

WEAR ABNORMAL CONTAMINATION NORMAL FLUID CONDITION ATTENTION

## Machine Id CATE Component Diesel Fluid DIESE

## CATERPILLAR 325F 418 (S/N xaa00215)

Diesel Engine

## DIESEL ENGINE OIL SAE 15W40 (5 GAL)

Bandle Number   Client Info   RW000408   RW000408   RW000408   RW000408   RW001408   RW001408   RW001408   RW001408   RW001408   RW001408   RW001408   RW01408   RW0148		- (/						
Nith Hime of sampling has been noted. Resample the next service interval to monitor.   Not we	RECOMMENDATION	Test	UOM	Method	Limit/Abn	Current	History1	History2
tithe next service interval to monitor.   The part of the part o	Oil and filter change at the time of sampling has been noted. Resample at the next service interval to monitor.	Sample Number		Client Info		RW0005148	RW0004406	RW0003818
Machine Age   Ints   Cited Into   7871   7875   7885   7885     Oil Age   hrs   Citen Info   326   177   380     Pitler Age   hrs   Citen Info   326   177   380     Oil Changed   Citen Info   Changed		Sample Date		Client Info		11 May 2024	07 Apr 2023	21 Oct 2022
Filter Age   ns   Client Info   S26   17.7   B30     OI Changed   Client Info   Changed   Change		Machine Age	hrs	Client Info		7871	7545	7368
Oil Changed Filter Changed Sample Status   Client Info   Changed Changed ABIOMA   Changed Changed ABIOMA   Changed Changed Changed   Changed Changed     ITEA P   Iron   ppm   ASTM 0518m   >20   2   <1		Oil Age	hrs	Client Info		326	177	380
Filter Changed Sample Status   Client Info   Changed NoRMAL   Changed NORMAL   Changed NORMAL   Changed NORMAL   Changed NORMAL     /EAR   Image   Kith DS185n   >20   2   <1		Filter Age	hrs	Client Info		326	177	380
Sample Status   VEAN   NORMAL   NORMAL   NORMAL     Iron   pm   ASTM Distis   >20   46   43   18     Chronium level is abnormal. Piston wear is indicated.   Nickel   pm   ASTM Distis   >20   -1   0     Nickel   pm   ASTM Distis   >20   -1   0   0     Nickel   pm   ASTM Distis   >20   -1   0   0     Nickel   pm   ASTM Distis   >20   -1   0   0     Querinium   pm   ASTM Distis   >20   -1   0   0     Auminum   pm   ASTM Distis   >20   -1   0   0   0     Querinium   pm   ASTM Distis   >40   <		-		Client Info		Changed	Changed	Changed
Vice   Iron   ppm   ASTM DB18m   >100   46   43   18     Chromium   ppm   ASTM DB18m   >20   2   <1		Filter Changed		Client Info		Changed	Changed	Changed
Chromium   ppm   ASTM D516m   >20   2   <1		Sample Status				ABNORMAL	NORMAL	NORMAL
Chromium   ppm   ASTM D516m   >20   2   <1   <1     Nickel   ppm   ASTM D516m   >2   <1	WEAR	Iron	ppm	ASTM D5185m	>100	46	43	18
he aluminum level is abnormal. Piston wear is indicated. Nickel ppm ASTM 05165n -2 -1 0 0   Titanium ppm ASTM 05165n -2 -1 0 0   Aluminum ppm ASTM 05165n -2 -1 0 0   Aluminum ppm ASTM 05165n -20 0 0 0   Aluminum ppm ASTM 05165n -30 0 0 0 0   Vandum ppm ASTM 05165n -15 0	The aluminum level is abnormal. Piston wear is indicated.			ASTM D5185m	>20			
Titanium   ppm   ASTM 0585m   -2   <1   0   0     Silver   ppm   ASTM 0585m   -2   <10								
Silver   ppm   ASTM D5185m   >2   <1   0   0     Aluminum   ppm   ASTM D5185m   >25   ▲ 40   12   4     Lead   ppm   ASTM D5185m   >30   4   00   0     Copper   ppm   ASTM D5185m   >30   4   00   1     Tin   ppm   ASTM D5185m   >30   4   00   0   0     Vanadium   ppm   ASTM D5185m   >15   0<		Titanium		ASTM D5185m	>2	<1	0	0
Auminum   ppm   ASTM D5163m   >2.55   A   4.00   12   4     Lead   ppm   ASTM D5163m   >40   0   0   0     Copper   MSIM D5163m   >40   0   0   0   0     Vanadium   ppm   ASTM D5163m   >15   0   0   0   0     Vanadium   ppm   ASTM D5163m   >15   0<		Silver					0	
Lead   ppm   ASTM D5185m   >4-00   0   0   0     Copper   ppm   ASTM D5185m   >3-30   4   0   1     Tin   ppm   ASTM D5185m   >15   0   0   0   0     Vanadium   ppm   ASTM D5185m   NONE   NONE <th>Aluminum</th> <td></td> <td></td> <td></td> <th><b>4</b>0</th> <td></td> <td></td>		Aluminum				<b>4</b> 0		
Copper   ppm   ASIM D5185m   >3300   4   0   1     Tin   ppm   ASIM D5185m   0   0   <1						0	0	0
Tin   ppm   ASTM D5185m   >15   0   0   <1     Vanadium   ppm   ASTM D5185m   0   0   0   0     White Metal   scalar   'Visual   NONE   NONE   NONE   NONE   NONE     ODTTAMINATION   Silicon   ppm   ASTM D5185m   >25   5   4   3     Uel content negligible. There is no indication of any contamination in te oil.   Silicon   ppm   ASTM D5185m   >20   2   <1							0	
Vanadium   ppm   ASTM D5185m   0						0	0	<1
White Metal Yellow Metal   scalar   'Visual   NONE   NONE   NONE   NONE   NONE     CONTAMINATION   Silicon   ppm   ASTM D585m   >20   2   <1   2     uel content negligible. There is no indication of any contamination in to oil.   Silicon   ppm   ASTM D585m   >20   2   <1   2     Fuel   %   ASTM D585m   >5   1   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   <10   10   10		Vanadium		ASTM D5185m		0	0	0
Silicon   ppm   ASTM D5185m   >25   5   4   3     uel content negligible. There is no indication of any contamination in te oil.   Potassium   ppm   ASTM D5185m   >20   2   <1		White Metal		*Visual	NONE	NONE	NONE	NONE
Potassium   ppm   ASTM D5180m   >20   2   <1   2     uel content negligible. There is no indication of any contamination in the oil.   Fuel   %   ASTM D3844   >5   1.2   <1.0		Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Potassium   ppm   ASTM D5180m   >20   2   <1		Ciliaan			. 05	E	л Л	 0
uel content negligible. There is no indication of any contamination in ne oil.   Fuel   %   ASTM D3824   >5   1.2   <1.0   <1.0     Water    WC Method   >0.2   NEG   NEG   NEG     Glycol   WC Method   >0.2   NEG   NEG   NEG   NEG     Sot %   %   'ASTM D7844   >3   0.7   0.3   0.5     Nitration   Abs/cm   'ASTM D7844   >20   6.5   6.4   8.2     Sulfation   Abs/cm   'ASTM D7844   >30   0.58   16.6   20.9     Silt   scalar   'Visual   NONE   NONE   NONE   NONE     Sad/Dirit   scalar   'Visual   NORM   NORM   NORM   NORM   NORM     Appearance   scalar   'Visual   NORM   NORM   NORM   NORM   NORM     LUD CONDITION   Nee issuitable alkalinity remaining in the oil. Confirm oil type.   Sotium   pm   ASTM D5185   10   0   0   2	CONTAMINATION							
Water Water WC Method >0.2 NEG NEG NEG   Glycol WC Method >0.2 NEG NEG NEG NEG   Sodt %0 % 'ASTM D764 >30 0.7 0.3 0.5   Nitration Abs/cm<'' ASTM D761	Fuel content negligible. There is no indication of any contamination in the oil.							
Glycol   WC Method   NEG   NEG   NEG   NEG     Soot %   %   *ASTM D7844   >3   0.7   0.3   0.5     Nitration   Abs/cm   *ASTM D7844   >30   6.5   6.4   8.2     Sulfation   Abs/cm   *ASTM D7845   >30   15.8   16.0   20.9     Silt   scalar   *Visual   NONE   NONE   NONE   NONE   NONE     Debris   scalar   *Visual   NONE   NONE   NONE   NONE   NONE     Sand/Dirt   scalar   *Visual   NORE   NORE   NORE   NORE   NORE     Appearance   scalar   *Visual   NORE   NORE   NORE   NORE   NORE     Drodor   scalar   *Visual   NORE   NORE   NORE   NORE   NORE     Molybelemur   scalar   *Visual   NORE   NORE   NORE   NORE   NORE     Molybelemur   scalar   *Visual   NORE   NORE			70					
Soot %   %   *ASTM D7844   >3   0.7   0.3   0.5     Nitration   Abs/cm   *ASTM D7624   >20   6.5   6.4   8.2     Sulfation   Abs/tmm   *ASTM D7415   >30   15.8   16.6   20.9     Silt   scalar   *Visual   NONE   NORE					>0.2			
Nitration   Abs/cm   *ASTM D7624   >20   6.5   6.4   8.2     Sulfation   Abs/tm   *ASTM D7415   >30   15.8   16.6   20.9     Silt   scalar   *Visual   NONE   NONE   NONE   NONE   NONE   NONE     Debris   scalar   *Visual   NONE   NORE		-	0/		. ?			
Sulfation   Abs/.tm   *ASTM D7415   >30   15.8   16.6   20.9     Silt   scalar   *Visual   NONE   NONE   NONE   NONE   NONE     Debris   scalar   *Visual   NONE   NONE   NONE   NONE   NONE     Sand/Dirt   scalar   *Visual   NOR   NORE   NORE   NORE   NORE     Appearance   scalar   *Visual   NOR   NORM								
Siltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONENONESand/Dirtscalar*VisualNONENONENONENONENONEAppearancescalar*VisualNORMNORMLNORMLNORMLNORMLNORMLAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORMLNORMLInterest subtable alkalinity remaining in the oil. Confirm oil type.SodiumppmASTM D5185m51804557BoronppmASTM D5185m100026565656565656565666565666566366394410351101127776093366394410351101127771101112777119012461015110111277119012461111127711901246111112771110111277111011127711101112771110111277111011127711101112771110111277111011127711101112771110111277111011127711101 <td< td=""><th></th><td></td><td></td><td></td><th></th><td></td><td></td></td<>								
Debrisscalar*VisualNONENONENONENONENONESand/Dirtscalar*VisualNORNORNORNORNORNORAppearancescalar*VisualNORMNORMNORMNORMNORMNORMNORMOdorscalar*VisualNORMNORMNORMNORMNORMNORMNORMNORMEmulsified Waterscalar*Visual>0.2NEG								
Sand/Dirtscalar*VisualNONENONENONENONENONENONEAppearancescalar*VisualNORMNORML<								
Appearancescalar*VisualNORML<								
Odorscalar*VisualNORML <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>								
Emulsified Waterscalar*Visual>0.2NEGNEGLUID CONDITIONhe oil viscosity is lower than normal. The BN result indicates that here is suitable alkalinity remaining in the oil. Confirm oil type.SodiumppmASTM D5185m1004557BariumppmASTM D5185m100026265ManganeseppmASTM D5185m100206265ManganeseppmASTM D5185m4502438800933CalciumppmASTM D5185m3000144710111127PhosphorusppmASTM D5185m11506839441035ZincppmASTM D5185m135077311901246SulfurppmASTM D5185m1350212731313514OxidationAbs/:1m*ASTM D7414>258.613.015.6								
LUID CONDITIONSodiumppmASTM D5185m>15804507BoronppmASTM D5185m250<113BariumppmASTM D5185m10002MolybdenumppmASTM D5185m100206265ManganeseppmASTM D5185m450243880933CalciumppmASTM D5185m3000144710111127PhosphorusppmASTM D5185m11506839441035ZincppmASTM D5185m135077311901246SulfurppmASTM D5185m1350212731313514OxidationAbs/.1mm*ASTM D7414>258.613.015.6								
BoronppmASTM D5185m250<1	FLUID CONDITION The oil viscosity is lower than normal. The BN result indicates that there is suitable alkalinity remaining in the oil. Confirm oil type.							
he oil viscosity is lower than normal. The BN result indicates that here is suitable alkalinity remaining in the oil. Confirm oil type.BariumppmASTM D5185m10002MolybdenumppmASTM D5185m100206265ManganeseppmASTM D5185m100243880933CalciumppmASTM D5185m3000144710111127PhosphorusppmASTM D5185m13506839441035ZincppmASTM D5185m135077311901246SulfurppmASTM D5185m4250212731313514OxidationAbs/.tm*ASTM D7414>258.613.015.6							45	
Barlum ppm ASTM D5185m 10 0 2   Molybdenum ppm ASTM D5185m 100 20 62 65   Manganese ppm ASTM D5185m 450 243 8800 933   Calcium ppm ASTM D5185m 3000 1447 1011 1127   Phosphorus ppm ASTM D5185m 1150 683 944 1035   Zinc ppm ASTM D5185m 1350 773 1190 1246   Sulfur ppm ASTM D5185m 4250 2127 3131 3514   Oxidation Abs/.tmm *ASTM D7414 >25 8.6 13.0 15.6							1	
Molybdenum ppm ASIM D5185m 100 20 62 65   Manganese ppm ASTM D5185m								
Magnesium ppm ASTM D5185m 450 243 880 933   Calcium ppm ASTM D5185m 3000 1447 1011 1127   Phosphorus ppm ASTM D5185m 1150 683 944 1035   Zinc ppm ASTM D5185m 1350 773 1190 1246   Sulfur ppm ASTM D5185m 4250 2127 3131 3514   Oxidation Abs/.1mm 'ASTM D7414 >25 8.6 13.0 15.6		•			100			
Calcium ppm ASTM D5185m 3000 1447 1011 1127   Phosphorus ppm ASTM D5185m 1150 683 944 1035   Zinc ppm ASTM D5185m 1350 773 1190 1246   Sulfur ppm ASTM D5185m 4250 2127 3131 3514   Oxidation Abs/.1mm *ASTM D7414 >25 8.6 13.0 15.6		•			450			
Phosphorus   ppm   ASTM D5185m   1150   683   944   1035     Zinc   ppm   ASTM D5185m   1350   773   1190   1246     Sulfur   ppm   ASTM D5185m   4250   2127   3131   3514     Oxidation   Abs/.tmm   *ASTM D7414   >25   8.6   13.0   15.6		-						
Zinc ppm ASTM D5185m 1350 773 1190 1246   Sulfur ppm ASTM D5185m 4250 2127 3131 3514   Oxidation Abs/.1mm *ASTM D7414 >25 8.6 13.0 15.6								
Sulfur   ppm   ASTM D5185m   4250   2127   3131   3514     Oxidation   Abs/.1mm   *ASTM D7414   >25   8.6   13.0   15.6								
Oxidation   Abs/.1mm   *ASTM D7414   >25   8.6   13.0   15.6								
Base Number (BN) mg KOH/g ASTM D2896 8.5 6.36 10.55 8.85								
		Base Number (BN)	mg KOH/g	ASTM D2896	8.5	6.36	10.55	8.85

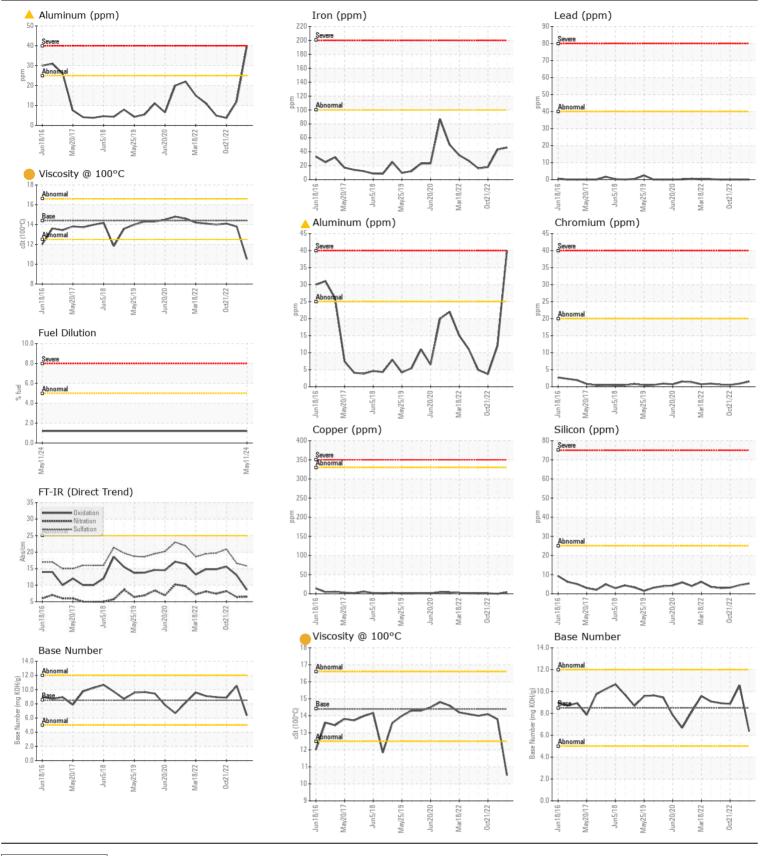
Visc @ 100°C cSt

10.5

13.8

14.1

ASTM D445 14.4



HALLACK CONTRACTING, INC. Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513 Sample No. : RW0005148 4223 W POLK Received : 28 May 2024 Lab Number : 06193002 HART, MI Tested : 31 May 2024 : 31 May 2024 - Jonathan Hester US 49420 Unique Number : 11049754 Diagnosed Test Package : MOB 2 (Additional Tests: FuelDilution, PercentFuel) Contact: DAN HALLACK KARL BUTCHER Certificate L2367 shop@hallackcontracting.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. T: (231)873-5081 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012) F: (231)873-2889

Contact/Location: DAN HALLACK KARL BUTCHER - HALHAR