

# Huron

## INDUSTRIES, INC.

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### TECHNICAL DATA SHEET

#### NEOLUBE NO. 2 LUBRICANT - COLLOIDAL GRAPHITE IN ISOPROPRANOL

HIGH CHEMICAL PURITY • LOW HALOGEN CONTENT • DRY FILM LUBRICANT • NUCLEAR GRADE

NEOLUBE NO. 2 is a compound of processed micrographite and thermoplastic resin in isopropyl alcohol. Applied by brush, spray or dipping, it dries in seconds to a slippery, lustrous, adherent film of purest graphite. NEOLUBE NO. 2 is a dry film conductive lubricant used extensively at nuclear power generating plants and other nuclear facilities as an anti-seize compound, thread lubricant and for lubricating moving parts and rubbing surfaces.

This material has the properties that enable it to be used for lubrication in internal and external applications of commercial and government nuclear reactor systems. High grade graphite particles in thermoplastic resin and isopropanol produces a thin, non-corrosive film. NEOLUBE NO. 2 resists abrasion and lubricates threaded parts, moving parts and rubbing surfaces. This material allows easier assembly and nondestructive disassembly.

The composition of this product is 99% pure furnace graphite particles in isopropanol. The material has excellent radiation resistance and high chemical purity. The thin, non-corrosive film of NEOLUBE NO. 2 prevents seizing, fretting, galling and resists abrasion. It does not migrate and is non-freezable. NEOLUBE NO. 2 provides a non-corrosive dry adherent lubrication for metal parts with limited clearances in applications where control of impurities is required.

**NEOLUBE NO. 2 IS NOT RECOMMENDED FOR LUBRICATING THREADS IN THE REACTOR PRIMARY CONTAINMENT AREAS, WHERE OPERATING TEMPERATURES FOR THE FITTINGS ARE GREATER THAN 400°F. NEOLUBE NO. 1260 IS RECOMMENDED FOR USE IN CONTAINMENT AND/OR SECONDARY SIDE IN NUCLEAR APPLICATIONS.**

Radiation: NEOLUBE NO. 2 has been used successfully in applications where it has withstood radiation levels of  $1 \times 10^9$  Rads.

Mercury Certification: Instruments and equipment containing Mercury or compounds of Mercury are not used in the manufacture and packaging of NEOLUBE NO. 2, nor in testing or inspection, unless samples are discarded after tests. Compounds containing Boron are not used in cleaning, nor processing equipment, nor containers. There is no intentional addition of low melting point metals (Lead, Bismuth, Zinc, Mercury, Antimony, Cadmium or Tin) to this product, nor of Copper or Silver.

#### PHYSICAL PROPERTIES

Lubricant:	Colloidal Graphite
Binder:	Cellulosic Resin
Fluid Component:	Anhydrous Isopropyl Alcohol
Diluents:	Commercial Alcohols, Esters, Ketones
Color:	Black
Temperature Range:	-70°F - 400°F
Flash Point:	52°F (11°C) Tag Closed Cup
Consistency:	Liquid
Density:	6.6 lb/gal (0.8 kg/l)
Shelf Life:	No Limit in Closed Container
Conductivity:	1.2K ohms/Sq.
VOC:	766 g/l (6.4 lb/gal)
Approximate Coverage:	@ .5 ml = 8 sq ft/gal
Physical Properties (As Cured)	

Coefficient of Friction:	0.19 (Static) (0.030 - 0.090)**
Service Temperature:	400°F (204°C)**
Intermittent Temperature:	850°F (454°C)

#### PROVEN APPLICATIONS

Industrial applications of NEOLUBE NO. 2 include those where oils or greases, because of their very nature, are inadequate or objectionable. Oils collect dust, burn off or congeal; drip, soil and insulate. When used within load limits, NEOLUBE NO. 2 is an adequate substitute for oils or greases with none of their disadvantages. (DO NOT USE NEOLUBE NO. 2 ON BALL OR ROLLER BEARINGS.)

NEOLUBE NO. 2 has been used successfully on Zircon Fuel Rods surrounded by Uranium pellets. During this application, it will not hinder the heat transfer of neutron flux.

It has also been used successfully in vacuum systems. Other proven applications include:

1. Non-seize lubricant for bolts-metals-valves. Anti-seize lubricant for stainless steel bolts.
2. Lubrication coating that is dust free and clean for business machines, vending machines, clocks, locks, meter mechanisms, and piano and organ mechanisms (mating surfaces).
3. Lubricant for high pressure air fittings or hydraulic systems.
4. Lubricant for buss bars carrying contact shoes, high tension switch contacts. Reduces chatter, arcing and pitting.
5. Static bleeding of conveyor belts; lubricate conveyor chains in degreasing operations; reduce static on floors.
6. Excellent shielding properties for certain types of electric interference. Prevents radio wave interference. Maybe used in printed circuit techniques. Maybe used for shielding tape recorder cases.
7. Coating for gaskets, grid coating for cathode ray tubes.
8. Cutting lubricant on difficult metal cutting jobs.
9. Ideal source for graphite films in nuclear applications.
10. Ideal where a dry film lubricant prevents soiling as in: knitting, weaving and lace making machines.
11. Excellent for die and mold pretreatment conditioners. Protects from atmospheric elements and aids in initial lubricant.
12. Internal combustion engine components (assembly and break-in)
13. Automotive and industrial gaskets.
14. Rubber components (assembly and break-in)
15. Opaque coating for film negatives.

<b>PHYSICAL AND CHEMICAL REQUIREMENTS</b>	
Solids Content By Weight	3.0% -3.5%
Particle Size, microns Maximum dimensions of 90% of particles Maximum dimensions of any particles	4 Microns 10 Microns
Total Halogen Content, ppm Fluorine, ppm (EPA 340.2) Chlorine, ppm (ASTM D-808/E-256) Active Sulfur, ppm (ASTM D-1662) (ppm=parts per million)	200 ppm (Maximum) 75 ppm (Maximum) 100 ppm (Maximum) 900 ppm (Maximum)
Film Properties:  Spalling  Adherence  Appearance	Film continuity shall not be broken, metal surfaces shall not be exposed.  The coated surface shall be dry and shall not become exposed when subjected to light abrasion.  Dry, nonolly
Odor	Characteristic of isopropanol, no odor of halogenated solvents shall be detected.

#### DIRECTIONS

**STIR WELL BEFORE USING.** Apply with a soft brush, dipping or spraying. If a smudge free surface is desired, remove excess by polishing with a soft cloth when dry. For heavy service, apply 2 or 3 coats. **NEOLUBE NO. 2** may be diluted 1:1 with Isopropanol for very light service. Functional thickness on a surface is 0.3 - 0.6 mils in the dry state.

#### USAGE

Substrates should be clean and dry before application. A solvent wipe and air dry is usually sufficient. For critical applications requiring maximum adhesion, the recommend the following pretreatments:

Steel:	Degrease, sand or vapor blast and/or phosphate coat.
Aluminum:	Degrease, sand or vapor blast, degrease, meta etch or anodize.
Stainless Steel:	Degrease, sand or vapor blast and/or Granodine 16 (Amchem).
Copper Alloys:	Degrease, sand or vapor blast, degrease, dilute nitric acid dip and water rinse.
Rubber:	Clean with appropriate solvent.
Plastic:	Sand lightly, wipe with appropriate solvent.

#### APPLICATION

Shake or agitate well before using. Apply with brush in bottle, spray, dip or use regular brush.

#### DILUTION

If the application requires further dilution, add isopropanol while stirring thoroughly.

#### CURING

The coating air dries to the touch in 5 minutes under normal conditions of temperature and humidity. Full cure properties in approximately two hours depending on film thickness and drying conditions.

#### AVAILABLE SIZES

2 Ounce - Brush In Cap Bottle, Pint, Quart, Gallon and 5 Gallon Containers.

#### REGULATORY RATINGS

UN1219, ISOPROPANOL, 3, II  
ERG Guide 129 - Flammable Liquid  
EMERGENCY CONTACT: 800-535-5053  
HMIS = H1/F3/R0/PP-B                      NFPA = H1/F3/R0/SH-N/A

Use the customary safeguards in storing, handling and applying flammable materials of this type. Insure adequate ventilation. A Material Safety Data Sheet is furnished with each shipment.

#### HEALTH & SAFETY

Flammable. Harmful if swallowed, inhaled, or absorbed through skin. May cause eye irritation. Wash thoroughly after handling. Keep away from heat, sparks, and open flame. Keep container tightly closed when not in use. Use with adequate ventilation. Avoid breathing vapor. See Material Safety Data Sheet for proper first aid instructions.

A product certification is available for each batch and shipment.

**NEOLUBE** is available certified to Military Specification MIL-L-24131 (Specify **NEOLUBE NO. 1**)

**NEOLUBE** products are not considered safety related goods. As such, they are not designed, fabricated, handled, shipped, stored, etc., under a quality assurance program which complies with the requirements of 10CFR50, Appendix B, 10CFR21, or ANSI.

\*Also listed in some specifications as **NEOLUBE 'B'**.  
\*\**Machine Design* - June 1967 - "Torquing Stresses in Lubricated Bolts"  
\*\*\*The binding resin, which is present to prevent rub-off during assembly, slowly decomposes above 200°F (93°C).

Information presented in this Technical Data Sheet is considered reliable, but conditions and methods of use, which are beyond our control, may modify results. Before adopting our products for commercial use, the user should confirm their suitability. In no case should recommendations or suggestions for the use of our products be understood to sanction violation of any patent.

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# MATERIAL SAFETY DATA SHEET

I. GENERAL INFORMATION					
CHEMICAL NAME & SYNONYMS: GRAPHITE IN ISOPROPANOL			TRADE NAME & SYNONYMS: NEOLUBE NO. 2		
CHEMICAL FAMILY: GRAPHITE IN ISOPROPANOL			FORMULA: TRADE SECRET		
PROPER SHIPPING NAME: ISOPROPANOL			HAZARD CLASS: 3 - FLAMMABLE LIQUID		
UN NUMBER: UN1219			PACKING GROUP: II		
MANUFACTURER: 03432 HURON INDUSTRIES, INC.			MANUFACTURER'S PHONE NUMBER: 810-984-4213		
MANUFACTURER'S ADDRESS: P.O. BOX 610104/PORT HURON, MI 48061			EMERGENCY RESPONSE PHONE NUMBER: 800-535-5053		
PREPARED BY: DEBRA SULLIVAN			DATE PREPARED: July 17, 2007		
<p><i>Debra Sullivan</i></p> <p><b>UN1219, ISOPROPANOL, 3, II</b>  <b>ERG GUIDE 129 - FLAMMABLE LIQUID</b>  <b>NMFC NUMBER: 42690, SUB 2, FREIGHT CLASS 65</b></p>					
II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION					
HAZARDOUS COMPONENTS:	OSHA PEL	ACGIH TLV	NTP OSHA	I R C	%(OPTIONAL)
GRAPHITE (7782-42-5)	5.00 mg/m <sup>3</sup>	2.00 mg/m <sup>3</sup>	N N	N	1 - 5
ISOPROPANOL (67-63-0)	400.00 PPM	200.00 PPM	N N	N	60 - 100
THIS PRODUCT DOES NOT CONTAIN A CHEMICAL LISTED IN SECTION 313 AT OR ABOVE DE MINIMIS CONCENTRATES. ALL COMPONENTS LISTED ARE EXCLUDED FROM LISTING ON CANADIAN DSL INVENTORY AND THE TSCA INVENTORY. LD50 Is for ORAL RAT (67-63-0) 4700.00 mg/kg.					
III. PHYSICAL/CHEMICAL CHARACTERISTICS					
BOILING POINT: 95°F			SPECIFIC GRAVITY: 0.79		
VAPOR PRESSURE: 32.10 mm Hg @ 20°C			VISCOSITY (CPS): 50 - 200		
VAPOR DENSITY (AIR = 1): > 1			EVAPORATION RATE: > BUAC		
SOLUBILITY IN WATER: MISCIBLE			VOC: 766 g/l		
APPEARANCE & ODOR: BLACK			REDUCED VOC: 766 g/l		
IV. FIRE & EXPLOSION HAZARD DATA					
FLASH POINT (TEST METHOD): 52°F (PENSKY-MARTENS CC)			AUTO IGNITION TEMPERATURE: N/A		
FLAMMABLE LIMITS: 2.0 - 12.0			LEL: 2.0		UEL: 12.0
<p><b>EXTINGUISHING MEDIA:</b> CAUTION: ALL THESE PRODUCTS HAVE A VERY LOW FLASH POINT. USE OF WATER SPRAY WHEN FIGHTING FIRE MAY BE INEFFICIENT. FOR MIXTURES CONTAINING A HIGH PERCENTAGE OF AN ALCOHOL OR POLAR SOLVENT, ALCOHOL-RESISTANT FOAM MAY BE MORE EFFECTIVE. <b>SMALL FIRES:</b> DRY CHEMICAL, CO<sub>2</sub>, WATER SPRAY OR REGULAR FOAM. <b>LARGE FIRES:</b> WATER SPRAY, FOG OR REGULAR FOAM; DO NOT USE STRAIGHT STREAMS. MOVE CONTAINERS FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK.</p> <p><b>SPECIAL FIRE FIGHTING PROCEDURES:</b> FIGHT FIRE FROM MAXIMUM DISTANCE OR USE UNMANNED HOSE HOLDERS OR MONITOR NOZZLES. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER UNTIL WELL AFTER FIRE IS OUT. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICES OR DISCOLORATION OF TANK. ALWAYS STAY AWAY FROM TANKS ENGULFED IN FIRE. FOR MASSIVE FIRE, USE UNMANNED HOSE HOLDERS OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN.</p> <p><b>UNUSUAL FIRE &amp; EXPLOSION HAZARDS:</b> HIGHLY FLAMMABLE: WILL BE EASILY IGNITED BY HEAT, SPARKS, OR FLAMES. VAPORS MAY FORM EXPLOSIVE MIXTURES WITH AIR. VAPORS MAY TRAVEL TO SOURCE OF IGNITION AND FLASH BACK. MOST VAPORS ARE HEAVIER THAN AIR. THEY WILL SPREAD ALONG GROUND AND COLLECT IN LOW OR CONFINED AREAS (SEWERS, BASEMENTS, TANKS). VAPOR EXPLOSION HAZARD INDOORS, OUTDOORS OR IN SEWERS. THOSE SUBSTANCES DESIGNATED WITH A 'P' MAY POLYMERIZE EXPLOSIVELY WHEN HEATED OR INVOLVED IN A FIRE OR EXPLOSION HAZARD. CONTAINERS MAY EXPLODE WHEN HEATED. MANY LIQUIDS ARE LIGHTER THAN WATER. SUBSTANCE MAY BE TRANSPORTED HOT. IF MOLTEN ALUMINUM IS INVOLVED, REFER TO GUIDE 169.</p>					
<p><b>FIRE FIGHTING EQUIPMENT:</b> WEAR POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS (SCBA). STRUCTURAL FIREFIGHTERS' PROTECTIVE CLOTHING WILL ONLY PROVIDE LIMITED PROTECTION.</p>					

ESTIMATED HMIS RATINGS: HEALTH - 1 FLAMMABILITY - 3 REACTIVITY - 0 PERSONAL PROTECTION - B

ESTIMATED NFPA RATINGS: HEALTH - 1 FLAMMABILITY - 3 REACTIVITY - 0 SPECIFIC HAZARD - N/A

#### V. REACTIVITY DATA

STABILITY   UNSTABLE   X   STABLE	CONDITIONS TO AVOID: NONE
INCOMPATIBILITY	MATERIAL TO AVOID: STRONG OXIDIZERS
HAZARDOUS   MAY OCCUR POLYMERIZATION   X   WILL NOT OCCUR	CONDITIONS TO AVOID: N/A
HAZARDOUS DECOMPOSITION PRODUCTS: OXIDES OF CARBON	

#### VI. HEALTH HAZARD DATA

CARCINOGENICITY: NTP? NONE	CARCINOGENICITY: IARC MONOGRAPHS? NONE	CARCINOGENICITY: OSHA REGULATED? NONE
SIGNS AND SYMPTOMS OF EXPOSURE: INHALATION: VAPORS AND MISTS IRRITATE EYES, NOSE AND THROAT. DUSTS GENERATED FROM SANDING AND GRINDING ON SURFACES COATED WITH THIS PRODUCT AND VAPORS AND MISTS GENERATED FROM THIS PRODUCT MAY BE HARMFUL IF INHALED. EYE WATERING, HEADACHES, NAUSEA, DIZZINESS AND LOSS OF COORDINATION ARE INDICATIONS THAT VAPOR AND/OR MIST LEVELS ARE TOO HIGH. INGESTION: MAY BE HARMFUL IF SWALLOWED. EYE: CAUSES SLIGHT IRRITATION. SKIN: MAY CAUSE MODERATE IRRITATION. THE COMPONENTS OF THIS PRODUCT ARE NOT EXPECTED TO BE ABSORBED THROUGH THE SKIN.		
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: NONE KNOWN		
PRIMARY ROUTE(S) OF ENTRY: INHALATION		
EMERGENCY AND FIRST AID PROCEDURES: INHALATION: IF EXCESSIVE AMOUNTS OF VAPORS OR MIST ARE INHALED, REMOVE TO FRESH AIR. APPLY ARTIFICIAL RESPIRATION AND OTHER SUPPORTIVE MEASURES AS REQUIRED. CONSULT A POISON CENTER, EMERGENCY ROOM OR LUNG SPECIALIST FOR ADDITIONAL INFORMATION. INGESTION: DO NOT INDUCE VOMITING. EYE: FLUSH EYES IMMEDIATELY WITH PLENTY OF WATER FOR AT LEAST 15 MINUTE. SKIN: IF EXCESSIVE SKIN CONTACT OCCURS, FLUSH IMMEDIATELY WITH PLENTY OF WATER, FOLLOWED BY WASHING WITH SOAP AND WATER.		
HEALTH HAZARDS: CHRONIC: THIS PRODUCT CONTAINS GRAPHITE WHICH CAN ACCUMULATE IN LUNG TISSUE AFTER LONG-TERM EXPOSURE TO THE DUST. THE POTENTIAL FOR SUCH EXPOSURE FROM THE USE OF THIS PRODUCT IS VERY LIMITED. THIS PRODUCT CONTAINS ISOPROPYL ALCOHOL. LONG TERM EXPOSURE TO ISOPROPYL ALCOHOL VAPORS HAVE PRODUCED LIVER, KIDNEYS AND TESTICULAR EFFECTS IN EXPERIMENTAL ANIMALS.		

#### VII. PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: ELIMINATE ALL IGNITION SOURCES; NO FLARES, SMOKING, SPARKS OR FLAMES IN IMMEDIATE AREA. ALL EQUIPMENT USED WHEN HANDLING THE PRODUCT MUST BE GROUNDED. DO NOT TOUCH OR WALK THROUGH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. PREVENT ENTRY INTO WATERWAYS, SEWERS, BASEMENTS OR CONFINED AREAS. A VAPOR SUPPRESSING FOAM MAY BE USED TO REDUCE VAPORS. ABSORB OR COVER WITH DRY EARTH, SAND OR OTHER NON-COMBUSTIBLE MATERIAL AND TRANSFER TO CONTAINERS. USE CLEAN NON-SPARKING TOOLS TO COLLECT ABSORBED MATERIAL. LARGE SPILLS: DIKE FAR AHEAD OF LIQUID SPILL FOR LATER DISPOSAL. WATER SPRAY MAY REDUCE VAPOR; BUT MAY NOT PREVENT IGNITION IN CLOSED SPACES.
WASTE DISPOSAL METHOD: CONSULT WITH FEDERAL, STATE AND LOCAL WASTE REGULATIONS.
HANDLING AND STORING: STORAGE TEMPERATURE - AMBIENT. PREFERRED TEMPERATURE LESS THAN 90°F. PROTECT MATERIAL FROM DIRECT SUNLIGHT. STORAGE PRESSURE - ATMOSPHERIC. KEEP CONTAINER CLOSED. LOOSEN CLOSURE CAUTIOUSLY BEFORE OPENING. STORE IN A COOL AND WELL VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. KEEP AWAY FROM HEAT, SPARKS AND FLAME. GROUND AND BOND CONTAINERS WHEN TRANSFERRING MATERIALS. EMPTY CONTAINERS MAY RETAIN HAZARDOUS PROPERTIES. FOLLOW ALL MSDS/LABEL WARNINGS EVEN AFTER CONTAINER IS EMPTIED.

#### VIII. CONTROL MEASURES

EYE PROTECTION: VAPOR TIGHT CHEMICAL-TYPE SPLASH GOGGLES SHOULD BE WORN WHEN THE POSSIBILITY EXISTS FOR EYE CONTACT DUE TO SPLASHING OR SPRAYING OF LIQUID OR THE GENERATION OF AIRBORNE PARTICLES OR VAPORS.	SKIN PROTECTION: WEAR PROTECTIVE CLOTHING OR WORK UNIFORMS AND GLOVES CONSTRUCTED OF MATERIAL(S) WHICH ARE APPROPRIATE TO PREVENT CONTACT WITH THE CHEMICALS LISTED IN THE INGREDIENT SECTION OF THE MSDS.
ENGINEERING CONTROLS: PROVIDE SUFFICIENT MECHANICAL VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S). OVEREXPOSURES TO VAPORS AND MISTS MAY BE PREVENTED BY ENSURING VENTILATION CONTROLS, LOCAL EXHAUST AND/OR FRESH AIR ENTRY. NIOSH/MSHA SCHEDULE TC-23C-AIR PURIFYING OR A SCHEDULE TC-19C-AIR SUPPLIED RESPIRATOR MAY ALSO BE USED TO REDUCE EXPOSURES.	

THIS DATA IS OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS A PRODUCT SPECIFICATION. NO WARRANTY, EITHER EXPRESSED OR IMPLIED, IS HEREBY MADE. THE RECOMMENDED INDUSTRIAL HYGIENE AND SAFE HANDLING PROCEDURES ARE BELIEVED TO BE GENERALLY APPLICABLE. HOWEVER, EACH USER SHOULD REVIEW THESE RECOMMENDATIONS IN THE SPECIFIC CONTEXT OF THE INTENDED USE AND DETERMINE WHETHER THEY ARE APPROPRIATE.  
N/E = NOT ESTABLISHED N/A = NOT APPLICABLE