



# Nemmin

NEGOCIOS ESTRATÉGICOS MINEROS

## **KLEENOIL**

### **MICRO FILTRACIÓN INTELIGENTE**

**Presentation - 2024**

## EL LUBRICANTE:

Solo el 3% del costo de mantenimiento, pero capaz de evitar el 80% del desgaste





# CONSULTORÍA EN LUBRICACIÓN

- Mayor disponibilidad
- Decisiones basadas en condición
- Reducción de fallos
- Menor costo por hora de mantenimiento
- Mayor confiabilidad del Activo productivo
- Mayor ciclo de vida del Activo productivo
- Mayor ROI





# PROGRAMA DE MANTENIMIENTO PROACTIVO **KLEENTECH**

**01**

*Aceite limpio todo el tiempo para la maquinaria*



**02**

*KLEENOIL reduce la FRICCIÓN Y DESGASTE de metales*



**03**

*Incrementa la vida útil del aceite y de la maquina*



**04**

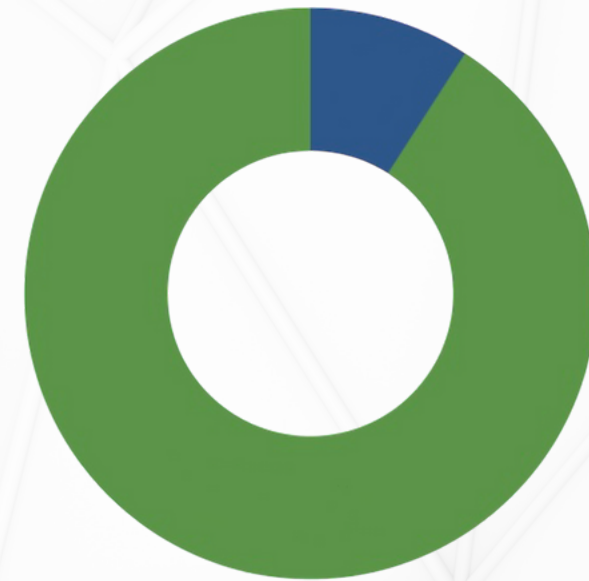
*Reduce los fallos debido a una menor fricción y desgaste*



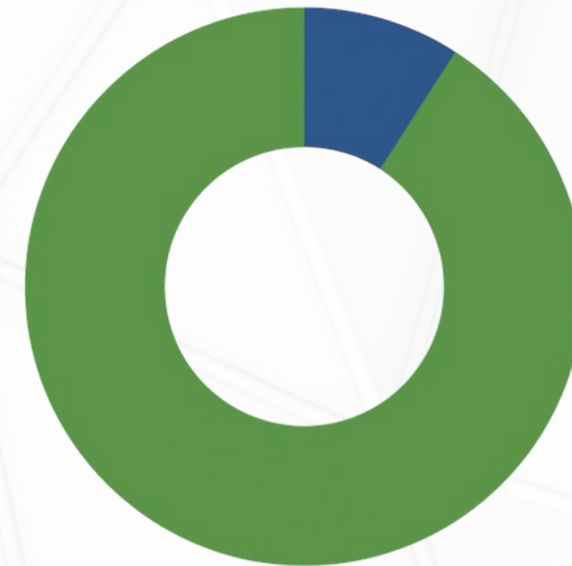
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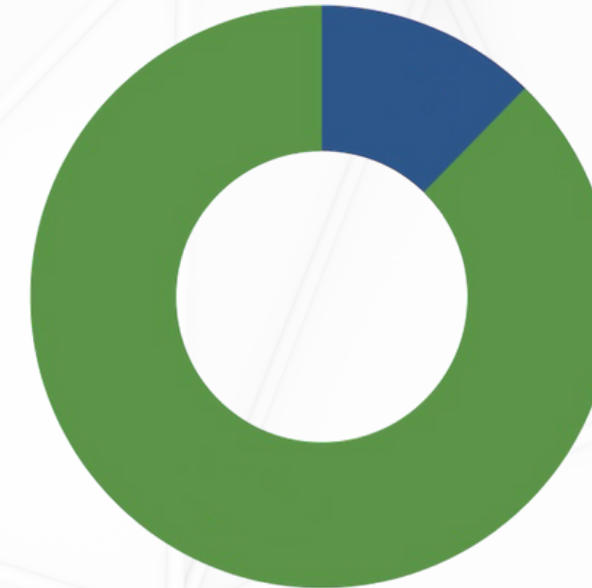
# BENEFICIOS DE UN PROGRAMA DE CONTROL DE CONTAMINACIÓN CON **KLEENOIL**



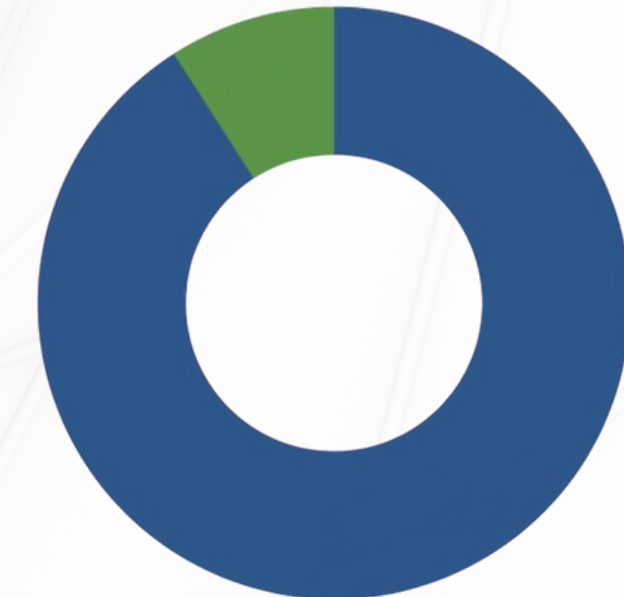
**Menor  
Consumo de lubricantes**



**Menos  
Fallas de la maquinaria**



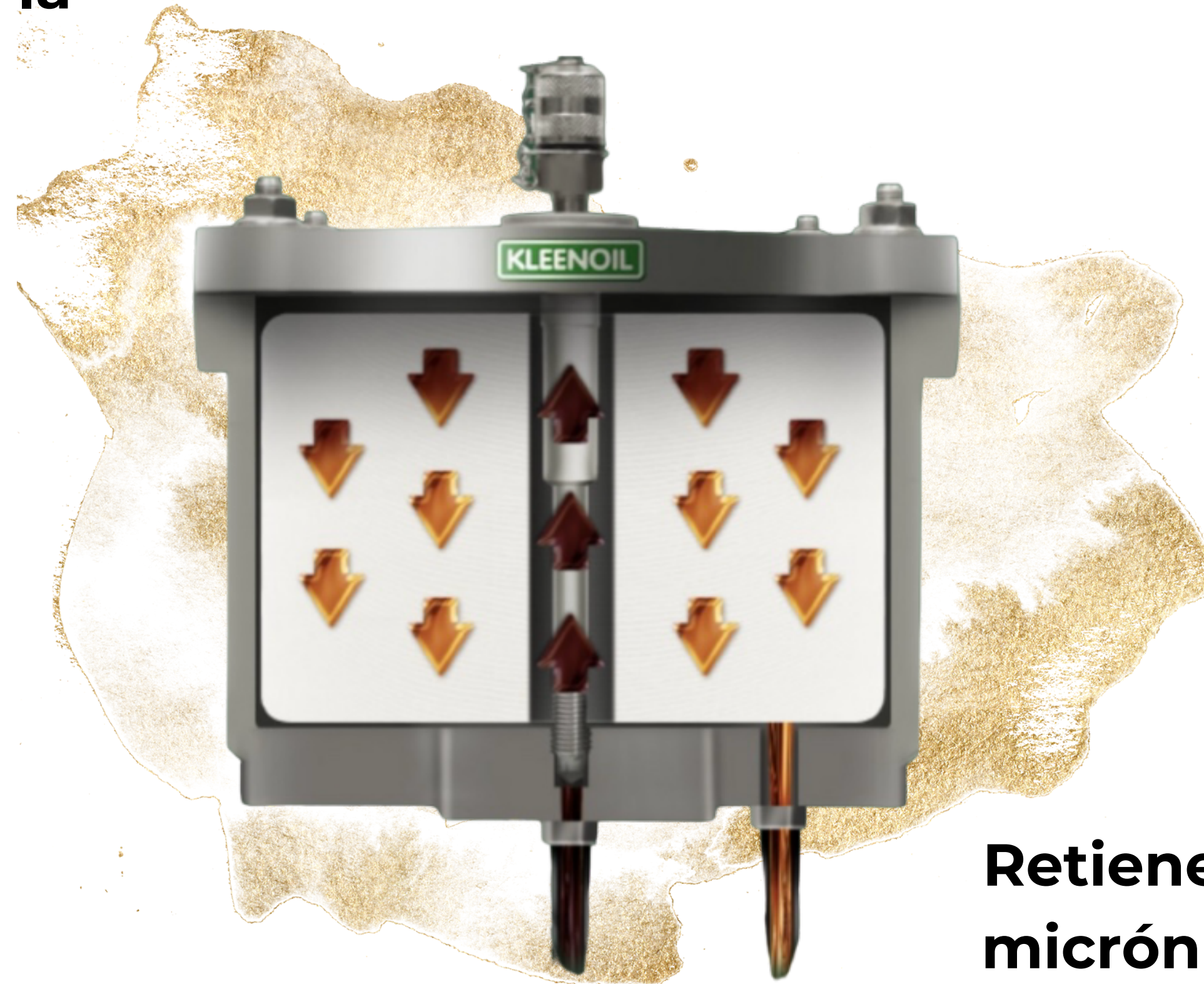
**Menos  
Mano de obra por  
reparaciones y  
cambios de aceite**



**Mayor  
Disponibilidad  
(menos paros, menos fallas)**



**Purifica el aceite de la  
maquinaria.**



**Retiene partículas de 1  
micrón 99.9% del agua  
condensada**



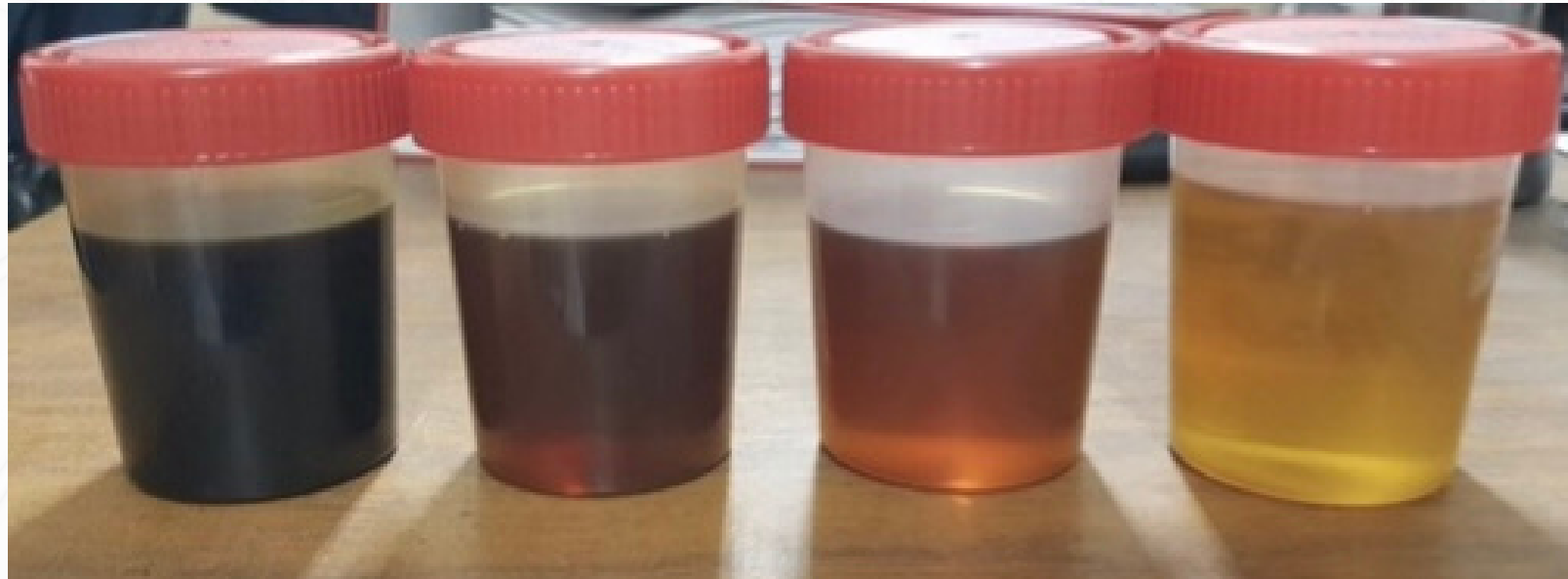
**Nemin**  
NEGOCIOS ESTRATÉGICOS MINEROS





**DESCONTAMINACIÓN DE LUBRICANTE EN INYECTORA DE PLÁSTICO SAN LUIS POTOSÍ, SLP**





# PLANTA SIMEC EN SAN LUIS POTOSÍ, SLP



WEAR	NORMAL
CONTAMINATION	NORMAL
FLUID CONDITION	NORMAL

Machine Id  
**DANIELLI HYDRAULIC CENTRAL SAN-UHHBTT-01**  
 Component  
**CUMMINS 140H Front Hydraulic System**  
 Fluid  
**{not provided} (2500 LTR)**

## RECOMMENDATION

Resample at the next service interval to monitor.

Test	UOM	Method	Lim/Abn	Current	History1	History2
Sample Number				KL0387241	KL03828075	---
Sample Date				25 Nov 2015	22 Sep 2015	---
Machine Age	yrs			22	22	---
Oil Age	yrs			7	7	---
Filter Age	yrs			0	0	---
Oil Changed				N/A	Not Changed	---
Filter Changed				N/A	Not Changed	---
Sample Status				NORMAL	ABNORMAL	---

## WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>20	4	10	---
Chromium	ppm	ASTM D5185m	>10	<1	<1	---
Nickel	ppm	ASTM D5185m		0	0	---
Titanium	ppm	ASTM D5185m		0	0	---
Silver	ppm	ASTM D5185m		0	0	---
Aluminum	ppm	ASTM D5185m	>10	<1	0	---
Lead	ppm	ASTM D5185m	>10	0	0	---
Copper	ppm	ASTM D5185m	>75	5	6	---
Tin	ppm	ASTM D5185m	>10	0	<1	---
Vanadium	ppm	ASTM D5185m		0	0	---
White Metal	scalar	*Visual	NONE	LIGHT	LIGHT	---
Babbitt	scalar	*Visual	NONE	NONE	NONE	---

## CONTAMINATION

There is no indication of any contamination in the component. The amount and size of particulates present in the system is acceptable.

Silicon	ppm	ASTM D5185m	>20	<1	0	---
Potassium	ppm	ASTM D5185m	>20	8	<1	---
Particles >4µm		ASTM D7647		383	17117	---
Particles >6µm		ASTM D7647	>1300	209	▲ 9324	---
Particles >14µm		ASTM D7647	>160	35	▲ 1588	---
Particles >21µm		ASTM D7647	>40	12	▲ 536	---
Particles >38µm		ASTM D7647	>10	1	▲ 82	---
Particles >71µm		ASTM D7647	>3	0	▲ 8	---
Oil Cleanliness		ISO 4406 (c)	>17/14	15/12	▲ 20/18	---





Machine Id  
**GGP-CA15**  
Component  
**TEREX TA400 Hydraulic System**  
Fluid  
**VALVOLINE H300 AW ISO 68 (341 LTR)**

**RECOMMENDATION**

Resample at the next service interval to monitor.

Test	UOM	Method	Unit/As	Current	History1	History2
Sample Number				<b>KL04814542</b>	KL04438371	---
Sample Date				<b>11 Dec 2018</b>	16 Mar 2018	---
Machine Age	hrs			<b>7891</b>	6580	---
Oil Age	hrs			<b>1718</b>	424	---
Filter Age	hrs			<b>1718</b>	424	---
Oil Changed				<b>Not Changed</b>	Not Changed	---
Filter Changed				<b>Not Changed</b>	Not Changed	---
Sample Status				<b>NORMAL</b>	ATTENTION	---

**WEAR**

All component wear rates are normal.

Iron	ppm	ASTM D5185n	>20	<b>4</b>	2	---
Chromium	ppm	ASTM D5185n	>10	<b>0</b>	<1	---
Nickel	ppm	ASTM D5185n		<b>&lt;1</b>	<1	---
Titanium	ppm	ASTM D5185n		<b>0</b>	0	---
Silver	ppm	ASTM D5185n		<b>0</b>	0	---
Aluminum	ppm	ASTM D5185n	>10	<b>&lt;1</b>	1	---
Lead	ppm	ASTM D5185n	>10	<b>&lt;1</b>	<1	---
Copper	ppm	ASTM D5185n	>75	<b>2</b>	1	---
Tin	ppm	ASTM D5185n	>10	<b>&lt;1</b>	0	---
Vanadium	ppm	ASTM D5185n		<b>0</b>	0	---
White Metal	scalar	*Visual	NONE	<b>VLITE</b>	NONE	---
Babbitt	scalar	*Visual	NONE	<b>NONE</b>	NONE	---

**CONTAMINATION**

The amount and size of particulates present in the system are acceptable. There is no indication of any contamination in the oil.

Silicon	ppm	ASTM D5185n	>20	<b>2</b>	3	---
Potassium	ppm	ASTM D5185n	>20	<b>&lt;1</b>	<1	---
Particles >4µm		ASTM D7647		<b>866</b>	7527	---
Particles >6µm		ASTM D7647	>1300	<b>203</b>	1729	---
Particles >14µm		ASTM D7647	>160	<b>17</b>	86	---
Particles >21µm		ASTM D7647	>40	<b>3</b>	16	---
Particles >38µm		ASTM D7647	>10	<b>0</b>	2	---
Particles >71µm		ASTM D7647	>3	<b>0</b>	1	---
Oil Cleanliness		ISO 4406 (c)	>17/14	<b>15/11</b>	18/14	---
Silt	scalar	*Visual	NONE	<b>NONE</b>	NONE	---
Debris	scalar	*Visual	NONE	<b>NONE</b>	NONE	---
Sand/Dirt	scalar	*Visual	NONE	<b>NONE</b>	NONE	---
Appearance	scalar	*Visual	NORML	<b>NORML</b>	NORML	---
Odor	scalar	*Visual	NORML	<b>NORML</b>	NORML	---
Emulsified Water	scalar	*Visual	>0.1	<b>NEG</b>	NEG	---

**FLUID CONDITION**

The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sodium	ppm	ASTM D5185n		<b>0</b>	<1	---
Boron	ppm	ASTM D5185n		<b>1</b>	2	---
Barium	ppm	ASTM D5185n		<b>0</b>	0	---
Molybdenum	ppm	ASTM D5185n		<b>0</b>	0	---
Manganese	ppm	ASTM D5185n		<b>1</b>	<1	---
Magnesium	ppm	ASTM D5185n		<b>2</b>	0	---
Calcium	ppm	ASTM D5185n		<b>583</b>	816	---
Phosphorus	ppm	ASTM D5185n		<b>306</b>	397	---
Zinc	ppm	ASTM D5185n		<b>368</b>	538	---
Sulfur	ppm	ASTM D5185n		<b>3126</b>	2711	---
Acid Number (AN)	mg<Orig	ASTM D8045		<b>0.322</b>	0.377	---
Visc @ 40°C	cSt	ASTM D445		<b>58.21</b>	58.2	---

# MINERÍA

## Sistema Hidráulico

Después de 1,718 horas trabajando con el sistema KLEENOIL, podemos observar un mejor nivel de impieza del lubricante pasando de 7,527 ppm mayores a 4 micrones, a 866 ppm.

El intervalo tradicional de servicio a esta unidad era de 1,000 horas, este servicio se puede extender algunas veces mas con un lubricante mas limpio y con menor desgaste al componente.







San Luis Potosí, S.L.P. a 29 de Septiembre 2014

**A QUIEN CORRESPONDA**

Por medio de la presente, nos permitimos informar que nuestra empresa **GA TRANSPORTES, S.A. DE CV.** Ubicados en la ciudad de San Luis Potosí, SLP, actualmente utiliza los sistemas de microfiltración por bypass **KLEENOIL**, así como los aditivos para aceite de motor **POWERUP>NNL690**, en la flotilla de tracto camiones.

A principios de año, tomamos la decisión de comprar los primeros 10 equipos, al mismo tiempo que agregamos a dichos camiones el aditivo **POWERUP>NNL690**. Nuestro intervalo para cambios de aceite de motor y filtro, era cada 25,000 kilómetros. Cabe mencionar que de estos primeros equipos, 5 de ellos superan los 150,000 kilómetros recorridos con el mismo aceite, todo esto soportado con análisis de laboratorio.

Al día de hoy, en base a los resultados positivos, contamos con 25 equipos instalados por parte de la empresa **COMSA**, de igual manera, a nuestro depósito de aceite le agregamos el aditivo **POWERUP**, de esta forma, mientras instalamos en los demás equipos el sistema, estamos utilizando aceite de primera calidad con este aditivo, el cual por sí solo, antes del equipo **KLEENOIL** extendemos el doble de kilometraje nuestro intervalo de mantenimiento.

A la fecha hemos logrado una reducción en costos de mantenimiento, así como de menores tiempos perdidos, es por eso que no dudamos en recomendar ampliamente el uso de estos sistemas.

Esperando que la presente información le sea de utilidad, quedamos de usted

Atentamente  
  
 Lic. Eduardo Ramos Salazar  
 Gerente general



**WEAR** NORMAL  
**CONTAMINATION** NORMAL  
**FLUID CONDITION** NORMAL



Machine ID  
**FREIGHTLINER CASCADIA 200 GA TRANSPORTES - GRUPO ACERERO TRANSPORTES (SN 3AKJGLBG1CSBW4985)**  
 Component  
**CUMMINS ISX 450 EGR Diesel Engine**  
 Fluid  
**RALDY D POWER 15W40 CI-4 PLUS/SL (45 LTR)**

**RECOMMENDATION**

Resample at the next service interval to monitor.

**WEAR**

All component wear rates are normal.

**CONTAMINATION**

There is no indication of any contamination in the oil. The amount and size of particulates present in the system are acceptable.

**FLUID CONDITION**

The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

Test	UOM	Method	Unit/In	Current	History1	History2
Sample Number				<b>KL3469437</b>	---	---
Sample Date				<b>31 Oct 2018</b>	---	---
Machine Age	kms			<b>661008</b>	---	---
Oil Age	kms			<b>270266</b>	---	---
Filter Age	kms			<b>270266</b>	---	---
Oil Changed				<b>Not Changed</b>	---	---
Filter Changed				<b>Not Changed</b>	---	---
Sample Status				<b>NORMAL</b>	---	---
<b>WEAR</b>						
Iron	ppm	ASTM D155	>165	<b>65</b>	---	---
Chromium	ppm	ASTM D155	>5	<b>1</b>	---	---
Nickel	ppm	ASTM D155	>4	<b>&lt;1</b>	---	---
Titanium	ppm	ASTM D155		<b>0</b>	---	---
Silver	ppm	ASTM D155		<b>0</b>	---	---
Aluminum	ppm	ASTM D155	>20	<b>3</b>	---	---
Lead	ppm	ASTM D155	>150	<b>6</b>	---	---
Copper	ppm	ASTM D155	>90	<b>5</b>	---	---
Tin	ppm	ASTM D155	>5	<b>0</b>	---	---
Vanadium	ppm	ASTM D155		<b>0</b>	---	---
White Metal	scalar	*Visual	NONE	<b>NONE</b>	---	---
Babbitt	scalar	*Visual	NONE	<b>NONE</b>	---	---
<b>CONTAMINATION</b>						
Silicon	ppm	ASTM D155	>35	<b>11</b>	---	---
Potassium	ppm	ASTM D155	>20	<b>40</b>	---	---
Fuel		ASTM D224	>3.0	<b>&lt;1.0</b>	---	---
Glycol	%	*ASTM D2262		<b>NEG</b>	---	---
Soot %	%	*ASTM D1586	>7.5	<b>1.4</b>	---	---
Nitration	Abs/cm	*ASTM D1524	>20	<b>9.5</b>	---	---
Sulfation	Abs/cm	*ASTM D1415	>30	<b>21.5</b>	---	---
Particles >4µm		ASTM D1947		<b>500</b>	---	---
Particles >6µm		ASTM D1947	>5000	<b>272</b>	---	---
Particles >14µm		ASTM D1947	>640	<b>46</b>	---	---
Partides >21µm		ASTM D1947	>160	<b>15</b>	---	---
Partides >38µm		ASTM D1947	>40	<b>2</b>	---	---
Partides >71µm		ASTM D1947	>10	<b>0</b>	---	---
Oil Cleanliness		ISO 4406 (d)	>19/16	<b>15/13</b>	---	---
Silt	scalar	*Visual	NONE	<b>NONE</b>	---	---
Debris	scalar	*Visual	NONE	<b>NONE</b>	---	---
Sand/Dirt	scalar	*Visual	NONE	<b>NONE</b>	---	---
Appearance	scalar	*Visual	NORM	<b>NORM</b>	---	---
Odor	scalar	*Visual	NORM	<b>NORM</b>	---	---
Emulsified Water	scalar	*Visual	>0.2	<b>NEG</b>	---	---
<b>FLUID CONDITION</b>						
Sodium	ppm	ASTM D155		<b>57</b>	---	---
Boron	ppm	ASTM D155		<b>6</b>	---	---
Barium	ppm	ASTM D155		<b>0</b>	---	---
Molybdenum	ppm	ASTM D155		<b>13</b>	---	---
Manganese	ppm	ASTM D155		<b>&lt;1</b>	---	---
Magnesium	ppm	ASTM D155		<b>39</b>	---	---
Calcium	ppm	ASTM D155		<b>3484</b>	---	---
Phosphorus	ppm	ASTM D155		<b>921</b>	---	---
Zinc	ppm	ASTM D155		<b>1255</b>	---	---
Sulfur	ppm	ASTM D155		<b>4321</b>	---	---
Oxidation	Abs/cm	*ASTM D1414	>25	<b>13.5</b>	---	---
Base Number (BN)	mg/KOH/g	ASTM D2296		<b>9.66</b>	---	---
Visc @ 100°C	cSt	ASTM D445		<b>13.71</b>	---	---

**Unidad con el mismo aceite durante 270,266 Kms, conservando un código de limpieza ISO4406 optimo, partículas mayores a 4 micrones por debajo de 500 ppm**



