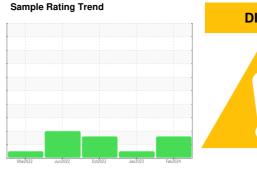


# **OIL ANALYSIS REPORT**

# DURON CHALLENGE 361 (S/N AJ261570)

**Diesel Engine** 

**DIESEL ENGINE OIL SAE 15W40 (--- GAL)** 





# **DIAGNOSIS**

### Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

All component wear rates are normal.

## Contamination

Elemental level of silicon (Si) above normal indicating ingress of seal material.

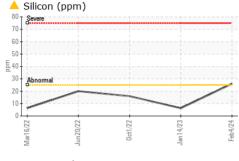
### **Fluid Condition**

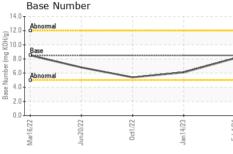
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

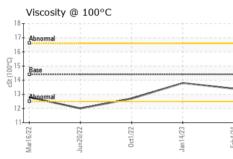
Sample Number   Client Info   PCA0082954   PCA0089421   PCA006931   PCA0069			Mar2022	Jun2022	Oct2022 Jan2023	Feb2024	
Client Info	SAMPLE INFORI	MATION	method	limit/base	current	history1	history2
Machine Age   mls	Sample Number		Client Info		PCA0082954	PCA0069421	PCA0069316
Dil Age	Sample Date		Client Info		04 Feb 2024	14 Jan 2023	01 Oct 2022
Coli   Changed   Client Info   N/A	Machine Age	mls	Client Info		0	1004877	980941
CONTAMINATION   method   fimit/base   current   history1   history2   history3   history4   hist	Oil Age	mls	Client Info		0	23980	24544
CONTAMINATION	Oil Changed		Client Info		N/A	Changed	Changed
Fuel	Sample Status				ABNORMAL	NORMAL	ABNORMAL
Water Glycol         WC Method         >0.2         NEG         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history1           Iron         ppm         ASTM D5185m         >100         11         86         ▲ 123           Chromium         ppm         ASTM D5185m         >20         <1	CONTAMINAT	ION	method	limit/base	current	history1	history2
WEAR METALS	Fuel		WC Method	>5	<1.0	<1.0	<1.0
WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         11         86         ▲ 123           Chromium         ppm         ASTM D5185m         >20         <1	Water		WC Method	>0.2	NEG	NEG	NEG
Description	Glycol		WC Method		NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	ron	ppm	ASTM D5185m	>100	11	86	<u>▲</u> 123
Description	Chromium	ppm	ASTM D5185m	>20	<1	3	4
Silver	Nickel	ppm	ASTM D5185m	>4	<1	<1	<1
Aluminum	Titanium	ppm	ASTM D5185m		0	0	<1
Lead         ppm         ASTM D5185m         >40         1         <1         9           Copper         ppm         ASTM D5185m         >330         <1         <1         <1         <1           Vanadium         ppm         ASTM D5185m         >15         <1         <1         1           Vanadium         ppm         ASTM D5185m         <1         0         <1         1           Cadmium         ppm         ASTM D5185m         0         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         16         32         89           Barium         ppm         ASTM D5185m         10         0         0         0         0           Molybdenum         ppm         ASTM D5185m         100         56         63         70         0           Magnesium         ppm         ASTM D5185m         100         1         1         1           Validium         ppm         ASTM D5185m         450         960         825         496           Calcium         ppm         ASTM D	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper         ppm         ASTM D5185m         >330         <1         <1         <1           Fin         ppm         ASTM D5185m         >15         <1	Aluminum	ppm	ASTM D5185m	>20	2	7	6
Fin	_ead	ppm	ASTM D5185m	>40	1	<1	9
Vanadium         ppm         ASTM D5185m         <1         0         <1           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         16         32         89           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         56         63         70           Manganese         ppm         ASTM D5185m         100         56         63         70           Manganesium         ppm         ASTM D5185m         450         960         825         496           Calcium         ppm         ASTM D5185m         3000         1035         1093         1244           Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         >25         26         6 </td <td>Copper</td> <td>ppm</td> <td>ASTM D5185m</td> <td>&gt;330</td> <th>&lt;1</th> <td>&lt;1</td> <td>&lt;1</td>	Copper	ppm	ASTM D5185m	>330	<1	<1	<1
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         16         32         89           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         56         63         70           Manganese         ppm         ASTM D5185m         100         56         63         70           Manganesium         ppm         ASTM D5185m         450         960         825         496           Calcium         ppm         ASTM D5185m         3000         1035         1093         1244           Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         2825         3411         2934           CONTAMINANTS         method         limit/base         current	Tin	ppm	ASTM D5185m	>15	<1	<1	•
ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         250         16         32         89           Barium         ppm         ASTM D5185m         10         0         0         0           Molybdenum         ppm         ASTM D5185m         100         56         63         70           Manganese         ppm         ASTM D5185m         100         1         1           Magnesium         ppm         ASTM D5185m         450         960         825         496           Calcium         ppm         ASTM D5185m         3000         1035         1093         1244           Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25	Vanadium	ppm	ASTM D5185m		<1	0	<1
Boron ppm ASTM D5185m 250 16 32 89 Barium ppm ASTM D5185m 10 0 0 0 Molybdenum ppm ASTM D5185m 100 56 63 70 Manganese ppm ASTM D5185m 0 1 1 Magnesium ppm ASTM D5185m 3000 1035 1093 1244 Phosphorus ppm ASTM D5185m 1150 1084 985 927 Zinc ppm ASTM D5185m 1350 1214 1199 1174 Sulfur ppm ASTM D5185m 4250 2825 3411 2934  CONTAMINANTS method limit/base current history1 history2 Silicon ppm ASTM D5185m >25 ▲ 26 6 16 Sodium ppm ASTM D5185m >20 4 10 5  INFRA-RED method limit/base current history1 history2 Soot % "ASTM D7844 >3 0.2 1.8 △ 3  Nitration Abs/cm "ASTM D7415 >30 19.9 28.2 38.7  FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/lmm "ASTM D7414 >25 17.0 29.3 41.7	Cadmium	ppm	ASTM D5185m		0	0	0
Barium ppm ASTM D5185m 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         100         56         63         70           Manganese         ppm         ASTM D5185m         0         1         1           Magnesium         ppm         ASTM D5185m         450         960         825         496           Calcium         ppm         ASTM D5185m         3000         1035         1093         1244           Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         26         6         16           Sodium         ppm         ASTM D5185m         >158         <1         5         2           Potassium         ppm         ASTM D5185m         >20         4         10         5           INFRA-RED         method         limit/base         current	Boron	ppm	ASTM D5185m	250	16	32	89
Manganese         ppm         ASTM D5185m         0         1         1           Magnesium         ppm         ASTM D5185m         450         960         825         496           Calcium         ppm         ASTM D5185m         3000         1035         1093         1244           Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         26         6         16           Sodium         ppm         ASTM D5185m         >158         <1	Barium	ppm	ASTM D5185m	10	0	0	0
Magnesium         ppm         ASTM D5185m         450         960         825         496           Calcium         ppm         ASTM D5185m         3000         1035         1093         1244           Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 26         6         16           Sodium         ppm         ASTM D5185m         >20         4         10         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         1.8         ▲ 3           Nitration         Abs/cm         *ASTM D7624         >20         8.2         14.5         16.3           Sulfation         Abs/cm         *ASTM	Molybdenum	ppm	ASTM D5185m	100	56	63	70
Calcium         ppm         ASTM D5185m         3000         1035         1093         1244           Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 26         6         16           Sodium         ppm         ASTM D5185m         >158         <1	Manganese	ppm	ASTM D5185m		0	1	1
Phosphorus         ppm         ASTM D5185m         1150         1084         985         927           Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 26         6         16           Sodium         ppm         ASTM D5185m         >158         <1	Magnesium	ppm	ASTM D5185m	450	960	825	496
Zinc         ppm         ASTM D5185m         1350         1214         1199         1174           Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 26         6         16           Sodium         ppm         ASTM D5185m         >158         <1		ppm	ASTM D5185m	3000	1035	1093	1244
Sulfur         ppm         ASTM D5185m         4250         2825         3411         2934           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 26         6         16           Sodium         ppm         ASTM D5185m         >158         <1	Phosphorus	ppm	ASTM D5185m	1150	1084	985	
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         ▲ 26         6         16           Sodium         ppm         ASTM D5185m         >158         <1	Zinc	ppm	ASTM D5185m	1350	1214	1199	1174
Silicon         ppm         ASTM D5185m         >25         ▲ 26         6         16           Sodium         ppm         ASTM D5185m         >158         <1         5         2           Potassium         ppm         ASTM D5185m         >20         4         10         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         1.8         △         3           Nitration         Abs/cm         *ASTM D7624         >20         8.2         14.5         16.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.9         28.2         38.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.0         29.3         41.7	Sulfur	ppm	ASTM D5185m	4250	2825	3411	2934
Sodium         ppm         ASTM D5185m         >158         <1         5         2           Potassium         ppm         ASTM D5185m         >20         4         10         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         1.8         ▲ 3           Nitration         Abs/cm         *ASTM D7624         >20         8.2         14.5         16.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.9         28.2         38.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.0         29.3         41.7	CONTAMINAN	TS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         4         10         5           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         1.8         ▲ 3           Nitration         Abs/cm         *ASTM D7624         >20         8.2         14.5         16.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.9         28.2         38.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.0         29.3         41.7		ppm			<u>^</u> 26		
INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.2         1.8         ▲ 3           Nitration         Abs/cm         *ASTM D7624         >20         8.2         14.5         16.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.9         28.2         38.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.0         29.3         41.7		ppm	ASTM D5185m	>158	<1	5	2
Soot %         %         *ASTM D7844         >3         0.2         1.8         ▲ 3           Nitration         Abs/cm         *ASTM D7624         >20         8.2         14.5         16.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.9         28.2         38.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.0         29.3         41.7	Potassium	ppm	ASTM D5185m	>20	4	10	5
Nitration         Abs/cm         *ASTM D7624         >20         8.2         14.5         16.3           Sulfation         Abs/.1mm         *ASTM D7415         >30         19.9         28.2         38.7           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.0         29.3         41.7	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         19.9         28.2         38.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.0         29.3         41.7	Soot %	%	*ASTM D7844	>3	0.2	1.8	<u>^</u> 3
FLUID DEGRADATION method limit/base current history1 history2  Oxidation Abs/.1mm *ASTM D7414 >25 17.0 29.3 41.7	Vitration	Abs/cm	*ASTM D7624	>20	8.2	14.5	16.3
Oxidation	Sulfation	Abs/.1mm	*ASTM D7415	>30	19.9	28.2	38.7
	FLUID DEGRAD	OATION	method	limit/base	current	history1	history2
Base Number (BN)   mg KOH/g   ASTM D2896   8.5   8.1   6.1   5.4	Oxidation	Abs/.1mm	*ASTM D7414	>25	17.0	29.3	41.7
	Base Number (BN)	mg KOH/g	ASTM D2896	8.5	8.1	6.1	5.4

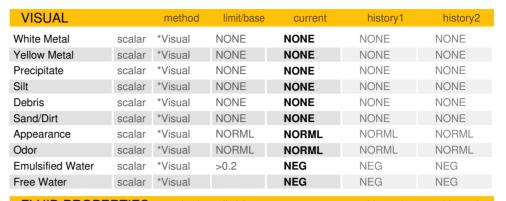


# **OIL ANALYSIS REPORT**



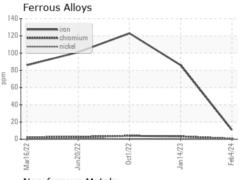


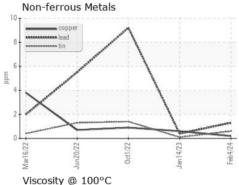


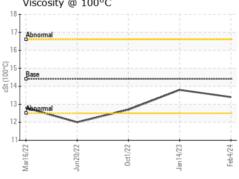


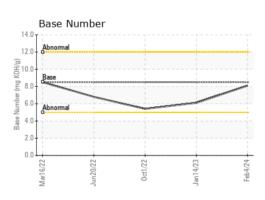
FLUID PROPE	EKIIE2	method	ilmit/base	current	nistory i	nistoryz
Visc @ 100°C	cSt	ASTM D445	14.4	13.4	13.8	12.7

### **GRAPHS**













Certificate L2367

Laboratory Sample No. Lab Number Unique Number Test Package : FLEET

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 : PCA0082954 : 06079484 : 10861575

: 05 Feb 2024 Recieved Diagnosed Diagnostician

: 07 Feb 2024 : Jonathan Hester

ELK RIVER, MN US 55330 Contact: JAY LEFEBVRE jay.lefebvre@leftruck.com

To discuss this sample report, contact Customer Service at 1-800-237-1369. \* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

T:

F:

**LEFEBVRE** 

10895 171ST AVE NW