



## MINING

Calumet solvents and base oils can be used in different mining processes, including all types of ore extractions. Our highly refined and environmentally friendly products offer consistent quality and give better control over the customers' processes.

### MINING PROCESSES

- Preg-robbing/blinding/blanking
- Copper-loaded solvent extraction
- Metal-loaded solvent extraction
- Molybdenum and potash ore processing by diesel flotation
- Dust suppression of railcar mined ores



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## PREG-ROBBING/BLINDING/BLANKING

Carbonaceous gold ores can adsorb gold (I) cyanide from pregnant leach solutions during processing. This phenomenon, known as preg-robbing, is responsible for poor recoveries (of gold).

Calumet Base Oils provide excellent insulation to the grinding process in aqueous environments because of their electrostatic attraction to the charged carbonaceous material, blinding or blanking that material's ability to adsorb the cyanide metal complex by blocking the pores in the clay particles.

Calumet paraffinic base oils offer a safer, cleaner and more environmentally friendly option compared to the current market standard. They offer better control over these processes because they deliver consistency when blending with other materials.

### PRODUCT RECOMMENDATION

- CALPAR™ 60

## COPPER-LOADED SOLVENT EXTRACTION

Calumet solvent extraction products are formulated with state-of-the-art technology to meet the specific needs of the mining industry. Calumet products are highly compatible with all copper conventional collectors and are stable over a wide pH range, making them maximally effective.

Calumet products can be blended to provide proper solvency to meet the needs of your specific metal/extractant chemistry needs.

Our products offer many advantages:

- **Better solvent recovery and saves time:** Separates cleanly from water solutions
- **Improved solvency power:** Works well with extractants
- **High flashpoint:** Safety first, along with decreased odor
- **Narrow distillation range:** To ensure consistent extraction and evaporative loss.

### PRODUCT RECOMMENDATION

- LVP™ 100
- CONOSOL® 170ES
- CONOSOL® 260
- Calumet™ 142ES
- HYDROCAL™ 38
- HYDROCAL™ 45
- HYDROCAL™ 60

## METAL-LOADED SOLVENT EXTRACTION

Calumet formulates mining diluents for the extraction process of retrieving precious metals. Our products have minimal environmental impact. The diluent and chelator formulations are chosen to selectively target the desired metal being extracted during the leaching process. By matching the solvent to the PTA chemistry, Calumet can improve the metal extraction efficiency of the PTA.

### PRODUCT RECOMMENDATION

- CONOSOL® 170
- CONOSOL® 170ES

CONOSOL 170ES is a petroleum distillate and synthetically produced hydrocarbon manufactured specifically for use in solvent extraction operations of metals. For this reason, the solvent is manufactured to close specifications to ensure product consistency and to optimize phase disengagement in materials that include, but are not limited to, copper, cobalt, nickel, platinum, palladium, uranium, vanadium, beryllium and lanthanide series metals.

## MOLYBDENUM & POTASH ORE PROCESSING BY DIESEL FLOTATION

The technique of diesel flotation involves the wet crushing of metal ores in the presence of flotation aids, traditionally diesel fuel, or collecting/frothing agents. These hydrophobic aids or agents either bind to the mineral being mined or form a film around it.

Calumet can provide a better alternative to diesel fuel. Our solvents and base oils provide effective film strength and excellent low temperature properties while also having the benefit of decreasing the environmental impact as compared to the traditional usage diesel fuel.

### PRODUCT RECOMMENDATION

- CONOSOL® 170
- Calumet™ 600 Solvent
- HYDROCAL™ 38
- HYDROCAL™ 60
- CALSOL™ 806
- CALPAR™ 60

## DUST SUPPRESSION OF RAILCAR MINED ORES

Dust suppressants coat small particles of ore, making it heavier so the ore is less likely to be lost to the environment. In a railcar, the constant wind and sun exposure causes the liquid to evaporate more quickly than normal. Therefore, it is essential to use high boiling point hydrocarbon solvents.

### PRODUCT RECOMMENDATION\*

#### ■ CONOSOL® 340

Calumet offers CONOSOL 340 solvent with a high flash point, high initial boiling point, and low evaporation rate which is perfect for controlling dust on moving railcars. A safe, environmentally friendly product is a great alternative to current products being used to help control mining ore dust.

\*Ask us about our dedust oil product lines for specific dedust needs.

## CALUMET SOLVENTS TYPICAL PROPERTIES

PROPERTIES	METHOD	Calumet 142ES	600 Solvent	LVP 100	CONOSOL C-170	CONOSOL 170ES	CONOSOL 260	CONOSOL 340
Viscosity @ 40 °C (cSt)	D445	-	3.56	1.91	2.08	2.15	3.74	7.86
Specific Gravity @ 60/60 °F	ASTM D1250	0.7873	0.8239	0.7975	0.8132	0.8245	0.8237	0.8518
Density @ 60 °F (Pounds Per Gallon)	ASTM D1250	6.529	6.869	6.649	6.77	6.865	6.873	7.092
Flash Point TCC (T), COC (C), PMCC (P) (°F)	ASTM D56, ASTM D92, ASTM D93	142 (T)	272 (C)	201 (P)	178 (P)	183 (P)	285 (P)	341 (C)
Pour Point (°F)	ASTM D97	-60	14	-27	<-80	-50	-30	-30
Aniline Point (°F)	ASTM D611	171.2	182	172.8	165.2	157.6	191	189.8
Aromatics (Vol. %)	ASTM D1319	1.0	5.8	<1.0	<0.5	5	0.3	0.28
Vapor Pressure @ 20 °C (mm Hg)	ASTM D2879	0.54	0.03	0.11	-	-	0.01	<0.01
Distillation IBP (°F)	ASTM D86	373	516	431	400	406	519	599
Distillation EP (°F)	ASTM D86	415	583	474	508	512	596	642
BTEX (Detection Limits per EPA Drinking Water MCLs)	EPA 8260B			ND	ND		ND	ND
Flammable								
Combustible		√			√	√		
Non-Hazardous			√	√			√	√

### APPLICATIONS

Preg-Robbing/Blinding/Blanking								
Copper-Loaded Solvent Extraction		√		√		√	√	
Metal-Loaded Solvent Extraction					√	√		
Diesel Flotation			√		√			
Dust Suppression								√

## CALUMET BASE OILS TYPICAL PROPERTIES

PROPERTIES	METHOD	CALSOL 806	HYDROCAL 38	HYDROCAL 45	HYDROCAL 60	CALPAR 60
Viscosity @ 40 °C (cSt)	D445	9.5	3.3	5.5	10.3	7.3
Viscosity @ 100 °C (cSt)	D445	2.4	1.3	1.7	2.5	2.1
Viscosity @ 100 °F (SUS)	D2161	59.8	37.5	44.9	62.9	51.3
Viscosity @ 210 °F (SUS)	D2161	34.2	30.3	31.9	34.6	33.4
Specific Gravity @ 60 °F	D1250	0.8938	0.8783	0.8849	0.8921	0.8437
Density (Pounds per Gallon)	D1250	7.452	7.313	7.368	7.428	7.025
Flash Point (°C)	D92	150	104	130	158	159
Flash Point (°F)	D92	302	219	265	317	318
Pour Point (°F)	D97	-82	-81	-81	-78	-57
Aniline Point (°C)	D611	70.8	138.6	149	72.7	91.6
Aniline Point (°F)	D611	159.5	59.2	65	162.8	196.9
Carbon Type Analysis (%)	D2140					
Ca		8	-	9	13	1
Cn		50	-	51	40	36
Cp		42	-	40	47	63

### APPLICATIONS

Preg-Robbing/Blinding/Blanking						√
Copper-Loaded Solvent Extraction			√	√	√	
Metal-Loaded Solvent Extraction						
Diesel Flotation		√	√		√	√
Dust Suppression*						

\*Ask us about our dedust oil product lines for specific dedust needs.

## RENEWABLE DIESEL FUELS

Calumet continues to drive innovation in the low-carbon fuels sector and is one of North America's leaders in the development and production of renewable fuel stocks. Our Montana refining complex started operations in the fourth quarter of 2022, with a clear focus on renewable diesel and renewable kerosene.

Our current base oils and solvents will seamlessly integrate with renewable diesel and kerosene to help reduce the carbon intensity and negativity around using regular diesel and kerosene within the mining industry. These low-carbon products will have numerous benefits compared to what is currently available due to the source material used to generate the fuels, edible and non-edible oils, and fats. The seed oils used in conjunction with Calumet's base oils impart a level of safety for the worker and his environment while improving operational efficiencies that are unmatched in the industry.

# PERFORMANCE BRANDS

## Bel-Ray and Royal Purple Specialty Mining Lubricants

To reduce your total cost of ownership:

- **Reduce maintenance and downtime**  
Extremely high film strength and consistent film thickness minimize metal to metal contact between moving surfaces resulting less contact, wear and damage
- **Increase production**  
Expanded drain intervals and usable lubricant life provide optimal Operational Availability and readiness
- **Extend equipment life**  
Formulations focused on proactively managing moisture, heat and contaminants
- **Improve component reliability**  
Maximized component Mean Time Between Failures and Planned Maintenance Intervals
- **Sustainable product options**  
Leading environmental stewardship utilizing the latest in ecologically responsible lubricant technology while providing enhanced asset protection
- **Training and lubrication support program available**  
Value added training and services offered, supporting lubrication and reliability program development, implementation, and sustainability for all departments: Operations, maintenance, reliability and management

Contact Roger Collard at [rogerc@clmt.com](mailto:rogerc@clmt.com) for more information.

## CALUMET SPECIALTY PRODUCTS & SOLUTIONS

Calumet manufactures, formulates, and markets a diversified slate of specialty branded products to customers in various consumer-facing and industrial markets. We are headquartered in Indianapolis, Indiana, with approximately 1,400 employees and 12 facilities across North America, and we serve over 2,700 global customers in 90 countries.



**BASE OILS**



**SPECIALTY OILS**



**SOLVENTS**



**ESTERS**



**WAXES**



**FUELS**



**ASPHALT**



**PERFORMANCE BRANDS**

### TECHNICAL ASSISTANCE

For product or technical questions, contact your Sales Representative or Calumet Product Support at (800) 437-3188 or email [technical@calumet.com](mailto:technical@calumet.com).

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Calumet's sampling and testing procedures in effect at the time of production will be used for certification testing. Results may be based on tank certification, manufacturing data, periodic testing and/or most recent product restock. Typical values only represent the values one would expect if the property were tested in our laboratories with our test methods on the specified date. Some product properties are not frequently measured, and accordingly typical values are not based on a statistically relevant number of tests. The information in this document relates only to the named product. The user is solely responsible for all determination regarding any use and any process.



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