UNDER DEVELOPING

ICHINEN CHEMICALS CO.,LTD.

Plastics Smart

ONE BIO SERIES

BIO-BASED PROCESS OIL

(BIO-BASED PLASTICIZER)

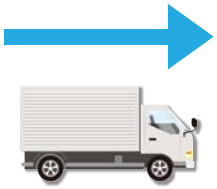
What is PROCESS OIL?

Process oil acts as a plasticizer for rubber, PVC, and other elastomers.
It helps adjust elasticity and hardness, and enhances kneading efficiency during processing.

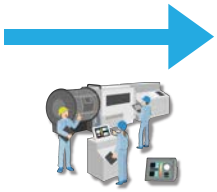
ONE BIO PROCESS OIL is

made by refining used cooking oil collected from restaurants.
ONE BIO PROCESS OIL helps reduce reliance on petroleum-based oils and promotes the recycling of used cooking oil.

COOKING OIL



COLLECTION



REFINEMENT& PROCESSING

PROCESS OIL

PHYSICAL PROPERTIES

No.	MAIN INGREDIENT	PHYSICAL PROPERTIES								
		BIOMASS CONTENT	DENSITY (g/cm³)	COLOR (ASTM)	FLASH POINT (℃)	KINEMATIC VISCOSITY (40℃) (mm²/s)	KINEMATIC VISCOSITY (100℃) (mm²/s)	VISCOSITY INDEX	MOISTURE (ppm)	ACID VALUE (mgKOH/g)
M-023	USED COOKING OIL	80	0.91	0	232	11.99	3.30	154	854.5	0.48
M-024	USED COOKING OIL	around 65	0.90	0	242	15.29	3.79	144	791.9	0.4
M-025	USED COOKING OIL	95	0.93	0.5	206	9.71	2.73	125	783.0	0.76
M-025L	USED COOKING OIL	around 90	0.94	2.0	212	10.5	2.90	130	930.2	0.87
M-032	USED COOKING OIL	around 65	0.84	0	234	9.16	2.81	168	196.1	0.09

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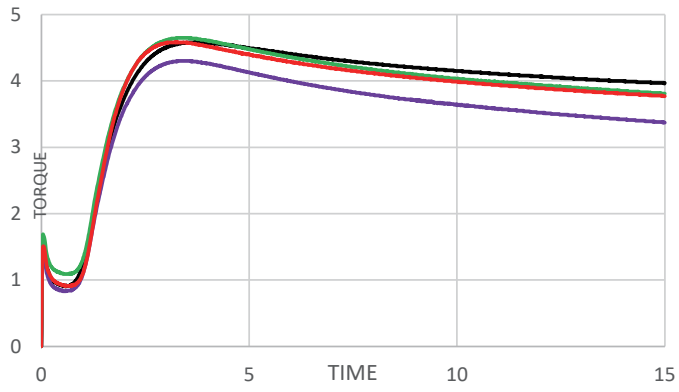
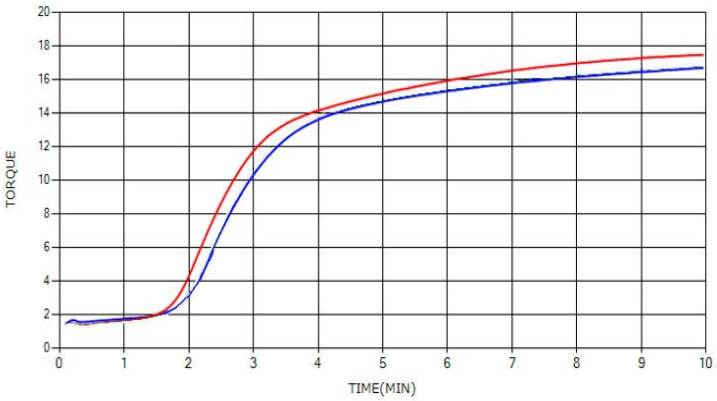
Prototype Data (for reference)

Vulcanization Curve (NR)



①Petroleum-based Process Oil
②UCO-based Process Oil
③UCO-based Process Oil
④UCO-based Process Oil

Vulcanization Curve (NBR)



①Petroleum-based Process Oil
②UCO-based Process Oil

Formulation/Physical Properties of NR

	Details	①	②	③	④
Fomulation	NR	100	100	100	100
	Carbon Black	20	20	20	20
	Silica	20	20	20	20
	Petroleum-based Process Oil	20			
	ONE BIO PROCESS OIL M-023		20		
	ONE BIO PROCESS OIL M-024			20	
	ONE BIO PROCESS OIL M-025				20
	Other Additives	10	10	10	10
	Sulfur	1.5	1.5	1.5	1.5
	Accelerator	1	1	1	1
	Total	172.5	172.5	172.5	172.5
Rheometer Test 160℃ X 15分	T10	1.01	1.04	1.06	1.08
	T90	2.43	2.35	2.32	2.25
	ML	0.90	0.83	1.09	0.91
	MH	4.59	4.30	4.65	4.59
Physical Properties	Specific Gravity	1.09	1.09	1.09	1.09
	Hardness(HA)	35	30	32	31
	M100 （MPa）	0.60	0.40	0.50	0.50
	Tensile Strength(MPa)	11.2	10.0	11.1	11.6
	Elongation(%)	650	770	720	770
100℃ × 70h	Compression Set(%)	57	58	55	57
Heat Aging Test 100℃ × 70h	Change in Hardness(%)	-1	-4	-6	-2
	Change in Tensile Strength(%)	-34	-46	-52	-48
	Change in Elongation(%)	-29	-29	-25	-31

Formulation/Physical Properties of NBR

	Details	①	②
Formulation	N230SL	100	100
	Carbon Black	40	40
	Petroleum-based Process Oil	30	-
	ONE BIO PROCESS OIL M-025	-	30
	$CaCO_3$	15	15
	Other Additives	10	10
	Sulfur	0.5	0.5
	Accelerator	4	4
	Total	199.5	199.5
Rheometer 160℃×10分	T10	1.80	1.60
	T90	5.01	4.96
	ML	0.7	0.57
	MH	9.7	9.78
Physical Properties	Specific Gravity	1.19	1.17
	Hardness(HA)	51	49
	M100 （Mpa）	1.40	1.25
	Tensile Strength(Mpa)	10.01	7.3
	Elongation(%)	510	470
70℃×22H×25%	Compression Test(%)	21	33
Heat Aging Test 100℃×70H	Change in Hardness	+8	+10
	Change in Tensile Strength(%)	0	+77
	Change in Elongation(%)	-14	+19