MATERIAL SAFETY DATA SHEET

DEAHEUNG CHEMICAL CO., LTD. www.dhcbond.com

PGM

Product Name	ARTIST 05

1. Product and Company Identification

A. Product Name: ARTIST 05

B. Recommended use of the chemical and restrictions on use

- Recommended use of the chemical: Bond the paper, Form, insulation, Fiber
- Restrictions on use of the product: Don't use this for other use.

C. Manufacturer/Supplier/Distributor Information

- Name: DAEHEUNG CHEMICAL CO., LTD.
- Address: 68, Sandan-ro 64beon-gil, Pyeongtaek-si, Gyeonggi-do, Korea
- Emergency phone number: 82-31-668-1424

2. Hazards identification

A. Hazard·Risk Classification

Flammable gases : category 1

Flammable Liquid : Category 2

Compressed gases : Liquefied gases

Acute toxicity(inhalation:gas) : Cstegory 2

Skin corrosion / Skin irritation : categories 2

Serious eye damage / Eye irritation : category 2

Carcinogenicity : Category 1A

Reproductive toxicity : Category 2

Specific target organ toxicity following single exposure : Category 2

Aspiration hazard : Category 2

B. Label elements including precautionary statements

- Symbol

- Signal Word: Danger
- Hazard·Risk Statement

H220 Extremely flammable gas

H225 Highly flammable liquid and vapour Causes severe skin burns and eye damage

H280 Contains gas under pressure; may explode if heated

H305 May be harmful if swallowed and enters airways

H315 Causes skin irritation

H319 Causes serious eye irritation

H330 Fatal if inhaled

H350 May cause cancer

H361 Suspected of damaging fertility or the unborn child

H371 May cause damage to organs

- Precautionary Statement

Prevention

P201 Obtain special instructions before use

P202 Do not handle until all safety precautions have been read and understood

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

Prevention	P233 Keep container tightly closed
	P240 Ground/bond container and receiving equipment
	P241 Use explosion-proof electrical/ventilating/light/…/equipment
	P242 Use only non-sparking tool
	P243 Take precautionary measures against static discharge
	P260 Do not breathe dust/fume/gas/mist/vapours/spray
	P264 Wash … thoroughly after handling
	P270 Do not eat, drink or smoke when using this product
	P271 Use only outdoors or in a well-ventilated area
	P280 Wear protective gloves/protective clothing/eye protection/face protection
	P281 Use personal protective equipment as required
	P284 Wear respiratory protection
Response	P301+P310 IF SWALLOWED : Immediately call a POISON CENTER or doctor/physician
	P302+P352 IF ON SKIN : Wash with soap and water
	P303+P361+P353 IF ON SKIN (or hair) : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
	P304+P340 IF INHALED : Remove victim to fresh air and keep at rest in a position comfortable for breathing
	P305+P351+P338 IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing
	P308+P313 IF exposed or concerned : Get medical advice/attention
	P309+311 IF exposed or you feel unwell: Call a POISON CENTER or doctor/physician
	P310 Immediately call a POISON CENTER or doctor/physician
	P320 Specific treatment is urgent (see … on this label)
	P321 Specific treatment (see … on this label)
	P331 Do NOT induce vomiting
	P332+313 If skin irritation occurs: Get medical advice/attention
	P337+313 If eye irritation persists get medical advice/attention
	P362 Take off contaminated clothing and wash before reuse
	P370+378 In case of fire: Use … for extinction
	P377 Leaking gas fire – do not extinguish unless leak can be stopped safely
	P381 Eliminate all ignition sources if safe to do so
Storage	P403 Store in a well ventilated place
	P403+P233 Store in a well ventilated place. Keep container tightly closed
	P403+P235 Store in a well ventilated place. Keep cool.
	P405 Store locked up
	P410+403 Protect from sunlight. Store in a well ventilated place
Disposal	P501 Dispose of contents/container to …

C. Other Hazard·Risk which are not included in the classification criteria (e.g. dust explosion hazard)

ISOBUTANE

Health	0
Fire	4
Reactivity	0

CYCLO-HEXANE	
Health	1
Fire	3
Reactivity	0
DIMETHYL ETER	
Health	2
Fire	4
Reactivity	1
ISOHEXANES	
Health	-
Fire	-
Reactivity	-
PROPANE	
Health	1
Fire	4
Reactivity	0
ROSIN	
Health	2
Fire	1
Reactivity	0
STYRENE-BUTADIENE RUBBER	
Health	1
Fire	1
Reactivity	0

3. Composition/Information on ingredients

Chemical Name	Other name	CAS number	Content(%)
ISOBUTANE	2-METHYL PROPANE	75-28-5	7~10
CYCLOHEXANE	HEXAHYDROBENZENE	110-82-7	10~15
DIMETHYL ETHER	METHYL ETHER	115-10-6	7~10
ISOHEXANES	HEXANES	73513-42-5	25~30
PROPANE	DIMETHYLMETHANE	74-98-6	7~10
MODIFIED ROSIN ESTER	FORAL 85	8050-31-5	10~15
STYRENE-BUTADIENE RUBBER	ETHENYLBENZENE POLYMER WITH	9003-55-8	7~15

4. First aid measures

A. Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing
	If eye irritation persists, Consult a physician if irritation persists.
B. Skin contact	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
	If skin irritation occurs : Get medical advice/attention
	Wash with soap and water
C. Inhalation	Immediately call a POISON CENTER or doctor/physician
	Rinse mouth. Do NOT induce vomiting
	Remove person to fresh air.
D. Ingestion	Do not induce vomiting unless instructed to do so by medical personnel.
	victim two glasses of water.
	Never give anything by mouth to an unconscious person. Get medical attention

E. Indication of immediate medical attention and notes for physician — Medical personnel are aware of the material and to take precautions to protect.

5. Fire-Fighting measures

A. Suitable extinguishing media

- Small fire — Use dry chemicals,CO2,water spray or alcohol-resistant foam.
- Large fire — Use water spray, water fog or alcohol-resistant foam

B. hazards arising from the chemical (e.g. nature of any hazardous combustion products)

Thermal decomposition may produce carbon monoxide and other toxic vapors.

C. Special protective equipment and precautions for fire-fighters

Wear an approved positive pressure self-contained breathing apparatus and firefighter turnout gear.

Heat from fire can generate flammable vapor.

When mixed with air and exposed to ignition source, Vapors can burn in open or explode if confined.

Vapors may be heavier than air, May travel long Distances along the ground before igniting and flashing back to vapor source.

Fine sprays/mists may be Combustible at temperatures below flash point.

Fight fire from a safe distance/protected location.

Heat may build enough pressure to rupture closed containers/spreading fire/increasing risk of Burns/injuries. Use water sprat/fog for cooling.

Avoid frothing/steam explosion.

Burning liquid may float water.

Although water soluble, may not be practical to extinguish fire by water dilution.

Notify Authorities immediately if liquid enters sewer/public waters.

6. Accidental release measures

If possible, seal leaking container.

Place leaking containers in a well-ventilated area, preferably an operating exhaust hood, or if necessary outdoors on an impermeable surface until appropriate packaging for the leaking container or its contents is available.

7. Handling and storage

A. Precautions for safe handling

Avoid breathing gas.

Avoid contact with eyes, skin and clothing.

Keep container closed. Use only with adequate ventilation.

Do not enter confined spaces unless adequately ventilated.

B. Conditions for safe storage (including any incompatibilities) — Store in its original container in a cool environment, keep away from heat, spark, and open flame. Ground containers during storage and transfer operations to avoid static spark.

Ideal storage temp. range fore ease of handling is 10 ~ 27℃

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

8. Exposure controls & personal protection

A. Control parameters (e.g. occupational exposure limit values, biological limit values)

- Occupational exposure limit values

ISOBUTANE	No data available
CYCLO-HEXANE	TWA - 200ppm 700mg/m3
DIMETHYL ETHER	No data available
ISOHEXANE	TWA - 500ppm 1188mg/m3 STEL - 1000ppm 3600mg/m3

PROPANE	No data available
ROSIN	No data available
STYLENE-BUTADIENE RUBBER(SBR)	No data available
- ACGIH limit values	
ISOBUTANE	TWA - 1000ppm
CYCLO-HEXANE	TWA - 100 ppm
DIMETHYL ETHER	No data available
ISOHEXANE	HEXANE, other isomer
	TWA - 500 ppm, STEL 1000 ppm
PROPANE	No data available
ROSIN	No data available
SBR	No data available
- Biological limit values	No data available
B. Appropriate engineering controls	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate ventilation.
C. Personal protective equipment	
- Eye/Face protection	Avoid eye contact with vapors, mist, or spray.
	The following eye protections are recommended : Safety Glasses with side shields.
- Skin protection	Avoid skin contact.
- Respiratory protection	Avoiding breathing gas
- Prevention of swellowing	Do not eat, drink or smoke when using this product.

9. Physical and chemical properties

A. Appearance	
Physical state	liquid
Color	Light yellow color
B. Odour	Little solvent odor
C. Odour threshold	No data available
D. pH	6.7
E. Melting point/freezing point	No data available
F. Initial boiling point and boiling range	No data available
G. Flashing point	- 41.00 ℃
H. Evaporation rate	No data available
I. Flammability(solid, gas)	No data available
J. Upper/lower flammability or explosive limits	No data available
K. Vapor pressure	No data available
L. Solubility	Not soluble in water
M. Vapor density	2.97 (Air=1)
N. Relative density	0.67 (Water=1)
O Partition coefficient:n-octanol/water	No data available
P. Auto-ignition temperature	No data available
Q. Decomposition temperature	No data available
R. Viscosity	No data available
S. Formula mass	No data available

10. Stability and reactivity

A.Chemical stability and possibility of hazardous reactions	may explode if heated
B. Conditions to avoid	Keep away from heat/sparks/open flames/hot surfaces – No smoking
C. Incompatible materials	flammable material
D. Hazardous decomposition products	Thermal decomposition products include hydrogen fluoride, hydrogen chloride, carbon monoxide, carbon dioxide and chloride.

11. Toxicological information

A. Information on the likely routes of exposure	No data available
– Inhalation exposure	Irritation, headache, sleepiness, dizziness, orientation loss.
– Ingestion exposure	Irritation, vomiting, headache, dizziness, orientation loss, pulmonary congestion.
– Skin exposure	May cause slight skin irritation. The liquid defats the skin.
– Eye exposure	May cause slight eye irritation.
B. Health hazards information	
– Acute toxic	
Oral	
CYCLO-HEXANE	LD50 12705 ㎎/㎏
ROSIN	LD50 > 2000 ㎎/㎏ Rat
Dermal	
CYCLO-HEXANE	LD50 > 2000 ㎎/㎏ Rabbit
Inhalation	
ISOBUTANE	LC50 658 ㎎/ℓ 4hr Rat
CYCLO-HEXANE	LC50 70 ㎎/ℓ
DIMETHYL ETHER	GAS LC50 308.5 ppm 4hr Rat
PROPANE	LC50 570000 ppm 15min Rat
– Skin corrosive/irritant	
CYCLO-HEXANE	Skin – rabbit – skin irritation
DIMETHYL ETHER	Skin – irritation(Vapor, liquid)
PROPANE	Can cause weak irritation
ROSIN	Can cause weak irritation
– Serious eye damage/eye irritation	
ISOBUTANE	No irritation
CYCLO-HEXANE	No irritation
DIMETHYL ETHER	Eye – Irritation(Vapor, liquid)
PROPANE	No data available
ROSIN	GLP : yes
SBR	STANDARD DRAIZE TEST : Mild, 500mg/24H
– Respiratory sensitization	No data available
– Skin sensitization	
ROSIN	Negative (Guinea Pigs) (GLP : yes)
– Carcinogenicity	
IARC	Group 3
EU CLP	Carc. 1A
– Germ Cell Mutagenicity	
ISOBUTANE	Negative
CYCLO-HEXANE	Negative
DIMETHYL ETHER	Negative
ROSIN	Negative

- Reproductive toxicity	No data available
- Specific target organ toxicity (single exposure):	
	It may effect on the central nerves.
	High levels of steam inhalation may produce unconsciousness.
- Specific target organ toxicity (repeated exposure)	
	DISTILLATES(PETROLEUM), HYDROTREATED LIGHT): skin removal
- Aspiration hazard	Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis.

12. Ecological information

A. Aquatic and terrestrial ecotoxicity

- Fish

PROPANE	LC50 > 100 ㎎/ℓ 96 hr Fish TLm
ROSIN	LC50 > 400 ㎎/ℓ 96 hr

- Shellfish

CYCLO-HEXANE	EC50 0.9 ㎎/ℓ 48 hr
PROPANE	LC50 52.157㎎/ℓ 48 hr
ROSIN	EC50 259 ㎎/ℓ 48 hr

- Bird

PROPANE	LC50 32.252㎎/ℓ 96 hr
ROSIN	EC50 > 1000 ㎎/ℓ 72 hr

B. Persistence and degradability: No data available

C. Bioaccumulative potential

- Bioaccumulative

ISOBUTANE	BCF 1.57 ~ 1.97
CYCLO-HEXANE	BCF 129
PROPANE	BCF 13

- Potential

ISOBUTANE	65.7 (%) 35 day
CYCLO-HEXANE	77 (%) 28 day
DIMETHYL ETHER	5 (%) 28 day
PROPANE	65.7 (%) 35 day

D. Mobility in soil: No data available

E. Other adverse effects: No data available

13. Disposal considerations

Recover, reclaim or recycle when practical. Dispose of in accordance with federal. State and local regulations.

14. Transport information

A. UN number	UN 1950
B. UN proper shipping name	AEROSOL
C. Transport hazard class:	2.1
D. Packing group (if applicable)	
ISOBUTANE	-
CYCLO-HEXANE	2
DIMETHYL ETHER	-
ISOHEXANE	II
PROPANE	-

ROSIN	Not Applicable.
SBR	Not Applicable.
E. Marin pollution (yes/no)	Yes

F. Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises:

- In case of fire

ISOBUTANE	F-D
CYCLO-HEXANE	F-E
DIMETHYL ETHER	F-D
ISOHEXANE	F-E
PROPANE	F-D

- In case of spill

ISOBUTANE	S-U
CYCLO-HEXANE	S-D
DIMETHYL ETHER	S-U
ISOHEXANE	S-D
PROPANE	S-U

15. Regulatory information

A. Industrial Safety and Health Act	No data available
B. Toxic Chemical Control Act	No data available
C. Dangerous Material Safety Control Act	
CYCLO-HEXANE	The 4th type, the 1st petroleum type 200ℓ
D. Wastes Management Act	Designated Wastes

E. Other requirements in domestic and other countries

- Domestic	Not Applicable.
- Other countries	
OSHA	Not Applicable.
CERCLA	
CYCLO-HEXANE	453.599 kg 1000 lb
EPCRA 302	Not Applicable.
EU regulations	
ISOBUTANE	F+; R12
CYCLO-HEXANE	F; R11Xn; R65Xi; R38R67N; R50-53
DIMETHYL ETHER	F+; R12
PROPANE	F+; R12
EU regulations	
ISOBUTANE	R12
CYCLO-HEXANE	R11, R38, R65, R67, R50/53
DIMETHYL ETHER	R12
PROPANE	R12
EU regulations	
ISOBUTANE	S2, S9, S16
CYCLO-HEXANE	S2, S9, S16, S25, S33, S51, S60, S61, S62
DIMETHYL ETHER	S2, S9, S16, S33
PROPANE	S2, S9, S16

16. Other information

A. Information source and references

Source of data : Korea Occupational Safety and Health Agency (KOSHA)>

B. Issuing date August 25, 2014

C. Revision number and date 0

D. others

○ Source of data : Korea Occupational Safety and Health Agency (KOSHA)>