DONGNAM
PETROLEUM IND. Co., Ltd.

DONGNAM Petroleum lnd. Co., Ltd.

Technology for nature
Technology for human

ELECTRIC INSULATING OIL

LUBRICATING OIL

WAX

KSA 한국표준협회 TRUSTED PARTNER KAB 한국인정지원센터 Korea Accreditation Board

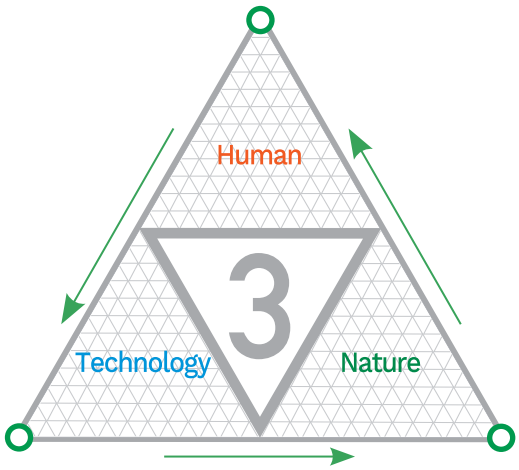
DONGNAM
Petroleum Ind. Co., Ltd.

Our Mission:
"To set an example of harmony through integrity and correctness!"

Our Company:
DONGNAM Petroleum Ind. Co., Ltd. is one of the leading companies in the Korean petrochemical industry, growing through our continuous strive to create a better relationship between human and nature through constant and innovative R&D in order to produce and supply first class petrochemical products such as Electric Insulating oils, Bio-degradable Insulating Oils, Machine Oils, Waxes, etc.

DONGNAM Petroleum Ind. Co., Ltd. prides itself on its initiative to adhering a strict corporate social responsibility (CSR) program in a bid to take the lead in preserving our wonderful earth for many future generations to come.

Our Motto:
" Technology for nature Technology for human "



CONTENTS

HISTORY

1973.02 Established DONGNAM PETROLEUM IND. CO., LTD.
1975.03 Granted Korea Standard for Electric Insulating Oil KS C 2301 1-2. 1-3
1976.08 Exported our transformer oil to Philippines National Hydro-electric power plant for 154kV transformer which represented Korea's first ever export of transformer oil
1981.08 Completion of construction of Banwoul Plant and relocated head office
1982.09 Completion of construction of Paraffin Wax Plant
1984.12 Completion of construction of Metal Processing Oil Plant
1985.03 Granted Korea Standard for Electric Insulating Oil KS C 2301 1-4
1992.08 Granted Korea Standard for Machine Oil KS M 2126 and Processing Oil KS M 2162
1995.04 Completion of construction of S.D.U. Plant for Micro Wax production
1996.08 Granted Korea Standard for Electric Insulating Oil KS C 2301 7-2~4
1998.12 Obtained Certificates of ISO 9002: 1994 (International Organization for Standard) for Quality System Management
2005.10 Obtained Certificates of ISO 14001: 2004 (International Standard Association) for Environmental Management System – Requirements with guidance for use
2006.11 Registered Patent No. 10-0654962 by KIPO (Korean Intellectual Property Office) for Method to separate plant sterols from soy bean oil
2007.04 Registered Patent No. 10-0705296 by KIPO (Korean Intellectual Property Office) for Environment-Friendly electric insulating oil with using vegetable oil
2007.10 Registered Patent No. 10-0764829 by KIPO (Korean Intellectual Property Office) for Method of manufacturing system of vegetable insulating oil for condenser
2009.10 Obtained Certificate of N.E.P. – MIKE-2009-037 (New Excellent Product of Korea) by KATS (Korean Agency for Technology and Standards) for Organic Electric Insulating Oil for transformers
2010.11 Conferred Korean Trade Association Million Dollar Export Tower Award
2011.07 Japanese Patent No. 5047271 (JAPAN) for Environment-Friendly insulating oil used for transformers
2011.08 Completed Environment-Friendly insulating oil production facilities.
2011.12 Chinese Patent No. ZL-200780016034.8 (CHINA) for Environment-Friendly insulating oil used for transformers
2012.07 Patent No. HK1130519 (HONGKONG) for Environment-Friendly insulating oil used for transformers
2014.12 Established a Indonesia branch PT. TENGGARA PETRO INDONESIA in Jakarta, Indonesia
2015.01 KEPCO (Korea Electric Power Corporation) Trusted Partner Serial No. 2014-KTP-007
2015.06 Established a Vietnam branch of DONGNAM PETROVINA CO., LTD. in Hai Phong City, Vietnam
2017.05 Completion of construction of a plant DONGNAM PETROVINA in Hai Phong City, Vietnam
2018.01 Obtained UL Certificate of Compliance for BIOTRAN-35. Certificate number 20171222-MH61908

CEO Message

DONGNAM Petroleum Ind. Co., Ltd. has grown with many Korean domestic heavy electrical industries and has evolved as a market leader in the petrochemical industry; producing and supplying superior petrochemical products such as electric insulating oils, industrial lubricating oils, various waxes etc., for more than 45 years to our customers with great satisfaction under our basic philosophy of "harmony, initiative, integrity and correctness" since its establishment in 1973.

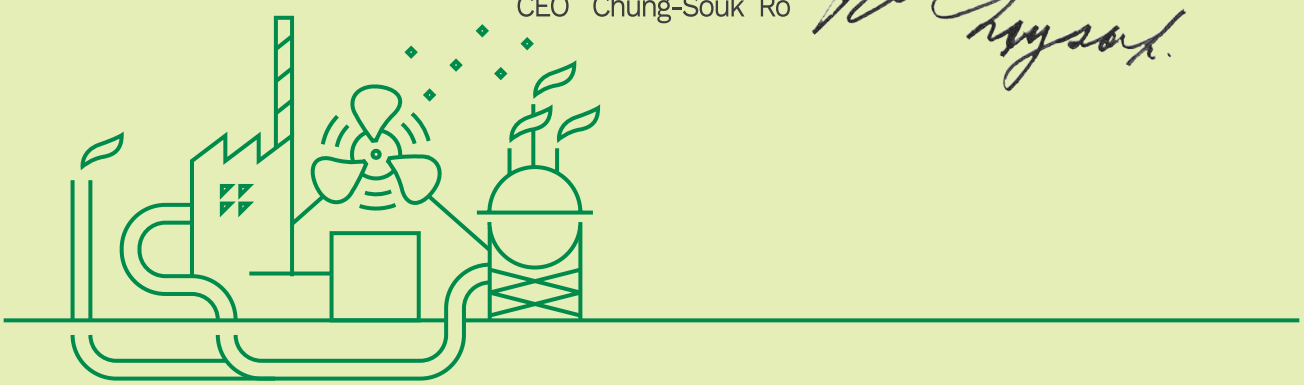
By participating in the world market beyond our domestic market, we have been competing healthily with leading overseas companies, and this has led us to grow by leaps and bounds with our supremely competitive products and services.

We at DONGNAM Petroleum Ind. Co., Ltd. believe deeply in constant research and development in order to evolve positively. From this dedication, we have developed new, better and even environmentally friendly products such as ESTRAN (mineral electric insulating oil with superior qualities) and also BIOTRAN (which is our very own vegetable oil based bio-degradable electric insulating oil) that has been exported to several international markets.

We thank you for your interest and support for more than 45 years. All executives and employees of DONGNAM Petroleum Ind. Co., Ltd. hereby promise to continue our proud tradition of good faith and harmony as we move forward into the future with you, our esteemed customers; while putting in more effort in challenging the boundaries with positive attitude and building on our customers' confidence. We look forward and expect your continued interest and support.

Thank you.

CEO Chung-Souk Ro



Electric Insulating Oil

DONGNAM Petroleum Ind. Co., Ltd. produces supreme electric insulating oils which can be used in super high voltage transformers (765kV); we have developed and applied a super high purification technique which allows development of new high voltage transformers to be smaller and lighter. Our insulating oils currently meet and / or exceed the various standards of different countries in the world today.

ESTRAN Series

The below figures are representative values.

Test Item		Unit	Test Method	Specification	U TYPE (Typical Data)	T TYPE (Typical Data)	I TYPE (Typical Data)
Density at 20℃		g/mL	ISO 3675	0.895 Max	< 0.870		
Appearance		-	-	Clear	Clear		
Viscosity	at -30℃	mm^2/s	ISO 3104	1,800 Max	< 1000		
	at 40℃	mm^2/s		12.0 Max	< 10		
Flash Point	(P.M)	℃	ISO 2719	135 Min	> 150		
Pour Point		℃	ISO 3016	-40 Max	-45.0		
Acidity Value		mg KOH/g	IEC 62021-1	0.01 Max	< 0.01		
Potentially Corrosive Sulfur		-	IEC 62535	Non Corrosive	Non Corrosive		
Corrosive Sulfur	(140℃ * 19 hr)	-	DIN 51353	Non Corrosive	Non Corrosive		
Water Content	Drum	mg/Kg	IEC 60814	40 Max	< 20		
	Bulk			30 Max	< 15		
Oxidation Stability	acid	mg KOH/g	IEC 61125 (Method C)	1.2 Max	0.7	< 0.5	< 0.1
	sludge	%		0.8 Max	0.2	< 0.1	< 0.1
	DDF at 90℃	-	IEC 60247	0.5 Max	0.04	0.02	< 0.01
Antioxidant additive	U Type	%	IEC 60666	Not detectable	ND	-	-
	T Type			< 0.08	-	0.075	-
	I Type			0.08 ~ 0.40	-	-	0.35
Breakdown Voltage	As delivered	kV	IEC 60156	30 Min	> 60		
	After treatment			70 Min	> 80		
Dissipation Factor	40-60Hz, 90℃	-	IEC 60247	0.005 Max	< 0.001		
Polychlorinated Biphenyls (PCBs)		mg/Kg	IEC 61619	Not detectable	Not detectable		

※ Above products conforms to IEC 60296:2012(ed.4). We offer the best quality and various characteristics of products meeting other international standards such as ASTM D3487 and customized specifications for our customer's needs.

KS (KOREA STANDARD)

The below figures are representative values.

Test Item		Unit	Test Method	Specification	KS 1-2 (Typical Data)	KS 1-4 (Typical Data)
Specific Gravity	(15 / 4℃)	-	KS M 2002	0.91 Max	0.840	0.842
Reaction		-	KS M 2012	Neutral	Neutral	Neutral
Kinematic Viscosity	(40℃)	mm^2/s	KS M ISO 3104	13.0 Max	7.8	7.9
	(100℃)	mm^2/s		4.0 Max	2.3	2.4
Flash Point	(P.M)	℃	KS M ISO 2719	140 Min	150	156
Pour Point		℃	KS M ISO 3016	-30 Max	-42	-42
Total Acid Value		mg KOH/g	KS C 2101	0.02 Max	< 0.01	< 0.01
Evaporation Loss	(98 ℃× 5 hr)	%	KS C 2101	0.4 Max	0.28	0.28
Corrosive Sulfur	(140 ℃× 19 hr)	-	KS C 2101	Non Corrosive	Non Corrosive	
Oxidation Stability (120 ℃×75 hr)	(Sludge)	%	KS C 2101	0.4 Max	0.21	0.19
	(Acid Value)	mg KOH/g		0.6 Max	0.09	0.08
Dielectric Strength	(2.5mm)	kV	KS C IEC 60156	40 Min	75	75
Volume Resistivity	(80 ℃)	Ω.cm	KS C 2101	1.0×10^{13} Min	2.0×10^{14}	-
				5.0×10^{13} Min	-	4.0×10^{14}
Power Factor	(60 Hz, 80 ℃)	%	KS C 2101	0.1 Max	-	0.008
Water Content	Drum	mg/kg	KS C 2101	40 Max	< 20	
	Bulk			30 Max	< 20	
Polychlorinated Biphenyls (PCBs)		mg/kg	KS C 2375	ND	ND	

Environmentally Friendly Electric Insulating Oil

This is a non-toxic and environmentally friendly product with excellent biodegradability and is safe against fire thanks to excellent heat-resistant and less flammable properties. It also has a longer lifespan due to excellent dielectric strength, thermal stability and low deterioration characteristic over time.

BIOTRAN-35

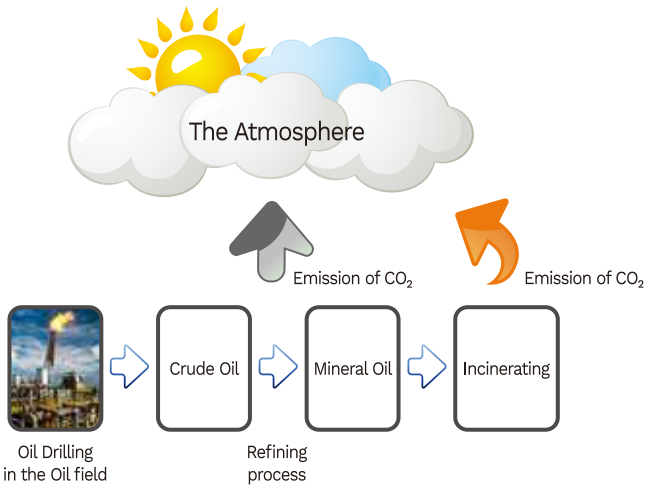
The below figures are representative values.

Test Item		Unit	Test Method	Specification	Typical Data
Specific Gravity	(15 / 4℃)	-	ASTM D 1298	≤ 0.96	0.9207
Kinematic Viscosity	(40℃)	mm^2/s	ASTM D 445	≤ 50.0	34.01
	(100℃)	mm^2/s		≤ 15.0	7.801
Flash Point	(coc)	℃	ASTM D 92	≥ 300	324
Fire Point	(coc)	℃	ASTM D 92	≥ 320	330
Pour Point		℃	ASTM D 97	≤ - 20.0	- 24
Total Acid Value		mg KOH/g	ASTM D 974	≤ 0.06	0.040
Dielectric Strength	(2.0mm)	kV	ASTM D 1816	≥ 40	74.2
Water Content		mg/kg	ASTM D 1533	≤ 200	≤ 40
Fish, Acute Toxicity Test		-	OECD TG 203	No dead Fish	No dead Fish
Biodegradation		%	OECD 301 F	≥ 70	≥ 80
Poly Chlorinated Biphenyls (PCBs)		mg/kg	KS C 2375	N.D	N.D

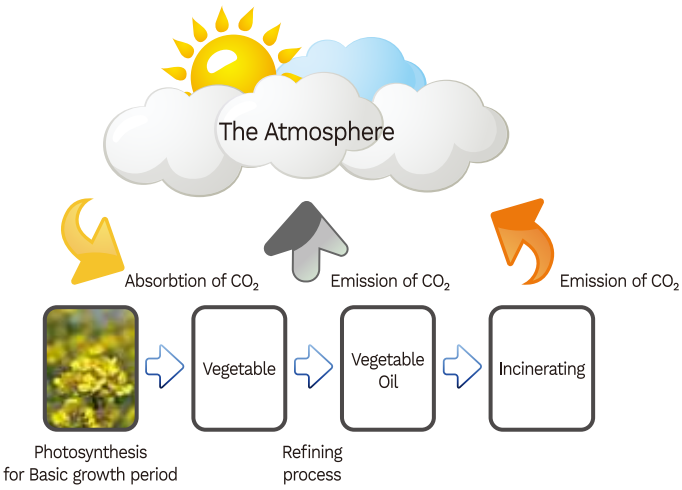
- Over 320℃ fire point of BIOTRAN-35 provides improved fire safety, more than twice the fire point of mineral oil.
- Over 80% biodegradable, made from 100% vegetable oil, and non-toxic, non-PCBs helps protect the environment.

CLASSIFIED UL

Life Cycle of Mineral Oil



Life Cycle of Vegetable Oil



A lower level of 2% CO_2 Emission as compared to Mineral oil's

Machine Oil

Machine oil is a lubricating oil produced through a highly advanced purification process which is used for a wide range of applications such as machine lubricating oil as well as a raw material in the production of special industrial oils.

Product Name		Specific Gravity (15/4℃)	Kinematic Viscosity (40℃, mm^2/s)	Flash Point (℃)	Pour Point (℃)	Color (ASTM)	Copper Corrosive (100×3h)
Paraffinic Seires (Yellow)	DNM-20	0.850	20.3	208	-15	L 0.5	1a
	DNM-32	0.862	30.0	210	-12	L 0.5	1a
	DNM-100	0.875	98.0	240	-12	L 0.5	1a
	DNM-460	0.898	472	310	-6	L 1.5	1a
Paraffinic Seires (White)	DNM-W	0.875	7.8	146	-21	L 0.5	1a
	DNM-20W	0.835	20.2	206	-18	0	1a
	DNM-32W	0.860	30.4	218	-15	0	1a
	DNM-100W	0.870	96.7	240	-12	0	1a
Naphthenic Seires	DNM-10N	0.905	9.0	144	-57	L 0.5	1a
	DNM-20N	0.910	20.1	164	-36	0.5	1a
	DNM-32N	0.915	29.9	170	-36	L 1.0	1a
	DNM-46N	0.920	45.3	196	-27	1.0	1a

The above figures are representative values.

Process Oil

Process Oil ensures uniform quality by taking a rapid softening effect at the time of rubber molding as filler with good compatibility, processability and dispersibility in natural and synthetic rubber. Also it improves physical and chemical properties such as flame resistance and aging resistance, tensile strength, elasticity, elongation, abrasion resistance of rubber.

Product Name		Specific Gravity (15/4℃)	Kinematic Viscosity (40℃, mm^2/s)	Flash Point (℃)	Aniline Point (℃)	Pour Point (℃)	Color (ASTM)
Paraffinic	DNP-1	0.876	8.7	144	73.2	-21	L 0.5
	DNP-2	0.867	30.2	208	86.0	-15	L 1.0
	DNP-3	0.870	47.2	210	110.2	-15	L 1.0
	DNP-4	0.881	95.7	240	116.4	-12	L 1.0
	DNP-5	0.891	209.8	262	120.4	-12	1.0
	DNP-6	0.899	486	310	128.0	-6	1.5
Naphthenic	DNN-1	0.911	8.7	142	60.0	-51	L 0.5
	DNN-2	0.917	28.6	166	82.6	-33	L 1.0
	DNN-3	0.912	46.3	186	82.0	-30	1.5

The above figures are representative values.

Metal Working Oil

Metal Working Oil is formulated from adding our unique additive to highly refined base oil and used for cutting, grinding, punching, rolling, drawing, and also for anti-corrosive effects. Through our customization program, our Metal Working Oil can be made to order to meet a range of diversified requirements.

Product Name		Kinematic Viscosity (40℃, mm^2/s)	Etc.
Press oil	ES-DX-5	120.1	·For Drawing processing such as SUS, SPCC etc.
	ES-205	130.5	·Excellent lubricity and extreme pressure.
Slide-way Fluid	DONA-WI #46	45.7	·Preventing stick-slip phenomenon.
	DONA-WI #68	67.8	·Preventing poor precision by wear of silding surface.

The above figures are representative values.

Hydraulic Oil

Hydraulic Oil is a high quality product formulated by the addition of a special additive to base oil with high viscosity and purified by treatment with hydrogen. This product is used in all hydraulic devices that involves very high pressure exertion. Through our customization program, we offer various grades of hydraulic oil to meet the requirements of various hydraulic machinery.

Product Name	Specific Gravity (15/4℃)	Kinematic Viscosity (40℃, mm^2/s)	Flash Point (℃)	Viscosity Index	Pour Point (℃)	Copper Corrosive (100×3h)
DONA-Hydraulic-#32	0.865	30.2	210	110	-24.0↓	1a
DONA-Hydraulic-#46	0.870	47.8	224	108	-24.0↓	1a
DONA-Hydraulic-#68	0.878	68.9	236	103	-24.0↓	1a

The above figures are representative values.

Paraffin Wax

Paraffin Wax having less oil and high hardness, is widely used in industrial applications such as candles, adhesives, textiles, and waterproof paper. It can also be made to order according to the needs and requirements of our customers.

Product Name	Melting Point (℃)	Penetration (35℃)	Reaction	Oil Content (%)	Color (Saybolt)
DONA-125S	54.1	-	Neutral	5.0↓	* L 0.5
DONA-135P	59.8	40↓		0.5↓	+28 Min

* ASTM

The above figures are representative values.

Microcrystalline Wax

Microcrystalline Wax is characterized by its high melting point and adhesives. It is widely used for stationery, polishes, hot melt adhesives and electric insulation fillers.

Product Name	Melting Point (℃)	Penetration (25℃)	Reaction	Oil Content (%)	Color (ASTM)
DONA-330JK	65(D.P)	-	Neutral	-	L 0.5
DONA-150M	60.0~68.3	50↓		5.0↓	L 2.5↓
DONA-160M	68.3~76.6	40↓		3.0↓	L 2.0↓
DONA-170M	76.6~82.1	40↓		3.0↓	L 2.0↓
DONA-170E	76.6~82.1	40↓		3.0↓	L 2.0↓
DONA-180M	82.1~87.8	30↓		3.0↓	L 2.0↓

The above figures are representative values.

Oxidized Wax

Oxidized wax is used as an anti-corrosive ingredient for anti-rust through metal surface coating and as a raw material for Metal Working Oil, leather, abrasive, grease, and anti-rust products etc. In particular, its melting point and acid value can be customized according to specific needs and requirements of our customers.

Product Name	Melting Point (℃)	Kinematic Viscosity (100℃, mm^2/s)	Total Acid Value (mg KOH/g)	Flash Point (℃)	Color (ASTM)
DONA-160KNL	58.0	9.1	User Require	200	L 4.0
DONA-160NR	61.8	20.2	50	254	L 7.5

The above figures are representative values.

Professional Lab Analysis Service

We provide accurate oil and wax chemical analysis using state-of-the-art analytical equipment and well skilled research technicians to our customers which we believe contribute to better R&D and quality control for our customers. Please contact your DONGNAM Petroleum Ind. Co., Ltd. contact person for any analysis service request and you will get a fast and accurate reply.

Certificates and Awards

DONGNAM
PETROLEUM IND. Co., Ltd.

▼ HEAD OFFICE/ FACTORY

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▼ VIETNAM BRANCH FACTORY

DONGNAM PETROVINA CO., LTD.

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▼ INDONESIA BRANCH OFFICE

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