

#### (C-FAQR) Machine Id [C-FAQR] PIPER PA31-350 L-6997-61A

# Left Piston Aircraft Engine

## PHILLIPS 66 AVIATION X/C OIL SAE20W50 (11 LTR)

### RECOMMENDATION

We advise that you check the engine tuning and timing. We advise that you check for excessive valve and valve guide clearance. The oil change at the time of sampling has been noted. We recommend an early resample to monitor this condition.

W	/E	A	R

Nickel ppm levels are abnormal. Exhaust valve wear is indicated.

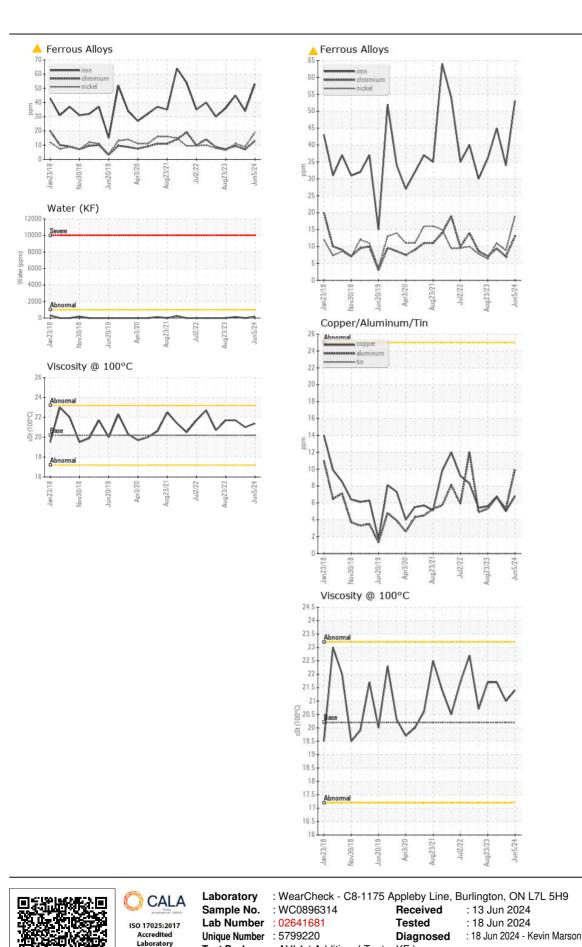
### CONTAMINATION

The water content is negligible. There is no indication of any contamination in the oil.

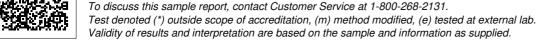
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The oil is no longer serviceable as a result of the abnormal and/or severe wear.

Sample DateClient Info05 Jun 202411 Feb 202422 Oct 2023TSNhrsClient Info000TSOhrsClient Info399638063616Oil AgehrsClient Info554662Filter AgehrsClient Info554662Oil ChangedClient InfoChangedChangedChangedFilter ChangedClient InfoMabNorMALNORMALNORMALFormppmASTM D5185(m)>90533445ChromiumppmASTM D5185(m)>90533445ChromiumppmASTM D5185(m)>901379NickelppmASTM D5185(m)>154911TitaniumppmASTM D5185(m)>50<1<1AluminumppmASTM D5185(m)>201051380818495CopperppmASTM D5185(m)>201000VanadiumppmASTM D5185(m)>20000White MetalscalarVisual*NONENONENONENONESiliconppmASTM D5185(m)>17757PotassiumppmASTM D5185(m)>200<1.0<1.0White MetalscalarVisual*NONENONENONENONESiliconppmASTM D5185(m)>15775Pot							
Sample DateClient Info05 Jun 202411 Feb 202422 Oct 2023TSNhrsClient Info399638063616Oil AgehrsClient Info554662Filter AgehrsClient InfoChangedChangedChangedChangedOil ChangedClient InfoChangedChangedChangedChangedFilter ChangedClient InfoChangedNORMALNORMALIronppmASTM D5185(m)>90533445ChromiumppmASTM D5185(m)>201379NickelppmASTM D5185(m)>201379NickelppmASTM D5185(m)>251057LeadppmASTM D5185(m)>251057LeadppmASTM D5185(m)>201051380818495CopperppmASTM D5185(m)>20000VanadiumppmASTM D5185(m)>20000VanadiumppmASTM D5185(m)>20000Vellow MetalscalarVisual*NONENONENONENONESiliconppmASTM D5185(m)>200<100FuelWC Method4.0<1.0<1.00.013pm MaterppmASTM D5185(m)>200<1.00.013SiliconppmASTM D5185(m)>00 <t< th=""><th>Test</th><th>UOM</th><th>Method</th><th>Limit/Abn</th><th>Current</th><th>History1</th><th>History2</th></t<>	Test	UOM	Method	Limit/Abn	Current	History1	History2
TSN  hrs  Client Info  0  0  0    TSO  hrs  Client Info  55  46  62    Filter Age  hrs  Client Info  55  46  62    Oil Changed  Client Info  Changed  Changed <th>Sample Number</th> <th></th> <th>Client Info</th> <th></th> <th>WC0896314</th> <th>WC0838448</th> <th>WC0830825</th>	Sample Number		Client Info		WC0896314	WC0838448	WC0830825
TSO  hrs  Client Info  3996  3806  3616    Oil Age  hrs  Client Info  55  46  62    Filter Age  hrs  Client Info  Changed  Changed  Changed  Changed    Filter Changed  Client Info  Changed  Changed  Changed  Changed    Sample Status  Image  Client Info  ABNORMAL  NORMAL  NORMAL    Iron  ppm  ASTMD5185(m)<>90  53  34  45    Chromium  ppm  ASTMD5185(m)<>20  13  7  9    Nickel  ppm  ASTMD5185(m)<>20  1051  300  0    Silver  ppm  ASTMD5185(m)<>2000  10513  8081  8495    Copper  ppm  ASTMD5185(m)<>200  0  0  0    Vanadium  ppm  ASTMD5185(m)<>20  0  0  0    Vellow Metal  scalar  Visual*  NONE  NONE  NONE    Vellow Metal  scalar	Sample Date		Client Info		05 Jun 2024	11 Feb 2024	22 Oct 2023
Oil AgehrsClient Info554662Filter AgehrsClient Info554662Oil ChangedClient InfoChangedChangedChangedFilter ChangedClient InfoChangedChangedChangedSample Status0ImagedASTM 0568(m)>90533445IronppmASTM 0568(m)>90533445ChromiumppmASTM 0568(m)>501379NickelppmASTM 0568(m)>50<10<11<11AttimitppmASTM 0568(m)>521057LeadppmASTM 0568(m)>521057LeadppmASTM 0568(m)>201051380818495CopperppmASTM 0568(m)>200000White MetalscalarVisual*NONENONENONENONENONESiliconppmASTM 0568(m)>200<1.0<1.000FuelWC Method>4.014.810.1333.433.4Yellow MetalscalarVisual*NONENONENONENONENONESiliconppmASTM 05189(m)>100<1.0<1.01.01.33.2GlycolmpmASTM 05189(m)>200<1.0NONENONESiliconppmASTM 05189(m)<	TSN	hrs	Client Info		0	0	0
Filter Age Oil ChangedhrsClient Info554662Oil ChangedClient InfoChangedChangedChangedChangedChangedChangedSample StatusClient InfoASTM D5185(m) >90533.445ASTM D5185(m) >90533.445IronppmASTM D5185(m) >90533.4459111111NickelppmASTM D5185(m) >15199111111TitaniumppmASTM D5185(m) >501057111AluminumppmASTM D5185(m) >25705771LeadppmASTM D5185(m) >25757775TinppmASTM D5185(m) >200000000VanaduumppmASTM D5185(m) >2000	TSO	hrs	Client Info		3996	3806	3616
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Sample Status  Image  ABNORMAL  NORMAL  NORMAL  NORMAL    Iron  ppm  ASTM D5185(m)  >90  53  34  45    Chromium  ppm  ASTM D5185(m)  >20  13  7  9    Nickel  ppm  ASTM D5185(m)  >1  9  11    Titanium  ppm  ASTM D5185(m)  >5  0  <1  <1    Aluminum  ppm  ASTM D5185(m)  >25  10  5  7    Lead  ppm  ASTM D5185(m)  >20000  10513  8081  8495    Copper  ppm  ASTM D5185(m)  >30  0  0  0    Vanadium  ppm  ASTM D5185(m)  >30  0  0  0    Vanadium  ppm  ASTM D5185(m)  >30  0  0  0    Vanadium  ppm  ASTM D5185(m)  >30  0  0  0    Valow Metal  scalar  Visual*  NONE  NONE	Oil Changed		Client Info		Changed	Changed	Changed
Iron  ppm  ASTM D5185(m)  >90  53  34  45    Chromium  ppm  ASTM D5185(m)  >20  13  7  9    Nickel  ppm  ASTM D5185(m)  >15  ▲ 19  9  11    Titanium  ppm  ASTM D5185(m)  >5  0  <1  <1    Aluminum  ppm  ASTM D5185(m)  >25  10  5  7    Lead  ppm  ASTM D5185(m)  >25  7  5  7    Tin  ppm  ASTM D5185(m)  >30  0  0  0    Vanadium  ppm  ASTM D5185(m)  >30  0  0  0    Visual*  NONE  NONE  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)	Filter Changed		Client Info		Changed	Changed	Changed
Chromium  ppm  ASTM D5185(m)  >20  13  7  9    Nickel  ppm  ASTM D5185(m)  >15  ▲ 19  9  11    Titanium  ppm  ASTM D5185(m)  >5  0  <1  <1    Aluminum  ppm  ASTM D5185(m)  >55  0  <1  <1    Aluminum  ppm  ASTM D5185(m)  >2000  10513  8081  8495    Copper  ppm  ASTM D5185(m)  >20  0  0  0    Vanadium  ppm  ASTM D5185(m)  >25  7  5  7    Tin  ppm  ASTM D5185(m)  >20  0  0  0    Vanadium  ppm  ASTM D5185(m)  >15  7  7  5    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  1.0  <1.0  <1.0    Fuel  WC Method  >4.0	Sample Status				ABNORMAL	NORMAL	NORMAL
Chromium  ppm  ASTM D5185(m)  >20  13  7  9    Nickel  ppm  ASTM D5185(m)  >15  ▲ 19  9  11    Titanium  ppm  ASTM D5185(m)  >5  0  <1  <1    Aluminum  ppm  ASTM D5185(m)  >55  0  <1  <1    Aluminum  ppm  ASTM D5185(m)  >2000  10513  8081  8495    Copper  ppm  ASTM D5185(m)  >20  0  0  0    Vanadium  ppm  ASTM D5185(m)  >25  7  5  7    Tin  ppm  ASTM D5185(m)  >20  0  0  0    Vanadium  ppm  ASTM D5185(m)  >15  7  7  5    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  1.0  <1.0  <1.0    Fuel  WC Method  >4.0							
Nickel  ppm  ASTM D5185(m)  > 15  A 19  9  11    Titanium  ppm  ASTM D5185(m)  <  <1  0  0    Silver  ppm  ASTM D5185(m)  >5  0  <1  <1    Aluminum  ppm  ASTM D5185(m)  >25  10  5  7    Lead  ppm  ASTM D5185(m)  >25  7  5  7    Lead  ppm  ASTM D5185(m)  >30  0  0  0    Vanadium  ppm  ASTM D5185(m)  >30  0  0  0  0    Visual*  NONE  NONE  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5080*  >10  0.014   0.013    pm Water  pm  <	-	ppm	( )				
Titanium  ppm  ASTM D5185(m)  <1		ppm	ASTM D5185(m)	>20	-		
Silver  ppm  ASTM D5185(m)  >5  0  <1		ppm	. /	>15	<b>1</b> 9		
Aluminum  ppm  ASTM D5185(m)  >25  10  5  7    Lead  ppm  ASTM D5185(m)  >20000  10513  8081  8495    Copper  ppm  ASTM D5185(m)  >25  7  5  7    Tin  ppm  ASTM D5185(m)  >30  0  0  0    Vanadium  ppm  ASTM D5185(m)  >30  0  0  0    White Metal  scalar  Visual*  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)  >20  0  <1.0  <1.0    Fuel  WC Method  visual*  NONE  NOLE  NOL13    ppm  MSTM D5185(m)  visual*  NONE  NORE  NORE    Sadar/ Dirt  scalar  Visual*  NONE	Titanium	ppm	ASTM D5185(m)			0	0
Lead  ppm  ASTM D5188(m)  >20000  10513  8081  8495    Copper  ppm  ASTM D5188(m)  >2000  0  0  0    Tin  ppm  ASTM D5188(m)  >30  0  0  0  0    Vanadium  ppm  ASTM D5185(m)  S0  0  0  0  0    White Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)  >20  0  <1.0		ppm	( )	>5	-		
Copper  ppm  ASTM D5185(m)  >25  7  5  7    Tin  ppm  ASTM D5185(m)  >30  0  0  0    Vanadium  ppm  ASTM D5185(m)  0  0  0  0    White Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)  >20  0  <1.0  <1.0    Water  %  ASTM D5185(m)  >20  0  <1.0  <1.0  <1.0    Water  %  ASTM D5185(m)  >20  0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0  <1.0 <th>Aluminum</th> <th>ppm</th> <th>ASTM D5185(m)</th> <th>&gt;25</th> <th>10</th> <th>5</th> <th></th>	Aluminum	ppm	ASTM D5185(m)	>25	10	5	
Tin  ppm  ASTM D5185(m)  >30  0  0  0  0    Vanadium  ppm  ASTM D5185(m)  >30  0  0  0    White Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)  >20  0  <1.0  <1.0    Fuel  WC Method  >4.0  <1.0  <1.0  <1.0  <1.0    Water  %  ASTM D6304*  >0.10  0.014   0.013    ppm Water  ppm  ASTM D6304*  >1000  148   133.2    Glycol  WC Method  NEG  NEG  NEG  NEG  NEG    Sand/Dirt  scalar  Visual*  NONE  NONE  NORE  NORML  NORM	Lead	ppm	ASTM D5185(m)	>20000	10513	8081	8495
Vanadium  ppm  ASTM D5185(m)  0  0  0  0    White Metal  scalar  Visual*  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)<>15  7  7  5    Potassium  ppm  ASTM D5185(m)<>20  0  <1.0	Copper	ppm	ASTM D5185(m)	>25	7	5	7
White Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)  >20  0  <1.0  <1.0    Fuel  WC Method  >4.0  <1.0  <1.0  <1.0  <1.0    Water  %  ASTM D6304*  >0.01  0.014   0.013    ppm Water  ppm  ASTM D6304*  >1000  148   133.2    Glycol  WC Method  NONE  NEG  NEG  NEG    Silt  scalar  Visual*  NONE  NONE  NONE  NONE    Debris  scalar  Visual*  NONE  NONE  NONE  NORML    Appearance  scalar  Visual*  NORML  NORML  NORML  NORML    Emulsi	Tin	ppm	ASTM D5185(m)	>30	0	0	0
Yellow Metal  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)  >20  0  <1  0    Fuel  WC Method  >4.0  <1.0  <1.0  <1.0  <1.0    Water  %  ASTM D6304*  >0.1  0.014   0.013    ppm Water  ppm  ASTM D6304*  >1000  148   133.2    Glycol  WC Method  NONE  NEG  NEG  NEG    Silt  scalar  Visual*  NONE  NONE  NONE  NONE    Debris  scalar  Visual*  NONE  NONE  NONE  NONE    Appearance  scalar  Visual*  NORM  NORML  NORML  NORML    Ddor  scalar  Visual*  NOR  Image: Norm  NOR  .2%    Sodium  ppm	Vanadium	ppm	ASTM D5185(m)		0	0	0
Silicon  ppm  ASTM D5185(m)  >15  7  7  5    Potassium  ppm  ASTM D5185(m)  >20  0  <1  0    Fuel  WC Method  >4.0  <1.0  <1.0  <1.0    Water  %  ASTM D6304*  >0.1  0.014   0.013    ppm Water  ppm  ASTM D6304*  >1000  148   133.2    Glycol  WC Method  NONE  NEG  NEG  NEG    Silt  scalar  Visual*  NONE  NONE  NONE  NONE    Debris  scalar  Visual*  NONE  NONE  NONE  NONE    Sand/Dirt  scalar  Visual*  NORM  NORM  NORM  NORML  NORML    Odor  scalar  Visual*  NORM  NORML  NORML  NORML    Odor  scalar  Visual*  NORM  NORML  NORML  NORML    Boron  ppm  ASTM D5185(m)	White Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Potassium  ppm  ASTM D5185(m)  >20  0  <1	Yellow Metal	scalar	Visual*	NONE	NONE	NONE	NONE
Potassium  ppm  ASTM D5185(m)  >20  0  <1	Silicon	nnm	ASTM D5185(m)	>15	7	7	5
Fuel  WC Method  >4.0  <1.0			. /				
Water  %  ASTM D6304*  >0.1  0.014   0.013    ppm Water  ppm  ASTM D6304*  >1000  148   133.2    Glycol  WC Method  NEG  NEG  NEG  NEG    Silt  scalar  Visual*  NONE  VLITE  VLITE  NONE    Debris  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Sand/Dirt  scalar  Visual*  NONE  NONE  NONE  NONE  NONE    Appearance  scalar  Visual*  NORML  NORML  NORML  NORML  NORML    Odor  scalar  Visual*  NORM  NORML  NORML  NORML  NORML    Emulsified Water  scalar  Visual*  >0.1  .5%  NEG  .2%    Sodium  ppm  ASTM D5185(m)  0.0  <1  0  <1    Boron  ppm  ASTM D5185(m)  0.0  0  0  0		ppm	× 7		-		
ppm WaterppmASTM D6304*>1000148133.2GlycolWC MethodNEGNEGNEGNEGSiltscalarVisual*NONEVLITEVLITENONEDebrisscalarVisual*NONENONENONENONENONESand/DirtscalarVisual*NONENONENONENONENONEAppearancescalarVisual*NORMNORMLNORMLNORMLNORMLOdorscalarVisual*NORMLNORMLNORMLNORMLNORMLBoronppmASTM D5185(m)0.0<1		0/					
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DebrisscalarVisual*NONENONENONENONESand/DirtscalarVisual*NONENONENONENONENONEAppearancescalarVisual*NORMNORMLNORMLNORMLNORMLOdorscalarVisual*NORMNORMLNORMLNORMLNORMLEmulsified WaterscalarVisual*>0.1.5%NEG.2%SodiumppmASTM D5185(m)0.0<10<1BoronppmASTM D5185(m)0.0000MalganeseppmASTM D5185(m)0.0000MagnesiumppmASTM D5185(m)0.0332CalciumppmASTM D5185(m)4.7<111PhosphorusppmASTM D5185(m)0.0000ZincppmASTM D5185(m)0.1334SulfurppmASTM D5185(m)0.1334	ppm Water		ASTM D6304*		148		133.2
Sand/DirtscalarVisual*NONENONENONENONEAppearancescalarVisual*NORMLNORMLNORMLNORMLNORMLOdorscalarVisual*NORMLNORMLNORMLNORMLNORMLEmulsified WaterscalarVisual*>0.1.5%NEG.2%SodiumppmASTM D5185(m)0.0<10<1BoronppmASTM D5185(m)0.0<10<1BariumppmASTM D5185(m)0.0000MolybdenumppmASTM D5185(m)0.0000MaganeseppmASTM D5185(m)0.0332CalciumppmASTM D5185(m)4.7<111PhosphorusppmASTM D5185(m)0.0000ZincppmASTM D5185(m)0.1334SulfurppmASTM D5185(m)84810161047955	ppm Water Glycol	ppm	ASTM D6304* WC Method	>1000	148 NEG	 NEG	133.2 NEG
AppearancescalarVisual*NORMLNORMLNORMLNORMLNORMLOdorscalarVisual*NORMLNORMLNORMLNORMLNORMLEmulsified WaterscalarVisual*>0.1.5%NEG.2%SodiumppmASTM D5185(m)0.0<10<1BoronppmASTM D5185(m)0.0<10<1BariumppmASTM D5185(m)0.0000MolybdenumppmASTM D5185(m)0.0000MaganeseppmASTM D5185(m)0.0332CalciumppmASTM D5185(m)4.7<111PhosphorusppmASTM D5185(m)0.0000ZincppmASTM D5185(m)0.1334SulfurppmASTM D5185(m)84810161047955	ppm Water Glycol Silt	ppm scalar	ASTM D6304* WC Method Visual*	>1000 NONE	148 NEG VLITE	 NEG VLITE	133.2 NEG NONE
Odor  scalar  Visual*  NORML  NORML  NORML  NORML    Emulsified Water  scalar  Visual*  >0.1  .5%  NEG  .2%    Sodium  ppm  ASTM D5185(m)   <1  0  <1    Boron  ppm  ASTM D5185(m)  0.0  <1  0  <1    Barium  ppm  ASTM D5185(m)  0.0  0  0  0    Molybdenum  ppm  ASTM D5185(m)  0.0  0  0  0    Manganese  ppm  ASTM D5185(m)  0.0  3  3  2    Calcium  ppm  ASTM D5185(m)  0.0  3  3  4    Phosphorus  ppm  ASTM D5185(m)  0.1  3  3  4    Sulfur  ppm  ASTM D5185(m)  0.1  3  4  5	ppm Water Glycol Silt Debris	ppm scalar scalar	ASTM D6304* WC Method Visual* Visual*	>1000 NONE NONE	148 NEG VLITE NONE	 NEG VLITE NONE	133.2 NEG NONE NONE
Sodium  ppm  ASTM D5185(m)  <1	ppm Water Glycol Silt Debris Sand/Dirt	ppm scalar scalar scalar	ASTM D6304* WC Method Visual* Visual* Visual*	>1000 NONE NONE NONE	148 NEG VLITE NONE NONE	NEG VLITE NONE NONE	133.2 NEG NONE NONE NONE
Sodium  ppm  ASTM D5185(m)  <1	ppm Water Glycol Silt Debris Sand/Dirt Appearance	ppm scalar scalar scalar scalar	ASTM D6304* WC Method Visual* Visual* Visual* Visual*	>1000 NONE NONE NORE	148 NEG VLITE NONE NONE NORML	NEG VLITE NONE NONE NORML	133.2 NEG NONE NONE NONE NORML
Boron  ppm  ASTM D5185(m)  0.0  <1	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor	ppm scalar scalar scalar scalar scalar	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual*	>1000 NONE NONE NORE NORML	148 NEG VLITE NONE NONE NORML NORML	NEG VLITE NONE NONE NORML	133.2 NEG NONE NONE NORE NORML
Barium  ppm  ASTM D5185(m)  0.0  0  0  0    Molybdenum  ppm  ASTM D5185(m)  0.0  0  0  0  0    Manganese  ppm  ASTM D5185(m)  0.0  0  0  0  0    Magnesium  ppm  ASTM D5185(m)  0.0  3  3  2    Calcium  ppm  ASTM D5185(m)  4.7  <1	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor	ppm scalar scalar scalar scalar scalar	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual*	>1000 NONE NONE NORE NORML	148 NEG VLITE NONE NONE NORML NORML	NEG VLITE NONE NONE NORML	133.2 NEG NONE NONE NORE NORML
Molybdenum  ppm  ASTM D5185(m)  0.0  0  0  0    Manganese  ppm  ASTM D5185(m)  0.0  0  0  0    Magnesium  ppm  ASTM D5185(m)  0.0  3  3  2    Calcium  ppm  ASTM D5185(m)  4.7  <1  1  1    Phosphorus  ppm  ASTM D5185(m)  0.0  0  0  0    Zinc  ppm  ASTM D5185(m)  0.1  3  3  4    Sulfur  ppm  ASTM D5185(m)  848  1016  1047  955	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium	ppm scalar scalar scalar scalar scalar scalar	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* Visual*	>1000 NONE NONE NORML NORML >0.1	148 NEG VLITE NONE NORML NORML .5%	NEG VLITE NONE NORML NORML NEG	133.2 NEG NONE NONE NORML NORML .2%
Manganese  ppm  ASTM D5185(m)  0.0  0  0  0    Magnesium  ppm  ASTM D5185(m)  0.0  3  3  2    Calcium  ppm  ASTM D5185(m)  4.7  <1	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium	ppm scalar scalar scalar scalar scalar scalar	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* Visual*	>1000 NONE NONE NORML NORML >0.1	148 NEG VLITE NONE NORML .5%	NEG VLITE NONE NORML NORML NEG	133.2 NEG NONE NONE NORML .2% <1
Magnesium  ppm  ASTM D5185(m)  0.0  3  3  2    Calcium  ppm  ASTM D5185(m)  4.7  <1	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium	ppm scalar scalar scalar scalar scalar scalar ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML NORML >0.1 0.0	148 NEG VLITE NONE NORML NORML .5% <1 <1 <1 0	NEG VLITE NONE NORML NORML NEG 0 0 0	133.2 NEG NONE NONE NORML .2% <1 <1 0
Calcium  ppm  ASTM D5185(m)  4.7  <1	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium	ppm scalar scalar scalar scalar scalar scalar ppm ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML NORML >0.1 0.0	148 NEG VLITE NONE NORML NORML .5% <1 <1 <1 0	NEG VLITE NONE NORML NORML NEG 0 0 0	133.2 NEG NONE NONE NORML .2% <1 <1 0
Phosphorus  ppm  ASTM D5185(m)  0.0  O  O  O    Zinc  ppm  ASTM D5185(m)  0.1  3  3  4    Sulfur  ppm  ASTM D5185(m)  848  1016  1047  955	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum	ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML >0.1 0.0 0.0 0.0	148 NEG VLITE NONE NORML .5% <1 <1 <1 0 0 0 0	 NEG VLITE NONE NORML NORML NEG 0 0 0 0 0 0 0	133.2 NEG NONE NONE NORML NORML .2% <1 <1 <1 0 0 0
Zinc  ppm  ASTM D5185(m)  0.1  3  3  4    Sulfur  ppm  ASTM D5185(m)  848  1016  1047  955	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese	ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML >0.1 0.0 0.0 0.0	148 NEG VLITE NONE NORML .5% <1 <1 <1 0 0 0 0	 NEG VLITE NONE NORML NORML NEG 0 0 0 0 0 0 0	133.2 NEG NONE NONE NORML NORML .2% <1 <1 <1 0 0 0
Sulfur  ppm  ASTM D5185(m)  848  1016  1047  955	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Malganese Magnesium	ppm scalar scalar scalar scalar scalar scalar ppm ppm ppm ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML >0.1 0.0 0.0 0.0 0.0 0.0 0.0	148 NEG VLITE NONE NORML .5% <1 <1 <1 0 0 0 3	 NEG VLITE NONE NORML NORML NEG 0 0 0 0 0 0 0 0 0 3	133.2 NEG NONE NONE NORML .2% <1 <1 0 0 0 2
	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium Calcium	ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML >0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.7	148 NEG VLITE NONE NORML .5% <1 <1 <1 0 0 0 3 <1	 NEG VLITE NONE NORML NORML NEG 0 0 0 0 0 0 0 0 0 0 3 1	133.2 NEG NONE NONE NORML .2% <1 <1 <1 0 0 0 2 1
Visc @ 100°C cSt ASTM D7279(m) 20.2 21.4 21.0 21.7	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium Calcium	ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML NORML >0.1 0.0 0.0 0.0 0.0 0.0 4.7 0.0	148 NEG VLITE NONE NORML .5% <1 <1 <1 0 0 0 3 <1 0 0 3 <1 0	 NEG VLITE NONE NORML NORML NEG 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0	133.2 NEG NONE NONE NORML .2% <1 <1 <1 0 0 0 0 2 1 1 0
	ppm Water Glycol Silt Debris Sand/Dirt Appearance Odor Emulsified Water Sodium Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc	ppm scalar scalar scalar scalar scalar ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D6304* WC Method Visual* Visual* Visual* Visual* Visual* ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	>1000 NONE NONE NORML NORML >0.1 0.0 0.0 0.0 0.0 4.7 0.0 0.0 0.0	148 NEG VLITE NONE NORML NORML .5% <1 <1 <1 0 0 0 3 <1 0 3 <1 0 3	 NEG VLITE NONE NORML NORML NEG 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	133.2 NEG NONE NONE NORML .2% <1 <1 <1 0 0 0 0 2 1 1 0 4



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Test Package : AVI 1 (Additional Tests: KF)