SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name	TENAC™-C **3510, 3513, 3530, 4510, 4513, 4520, 4560, 4563, 4590, 5520, 7510, 7511, 7513, 7520, 7523, 7554, 7590, 8520, 9520, BS550, EX352, HC350, HC450, HC460, HC490, HC550, HC590, HC750, HC760, HD450, HD750, LT350, RC850, V3510, Z3510, Z3513, Z4513, Z4520, Z453N, Z4563, Z7520, ZH450, ZH760**
SDS No.	TC-W001-9
Company Name	ASAHI KASEI CORPORATION
Address	1-105 Kanda Jinbo-cho, Chiyoda-ku, Tokyo 101-8101 Japan

Contact Department and Telephone Number

ASAHI KASEI CORPORATION (**JAPAN**)
TENAC Sales & Marketing Dept.
Phone +81-3-3296-3388, Fax +81-3-3296-3472
Automotive Materials Sales & Marketing Dept.
Phone +81-52-212-2133, Fax +81-52-212-2229

ASAHI KASEI PLASTICS **NORTH AMERICA**, INC.
Phone +1-517-223–0000 , Fax +1-517-223-5620

ASAHI KASEI **EUROPE** GmbH
Phone +49-211-88-22-030 , Fax +49-211-88-22-0333

ASAHI KASEI PLASTICS **SINGAPORE** PTE LTD
Phone +65-6324-3001 , Fax +65-6324-3808

ASAHIKASEI PLASTICS (**THAILAND**) CO., LTD.
Phone +66-2-632-7009 , Fax +66-2-632-7010

ASAHI KASEI PLASTICS (**SHANGHAI**) CO., LTD.
Phone +86-21-6391-5252 , Fax +86-21-6391-5886

ASAHI KASEI PLASTICS (**HONG KONG**) CO., LTD.
Phone +852-2151-4000 , Fax +852-2116-4300

ASAHI KASEI PLASTICS (**GUANGZHOU**) CO., LTD.
Phone +86-20-8527-1616 , Fax +86-20-8527-1700

Emergency Telephone Number

USA	CHEMTREC United States : (800)424-9300 24 hours Everyday International : +1-703-527-3887(Collect) 24 hours Everyday
EU	BIG v.z.w. Phone +32-1-458-4545 , Fax +32-1-458-3516 Technishe Schoolstraat 43A B-2440 Geel, Belgium
Others	Performance Plastics Technology Dept. Phone +81-44-271-2448, Fax +81-44-271-2168 9am-6pm(Japan time) on weekday

Recommended use and restriction on use, destination

Recommended use	Plastic ingredient for home electronics, electronic materials, automotive materials, industrial materials.

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Restriction on use	Please do not use our product TENAC-C for the following use. -Medical container/ packaging/ equipment/ parts of in-vino, or which contact with mucosa, body fluid, blood, and chemical solution. -Equipment and parts which contact with food containers/ packaging/ equipment/ parts and drinking water.* -Toys which contacts with mouth, drinking water and etc. (*) There are TENAC-C grades for equipment and parts which contact with food containers/ packaging/ equipment/ parts and drinking water. Please contact us.
Restriction on destination	The products of some color numbers might contain the pigments and dyes not registered as an existing chemical substance of some countries except USA, EU and Japan. Please contact to TENAC Sales & Marketing dept. about these details.

2. HAZARDS IDENTIFICATION

[GHS Classification]	
Health Hazards	Can not be classified
Environmental Hazards	Can not be classified
[GHS label element]	
Pictogram or symbol	Non
Signal word	Non
Hazard statement	Non
Special Hazard	Polyoxymethylene (polyacetal) resin needs attention so that heating (drying, fusion) and the gas that the formaldehyde is harmful to combustion time (in particular, incomplete combustion time) are generated.
[Precautionary statements]	
Safety measures	Do not handle until all safety precautions have been read, understood and precautionary measures are taken. Do not eat, drink or smoke when using these products. Wear protective gloves, eye-protection if necessary. Take burn prevention measures especially when handling melted resin. Install effective local exhaust in extrusion press because gas is generated.

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3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical name or generic name: Polyoxymethylene (Polyacetal) resin composition.

Components, Contents, Chemical formula, CAS number and EINECS number

Components	Contents [wt%]	Chemical formula	CAS No.	EINECS No.
Polyoxymethylene copolymer (Polyacetal)	80-99.5	$[-CH_2O-]_n$	24969-26-4	N/A
Carbon black (*1)	< 2	C	1333-86-4	215-609-9
Titanium dioxide(*1)	< 5	TiO_2	13463-67-7	236-675-5
Di iron trioxide (*1)	< 2	Fe_2O_3	1309-37-1	215-168-2
Other pigments and dyes(*1)	<10	Confidential	Registered	Registered
Other additives (*2)	0.5-10	Confidential	Registered	Registered
Total:	100wt%			

*1 Those are added as pigments and dyes. The total amount of them is less than 10wt%.

*2 It might contain heat stabilizers, light stabilizers, Antioxidants, weather-resistant agents, softening agent, dispersing agent, lubricants etc.

Uncolored products

All of ingredients are listed on TSCA, EINECS (ELINCS), ENCS (JPN), ISHL (JPN), IECSC (CHN), and ECL (KOR) inventories.

Colored products

All of ingredients are listed on TSCA, EINECS (ELINCS), ENCS (JPN), ISHL (JPN) inventories. The products of some color numbers might contain the pigments and dyes not registered as an existing chemical substance of some countries except USA, EU and Japan.

These ingredients are corresponding to the REACH regulations.

These products do not contain Substances of Very High Concern(SVHC) concentration above 0.1wt%

4. FIRST AID MEASURES

Swallowed.	If the pellet was swallowed accidentally, vomit immediately and get medical attention/advice if any abnormality occurs.
Eyes.	If pellet got in eyes. Do not rub. And wash with plenty of water. Remove contact lenses immediately. If abnormality is observed get medical attention and advice.
Skin.	If melted resin was contacted with skin. Do not peel off melted material. And cool down affected area with plenty of water for more than 30 minutes. Then get medical attention.
Inhaled	If inhaled the gases generated from melted material. If you feel unwell, move away from the working place immediately to well-ventilated area. Get medical advice if necessary.
Protection who gives the first aid.	Those who suffer from any abnormality should get medical attention.

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5. FIRE-FIGHTING MEASURES

Extinguisher	Pouring water, spraying water, carbon dioxide (CO_2), dry chemical extinguishing system and other extinguisher can be used.
Specific hazards	Strong heat, and gases such as Formaldehyde, CO_2, CO may be generated on fire.
Specific fire fighting method	Use the same fire fighting method as the general fire. Fight fire from the safe distance. Work from the windward.
Protection of fire fighter	Wear fire retardant clothing and respiratory equipment when fighting fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	Clean up the floor immediately because it may be slippery if pellet or powder remains.
Environmental precautions	Collect all leakage on the water surface such as drain system considering adverse effect to avian species and fish.
Methods for recovery, neutralization, containment and cleaning up.	Sweep up or clean with vacuum cleaner, collect and dispose of.
Prevention of secondary disaster	Not specified.

7. HANDLING AND STORAGE

Handling

Engineering measures	Should process product under the recommended temperature range.(180 ～210°C, 356 ～ 410°F) Do not inhale gas during processing of product. Provide for sufficient ventilation. Do not hold product at high temperatures over an extended time. (See 10. STABILITY AND REACTIVITY) Do not extrude with strong acids, oxidizing reagent, and PVC. Wear eye protection, heat-resistant gloves, long-sleeved work clothing for burn prevention when handling melted resin. Avoid breathing gases generated from the melted resin.
Local exhaust, total ventilation	Use effective local exhaust at the generating point of gases because the gases are generated when handling melted resin using extruder or injection molding machine. Perform total ventilation by ventilation fan at indoor or working area operating above procedure.
Cautions to fire	At the room temperature, the polyacetal pellets are in no danger of the ignition and the explosion. However, do not use the fire recklessly because the force of the fire expansion is fast when a fire occurs once. (1) Do not use heater with open flame. (stove, open fire, etc) (2) Do not carry match, lighter. No smoking. (3) Ground facilities and equipments (extruder, molding machine, air-conveying line, bag filters, etc) in order to prevent static discharge. (4) Use safe non-sparking tools. (5)Avoid generation or approach of any other ignition sources.

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Precautions for safe handling	(1) Do not eat or drink when using this product. (2) If leaked on the floor, remove and keep cleaned up. If leakage is left the floor becomes slippery and may cause a fall. (3) Determine and keep proper working process.
Storage	Store at the place where fulfills below storage conditions. (1) Protect from direct sunlight. (2) Protect from high temperature and humidity. (3) Store and keep away from ignition source. (4) Take precautionary measures against static discharge.
Safe containers and packaging material	Containers and packaging materials should fulfill storage conditions.

8. EXPORSURE CONTROLS / PERSONAL PROTECTION

Facility measures	See “7. HANDLING AND STORAGE” for facility measures.
Administrative level, allowable limit	Gases are generated from melted resin but administrative level and allowable limit are not established.
Dust	Allowable limit for this resin is not established in ACGIH. However below values are applicable for dust. (reference 1,2) PNOS: Particles(insoluble or poor soluble) NOT Otherwise Specified ACGIH TLV TWA Respirable 3 mg/m^3 Inhalable10 mg/m^3 PNOR: Particles not otherwise regulated OSHA PEL TWA Respirable fraction 5 mg/m^3 Total dust 15 mg/m^3 Dust, general threshold limit value DFG MAK TWA 4 mg/m^3 Reference information(reference 1,2) Formaldehyde ACGIH TLV TWA NIC-0.1 ppm NIC-0.12 mg/m^3 STEL NIC-0.3 ppm NIC-0.37 mg/m^3 Ceiling 0.3 ppm 0.37 mg/m^3 Carcinogenicity category A2 NIC-A1 *NIC: Notice of Intended Changes OSHA PEL TWA 0.75 ppm STEL 2 ppm Carcinogenicity category Ca DFG MAK TWA 0.3 ppm 0.37 mg/m^3 Ceiling 1 ppm 1.2 mg/m^3 Carcinogenicity category 4

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Protective equipment	
Respiratory protection	Wear dust control mask when dust is caused by the works such as machinery processing of resin product, sanding, removing resing powder from bag filter, cleaning of sieving machine.
Hand protection	It is recommended to wear hand protection if necesasry. Especially when handling melted resin, wear heat-resistant gloves for burn prevention.
Eye protection	It is recommended to wear side-shielded eye protection made with resin, resin goggles.
Skin and body protection	Wear long-sleeved clothing when handling melted resin for burn prevention.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Pellet
Physical state	Solid
Odor	Slight odor
pH	Not applicable
Melting point	155~173 ^{o}C(311 - 343 ^{o}F)
Decomposition point	260 ^{o}C (500 ^{o}F)
Ignition point	420 ^{o}C (788 ^{o}F)
Flash point	320 ^{o}C (608 ^{o}F)
Explosion limit	
Upper / lower	No data
Specific gravity	1.35 - 1.45
Solubility	
Water	Insoluble
Octanol/water partition coefficient	No data

10. STABILITY AND REACTIVITY

Stability	Stable at room temperature as far as stored protected from direct sun-light, away from fire or heat source.
Reactivity	Reactivity with water is none. Hazardous polymerization will not occur.
Conditions to avoid	Direct sunlight, fire, heat source and generation of its dust. Follow the recommended conditions below, to prevent decomposition. Processing at above 250 ^{o}C (482 ^{o}F) may result in releasing toxic and carcinogenic formaldehyde. The following limits are general guide; 1. Temperature should be lower for specific operating conditions. Optimal resin temperature : 180~210^{o}C (356~410^{o}F) Maximum resin temperature : 250^{o}C (482^{o}F) 2. When the resin temperature over the limit, conduct a purge. 3. If the injection molding machine is stopped, conduct a purge, and turn off the heater of cylinder.

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	4. When substitute to another resin, use non-colored Polyethylene, cleared Polystyrene and ASACLEAN (made by Asahi). 5. Do not mix product with pigments or additives other than those designated by Asahi, or with different resins or resin grades, as this may degrade product and cause decomposition. 6. In order to avoid auto ignition / hazardous decomposition of hot thick masses of resin, purging should be collected in small, flat shapes or thin strands to allow for rapid cooling in water.
Materials to avoid	Incompatible with strong acid, base and oxidizing agents.
Hazardous decomposition products	May include and are not limited to: Formaldehyde as decomposition gas. When ignited, formaldehyde, CO and CO_2.

11. TOXICOLOGICAL INFORMATION

These products might contain Titanium dioxide (< 5wt%), Diiron trioxide (< 2wt%) and Carbon black (< 2wt%).

GHS classification is shown in the table below. This toxicological classification is besed on reference 3,4,and 5.

	Resin Additives	Carbon black (*1)	Titanium dioxide	Diiron trioxide	Classifications of the products
Content	91wt%～	< 2wt%	< 5wt%	< 2wt%	
Skin corrosion /Irritation	Can not be classified	Can not be classified	Not classified	Category 2	Can not be classified (1)
Serious Eye Damage /Irritation	Can not be classified	Can not be classified	Category 2B	Category 1	Can not be classified (2)
Carcinogenicity	Can not be classified	Can not be classified	Category 2	Not classified	Can not be classified (3)
Specific Target Organ Systematic Toxicity (Single Exposure)	Can not be classified	Can not be classified	Can not be classified	Category 3 (respiratory tract irritation)	Can not be classified (4)
Specific Target Organ Systematic Toxicity (Repeated Exposure)	Can not be classified	Can not be classified	Can not be classified	Category 1 (respiratory system)	Can not be classified (4)

The complex of metal oxides might be included in Additives. In the report (reference 6), the toxicological status of the complex of metal oxides are specified as " not applicable "

(*1) In the report (reference 5), the toxicological status of carbon black is specified as " not applicable "

Notes

(1) The products cannot be classified because the hazardous substances are not exposed to the skin directly for they are covered by the product resin and not likely to be separated by the exudation etc.

(2) The products cannot be classified because the hazardous substances are not exposed to the eyes directly for they are covered by the product resin and not likely to be separated by the exudation etc.

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(3) The carcinogenicity of Titanium dioxide is based on the lung tumor of rats, and was caused by inhalation of the ultrafine Titanium dioxide. The products cannot be classified because the Titanium dioxide in the products are not inhaled as dust, gas, vapor and mist for they are covered by the product resin and not likely to be separated by the exudation etc

(4) The products cannot be classified because the hazardous substances are not inhaled as dust, gas, vapor and mist for they are covered by the product resin and not likely to be separated by the exudation etc.

Reference Information: Formaldehyde (CAS No. 50-00-0)

Polyoxymethylene (polyacetal) resin needs attention so that heating (drying, fusion) and the gas that the formaldehyde is harmful to combustion time (in particular, incomplete combustion time) are generated.

GHS Classification

	GHS Classification
Acute toxicity(oral)	Category 4
Acute toxicity(dermal)	Category 3
Acute toxicity(inhalation: gas)	Category 2
Skin corrosion /irritation	Category 2
Serious eye damage / eye irritation	Category 2A
Respiratory/skin sensitizer	Category 1 / Category 1
Germ cell mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ systematic toxicity (Single exposure)	Category 1 (respiratory organs, nervous system)
Specific target organ systematic toxicity (Repeated exposure)	Category 1 (respiratory organs, central nervous system)

Classified A2(Suspected Human Carcinogen) NIC-A1(Confirmed Human Carcinogen) by ACGIH.
*NIC: Notice of Intended Changes
Classified Group 1 (carcinogenic to human) by IARC(2005).

12. ECOLOGICAL INFORMATION

These products might contain Titanium dioxide (< 5wt%), Diiron trioxide (< 2wt%) and Carbon black (< 2wt%).

GHS classification is shown in the table below. This toxicological classification is besed on reference 3 and 4.

	Resin Additives	Carbon black	Titanium di-oxide	Di iron triox-ide	Classifica-tions of the products
Content	91wt%～	< 2wt%	< 5wt%	< 2wt%	
Hazardous to the aquatic environment (Acute)	Can not be classified	Not classified	Can not be classified	Can not be classified	Can not be classified
Hazardous to the aquatic environment (Chronic)	Can not be classified	Can not be classified	Can not be classified	Can not be classified	Can not be classified

The complex of metal oxides might be included in Additives.

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Reference Information: Formaldehyde (CAS No. 50-00-0)

GHS Classification Hazardous to the aquatic environment (Acute) Category 2

13. DISPOSAL CONSIDERATIONS

Dispose of according to regulation and standard of regional government.
Avoid direct release of waste containing these products (effluent, solid and washing water) to the river or landfill. In case of incineration treat by the method in accordance with relevant laws such as Air Pollution Control Law using the incinerator. Remove all the residues before disposal of the container (paper bag, drum, flexible container) of these products after use, dispose of in accordance with relevant laws and do not re-use for other usage.

14. TRANSPORT INFORMATION

International regulations:	
IMDG	Not Regulated
ICAO-TI/ IATA-DGR	Not Regulated
UN Classification	Not Regulated
UN Number	Not Regulated
Domestic regulations	Not Regulated
Marine pollutant	Not Regulated
U.S. Department of Transportation (D.O.T)	These products are not regulated by D.O.T.
Special safety precautions and conditions during transport	Do not handle roughly and keep dry not to break packaging bag. If the bag is broken and pellet is spilt, pay attention not to fall by slippery floor. If transpoprted by air-conveying line take prevention measures against static discharge.

15. REGULATORY INFORMATION

United States

OSHA	These products are not hazardous as defined by the OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200)
TSCA	All ingredients are on the TSCA inventory.
40 CFR 799 Subpart B,C	Not Applicable
40 CFR 721 Subpart E	Not Applicable
40 CFR 707 Subpart D	Not Applicable
40 CFR 747,749,761~3,766	Not Applicable
40 CFR 712(d),(e)	Not Applicable
CERCLA/ SUPERFUND(40 CFR 117,302)	These products contain no Reportable Quantity (RQ) Substances.

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SARA HAZARD CATEGORY	These products have been reviewed according to the EPA Hazard Categories promulgated under SECTION 311 and 312 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the Following categories: Not to have met any hazard category.
SARA 313 INFORMATION	These products contain no substance subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
U.S. STATE REGULATIONS	California Proposition 65 These products contain formaldehyde Chemical name / Max. content / Chemical status: Formaldehyde / 40 ppm / Cancer These products might be included Carbon black, Titanium oxide. Chemical name / Max. content / Chemical status: Carbon Black / 2 % / Cancer; Titanium dioxide / 5 % / Cancer These products contain formaldehyde, and might be included Carbon black, Titanium oxide, and Iron oxide. These ingredients might be governed by various state regulations in U.S. * Please use these products after confirming the state regulations.

EU

(EC) 1272/2008 AnnexVI table-3.1	Not Applicable
(EC) 1272/2008 AnnexVI table-3.2	Not Applicable
(EC) 1272/2008 (CLP)	Not Applicable
REACH Annex XIV	Not Applicable
REACH Annex XVII	The products in some colors may contain a small amount of nickel compounds as the complex of metal oxides. CAS No. / Maximun content: 68186-85-6 / 1.0wt%; 8007-18-9 / 0.3wt%; 69011-05-8 / 0.5wt%
SVHC (REACH)	Does not contain more than 0.1wt%
ELV (2011/37/EU)	Does not contain more than limit value.
RoHS(2011/65/EU)	Does not contain more than limit value.

China

Limited toxic chemical substances for export	Not Applicable

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Prohibited cargo list for import and export	Not Applicable
List of Dangerous Goods	Not Applicable
List of Hazardous Chemicals	Not Applicable
General rule for classification and hazard communication of chemicals. (GB.13690)	Not Applicable

Korea

Prohibited or regulated toxic substances	Not Applicable
Toxic substances	Not Applicable
Observed substances	Not Applicable

Taiwan

Toxic substances （Toxic Chemical Substance Control Act）	Not Applicable

16. OTHER INFORMATION

This safety data sheet (SDS) is issued based on the latest reference, data etc currently available. The contents may be updated by obtaining the new knowledge. Precautions in this SDS are for normal handling. For special handling, take safety measures appropriate for the special usage. The information in this SDS has been carefully assessed, but no guarantee is given for its accuracy.

Reference

1) ACGIH, "Guide to Occupational Exposure Value", (2016)
2) ACGIH, "TLVs, and BEIs Based on the Documentation of the Threshold Values for Chemical Substances and Physical Agents & Biological Exposure Indices",(2016)
3) Incorporated Administrative Agency National Insutitute of Technology and Evaluation, GHS classification database. http://www.safe.nite.go.jp/ghs/ghs_download.html
4) Ministry of Health, Labour and Welfare, Safety Site of the workplace, GHS model Safety Data Sheet information. http://anzeninfo.mhlw.go.jp/anzen_pg/GHS_MSD_FND.aspx
5) Japan carbon black association, " The safety of carbon black as Nano-materials "(2013)
6) Japan Complex Inorganic Colored Pigment Association, “Safety of CICP”, http://www.kaseikyo.jp/jcicpa-e/safety-of-cicp-e/