Safety Data Sheet
Conforms to OSHA Hazard Communication Standard (HCS)
29CFR 1910.1200

Printing date 08/09/2016 Version number 4 Reviewed on 08/09/2016

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1 Identification of the Substances/Preparation and of the Company/Undertaking

· **Product identifier**
· **Product name:** TYZOR® TnBT
· **Relevant identified uses of the substance or mixture and uses advised against**
Industrial use as formulation of adhesive , sealants ; Coatings and paints, thinners, paint removers; Lubricants, greases, release products ; Intermediate for printing inks; Esterification and transesterification processes; Fuels ; Polymer preparations and compounds.
Professional uses as Adhesives, sealants
Consumer uses as as Adhesives, sealants

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Dorf Ketal Specialty Catalysts LLC
11200 Westheimer Road
Suite 400
Houston, Texas 77042
Phone= +1 713 343 2377
Fax= +1 832 649 7615
Email: ehss@dorfketal.com
· **Emergency telephone number:**
For Chemical Emergency ONLY (spill, leak, fire, exposure or accident) call Chemtrec at +1 (703) 527 3887 or Chemtrec India at 000-800-100-7141. DORF KETAL Emergency Control Room +91 22–65271001.

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2 Hazard(s) identification

· **Classification of the substance or mixture**

Flam. Liq. 3	H226	Flammable liquid and vapor.
Skin Irrit. 2	H315	Causes skin irritation.
Eye Dam. 1	H318	Causes serious eye damage.
STOT SE 3	H335-H336	May cause respiratory irritation. May cause drowsiness or dizziness.

· **OSHA/HCS status**
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

· **Label elements**
· **Hazard pictograms**

GHS02 GHS05 GHS07

· **Signal word** Danger

· **Hazard-determining components of labeling:**
titanium tetrabutanolate
· **Hazard statements**
Flammable liquid and vapor.
Causes skin irritation.
Causes serious eye damage.
May cause respiratory irritation. May cause drowsiness or dizziness.

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· **Precautionary statements**
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Wear protective gloves/protective clothing/eye protection/face protection.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER/doctor.
Take off contaminated clothing.
IF ON SKIN: Wash with plenty of water.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 2
Fire = 2
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 2
Fire = 2
Reactivity = 0

· **Other hazards**
The criteria for PBT and vPvB is not met and this substance is not hazardous to the ozone layer.
· **% of unknown toxicity:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Substance**

· **Dangerous components:**

5593-70-4	titanium tetrabutanolate	Flam. Liq. 3, H226 Eye Dam. 1, H318 Skin Irrit. 2, H315; STOT SE 3, H335-H336	> 98%

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4 First-aid measures

· **Description of first aid measures**
· **General information:**
Take affected persons out into the fresh air.
Do not leave affected persons unattended.
· **Inhalation:**
Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
· **Skin Contact:**
Immediately rinse with water.
If skin irritation continues, consult a doctor.
Remove contaminated clothing and shoes.

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Wash clothing before reuse.

· **Eye Contact:**
Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids.
Check for and remove any contact lenses.
Rinse opened eye for several minutes under running water. Then consult a doctor.

· **Ingestion:**
Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel.
Never give anything by mouth to an unconscious person. Get medical attention immediately.

· **Most important symptoms and effects, both acute and delayed**
May be irritating to respiratory system. Respiratory tract irritation, coughing.
Skin irritation. Pain or irritation, redness, blistering may occur.
Dizziness
Headache

· **Indication of any immediate medical attention and special treatment needed**
Show this safety data sheet to the doctor in attendance. Treat symptomatically.

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5 Fire-fighting measures

· **Extinguishing media** In case of fire use the following suitable extinguishing agent.

· **Suitable extinguishing agents:**
Foam
Fire-extinguishing powder
Alcohol resistant foam
Carbon dioxide
Sand

· **For safety reasons unsuitable extinguishing agents:**
Water with full jet
Water spray

· **Special hazards arising from the substance or mixture**
Flammable liquid and vapour.
In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
Runoff to sewer may create fire or explosion hazard.
In case of fire, the following can be released:
Carbon dioxide
Carbon monoxide (CO)
Metal oxides

· **Advice for firefighters**
Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

· **Protective equipment:**
Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

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6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective clothing.
Keep away from ignition sources
Ensure adequate ventilation
Wear protective equipment. Keep unprotected persons away.
Use respiratory protective device against the effects of fumes/dust/aerosol.
· **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Stop leak if without risk.
Move containers from spill area.
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents

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7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Put on appropriate personal protective equipment .
Do not ingest.
Avoid contact with eyes, skin and clothing.
Avoid breathing vapour or mist.
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
· **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect from heat.
Protect against electrostatic charges.

· **Conditions for safe storage, including any incompatibilities**
· **Requirements to be met by storerooms and receptacles:**
Avoid storage near extreme heat, ignition sources or open flame.
· **Information about storage in one common storage facility:**
Store away from foodstuffs.
Store away from oxidizing agents.
· **Further information about storage conditions:**
All organometallic compounds exhibit discoloration when exposed to sunlight. We recommend that the product shipped in non-steel packaging be stored in enclosed buildings and out of direct sunlight or intense UV light.
Moisture-sensitive material. Once opened, container should be kept under nitrogen blanketing to prevent decomposition.
Keep receptacle tightly sealed.

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· **Specific end use(s)**
For industrial and professional use, and for consumer use of adhesive and sealants. Exposure scenarios for identified uses are presented in annexes of the SDS. The identified uses are listed in the table of contents of the annexes.

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8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
No exposure limit value known.

· **Exposure controls**
· **Appropriate engineering controls:**
Local exhaust ventillation may be necessary for some operations.
If there are no applicable exposure limit requirement or guidelines, general ventilation should be sufficient for most operations.
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
· **Breathing equipment:**
Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
Where there is potential for airborne exposures, wear NIOSH approved respiratory protection.
· **Protection of hands:**


Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
Gloves: EN374. Gloves should be worn when there is potential for dermal exposure.
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

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· **Eye protection:**
EN166 (goggles or safety glasses)

Tightly sealed goggles

· **Body protection:** Protective work clothing
· **Limitation and supervision of exposure into the environment**
Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

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9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Liquid
Color:	Light yellow
· **Odor:**	Alcohol-like
· **Odor threshold:**	No data available.
· **pH-value:**	No data available
· **Melting point/Freezing Point :**	- 75 °C (OECD 102)
· **Boiling point/Boiling range:**	Substance decomposes before boiling (OECD 103). 117 ˚C at 101,3 kPa (BP of main degradation product, n-butanol, used for CSA)
· **Flash point:**	42- 45 °C (108- 113 °F) (ASTM-D 93)
· **Flammability (solid, gaseous):**	Not applicable.
· **Decomposition temperature:**	No data available.
· **Auto ignition temperature**	Auto ignition temperature of the critical decomposition product n-butanol is 343 °C at 1013 hPa.
· **Explosion limits:**	
Lower:	Not applicable (Substance non explosive)
Upper:	Not applicable (Substance non-explosive)
· **Oxidizing properties**	No
· **Vapor pressure:**	Substance decomposes during vapour pressure testing (OECD 104). 10 hPa at 20 °C (read across data of hydrolysing product n-butanol)
· **Relative density at 25 °C (77 °F)**	0.996 (ASTM D 891)
· **Vapor density**	No data available

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· **Evaporation rate**	No data available
· **Solubility(water):**	Testing is not technically feasible as substance is hydrolytically unstable. 63200 mg/L at 25 °C (water solubility of degradation product n-butanol)
· **Partition coefficient (n-octanol/water):**	Hydrolytically unstable, Log Kow (Pow): 0,84 at 25 °C for hydrolysing product n-butanol released in water
· **Viscosity:**	
Dynamic:	66 mPas (DKTM-112) (viscosity of main degradation product n-butanol is 2.54 mPas)
Kinematic:	No data available.

10 Stability and reactivity

· **Reactivity**
Under normal conditions of storage and use, hazardous reactions will not occur.
Water reactive, complete hydrolysis will take place with no significant reaction products other n-butanol and hydrated titanium dioxide when comes in contact with water or moisture
· **Chemical stability** The product is stable under storage at normal ambient temperature.
· **Possibility of hazardous reactions**
Under normal conditions of storage and use, hazardous reactions are not known.
· **Conditions to avoid**
Avoid all possible sources of ignition (spark or flame).
Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
· **Incompatible materials:**
Hydrolyzes in water to form n-butanol and titanium dioxide.
Acids
Oxidizing materials
· **Hazardous decomposition products:**
Hydrolyzes in water to form n-butanol.
Incomplete combustion and thermolysis may produce gases such as:
Carbon dioxide
Carbon monoxide
Hydrocarbons

11 Toxicological information

· **Information on toxicological effects**
There is no experimental data available on toxicokinetics and the assessment has been made qualitatively on the basis of the physical and chemical properties and other relevant data obtained from the degradation products. As the substance is hydrolyzed, the hazardous degradation product is metabolized and excreted rapidly.

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· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
5593-70-4 titanium tetrabutanolate		
Oral	LD50	> 2000 mg/kg bw (Rat)
Dermal	LD50	5300 mg/kg bw (Rabbit)
Inhalative	LC50	20100 mg/l (Rat)

· **Primary irritant effect:**
· **on the skin:** Irritant to skin and mucous membranes.
· **on the eye:** Strong irritant with the danger of severe eye injury.
· **Respiratory/ Skin sensitization:** No sensitizing effects known.
· **Germ cell mutagenicity:** No adverse effect observed. Negative
· **Carcinogenicity:** Substance has not been classified for carcinogenicity
· **Reproductive toxicity:** Substance is not classified for reproductive toxicity.

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
Substance is not listed.

· **NTP (National Toxicology Program)**
Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
Substance is not listed.

· **Single dose toxicity:**
May cause respiratory irritation.
May cause drowsiness or dizziness.
· **Repeated Dose toxicity**
Substance has not been classified for specific target organ toxicity- repeated exposure.
NOAEL oral: 125 mg/kg bw/day (subchronic; rat)
NOAEC inhalation: 1520 mg/m³ (subchronic; rat)
· **Aspiration hazard** Substance is not classified for aspiration hazard.
· **Other relevant information:** No data available

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12 Ecological information

· **Toxicity**
Substance is not classifed as dangerous to aquatic organisms. Because this substance hydrolysis rapidly the intrinsic ecotoxicological properties are related to the most critical decomposition product n-butanol.

· **Aquatic toxicity:**	
5593-70-4 titanium tetrabutanolate	
EC10	650 mg/L (microorganism)
EC50 (48 h)	1300 mg/l (Daphnia)
EC50 (96 h)	225 mg/L (Algae)
LC50 (96 h)	1825 mg/l (Fish)

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NOEC (21 d)	4 mg/L (Daphnia)

· **Persistence and degradability**
Readily degradable. Main organic decomposition product (n-butanol) is readily biodegradable; . No persistence potential.(OECD Guideline 111)
· **Bioaccumulative potential**
No potential for bioaccumulation
(OECD Guideline111)
· **Mobility in soil**
High mobility in soil based on high water solubility and estimated Koc 3.471 L/kg of degradation product n-butanol.
· **Results of PBT and vPvB assessment** The substance is not a PBT or a vPvB
· **Other adverse effects** This substance is not hazardous to the ozone layer.

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13 Disposal Information

· **Waste treatment methods**
The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil,waterways, drains and sewers.
· **Recommendation:**
Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

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14 Transport information

· **UN-Number**
· **DOT, ADR, IMDG, IATA** UN1993

· **UN proper shipping name**
· **DOT** Flammable liquids, n.o.s. (titanium tetrabutanolate)
· **ADR** 1993 Flammable liquids, n.o.s. (titanium tetrabutanolate)
· **IMDG, IATA** FLAMMABLE LIQUID, N.O.S. (titanium tetrabutanolate)

· **Transport hazard class(es)**

· **DOT**

· **Class** 3 Flammable liquids

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· **Label**	3
· **ADR**	
	
· **Class**	3 (F1) Flammable liquids
· **Label**	3
· **IMDG, IATA**	
	
· **Class**	3 Flammable liquids
· **Label**	3
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	III
· **Environmental hazards:**	
· **Marine pollutant:**	No
· **Special precautions for user**	Warning: Flammable liquids
· **Danger code (Kemler):**	30
· **EMS Number:**	F-E,S-E
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **IMDG**	
· **Limited quantities (LQ)**	5L

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15 Regulatory information

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

· **Section 313 (Specific toxic chemical listings):**

Substance is not listed.

· **TSCA (Toxic Substances Control Act):** Substance is listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

Substance is not listed.

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· **Chemicals known to cause reproductive toxicity for females:**
Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**
Substance is not listed.

· **Chemicals known to cause developmental toxicity:**
Substance is not listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**
Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**
Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
Substance is not listed.

· **Chemical safety assessment** Chemical safety assessment has been carried out.

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16 Other information

File Name: TYZOR TnBT_SDS_US_en_AUG-09-2016
Superseded SDS date: MAY-12-2014
Change History: Storage infomation updated.

· **Note** Conforms to UNGHS Rev.3(2009)

· **Abbreviations and acronyms:**
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
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
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)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
APF = Assigned protection factor
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
IOELV: Indicative Occupational Exposure Limit Values
Flam. Liq. 3: Flammable liquids, Hazard Category 3
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

· **Disclaimer:**
The data and recommendations presented in this data sheet concerning the use of our product and the materials contain there in are believed to be accurate and are based on information which is considered reliable as of the date hereof. However, the customer should determine the suitability of much material for his purpose before adopting them on a commercial scale. Since the use our product by others is beyond our

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