SmartGrease™

Adds performance, life and value to these automotive products.

Powertrain
ABS
Alternator
Caliper
Clutch
Condenser
CV Joint
Differential
Drum Brakes
Fuel System
Idler Pulley
Idle Air Actuator
Master Cylinder
Shifters
Slip Yokes
Supercharger
Throttle Plate
Transfer Case
U Joints
Water Pump
Wheel Bearings

Switches
Airbag Cutoff
Climate Control
Dash panel Dimmer
Dual Stalk
Hazard
Headlamp
Ignition
Multifunction
Power Lock
Power Mirror
Power Seat
Reading Lamp
Rear Defrost
TRS
Trunk Release
Turn Signal
Window Lift

Steering /Suspension
Ball Joint
Idler Arm
Intermediate Shaft
Manual Steering
Pitman Arm
Power Steering Gear
Rack and Pinion Steering
Shaft Bearings
Shock Absorbers
Stabilizer Bushings
Steering Yoke
Strut Bearing
Tie Rods
Tilt and Telescope

Sensors
Exhaust Gas Recirculating
Fuel Level
Oxygen
Oil Pressure
Pedal Position
Power Mirror Position
Seat Position
Steering Position
Suspension Position
Temperature
Throttle Position
Transmission Speed
Wheel Speed

Cables
Brake
Climate Control
Clutch
Exterior Mirror
Fuel Door Release
Hood Release
Parking Brake
Seat Recline
Speedometer
Sunroof
Throttle
Transmission
Trunk Release
Window Regulator

Motors
ABS
Antenna
Cooling Fan
Electric Brake
Electric Steering
ETC
Fuel Pump
HVAC Blower
Power Mirror
Seat
Starter
Sunroof
Suspension
Trunk Pulldown
Window
Wiper

Actuators
ABS
Air Bag Clock Spring
Climate Control
Cup Holders
Door Lock
Exterior Mirror
Grab Handles
Hinges
Key Cylinders
Latches
Pedals
Power Sliding Door
PRNDL
Seat Position
Springs
Vent Controls
Visors
Window Lift

Connectors
ABS
Airbag
Alternator
Battery
Cooling Fan
ECM/ECU
EGR
Firewall
Fuel Sender
Headlamp/Tail lamp
Mass Air Flow
Multifunction Switch
O2
Speakers
Starter
TPS
TRS
Wheel Speed Sensor

Nye® Synthetic Lubricants

NyeAutomotive.com

SYNTHETIC OILS COMMONLY USED AT NYE

Synthetic Oils	Temp Range (°C)	Key Characteristics/Typical Applications
Alkylated Naphthalene (AN)	-30 to 180	Compared to PAO and diesters, offers improved hydrolytic, thermal, and oxidative stability. Good blendstock for polyalphaolefins requiring high stability under extreme conditions.
Pennzane® (MAC) *from Shell*	-45 to 125	Highly specialized fluid that combines the low vapor pressure of a PFPE with the lubricity and film strength of a PAO. Typically used in aerospace and critical vacuum applications.
Perfluoropolyether (PFPE)	-90 to 250	Extremely stable, nonflammable, chemically inert, low vapor pressure fluids. Used in extreme environments and to avoid plastic and elastomer compatibility problems.
Polyalphaolefin (PAO)	-60 to 125	Stable, lubricious fluids compatible with most plastics and elastomers. A drop-in replacement for petroleum, it's used in countless applications in many industries.
Polyglycol	-40 to ~125	Good load-carrying ability, compatible with most elastomers, non-carbonizing. Often used in arcing switches.
Polyphenylether (PPE)	+10 to 250	Radiation, chemical, and acid-resistant fluids. Traditionally used for noble-metal connectors and high-temperature mechanical components.
Silicone	-70 to 200	Stable fluids with good wetting characteristics. Commonly used with plastic gears, control cables, and seals.
Synthetic Ester	-65 to 150	Excellent wear resistance, stable, affinity for metals, handles heavy loads. Great for loaded bearings.

COMPATIBILITY OF SYNTHETIC BASE OILS

G Good
F Fair
P Poor

S Soluble
W Weakly soluble
V Varies with grade
I Insoluble

	Plastic																Elastomer								Solvent							
	Acetal (POM)	ABS	Phenolic (PF)	Polyamide-imide (PAI)	Polyamide (nylon) (PA)	Polycarbonate (PC)	Polyester	Polyetherimide	Polyethylene (PE)	Polyimide (TPI)	Polyphenylene oxide (PPO)	Polystyrene	Polysulfone (PSU)	PTFE	Polyvinyl chloride (PVC)	Terephthalate (PBT)	Buna S	Butyl	EPDM, EPR	Fluoroelastomer	Natural Rubber	Neoprene	Nitrile	Silicone	Water	Water plus detergent	Isopropanol	Methanol	Mineral Spirits	Fluoroalkane	Hydrofluorocarbon	Hydrofluoroether
Synthetic Hydrocarbon Includes: polyalphaolefin (PAO) Viscosity Index (VI) = 125–250	G	G	G	G	G	G	G	G	F	G	G	F	G	G	F	G	P	P	P	G	P	G	G	F	I	W	I	I	S	I	I	I
Polyglycol Polyether Viscosity Index (VI) = 160–220	G	P	G	G	G	P	P	G	F	G	P	G	P	G	P	G	P	P	G	G	P	P	F	G	V	W	V	V	S	I	I	I
Ester Diester, polyolester Viscosity Index (VI) = 120–150	G	P	G	G	G	P	P	G	F	G	P	P	P	G	P	G	P	P	F	G	P	P	F	F	I	W	I	I	S	I	I	I
Silicone Dimethyl-, phenyl-, halogenated- Viscosity Index (VI) = 200–650	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	P	I	W	I	I	S	I	I	I
Multiplyalkylated Cyclopentane *Pennzane®* from Shell Viscosity Index (VI) = 135	G	G	G	G	G	G	G	G	F	G	G	F	G	G	F	G	P	P	P	G	P	G	G	F	I	W	I	I	S	I	I	I
Perfluoropolyether PFPE Viscosity Index (VI) = 100–350	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	I	W	I	I	I	S	V	V
Polyphenylether PPE Viscosity Index (VI) = 40–60	G	P	G	G	G	P	P	G	F	G	P	P	P	G	P	G	P	P	F	G	P	P	F	F	I	W	I	I	S	I	I	I

GREASE GELLANTS COMMONLY USED AT NYE

Gellants are selected for their water and salt-water resistance, thermal stability, thickening efficiency, lubricity, and shear stability.

Organic Soaps
Lithium
Lithium Complex
Sodium
Sodium Complex
Calcium
Calcium Complex
Aluminum Complex

Organic Non-Soaps
Urea

Inorganic
Bentonite Clay
Silica
PTFE
Metal Oxide

GREASE STIFFNESS ANALOGS

NLGI Grade	Penetration (worked, 60x)	Analog
000	445–475	Ketchup
00	400–430	Applesauce
0	355–385	Brown mustard
1	310–340	Tomato paste
2	265–295	Peanut butter
3	220–250	Veg. shortening
4	175–205	Frozen yogurt
5	130–160	Hard butter
6	85–115	Cheese spread

LUBRICANT ADDITIVES COMMONLY USED AT NYE

Additive Type	Capabilities
Antioxidant	Prolongs life of base oil
Antiwear (EP)	Chemically active protection of loaded metal surfaces
Antirust	Slows rusting of iron alloys
Anticorrosion	Slows corrosion of non-noble metals
Filler	Thermal/electrical conductivity, special physical properties
Fortifier (EP)	Solids burnish into loaded surface under extreme pressures
Lubricity	Reduces coefficient of friction, starting torque or stick/slip
VI Modifier	Reduces rate of change of viscosity with temperature
Pour Point	Improves lower temperature limit
Dye	Visual/UV markers as inspection/assembly aids

KINEMATIC VISCOSITY OF COMMON FLUIDS

KV (cSt @ 25°C)	Material
20,000,000 —	Gum Rubber
5,000,000 —	
10,000 —	Honey
1,000 —	Castor Oil
100 —	SAE 10 Motor Oil
3 —	Milk
1 —	Water
0.40 —	Acetone

CALCULATING THE APPROXIMATE UNIT COST OF SYNTHETIC GREASE IN U.S. DOLLARS

Amount of Grease Per Device (dia. in mm.)	Volume(cc)	lbs./100,000 Units Low Density (1gm/cc)	lbs./100,000 Units High Density (2gm/cc)	Grease Cost per Device LD@$10/lb. (1gm/cc)	Grease Cost per Device HD@$100/lb. (2gm/cc)
1	0.0003	0.066	0.13	$0.000006	$0.00013
2	0.0021	0.46	0.93	$0.00005	$0.0009
3	0.007	1.54	3.09	$0.00015	$0.003
5	0.033	7.3	14.6	$0.0007	$0.015
10	0.26	57.3	114.6	$0.006	$0.11

Nye® Synthetic Lubricants The SmartGrease Company™

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