION

FIRE SERVICE LAW:	Inflammable synthetic resin. Designated quantity: More than 20 m^3 for the foamed product. More than 3,000 kg for other types.
WASTE DISPOSAL LAW:	Waste plastics among industrial wastes.
OTHERS :	Formaldehyde is designated as Class 3 substance by the Industrial Safety and Health Law (Regulations concerning hazards caused by specific chemicals) and designated as deleterious substance by the Poisons and Deleterious Substance Control Law. Recommended usage, criteria, and limit values are provided by Japan Industrial Safety and Health Society, OSHA and ACGIH.

16. OTHER INFORMATION

HANDLING OF THE DETAILS GIVEN ABOVE:	Details given above are based on references, information and data available at this moment, but no warranty can be made on exactness of these details. They are also prepared on the assumption that the product will be handled in a normal way. For special handling, adequate safety and environmental measures should be taken in respect to its applications. Our products are not specifically intended for implants for medical and dental applications, and therefore they are not recommended for such applications. "No finding" in this report means that there will be no hazard in general, but no proving data is available at the time of reporting.
WHERE TO CALL FOR FURTHER INFORMATION :	08-7522966