

# Automotive & Industrial Lubricants



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provide  
Consistency,  
Quality,  
Service,  
Economy

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## Multigrade Engine Oils

### PANOL MG SUPER OILS ( PETROL ENGINES)

Panol Multigrade oils are environment friendly, fuel efficient, multigrade motor oils. These oils contain detergent, dispersant, antioxidant to provide long engine life.

A multi grade oil containing a special Viscosity index improver additive which imparts Exceptional Viscosity-temperature characteristics to the oil. Provides ease in cold starting, reduced oil consumption, enhanced engine cleanliness, longer battery life.

It meets as per IS 13656 - 1993 Type E-PLI / EDL – 1,US MIL – L – 2104 B,API SC /CC,U K DEF 210 1 D

Characteristics	Test Methods	15W-40	20W-40	20W-50
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.5 – 14.5	13.5 – 14.5	17-18
Viscosity Index, Min.	IS-1448 : P-56	120	110	115
Flash Point °C COC, Min.	IS-1448 : P-69	200	200	200
TBN mg KOH/gm	IS-1448 : P-86	5	5	5

## New Generation Diesel Engine Oils

### PANOL MTB HD OILS

PANOL MTB HD Oils are manufactured from high VI, highly refined base oils combined with an additive system containing detergents, ashless dispersants, anti-oxidant and anti-wear inhibitors.

These meet performance requirements of former U.S. MIL-L-2104 B and API CC/SC specification. These also meet BIS 13656-2002 EDL1/EPL1 performance requirements.

Characteristics	Test Methods	SAE 30	SAE 40	SAE 50
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	10 – 12	13 – 15	17 – 19
Viscosity Index, Min.	IS-1448 : P-56	95	90	90
Flash Point °C COC, Min.	IS-1448 : P-69	215	220	225
TBN mg KOH/gm	IS-1448 : P-86	4.5	4.5	4.5

### PANOL MTC DIESEL SUPER OILS

PANOL MTC GRADE Oils are high performance heavy duty engine oils manufactured from high quality, solvent extracted, base oils which have been fortified with additives to provide excellent protection against wear, deposits and corrosion. Blended out of superior quality base stock containing select antioxidants, detergent/dispersant, antiwear additive package.

Recommended for high speed naturally aspirated/turbo/super charged diesel engines operating at low speed and high torque conditions.

Meets: IS 13656 - 1993 Type E-DL3 /E PL – 1,Exceeds US MIL – L – 2104 C, Exceeds API CD /SC, Mack T.7 Engine requirements

Characteristics	Test Methods	10 W	20	30	40	50
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	5 min	6-8	10-12	13-15	17-19
Viscosity Index, Min.	IS-1448 : P-56	100	95	95	90	90
Flash Point °C COC, Min.	IS-1448 : P-69	190	200	215	220	225
TBN mg KOH/gm	IS-1448 : P-86	9.0	9.0	9.0	9.0	9.0

### PANOL MTC DIESEL SUPER OILS

PANOL MTC MULTI GRADE Oils are high performance heavy duty engine oils manufactured from high quality, solvent extracted, base oils which have been fortified with additives to provide excellent protection against wear, deposits and corrosion. Blended out of superior quality base stock containing select antioxidants, detergent/dispersant, antiwear additive package.

Recommended for high speed naturally aspirated/turbo/super charged diesel engines operating at low speed and high torque conditions.

Meets IS 13656 - 1993 Type E-DL3 /E PL – 1,Exceeds US MIL – L – 2104 C, Exceeds API CD /Sc,Mack T.7 Engine requirements

Characteristics	Test Methods	20W-40	25W-50
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.5-14.5	17.0-18.0
Viscosity Index, Min.	IS-1448 : P-56	110	115
Flash Point °C COC, Min.	IS-1448 : P-69	200	200
TBN mg KOH/gm	IS-1448 : P-86	9.0	9.0

## PANOL PREMIUM MULTIGRADE 15W/40

(High Performance multigrade Engine oil)

PANOL premium MG 15W-40 is a top tier multigrade diesel engine crankcase oil manufactured from premium quality virgin base stock. It is fortified with a shear stable viscosity index improver, and high performance engine oil additives. It also contains a special additive to retard soot induced oil thickening, particularly for engines emitting black exhaust smoke. As a result, oil in service does not thicken much while the engine runs over a longer period.

Formulated to operate under most arduous operating conditions at IDI engines. This multigrade oil provides excellent lubrication for diesel engines in road transport, mining and earth moving machines

Meets

- AP1 CF-4 / CE/SF
- MIL – L – 2104 E
- IS 13656 – 1993, Type E – DL3 / E – PL2
- MACKEO – K/2
- ALLISON C3
- Caterpillar Series 3
- CCMC D4

Characteristics	Test Methods	Result
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.5-14.5
Viscosity Index, Min.	IS-1448 : P-56	120
Flash Point °C COC, Min.	IS-1448 : P-69	200
TBN mg KOH/gm	IS-1448 : P-86	10.0 min

Characteristics	Test Methods	Result
Viscosity Index, Min.	IS-1448 : P-56	130
Flash Point °C COC, Min.	IS-1448 : P-69	200
TBN mg KOH/gm	IS-1448 : P-86	10 min

## Low Emission CNG Engine Oils

### PANOL CNG SUPER OILS

PANOL CNG premium grade engine oils are low ash CNG Engine oils designed to meet low emission requirement of city service buses, trucks and passenger cars. This product meets API CF requirements.

Characteristics	Test Methods	15W-40	20W-40	20W-50
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.5 – 15.0	13.5 – 15.0	17.0-18.0
Viscosity Index, Min.	IS-1448 : P-56	120	110	115
Flash Point °C COC, Min.	IS-1448 : P-69	200	200	200
TBN mg KOH/gm, Min.	IS-1448 : P-86	5.0	5.0	5.0
Sulphated Ash %.	IS-1448 : P-4	0.55	0.55	0.55

## Marine Type Engine Oils

### PANOL DG SET OILS

PANOL DG Set Oils are made out of selected highly refined base stocks and proprietary additives to meet the stringent requirements of marine type engines. Their high TBN, excellent thermal stability, and anti-wear characteristics make them highly effective for use in diesel sets coupled to power generators.

Characteristics	Test Methods	303	304	402	403
SAE GRADE	Visual	30	30	40	40
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	10.0-12.0	10.0-12.0	13-15	13-15
Viscosity Index, Min.	IS-1448 : P-56	95	95	90	90
Flash Point °C COC, Min.	IS-1448 : P-69	220	220	230	230
TBN mg KOH/gm	IS-1448 : P-86	30	40	22	30

## Tractor Oil

### PANOL TRACTOR GOLD

PANOL Tractor Gold meets API CC/SC, US MIL-L-2104B and IS:13656-2002 Type EDL1 / EPL1 for engine oils. It also meets API GL 4 performance levels for gear and transmission lubricants. It is a multigrade universal tractor oil recommended for engine combined transmission and hydraulic systems of tractors.

Characteristics	Test Methods	SAE 20W-40
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.5 – 15.0
Viscosity Index, Min.	IS-1448 : P-56	110
Flash Point °C COC, Min.	IS-1448 : P-69	200
TBN mg KOH/gm	IS-1448 : P-86	5

## Running-In Engine Oils

**PANOL Running In Oils** are formulated from specially selected virgin base oils and contain well balanced dosages of detergent-dispersants and anti-corrosion agents so that the impurities get thrown out at the time of draining these oils. Optimised dosage of additives, not only help in initial bedding-in but also prevent bore polish and glazing. It is not necessary to drain-out PANOL Running In Oil at the Pre Delivery Inspection (PDI) stage.

**PANOL R IN 30** has been devised to meet the performance level of API CC and MIL-L-21260 C Type II and DB-6551 corrosion tests.

**PANOL R IN 30X** meets the performance level of API CD and DB-6551 corrosion .

Characteristics	Test Methods	PANOLRIN 30	PANOLRIN 30
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	10.0-12.0	10.0-12.0
Viscosity Index, Min.	IS-1448 : P-56	95	95
Flash Point °C COC, Min.	IS-1448 : P-69	230	230
TBN mg KOH/gm	IS-1448 : P-86	5	8

## Economy Grade Engine Oils

### PANOL HD GOLD

**PANOL HD Oils** have been developed reduce friction, prevent wear, carry away heat and seal the piston ring clearances. Their use prevents blow-by and offers effective lubrication to the engines, even during stop-and-go operations. These meet the requirements of MIL-L-2104A & API-CB (Now obsolete) specifications.

Characteristics	Test Methods	HD 20	HD 30	HD 40	HD 50
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	6.0-8.0	10-12	13-15	17-19
Viscosity Index, Min.	IS-1448 : P-56	98	95	90	90
Flash Point °C COC, Min.	IS-1448 : P-69	200	215	220	225
Pour Point °C, Max.	IS-1448 : P-10	(-)9	(-)6	(-)6	(-)6

## Pump Set Oil

### PANOL PSO PLUS

**PANOL PSO Plus** is Heavy Duty Pump-Set Oil manufactured from highly refined base oils. It has special additive to provide anti-corrosion protection to engine internals during ideal periods. This engine oil is designed for both compression-ignition and spark-ignition type engines. It is a proprietary branded product.

Characteristics	Test Methods	Results
Appearance	Visual	Red
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	12.5-16.3
Viscosity Index, Min.	IS-1448 : P-56	95
Flash Point °C COC, Min.	IS-1448 : P-69	220

## 2 & 3-Wheeler Engine Oils

### PANOL 2T HI-TECH

**PANOL 2T Hi-Tech** is a semi-synthetic, low smoke, eco-friendly 2T oil developed for two stroke engines. It is blended using carefully selected base oils and additives. It meets **JASO** (Japanese Automotive Standard Organisation) **FC** performance requirements. It also meets **API TC** requirements.

Characteristics	Test Methods	Results
Colour	Visual	Green Dyed
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	Min 6.5
Flash Point °C COC, Min.	IS-1448 : P-69	70
Sulphated Ash % wt (Max.)	IS-1448 : P-4	0.25

## Panol 4T Oils

**PANOL 4T X'tra & X'cite SAE 20W-40 & 20W-50** are specially formulated 4 stroke engine oils with a well balanced V.I. Improver blend to offer assured performance when used in engines of different designs.

**PANOL 4T X'tra 20W-50** meets API SG/CD and **PANOL 4T X'cite 20W-40** meets API SJ specification. Both are designed to meet

**JASO T-903** performance classification **MA** and are on file with Japan Lubricating Oil Society (**JALOS**).

Characteristics	Test Methods	20W-40	20W-50
Appearance	Visual	Blue	Blue
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.5-15.0	17.5-18.5
Viscosity Index, Min.	IS-1448 : P-56	110	120
Flash Point °C COC, Min.	IS-1448 : P-69	230	230
TBN gm KOH/gm	IS-1448 : P-86	5.0	5.0

## High Performance Gear Oils

### PANOL SYNCRO ST OILS

**PANOL Auto Gear ST Oils** are made from selected base oils to give resistance to oxidation thickening and good lubricating properties. These oils meet the performance level of API GL-2 and IS 1277-1975 specification requirements.

Characteristics	Test Methods	SAE 90	SAE 140
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	16-18	28-30
Viscosity Index, Min.	IS-1448 : P-56	85	80
Flash Point °C COC, Min.	IS-1448 : P-69	180	190

### PANOL SYNCRO HD OILS

**PANOL Auto Gear HD Oils** are formulated with mild EP additives and base stocks having excellent resistance to oxidation.

Suitable for manual transmissions in cars and light duty trucks where API GL-1, GL-2 and GL-3 are recommended. These may be used for manual transmissions with spiral bevel or worm gear drives.

These grades meet the performance level envisaged by API GL-3.

Characteristics	Test Methods	SAE 90	SAE 140
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	16-18	28-30
Viscosity Index, Min.	IS-1448 : P-56	85	80
Flash Point °C COC, Min.	IS-1448 : P-69	180	190

### PANOL SYNCRO EP OILS

**PANOL Auto Gear EP Oils** are heavy duty type multipurpose gear oils formulated to give good oxidation stability for long service life. They contain EP (Extreme Pressure) additives that withstand high temperature and pour depressants that prevent the lubricant from channeling at low temperatures. These oils can be used where an API GL4 lubricant is recommended.

Characteristics	Test Methods	EP 80W	EP 90	EP 80W-90	EP 140
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	9-11	16-18	13-15	28-30
Viscosity Index, Min.	IS-1448 : P-56	90	90	90	80
Flash Point °C COC, Min.	IS-1448 : P-69	165	180	165	190

### PANOL SYNCRO PLUS EP 90

**PANOL Auto Gear EP 90 Oil** is formulated using special EP additive having good load carrying capacity, resistance to oxidative thickening and provides excellent rust protection. It is specially recommended for TATA Motors and Ashok Leyland vehicles.

**PANOL Auto Gear EP 90 Oil** meet requirements of the API GL-4, MIL-L-2105, CS 3000A and IS 1118 -1992 specifications.

Characteristics	Test Methods	EP 80W
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	9-11
Viscosity Index, Min.	IS-1448 : P-56	90
Flash Point °C COC, Min.	IS-1448 : P-69	165

### PANOL SYNCRO PREMIUM OILS

**PANOL Auto Gear Premium grades** are recommended for gear applications requiring lubricants meeting U.S. MIL-L-2105D, API GL-5 performance level, particularly suitable where loading is severe and maximum gear protection is required.

These oils are recommended for bevel, spiral bevel and hypoid gear differentials, for synchromesh & constant mesh transfer cases, oil lubricated universal joints and manually operated steering gears. Recommended for rear axles of TATA Motors and Ashok Leyland vehicles.

Characteristics	Test Methods	SAE 80W-90	SAE 90	SAE 140
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.0-15.0	16.0-18.0	28-30
Viscosity Index, Min.	IS-1448 : P-56	90	90	80
Flash Point °C COC, Min.	IS-1448 : P-69	165	180	190

## PANOL SYNCRO PREMIUM OILS

**PANOL Syncro premium Gear 80W-90 Oil** is a high performance gear and transmission oil formulated using special EP additive and high quality base oils. Meets API GL-5, U.S. MIL-L-2105D and IS 1118-1992 specifications. It is specially recommended for TATA Motors & Ashok Leyland vehicles for their synchromesh gear boxes and steering gears.

**PANOL Syncro premium 85W-140 (Oil)** is blended from highly refined base oils, fortified with specially selected extreme pressure additives that withstand thermal degradation at high temperatures. This combination makes it an excellent heavy duty gear lubricant that can provide effective load carrying capacity particularly for hypoids in automotive axles operated under high speed and / or low speed, high torque conditions and severe shock loads. Recommended for TATA Motors & Ashok Leyland vehicles for their spiral bevel gear boxes.

Characteristics	Test Methods	PANOL Syncro Premium	
		80W-90	85W-140
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.0-15.0	28-30
Viscosity Index, Min.	IS-1448 : P-56	90	85
Flash Point °C COC, Min.	IS-1448 : P-69	165	180

## PANOL AUTO GEAR SUPERIOR 80W-90

**PANOL Auto Gear Superior 80W-90** is a premium grade, long-life gear and transmission lubricant formulated to meet the specific requirements of TATA vehicles having G600 Synchromesh Gear Box.

To meet these high performance requirements the product is blended from superior quality base oils and specially selected additive. The base oils are specifically selected for their superior thermal stability at high operating temperatures and the end-product is tested for action on cupric alloys.

Characteristics	Test Methods	PANOL Auto Gear Superior 80W-90
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	13.0-15.0
Viscosity Index, Min.	IS-1448 : P-56	90
Flash Point °C COC, Min.	IS-1448 : P-69	165

## High Performance Transmission Fluids

### PANOL TRANSMISSION FLUID

**PANOL Transmission Fluids** (SAE 10W and SAE 30) are hydraulic transmission fluids formulated to meet General Motors Detroit Diesel ALLISON DIVISION type C-4 specifications. These oils are blended from highly refined virgin base stocks with special additives to impart high oxidation stability, anti-wear, anti-rust, anti-foam and the desired frictional characteristics in service. These oils are compatible with the seal material used in hydraulic transmission systems.

Characteristics	Test Methods	SAE 10W	SAE 30
Colour	Visual	Red	Red
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	5.5 min	10-12
Viscosity Index, Min.	IS-1448 : P-56	100	95
Flash Point °C COC, Min.	IS-1448 : P-69	190	215
Pour Point °C, Max.	IS-1448 : P-10	(-)27	(-)18

### PANOL TRANS TQX

**PANOL Trans TQX** is blended from high quality solvent extracted base oils together with multi-functional additives to impart anti-oxidation, anti-wear, dispersancy, defoaming and desired friction characteristics. Due to its high viscosity and low pour point, it assures quiet and smooth operation of hydraulic equipments under all climatic conditions. It is a fluid with low co-efficient of friction, thus permitting clutch plates to engage slowly and gradually as the transmission shifts. It is dyed RED to distinguish it from other Crank-case oils, should leakage occur. It meets General Motors Automotive Transmission fluids Type A Suffix A (TASA) requirements.

Characteristics	Test Methods	PANOL Trans TQX
Colour	Visual	Red
Kinematic Viscosity at 100° C cSt	IS-1448 : P-25	7.4 - 7.9
Viscosity Index, Min.	IS-1448 : P-56	160
Flash Point °C COC, Min.	IS-1448 : P-69	180
Pour Point °C, Max.	IS-1448 : P-10	(-)39

## Panol Automotive Greases

**PANOL Chassis Grease** is a calcium base grease containing additives that impart extreme pressure properties. Being tacky it cannot be easily displaced with vibration and shock loads. It is also water resistant.

**PANOL Wheel Bearing Grease** is sodium base grease with very good structural stability. It gives excellent performance when the bearing is half filled with grease and not excessively packed. It withstands high temperatures and can be used in wheel bearings of vehicles with both drum and disc brakes.

**PANOL Multi-purpose Grease 2 & 3** are lithium soap, all purpose premium quality greases. These are resistant to water washing and can withstand high temperatures. These have good oxidation and thermal stability and do not soften excessively on working.

**PANOL M.P. Grease No. 3** is specially formulated for heavy-duty service e.g. wheel bearings of commercial vehicles and industrial locations with shock loadings. It has improved oxidation stability and antirust properties.

Characteristics	Test Methods	PANOL Chassis Grease	PANOL Wheel Bearing	PANOL Multipurpose 2	PANOL Multipurpose 3	PANOL M.P. Grease No.3
Colour	Visual	Dark	Brown	Light Brown	Light Brown	Light Brown
Structure	Touch	Semi Fluid	Short Fibre	Smooth	Smooth	Smooth
Penetration at 25 °C (60 Strokes)	ASTM D 217	310 - 250	220 - 250	265 - 295	220 - 250	220 - 250
Drop Point °C	ASTM D 566	150	150	180	180	190

### PANOL IPLEX LOW TEMPERATURE GREASE

**PANOL Iplex Low Temperature Grease** is designed for operation at sub-zero temperatures. It is formulated as a dispersion of calcium complex soap in synthetic base oil. The base oil selected is such that it has a high viscosity index. It is non-reactive to copper and has excellent oxidation stability.

**PANOL Iplex Low Temperature Grease** can be operated for prolonged durations in operating temperature ranging from (-)50 to 180° C.

Characteristics	Test Methods	Results
Worked Penetration, 60 double stroke at 25° C	ASTM D 217	265 – 295
Change in Penetration at 25° C, difference between 60 & 100000 Strokes	ASTM D 217	17
Viscosity Index, Min.	ASTM D 2265	264

### PANOL AUTO GREASE HD

**PANOL Auto Grease – HD** is a premium quality tailor-made grease having high viscosity base oils and synergistic additive package for giving enhanced performance levels.

**PANOL Auto Grease – HD** has excellent shear stable soap structure which prevents softening and leakage of grease under heavy loads and high temperatures. This grease is highly resistant to water washout, rust corrosion and oxidation.

Characteristics	Test Methods	Results
Colour	Visual	Light Yellow
Texture	Feel	Smooth Buttery
Soap Type	-	Lithium
Drop Point °C	ASTM D 566	180
Worked Penetration 60 double stroke at 25° C	ASTM D 217	240 – 260

### PANOL IPLEX GREASE RR 3

**PANOL Iplex Grease RR3** is a premium quality multifunctional long life grease, especially formulated for varied applications from normal to severe mechanical operation. This grease is fortified with friction modifiers, rust & corrosion inhibitors in high viscosity index base oil. PANOL IPLEX Grease RR3 has far excellent shear stability, surface adhesion and water repellency properties as compared to normal lithium based multipurpose greases. It has approval from Ashok Leyland.

Characteristics	Test Methods	Results
Colour	Visual	Yellowish Brown
Structure	Feel	Smooth
Soap Type	-	Lithium
Drop Point °C Min.	ASTM D 566	180
Worked Penetration 60 double stroke at 25° C	ASTM D 217	220 – 250
Roll stability, penetration change, % after 16 hours	ASTM D1831	22 max.



## Automotive Speciality Oils

### PANOL BRAKE FLUID

**PANOL Halt X DOT 3** is a specially formulated Hydraulic Brake Fluid for use in all types of automotive vehicles fitted with either the drum or disc brakes. It is designed to withstand the high operating temperatures created by sudden and repetitive braking.

It is recommended at locations where a Heavy Duty Brake Fluid meeting US Dept. of Transportation's requirements, popularly pronounced as DOT 3, and IS: 8654-1986 is envisaged.

**PANOL Halt X DOT 4** is a superior quality brake fluid. It meets US Dept. of Transportation's stringent specification FNVSS-116-DOT-4. It also meets IS: 8654-1986 & SAE J 1703F specifications. It has exceptional thermal stability, chemical stability and good water tolerance.

Characteristics	Test Methods	Dot 3	Dot 4
Appearance	Visual	Red	Red
Kinematic Viscosity at 100° C cSt	D-445	1.5	1.5
Kinematic Viscosity at -40° C cSt	D-445	1500 max	1800 max
Equilibrium Reflux Boiling Point, °C	IS-8654 Appendix A-2	205	230
Effect on Rubber	Swell Test	Passes	Passes

### PANOL ANTIFREEZE RADIATOR COOLANT

**PANOL Antifreeze Coolant** is a long life coolant recommended for use in on-road and off-road vehicles both light and heavy-duty commercial vehicles. It meets BIS 5759-1994 and JIS-K-2234-1987 and Fiat (Italian) specifications.

**PANOL Antifreeze Coolant** is specially formulated with additives, which inhibit corrosion of alloys having aluminum, steel, copper and solder. Based on OEM recommendations it is used as a 30% to 50% solution in water.

Characteristics	Test Methods	Results
Appearance	Visual	Clear
Colour	Visual	Greenish Blue
Specific Gravity @ 20° C Min.	JIS K 2234 (IS- 5759)	1.127
Boiling Point °C	-do-	155
Freezing Point Water Sol.		
30% °C Max	-do-	(-) 14.0
50% °C Max		(-) 34.0
Foam 30% Sol. ml. Max.	-do-	4 max
Rubber Compatibility	-do-	Passes
Corrosion at 88 + 2° C for 336 ± 2 hrs.	-do-	Passes
pH of 30% solution v/v	-do-	8.0



## Panama Industrial

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## Circulating Oils (R & O Type)

### PANOL CH OIL (R & O)

**PANOL CH Oils** are manufactured from specially selected base oils duly fortified with adequate quantities of correct Oxidation and Rust Inhibitors (R&O) for use in enclosed systems. They have very good demulsibility and antifoam characteristics.

**PANOL CH Oils** are available in viscosity grades ranging from ISO VG 32 to ISO VG 460 and are used for circulating systems operating upto 70 kg/cm<sup>2</sup>. ISO VG grades 32, 46, 68, 100 and 150 meet IS 3098/83 specifications.

Typical Inspections										
Characteristics	Test Methods	32	46	68	100	121	150	220	320	460
Density at 15° C	D-1298	0.87	0.875	0.880	0.89	0.90	0.90	0.91	0.92	0.92
Flash Point °C COC	D-92	190	200	210	220	220	230	230	240	240
Viscosity at 40° C cSt	D-445	32	46	68	100	120	150	220	320	460
Viscosity Index	D-2270	95	95	95	95	90	90	90	90	90

## Circulating Oils (Antiwear Type)

### PANOL CIRCULATING OIL (ANTIWEAR)

**PANOL Circulating Oil AW** grades 22 to 100 meet ISO VG requirement (IS:10522-1993) and are blends of high Viscosity Index chemically stable base oils, and specially selected antiwear, anti-oxidation, antirust and anti-foam additives. These oils have good demulsibility characteristics. They meet the requirements of very high pressure hydraulic systems (1000 psi and above) and also of systems where high speed actuations are desired. These can also be used in enclosed gear boxes, compressors, chain drives, machine tools, circulation oiling systems, etc. Processed out of high quality solvent refined mineral oils. These oils contain antioxidant, antiwear and antifoam additives

Typical Inspections	Test Methods	AW 15	AW 22	AW 32	AW 37	AW 46	AW 57	AW 68	AW 100	AW 150	AW C220	AW 320	AW 460
Viscosity at 40° C cSt	D 445	15	22	32	37	46	57	68	100	150	227	320	455
Viscosity Index, (Min.)	D 2270	98	98	98	95	95	95	95	95	95	95	95	90
Flash Point °C COC, Min.	D 92	160	160	195	195	205	205	215	215	215	230	230	230
TAN mg KOH/gm(Max.)	IS:1448 P:2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Rust Preventive Characteristics	D 665B	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Pump Wear in mgms (Vicker 's 104° C Pump Test)	D 2882	-	-	50	50	50	50	50	50	50	50	50	N.A.
Pour Point			-9			-6	-3	-6	-3				6
Emulsion Characteristics (minutes)	D 1401	40-37-3 (10)	40-37-3 (10)	40-37-3 (10)	40-37-3 (15)	40-38-2 (15)	40-37-3 (20)	40-37-3 (20)	40-37-3 (30)	40-37-3 (30)	40-37-3 (30)	N.A.	N.A.
Foaming Characteristics ML Stability		-	-	-	-	-	-	-	-	-	-	-	-
Seq. I		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Seq.II		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Seq.III		Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

## Circulating Oils (HLP Type)

### PANOL CIRCULATING OIL (HLP TYPE)

PANOL HLP Oils are of the antiwear type having extreme pressure characteristics. These are blended from specially selected high viscosity index base-oils with additives to obtain the required anti-wear characteristics. These oils are also fortified with rust and oxidation inhibitors. They also have excellent good demulsibility and anti-foam characteristics.

Typical Inspections						
Characteristics	Test Methods	32	46	68	100	150
Colour Max.	D-1500	3.0	3.5	4.0	4.5	5.0
Flash Point °C COC	D-92	196	200	210	210	210
Viscosity at 100° C cSt	D-445	5.1	6.5	7.6	9.6	12.0
Viscosity Index	D-2270	95	95	95	90	90

## Turbine Oils

### PANOL TURBO

PANOL Turbine Oils are premium quality Turbine Oils which are used as initial fill and for top-up of lubrication systems of steam, gas and hydraulic turbines for obtaining reliable service.

Typical Inspections						
Characteristics	Test Methods	32	46	57	68	
Flash Point °C COC	D-92	200	205	205	210	
Viscosity at 100° C cSt	D-445	31	45	57	67	
Viscosity Index	D-2270	102	98	96	95	

## Turbine Oils

### PANOL TURBO

PANOL Turbine Oils are premium quality Turbine Oils which are used as initial fill and for top-up of lubrication systems of steam, gas and hydraulic turbines for obtaining reliable service.

Typical Inspections					
Characteristics	Test Methods	32	46	57	68
Flash Point °C COC	D-92	200	205	205	210
Viscosity at 40° C cSt	D-445	31	45	57	67
Viscosity Index	D-2270	102	98	96	95

## High Speed Spindle Oils

### PANOL SPINDLE OILS

PAN SPIN Oils have been developed to meet the requirements of high speed spindles of machine tools, plain and anti-friction bearings of textile spindles and other hydraulic applications of precision machines where a very light bodied oil is needed.

Typical Inspections							
Characteristics	Test Methods	2	5	10	12	15	22
Flash Point °C COC	D-92	70	70	144	150	150	180
Viscosity at 40° C cSt	D-445	2	5	10	12	15	22
Pour Point	D 97	-6	-6	-6	-6	-3	-3

## Stationary Diesel Engine Oils

### PANOL SD GEN OILS

PANOL Heavy Duty Stationary Diesel Engine Oils are blended from selected base oils and a combination of additives to offer a superior performance. These oils have excellent oxidation and chemical stability needed for high temperature operation. These are dispersant/detergent oils that help clean the engine and keep the insolubles in suspension while functioning as a lubricant. They also have the necessary reserve alkalinity to withstand the corrosive effects of acids formed during combustion of the fuel. It is blended to meet MIL-L-2104 A specification.

Typical Inspections			
Characteristics	Test Methods	SD 100	SD 150
Flash Point °C COC	D-92	200	215
Viscosity at 100° C cSt	D-445	8.2	10.5
Viscosity Index	D-2270	98	95

## Textile Machinery Oils

### PANOL LOOM OILS

**PANLOOM Oils** comprise a range of lubricants which have been specifically designed for all loss systems of textile looms. Their wide range enables the user to select the correct grade as per his requirements. These are user friendly in as much as the grades have been formulated to perform well, both for boundary as well as dynamic lubrication conditions.

Typical Inspections								
Characteristics	Test Methods	32	68	100	150	220	320	460
Flash Point °C COC	D-92	180	210	220	230	230	240	240
Pour Point	D-97	+9	+9	+9	+9	+9	+9	+9
Viscosity at 40° C cSt	D-445	32	68	100	150	220	320	460

### PANOL TEX

**PANOL Tex Oils** are mainly designed for use in boundary lubrication systems. They are fortified with additives to provide oiliness, adhesiveness, film strength, rust inhibition and scourability characteristics. Therefore these oils can also be used in enclosed systems such as comb boxes etc.

Typical Inspections						
Characteristics	Test Methods	32	68	100	150	220
Density at 15° C	D-1298	0.880	0.885	0.889	0.896	0.902
Flash Point °C COC	D-92	145	170	180	185	190
Pour Point	D-97	+5	+5	+5	+5	+5
Viscosity at 40° C cSt	D-445	33	70	102	145	210

## PANOL GINNING OILS

**PANOL Ginning Oils** are recommended in case of oil lubricated bearings which are designed as all-loss systems. These are formulated for their excellent adhesive properties so that the "oil-throw" is minimal.

Typical Inspections				
Characteristics	Test Methods	460	550	680
Flash Point °C COC	D-92	205	205	205
Pour Point °C	D-97	6	6	10
Viscosity at 40° C cSt	D-445	460	550	680

## General Machinery Oils

### PANOL LUB OILS

**PANOL LUB Oils** comprise specially selected minerals oils with ISO viscosity grades ranging from 10 cSt to 220 cSt at 40° C. These are also used by the industry for once-thru all-loss lubrication systems. These are invariably used in enclosed systems where the use of high grade products is not desired because of copious leakage from oil seals and the consequent heavy make-up. PANOL ISO VG grades 10, 32,46, 68, 100, 150, 220, 320 and 460 meet IS : 493 (Part I & Part II) - 1981 specifications.

Typical Inspections										
Characteristics	Test Methods	LUBOL Oils								
		10	32	46	68	100	150	220	320	460
Density at 15° C	D-1298	0.850	0.870	0.870	0.890	0.88	0.89	0.89	0.90	0.90
Flash Point °C COC	D-92	140	180	180	210	220	230	230	240	240
Viscosity at 40° C cSt	D-445	10	33	46	69	102	152	210	320	460

## Gear & Bearing Lubricants

### PANOL G & B LUBRICANTS

**PANOL Gear Box & Bearing Lubricants** are formulated to give full fluid film conditions when used for the lubrication of bearings and gears. These are not compounded with fixed oils or soaps.

Typical Inspections						
Characteristics	Test Methods	PANOL G & B Lubricants				
		100	150	220	320	460
Colour	D-1500	5	5	6	6	7
Flash Point °C COC	D-92	210	210	220	230	240
Viscosity at 40° C cSt	D-445	100	150	220	320	460

## High Speed Machinery Lubricants

### PANOL HM LUBRICANTS

**PANOL HM Lubricants** are manufactured from selected base oils which change less in terms of viscosity with temperature. These oils are fortified with additives to offer long service. However during their selection, care has been taken to ensure non-clogging of sintered bush bearings.

Typical Inspections							
Characteristics	Test Methods	PANOL HM Lubricant					
		32	37	46	68	100	150
Colour	D-150	3	3.5	3.5	4.0	5.0	7.5
Flash Point °C COC	D-92	180	180	180	210	220	220
Viscosity at 40° C cSt	D-445	32	37	46	68	102	152
Viscosity Index	D-2270	95	95	95	93	93	93
Copper Strip Corrosion at 100° C/3 hrs.	D-130	Not worse than 1					

## Machine Tool Way Oils

### PANOL SLIDE HYDRA OILS

**PANOL Hydraulic-Cum-Way Oils** are blended from high quality base oils used for hydraulic oils and fortified with anti-wear, anti-rust and tackiness additives required in way-lubricants. These oils would perform the function of a hydraulic fluid in non-critical systems and at the same time give the necessary stick-slip characteristics required of a way-oil under moderate load conditions.

Typical Inspections					
Characteristics	Test Methods	Slide	Slide	Slide	Slide
		hydra 32	hydra 57	hydra 68	hydra 68
Density at 15° C	D-1298	0.870	0.875	0.880	0.890
Flash Point °C COC	D-92	150	150	150	230
Viscosity at 40° C cSt	D-445	31	57	68	102

## Industrial Gear Oils

### PANOL GEAR SP OILS

**PANOL Gear SP Grades** are marketed over a wide viscosity range to take care of the variety of "speed-load" conditions encountered by the industry. These contain chemically active additives which react with the metal of the gear teeth's to form an antiwelding film between them. All these grades meet IS 8406/93 specifications.

Typical Inspections									
Characteristics	Test Methods	PANOL GEAR SP							
		68	100	150	220	257	320	460	680
Colour	Visual	O P A Q U E							
Flash Point °C COC	D-92	200	205	205	210	210	210	220	240
Viscosity at 40° C cSt	D-445	68	100	150	220	257	320	460	680
Copper Corrosion	D-130	Not worse than 1							

## STEAM CYLINDER OILS

### PANOL CYLINDER OILS

**PANCYL Oils** are highly refined oils having good chemical and thermal stability and low deposit forming tendency at elevated temperatures. These oils have excellent film strength and oiliness characteristics and provide low friction and good sealing properties.

Typical Inspections								
Characteristics	Test Methods	460	680	800	1000	EP 460	EP 530	EP 680
		Appearance	Visual	O P A Q U E				
Flash Point °C COC	D-92	220	220	220	280	220	220	220
Viscosity at 40° C cSt	D-445	460	685	805	1000	460	530	685

## Neumatic Tool Oils

### PANOL NEUM OILS

**PANOL NEUM Oils** are formulated to obtain good chemical stability to prevent oxidation and deposit formation, to have low pour point for easy flowability and high film strength for protection against wear. Special additives are used in their formulation to provide maximum resistance to water washing, good lubricity at high operating speeds and impact resistance to shock loading.

Typical Inspections				
Characteristics	Test Methods	No.1	No.2	No.3
Flash Point °C COC	D-92	150	155	170
Viscosity at 40° C cSt	D 445	40	100	180
Foaming Characteristics	D-892	Passes		
Rust Test	D-665	Passes		

## Open Gear & Wire Rope Compounds

### PANOL GEAR COMPOUNDS

PANOL Open Gear & Wire Rope Lubricants are bituminous compounds blended to the right viscosity to provide the necessary film strength and adhesiveness. These products are viscous enough to give an unruptured film and yet sufficiently free flowing to offer adequate heat dissipation. The grades with suffix e.g. F-50 contain a solvent for ease of application, since the thicker variety of open gear lubricants need to be heated.

For Wire Rope Lubrication, both a lubricant and a rust preventive are often needed. In such instances Open Gear Lubricants are used, since these bituminous compounds offer excellent protection in case of heavily loaded situations. Whilst PANTAK 0 can be applied neat, PANTAK 1 is applied after heating it adequately.

Characteristics	Test Methods	0	1	2	F-30	F-50
Colour	Visual					
Density at 30° C	D-1298	1.005	1.013	1.020	—	—
Flash Point °C COC Min.	D-92	180	190	210	—	—
Viscosity at 100° C cSt	D-445	220-260	433-476	1000-1150	—	—
Viscosity at 50° C cSt	D-445	—	—	—	1400	2900

### PANOL COMPOUND OILS

PANOL Compound Oils are recommended for traction motors in gears of electric locomotives, non critical girth gears/pinions in cement mills, rod mills, paper mills, bull gears, etc.

Typical Inspections					
Characteristics	Test Methods	PANOL Compounds			
		G 10	G 20	G 30	G 40
Colour	Visual	Black	Black	Black	Black
Kinematic Viscosity at 100° C cSt	ASTM D 445	86 - 103	410 - 450	770 - 900	1000-1200
Flash Point °C COC	ASTM D 92	250	280	280	280
Copper Strip Corrosion at 100° C 3 hrs. max.	ASTM D 130	1a	1a	1a	1a
Four Ball Weld Load Test, kgs. Min.	ASTM D 2783	250	250	250	250

## Industrial Greases

### PANOL HIGH TEMPERATURE GREASES

**PANGEM Grease HT** is a lithium soap grease with graphite, while **PANGEM SUPER HT** is a bentanite base gel with heavy bodied mineral oil having high drop points.

Characteristics	Test Methods	HT	SUPER HT
Colour	Visual	Greenish Black	Brown
Structure	Touch	Short Fibre	Smooth
Worked Penetration 60 double stroke at 25° C	ASTM D 217	275	200
Drop Point °C	ASTM D 5116	175	260

### PANOL MOLYPLEX GREASES

**PANGEM Moly Greases** provide protection against corrosion in splined shafts, pivot pins, ball and socket joints and on parts subjected to oscillating and sliding motions operating under adverse working conditions e.g., water vapour, rain, dust and shock loads.

Typical Inspections					
Characteristics	Test Methods	PANOL Compounds			
		G 10	G 20	G 30	G 40
Colour	Visual	Black	Black	Black	Black
Kinematic Viscosity at 100° C cSt	ASTM D 445	86 - 103	410 - 450	770 - 900	1000-1200
Flash Point °C COC Min.	ASTM D 92	250	280	280	280
Copper Strip Corrosion at 100° C 3 hrs. max.	ASTM D 130	1a	1a	1a	1a
Four Ball Weld Load Test, kgs. Min.	ASTM D 2783	250	250	250	250

## Refrigeration Oils

### PANOL COOL PRESS

**PANPRESS COOL Oils** are manufactured from specially selected base oils that possess low temperature fluidity and good chemical stability. These oils have inherent oxidation resistant characteristic and high dielectrics strength needed by sealed units of air conditioners and refrigerators.

Typical Inspections								
Characteristics	Test Methods	PANOL Compounds						
		12	32	46	68	100	F 32	F 57
Flash Point °C COC	D 92	142	156	162	172	202	154	166
Pour Point °C	D 97	-39	-30	-27	-24	-24	-30	-24
Viscosity at 40° C cSt	D 445	13	32	45	64	95	32	56

## Industrial Greases

### PANOL HIGH TEMPERATURE GREASES

**PANGEM Grease HT** is a lithium soap grease with graphite, while **PANGEM SUPER HT** is a bentanite base gel with heavy bodied mineral oil having high drop points.

Characteristics			
Properties	Test Methods	HT	SUPER HT
Colour	Visual	Greenish Black	Brown
Structure	Touch	Short Fibre	Smooth
Worked Penetration 60 double stroke at 25° C	ASTM D 217	275	200
Drop Point °C	ASTM D 5116	175	260

### PANOL MOLYPLEX GREASES

**PANGEM Moly Greases** provide protection against corrosion in splined shafts, pivot pins, ball and socket joints and on parts subjected to oscillating and sliding motions operating under adverse working conditions e.g., water vapour, rain, dust and shock loads.

Typical Inspections			
Characteristics	Test Methods	GEM Moly 3	GEM MOLY 4
Colour	Visual	Grey black	Grey black
Texture	Feel	Smooth	Smooth
Drop Point °C Min.	ASTM D 5116	180	180
Worked Penetration 60 double strokes at 25° C	ASTM D 217	265 – 295	265 – 295
Four Ball Weld Load Kgs. Min.	ASTM D 2783	210	250
Copper Corrosion at 100° C for 24 hrs. Max.	ASTM D 4048	1	1

### PANOL MULTIPURPOSE GREASES

**PANOL Universal Grease No. 1, 2 & 3** are dispersion of lithium in carefully selected base oils with performance additives.

Typical Inspections				
Characteristics	Test Methods	No. 1	No. 2	No. 3
Appearance	Visual	Light Brown	Light Brown	Light Brown
Structure	Touch	Smooth	Smooth	Smooth
Base Soap	–	Lithium	Lithium	Lithium
Drop Point °C, Min.	ASTM D 5116	180	180	180
Worked Penetration 60 double strokes at 25° C	ASTM D 217	310 - 340	265 - 295	220 - 250



## Heavy Duty Bearing Greases

### PANOL LIME BASED GREASES

**PANGEM L 2 AND L 3** are a dispersion of high quality low ash lubricating oil in lime-lead matrix.

Typical Inspections			
Characteristics	Test Methods	No. 2	No. 3
Colour	Visual	Dark	Dark
Texture	Touch	Smooth	Smooth
Worked Penetration 60 double stroke at 25° C	ASTM D 217	310 - 340	265 - 295
Drop Point °C, Min.	ASTM D 5116	90	90

## Graphited Greases

### PANOL GRAPHITED GREASES

**PANOL Graphited Greases** are calcium based greases containing micro fine graphite. These greases are used for general lubrication under comparatively high load and low relative displacement of interacting surfaces. These greases have excellent water resistance and have good mechanical stability.

Typical Inspections			
Characteristics	Test Methods	PANOL Graphited	
		GRADE - 1	GRADE - 3
Colour	Visual	Black	Black
Structure	Feel	Smooth	Smooth
Drop Point °C Min.	ASTM D 5116	95	95
Graphite by mass %	ASTM D 128	6 – 15	45 – 55
Worked Penetration 60 double strokes at 25° C	ASTMD 217	310 - 340	175 – 205

## Neat Cutting Oils

### PANOL NEAT CUT 55

**PANOL NEAT Cut 55** is recommended at locations where the surface finish requirements are rigid and the productivity is of prime importance. It has proved its effectiveness over a wide range of metal alloys including stainless steels, high tensile steels and heat resistant alloys.

Typical Inspections		
Characteristics	Test Methods	Results
Flash Point °C COC	D 92	160
Pour Point °C	D 97	+ 5
Viscosity at 40° C cSt	D 445	37
Copper Corrosion 3 hrs. at 100° C	D 130	4
Sulphur	—	+ ve
Chlorine	—	+ ve
EP Weld Load Kgs. Min.	—	800

### PANOL NEAT CUT OILS

Both **PANOL NEATCUT-353** and **PANOL NEATCUT-553** offer satisfactory performance over a wide range of machine tool speeds and depths of cuts. PANOL NEATCUT 353 is a low viscosity product designed especially for arduous operations like deep hole boring. It is also suitable for ferrous and ferrous alloys only. PANOL NEATCUT-553 which meets IS:3065:1985 type 3 Grade II and has therefore been found more effective in severe metal cutting operations including gear cutting, broaching and threading of alloy and stainless steel.

Typical Inspections			
Characteristics	Test Methods	353	553
Flash Point °C COC	D 92	135	160
Pour Point °C	D 97	- 3	- 3
Viscosity at 40° C cSt	D 445	11-15	34-40
Copper Corrosion 3 hrs. at 100° C	D 130	4	4

## PANOL NEAT CUT OILS

**PANOL Straight Cutting Oils** are marketed in the following grades.

**PANOL Neat Cut NS 15** is a non staining type neat cutting blended from high Viscosity Index base oils contains fatty material enhancing its free flowing and heat dissipation characteristics. It meets IS 3065-1985 (Reaffirmed 1990) Type 1 grade II specifications. It is recommended for use of machining of ferrous and non-ferrous metals.

**PANOL Neat Cut NS 115** is superior quality neat cutting oil containing chlorinated fatty material which reduces tool wear and improves machinability. It exceeds IS 3065-1985 (Reaffirmed 1990) Type 1 grade II specifications. It is suitable for multi tool set ups on automats where a variety of operations are performed on ferrous and non ferrous metals. It is recommended for thread grinding, form grinding and milling using multiple cutters.

**PANOL Neat Cut NS 102** is an inactive type cutting oil blended from high VI base oil incorporating sulphurised fatty material and a deodorant. It is developed to meet a wide range of machining operations giving good surface finish and protect tools from excessive wear It meets IS:3065-1985 Type 2 Grade II requirements. It is recommended for all machining operations on ferrous and non ferrous components

**PANOL Neat Cut 352** is formulated with high VI base oils and contains fatty material and active sulphur to provide extra cutting assistance under continuous long work cycles. It is recommended for deep hole

drilling including gun drilling and trepanning operations where pressurized coolant system is employed for easy swarf removal and effective cooling at the cutting point.. It is not recommended for the use on non ferrous metals.

**PANOL Neat Cut S 533/543** contains to these oils. The presence of chlorine enables the use of these oils for extreme pressure, low or moderate temperature cutting operations where feed rates are high but speeds are low. It is recommended for gear hobbing , gear shaving, screw cutting , tapping ,milling, reaming etc. and they do not discolour components..

**PANOL Neat Cut S 549** is an active type neat cutting oil containing sulphurised fatty material and free sulphur to give better finish and longer tool life over a wide range of operating temperatures. This oils is recommended for machining operations of high tensile stainless steel as well as nickel- chromium alloys on automats. Gear cutting, hobbing, drilling, reaming and thread cutting machines. It is not recommended for use on non ferrous metals..

**PANOL Neat Cut DF 45** is a non staining type of neat cutting oil suitable for multiple operations involving very severe metal grinding processes such as flute grinding of Drills, Reamers and other Form-Grinding Tools. It may also be used for Cold Die Forging of bolt-heads. It meets requirements of IS:3065-1985 Type 2 Grade III.

Characteristics	15	115	102	352	533	543	549	DF 45
Appearance	B R I G H T & C L E A R							
Density at 15° C	0.86	0.89	0.90	0.91	0.89	0.90	0.89	0.89
Flash Point °C COC	160	160	140	140	160	160	160	160
Pour Point °C	+8	+8	+8	+8	+6	+6	0	+6
Viscosity at 40° C cSt	19-25	19-25	30-36	9-12	30-36	39 - 45	27-35	40-45
EP Weld Load, kgs.	300	350	350	400	400	400	400	400

## Honing

### PANOL HONING OIL

**PANHONE** is a low viscosity neat cutting petroleum based coolant having good cleaning properties. Its use helps flushing of fine swarf from the honed surface. It satisfies the essential requirements of honing oil, which should provide controlled lubrication as well as maintain the honing stone “open” and “free cutting”. It is a “ready to use” product having excellent heat dissipation properties and can be used for both ferrous and non-ferrous applications. It meets IS: 3065:1985 type 1 Grade I requirements.

Typical Inspections		
Characteristics	Test Methods	5
Appearance	Visual	Bright and Clear
Density at 15° C	D-1298	0.820
Flash Point °C COC	D-92	128
Viscosity at 40° C cSt	D-445	5.2
Copper Strip Corrosion	D-130	< 1

## Precision Machine Coolants

### PANOL CUT SF

**PANOL Cut SF Coolants** are used by the Engg Industry at locations where mirror surface finishes are desired from high speed machines. Their use helps in the manufacture of precision parts with close tolerances. The selection of the grade is based on the material type and tool, the depth of the cut, speed of cutting, the job material, the desired surface finish, and the rigidity of the tooling. Work experience therefore assumes added importance in recommending the correct grade.

Typical Inspections			
Characteristics	Test Methods	60 SF	80 SF
Appearance	Visual	S e m i - T r a n s p a r e n t	
Density at 15° C	D 1298	0.880	0.885
Flash Point °C COC	D 92	150	170
Pour Point °C	D 97	+ 8	+ 15
Viscosity at 40° C cSt	D 445	12	15
Copper Strip Corrosion at 100° C, 3 hours	D 130	1a	1a

## Honing Cum Lapping Oil

### PANHONE LAP OIL

**PANHONE LAP 5** is specially formulated with a unique organic acid soap, which imparts lower coefficient friction to the formulation. It not only ensures a mirror finished surface but the same is untarnished and bright in appearance.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance	Visual	Bright & Clear
Colour	Visual	Red
Density at 15° C	D 1298	0.820
Flash Point °C COC	D 92	120
Pour Point °C	D 97	- 3
Viscosity at 40° C cSt	D 445	5.0
Copper Strip Corrosion	D 130	10
EP Weld Load, kgs. Min.	D 2783	126

## High Speed Machine Coolant

### PANOL ST CUT 91 SF

**PANOL ST Cut 91 SF** is a thermally stable light viscosity mineral oil imparted with oiliness characteristics. It has been fortified with adequate quantity of halogenated additives having extreme pressure properties. It provides excellent service in moisture free conditions and can be used for machining ferrous metals with ease.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance	Visual	Bright & Clear
Density at 15° C	D 1298	0.820
Pour Point °C	D 97	0
Flash Point °C COC	D 92	100
Viscosity at 40° C cSt	D 445	3.5 – 5
Copper Strip Corrosion	D 130	< 1
EP Weld Load, kgs. Min.		126

## Emulsifiable Coolants

### PANOL CUT SS

**PANOL Cut SS** is fortified with appropriate additives to prevent bacterial degradation of the emulsion. It also prevents rusting of the work piece and machine tool beds. It is recommended for a variety of cutting operations on both ferrous and non-ferrous metals. For general machining operations the emulsion is normally prepared with 5% oil and for grinding operation the emulsion has 2% of oil.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance	Visual	Bright & Clear
Density at 15° C	D 1298	0.880
Ash % Wt.	D 482	0.865
Copper Strip Corrosion	D 130	Passes
Cast Iron Corrosion	IP 125	Passes
Emulsion Stability & Frothing	D 1479	Passes

## PANOL CUT EP OILS

**PANOL Cut EP Oils** offer higher EP characteristics for heavy machining operations and are recommended for alloy steel and high speed steels. These provide good emulsion stability and enhanced tool life.

Typical Inspections				
Characteristics	Test Methods	PANOL CUT EP OILS		
		EP 60	EP 120	EP 180
Appearance	Visual	Brown	Brown	Brown
Specific Gravity at 60° F	D 1298	0.880	0.890	0.906
Flash Point °C COC	D 92	156	156	158
Viscosity at 40° C cSt	D 445	20-40	50	50
Copper Corrosion Test	D 130	Passes	Passes	Passes
Cast Iron Corrosion	Standard	Passes	Passes	Passes

## PANOL CUT

**PANOL Cut AL** offers good service for machining ferrous and non-ferrous metals including copper and Aluminium alloys. It also meets IS-1115 specifications for general purpose soluble cutting oil.

Typical Inspections		
Characteristics	Test Methods	PANOLAL
Specific Gravity at 30° C	D 1298	0.880
Flash Point °C COC	D 92	156
Viscosity at 40° C cSt	D 445	20-40
Emulsion stability with 600 ppm hard water	D 130	Passes
Cast Iron Corrosion	Standard	Passes

## PANOL CUT H

**PANOL Cut H** is specifically designed for locations where very hard water exceeding 500 ppm are not uncommon. It is known to offer good service even when the water hardness exceeds 1000 ppm. This is achieved by the use of a unique emulsifier which keeps the emulsions stable even when the water hardness is high.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance liquid	Visual	Bright and clear
Density at 29.5° C	D 1298	0.87
Emulsion 3% in 1000 ppm hard water	D 1479	Passes
Cast Iron Corrosion	IP 125	Passes
Copper Strip Corrosion	D 130	Passes
4 Ball Weld Load in kg	D 2783	130
pH ( 2% Emulsion)	Std Test Method	8

## PANOL CUT SUPER SS

**PANOL Cut SUPER SS** has been specially formulated for non-ferrous operations. Though it may also be used for ferrous machining. When regularly cleaned of swarf, it has offered trouble free operations over extended periods (over 1 year) in CNC machining centers. The product also exceeds the requirements of IS 1115-1986, and has been specially fortified with a biocide to take care of the type of bacteria which selectively converts Sulphates in water to H<sub>2</sub>S, the culprit for tarnishing of metal surfaces.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance	Visual	Clear & Bright
Density at 15° C	D 1298	0.875
Ash % wt.	D 482	2.0
Copper Strip Corrosion	D 130	Passes
C.I. Corrosion	IP 125	Passes
Emulsion stability & frothing	D 1479	Passes
Weld E P load 1:40 Emulsion, Kgs.	D 2783	100

## Synthetic Coolant

### PANOL SYNTHCUT

**PANOL Synthcut** is a non-nitrite synthetic coolant ideal for grinding operations involving cast iron. Its mild EP properties help the product in providing superior surface finish where the mineral based products have been found wanting due to inadequate flushing.

Typical Inspections		
Characteristics	Test Methods	Results
Sulphated Ash % Wt.	IS-1448 : P:4	0.94
pH 3% Emulsion	D 664	8.7
C.I. Corrosion	IS-1115	Passes
Copper Corrosion	IS-1448 : P:15	1 (a)

## Semi Synthetic Coolant

### PANOL SEMISYNTHCUT

Recent development in the field of additives and organic chemistry have helped in developing suitable molecules which, when involved in rubbing loads, help in providing lower coefficients of friction and are also miscible with water.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance – neat	Visual	Bright & Clear
- 5% Emulsion		Translucent
Ash % wt	IS-1448 : P-4	2.51
Copper Strips Corrosion at 100° C 3 hrs	IS-1448 : P-15	1 A
Aluminum Corrosion at 100° C 3 hrs	PANOL	Passes
C.I. Corrosion 2.5% & 5.0% in d/w & 400 ppm h/w	IS-1115	Passes
Emulsion Stability and frothing	IS-1448 : P-98	Passes
pH of 5% Emulsion Distilled Water	D-664	8.77

## Drawing Lubricants

### PANOL REFILL TUBE MANUFACTURING OILS

**PANOL Refill Tube Drawing Lubricants** are specially developed, metal working fluids for intricate machining operations performed on PPM machines. The base oils and additive packages used in formulating these products are specially selected to provide good lubricity and high film strength for these critical machining operations.

Typical Inspections			
Characteristics	Test Methods	PANOL ST CUT 190	PANOL ST CUT 5
Pour Point	D 97	-3	0
Flash Point COC °C	D 92	180	145
Viscosity at 40° C cSt	D 445	30	10.5
Copper Corrosion	D 130	1	1

### PANOL WIRE DRAWING OILS

**PANOL Wire Met Fluids** may be applied by flooding, dipping or rolling on the parts depending on the method and equipment used for drawing.

**PANOL Wire Met 10** is recommended for general purpose light duty drawing operations of soft material.

**PANOL Wire Met 17** is designed for drawing of aluminium wire used in the manufacture of aluminium cables.

**PANOL Wire Met 32** is recommended for drawing stainless steel wires.

**PANOL Wire Met 540** - is recommended for manufacture/drawing in heavy duty operations.

Typical Inspections					
Characteristics	Test Methods	PANOL Wire Met			
		10	17	32	540
Flash Point °C COCc	D-92	210	210	134	180
Viscosity at 40° C cSt	D-445	200	300	25.2	130
Saponification Value	D-94	19	10	158	100
Copper Strip corrosion 3 hrs at 100° C	D-130	1	1	4b	1b

## Spark Erosion Oils

### PANOL SPARK EROSION OILS

**PANOL EDM Oils** are highly refined mineral oils of narrow boiling range manufactured to meet the di-electric strength requirements of end use.

Typical Inspections				
Characteristics	Test Methods	EDM 20	SEO 30	SEO 40
Flash Point °C COCc	D-92	80	130	106
Pour Point °C	D-97	-5	-4	-9
Viscosity at 40° C cSt	D-445	4	4.8	2.3
Copper Corrosion	D-130	1	1	1
Di-electric Strength	IS-6792	40	40	40

## Rolling Oils

### PANOL ROLLING OILS

PANOL Metal Rolling Oils designed for cold rolling, are based on specially selected base oils having excellent heat carrying away properties together with good oxidation stability. These may be applied by flooding, dipping or spraying. Depending on the type of machine or requirements, these are manufactured to meet a wide range of viscosity specifications.

PANOL Metal Rolling Oils are available in the following grades:-

**PANOL Rolling Oil 10** It is recommended for use in cold rolling of copper and its alloys. Since it is suitably fortified with a polar additive it is also used for cold rolling of stainless steel and carbon steel strips where surface finish is of importance.

**PANOL Rolling Oil 24/2.4** These are used for rolling both ferrous and non-ferrous metals. The base oils used in their formulation have been selected because of their excellent corrosion inhibiting properties. PANOL Rolling Oil 40G, being a lower viscosity product, is specifically recommended for obtaining mirror finished surfaces from thin rolled sheets and also be used for machining of aluminium parts.

**PANOL Rolling Oil 25** This is a premium product which can withstand maximum loading because of the compounding used in its formulation. It is particularly useful for cold rolling of carbon and alloy steels, brass and copper sheets.

Typical Inspections					
Characteristics	Test Methods	10	24	2.4	25
Flash Point °C COCc	D-92	150	160	106	170
Viscosity at 40° C cSt	D-445	10	24	2.5	25
Saponification Value	D-94	2.5	-	-	9
Copper Strip Corrosion	D-130	1	1	1	1

\* Specific Gravity at 30° C.

## Specialities – Quenching & Tempering

### PANOL QUENCHING OILS

**Panquench 32** is a general purpose quenching oil having low volatility and inherent oxidation stability.

**Panquench 32 C** is accelerated quenching oil with special polar additives to give higher hardness during prolonged service.

**Panquench 32 XL** is a low viscosity index quenching oil having low volatility and inherent thermal stability. It meets IS 2664/93 requirements and has offered a quenching time of 19.8 secs. in one of the results reported by IIP Dehradun.

**PANOL Quench Oil 100 XX** is a high viscosity quenching oil suitable for systems without cooling facilities.

**PANOL Marquench Oil 150 XXX** is a marquench meeting IS:4543-1980 (reaffirmed in 1987)

**Panquench 14** is a narrow range petroleum based product which has been suitably fortified with a special additive. It meets the requirements of IS 2664/93 and in one of the tests performed by IIP Dehradun the average quenching time in seconds reported with its use was 14.0 secs.

Typical Inspections							
Characteristics	Test Methods	32	32C	32XL	100 XX	150 XXX	14
Flash Point °C COC	D-92	200	195	200	220	246	205
Viscosity at 40° C cSt	D-445	32	32	30	168	167*	22
Viscosity Index	ASDM 39 B	90	90	90	90	98	–
	D-2270	–	–	–	–	–	95
Conradson Carbon	IS-1448 : P-122	0.08	0.2	0.08	0.31	0.25	–

### PANOL TEMPERING OIL

**PANOL Marquench Oil 320 XXX** is a specially developed tempering oil having excellent thermal and oxidation stability. It has a high flash point and can be heated to higher temperatures without incurring abnormal evaporation losses.

Typical Inspections		
Characteristics	Test Methods	Results
Flash Point °C COC	D-92	250
Viscosity at 40° C cSt	D-445	350*
Viscosity at 100° C cSt	D-445	90

\* Viscosity @100° C cSt is 24.6

## Rust Preventives (Oil Based)

### PANOL ANTI-RUST GRADES

Steel parts after manufacture need protection to prevent their surfaces from rusting. These surfaces may be inaccessible places of assembled machines such as internal combustion engines, compressors, gear boxes, precision ball bearings etc, or for pressed sheets and other machined parts that need protection during inter-process storage. These oil based grades are used over a wide variety of locations.

Typical Inspections							
Characteristics	Test Methods	OB 50	OB 52	OB 560	OB 54	OB 55	OB 56
Appearance	Visual	Semi – Transparent					
Density at 15° C	D-1298	0.868	0.880	0.887	0.885	0.88	0.895
Flash Point °C COC	D-92	85	150	200	180	150	150
Viscosity at 40° C cSt	D-445	3.9	9.0	39	150	10.0	125/112

## Rust Preventives (Oil Based)

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Typical Inspections			
Characteristics	Test Methods	82 B	86-T
Appearance	Visual	Opaque	Opaque
Flash Point °C COC	D 92	45	45
Viscosity Ford Cup No. 4 (secs.)	—	16	32

## Rust Preventives (De-Watering Type)

### PANOL DE-WATERING RUST PROTECTIVES

**PANOL De-watering Rust Protectives** are non-asphaltic type products consisting of film forming agents and rust inhibitors in a suitable hydrocarbon carrier. On application the carrier evaporates leaving a thin self-healing rust protective film on the metal surface. These can be applied cold by dip, brush, swab or spray and are extensively used for protection of machined auto parts, tubes, sheets, etc.

**PANOL Anti-Rust DW 42** has excellent properties for preventing finger print corrosion and is ideal for use on highly polished precision parts.

**PANOL Anti-Rust DW 48** provides a thicker film and gives longer protection as compared to DW 42 .

**PANOL Anti-Rust DW 110** is a product specially developed for the anti-friction bearing industry. It can be used as inter-process rust preventive after diluting with a suitable solvent as well as for final packing

**PANOL Anti-Rust DW 551, 552 & 559B** are our solvent based exclusive products having soft films and meeting humidity cabinet control test exceeding 7 days indicating excellent salt spray protection. The protection provided by DW 559 B is the highest and by DW 552 the lowest in this range.

Typical Inspections							
Characteristics	Test Methods	DW-551	DW-552	DW 559B	DW-42	DW-48	DW-110
Appearance	Visual	Semi-Transparent		Dark Fluid	Semi-Transparent		
Flash Point °C COC	D-92	45	45	38° C **	45	45	45
Viscosity at 40° C cSt	D-445	3.9	2.9	4.5 cSt	2.2	5.2	24

## Rust Preventives (Acid Resistant)

### PANOL ANTIRUST CR GRADES

**PANOL Antirust CR 1250, CR 1920 and CR 2880** are mineral oil based low viscosity products which provide excellent protection from salty conditions to sheets and strips during sea transport, or when facing acidic conditions in sheds located near pickling tanks and in the open. The selection between these three grades for end use depends on the method of application and economics.

Typical Inspections				
Characteristics	Test Methods	CR 1250	CR 1920	CR 2880
Flash Point °C COC Min.	IS-1448 : P-68	60	60	60
Resistance to acidic fumes (5% HCL)	Proprietary Test	Passes for 125 hrs.	Passes for 192 hrs.	Passes for 288 hrs.
Salt Spray Test	ASTM D-117	Passes for 48 hrs.	Passes for 72 hrs.	Passes for 110 hrs.
Nature of film	Touch	Smooth & Oily	Smooth & Oily	Smooth & Oily
Film coverage approx.		110m <sup>2</sup> / Litre	100m <sup>2</sup> /litre	50m <sup>2</sup> /litre
Film thickness (non drying) Microns		7 to 12 Microns	7 to 9 Microns	7 to 9

## Rust Preventive (Translucent Dry Film)

### PANOL ANTIRUST TL 802

**PANOL Antirust TL 802** is a medium viscosity liquid, which may be applied with a brush, swab, or a pressure spray, on to the metal surface devoid of oil or grease. It has excellent adhesiveness and dries gradually to leave a hard lasting film, which does not peel off easily. Its thin film has proved its effectiveness in sheets, coils, strips, bars and wire ropes.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance	Visual	Bright light bro
Viscosity Ford Cup No. B 4	–	15.6
Film thickness, microns	–	12-15
Area Coverage M <sup>2</sup> / L	–	25.8
Resistance to 3% H <sub>2</sub> SO <sub>4</sub> sol	–	Passes
Alkaline Resistance 25% KOH sol	–	Passes

## Heat Transfer Oils

### PANOL HEAT TRANSFER OILS

**PANOL Heat Transfer Oils** are manufactured from highly paraffinic base oils having high viscosity index. These base stocks with exceptional oxidation stability have been found ideal for blending of heat transfer oils. These have high thermal conductivity and adequate specific heat to offer effective heat transfer.

**PANOL Heat Transfer Light** is a low viscosity heat transfer oil that is suitable for use in pressurised heat transfer systems.

**PANOL Heat Transfer 550** has the correct viscosity for obtaining optimum heat transfer rates from well designed systems. It also functions as a lubricant for the circulating pumps.

Typical Inspections			
Characteristics	Test Methods	LIGHT	550
Flash Point °C COC	D-92	180	200
Viscosity at 40° C cSt	D-445	22	32
Viscosity Index	D-2270	95	95

## Cable Oil

### PANOL CABLE OIL N

**PANOL Cable Oil N** has been specially developed to meet the impregnating requirements of paper insulated cables. It has a very high di-electric value, resistivity and low power factor to limit power losses to the minimum.

Typical Inspections		
Characteristics	Test Methods	Results
Kinematic Viscosity at 50° C	D-445	500 - 600
Acidity mg/KOH/gm.	D-664	0 - 7
Flash Point °C COC	D-92	More than 260
Pour Point°C	D-97	0
Dielectric Strength - Break down Voltage in KV	IS-6792	More than 60
Resistivity at 50° C in ohms/cm.	D-1169	1 to 10 x 10 <sup>18</sup>

## Cable Compound

### PANOL CABLE OIL R

**PANOL Cable Oil R** is a jointing compound manufactured from highly refined ingredients under dust free conditions. The product formulation ensures resistance to gas evolution by balancing the saturates and unsaturates, at the same time making the lubricant with improved thermal stability characteristics.



Typical Inspections		
Characteristics	Test Methods	Results
Flash Point °C COC	D-92	200
Viscosity at 100° C cSt	D-445	62
Acidity mg/KOH/gm.	D-664	50
Dielectric Strength KV Min.	IS-6792	45
Volume Resistivity at 20° C ohms/cm.	D-1169	23.3x1012
Power Factor at 20° C & 50 Hz	D-924	0.005

## Ink Oils

### PANOL INK OILS

Inks are basically a blend of pigments, carriers, driers and dispersents. Lubricating oils are generally used as carriers in these formulations. PANOL has a wide range of ink oils which satisfy variety of requirements of the ink manufacturers.

Typical Inspections						
Characteristics	Test Methods	40	55	56	57	22
Flash Point PMCC °C	D-93	100	105	110	105	180
Viscosity at 40° C cSt	D-445	3.3	3.5	3.7	3.6	2.0
Aniline Point °C	D-661	70	75	80	78	—
IBP / FBP °C	D-86	212/255	240/282	265/320	226/360	—

## Cleaning Agent

### PANOL CLEANSER S 10

PANOL Cleaner S 10 is an aliphatic type of hydrocarbon base fluid with sufficiently low surface tension to facilitate effective cleaning of difficult-to-clean intricate machined parts. While it is covered under 'Non-dangerous' petroleum products category, the product needs to be used with sufficient ventilation and care should be taken to avoid any open sparks in the area of use.

Typical Inspections		
Characteristics	Test Methods	Results
Appearance	Visual	Bright & Clear
Colour	ASTM D-1500	0.5 Max
Specific Gravity at 30° C	IS-1448 : P-16	Typical 0.839
Aniline Point	IS-1448 : P-3	25°C Max

## Glass Mould Oils

### PANOL GLASS MOULD OIL

PANOL GMO 10 is manufactured from highly refined lubricating oil base stocks. These base stocks have been specially selected for their ability to provide adequate cushioning between the mould and the finished articles. This product is generally recommended at locations where the emulsifiable glass mould oils do not offer satisfactory performances.

Typical Inspections		
Characteristics	Test Methods	Results
Flash Point °C COC	D-92	142
Fire Point °C	D-92	152
Viscosity at 40° C cSt	D-445	12.8

### PANOL GM 15

Moulds used for manufacturing quality glassware need a suitable lubricant as a mould releasing agent. The use of a proper mould lubricant also helps improve the surface finish and appearance of the moulded articles.

Typical Inspections		
Characteristics	Test Methods	Results
Flash Point °C COC	D-92	150
Viscosity at 40° C cSt	D-445	14
Ash % wt.	D-482	0.26
pH	D-664	7.3
Emulsion Stability 20% at 24 hrs.	D-1479	Passes

## CEMENT MOULD OILS

### PANOL CM 300

PANOL CM 300 is manufactured from highly refined mineral oil base stocks. This has been blended with a special additive to give it a body so that the product offers improved surface finish to the moulded articles.

Typical Inspections		
Characteristics	Test Methods	Results
Viscosity at 40° C cSt	D-445	18/22
Flash Point °C	D-92	165°C
Evaporation at 50° C for 24 hrs	Std. Test	0.1%
Pour Point °C Max.	D-97	+ 9

**PANOL CM 3000**

**PANOL CM 3000** is an emulsifiable oil-based product, which can be used both in the neat state as well as after dilution with water. It can be applied by a brush, swab or sprayed on to the moulds before charging them with cement/concrete mixture.

Typical Inspections		
Characteristics	Test Methods	Results
Flash Point °C COC	D 92	75
Viscosity at 40° C cSt	D 445	4
Emulsion Stability 20% at 24 hrs.	—	Passes
Rust Test	D 665	Passes



# PLANTS

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