

**OIL ANALYSIS REPORT** 

## Machine Id **LIEBHERR 515** Component Lower Diesel Engine TRC MOLY XL PRO-SPEC IV 15W40 (8 GAL)

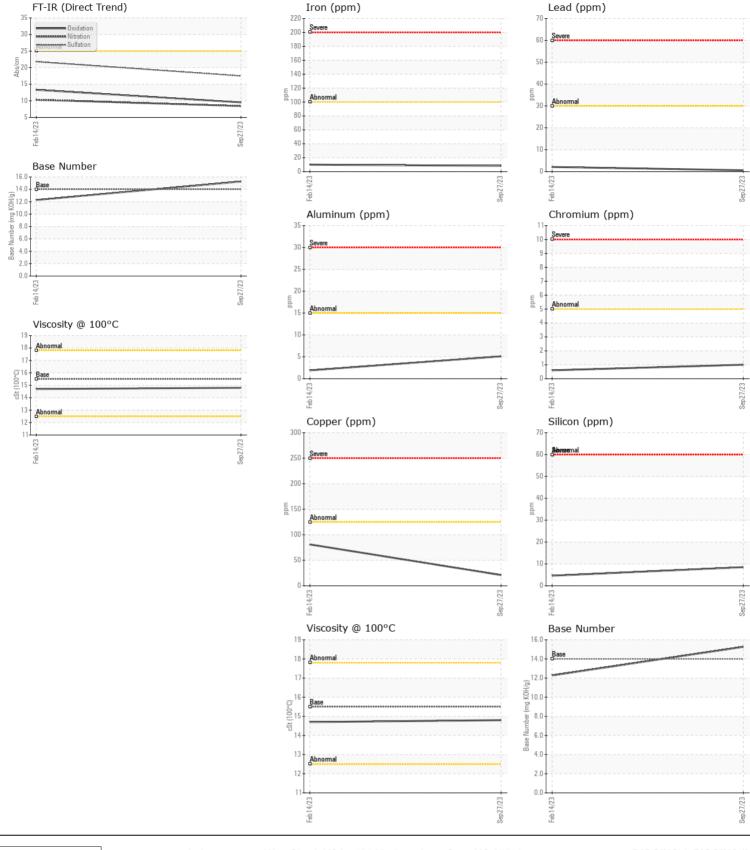
Resample at the next service interval to monitor.         Sample Date Sample Date Machine Age         Client Info         TR05/16207            Machine Age         hrs         Client Info         27 Sep 203         14 Feb 2023            Machine Age         hrs         Client Info         250         500            Oil Age         hrs         Client Info         250         500            Oil Changed         Client Info         Not Change         Changed            Oil Changed         Client Info         Not Change         Changed            Sample Status         Nort Mange          Changed            VEAR         Iron         ppm         ASIM 05185m         >50         1         -1            Nickel         ppm         ASIM 05185m         >5         1        1            Silver         ppm         ASIM 05185m         >5         1         1            Silver         ppm         ASIM 05185m         >5         1         1            Tota off         ppm         ASIM 05185m         >5         1         1		 						
Sample at the next service interval to monitor.         Sample bate Machine Age         Client Info         27.59, 202         14 Feb 2023	RECOMMENDATION	Test	UOM	Method	Limit/Abn	Current	History1	History2
Saling Data         Clean Info.         27 Sig 202         in Fig 2.0.0         in Fig 2.0.0	Resample at the next service interval to monitor.							
Oil Age         hrs         Client Info         250         500            Oil Changed         Client Info         Not Changed         Changed            Oil Changed         Client Info         Not Changed         Changed            Sample Status         Not Changed         Changed          Not Changed            VEAR         Iron         pp         ASIM D518n         >-100         8         10            All component wear fales are normal.         Iron         pp         ASIM D518n         >-10         8         10            Nickel         ppm         ASIM D518n         >5         1             Nickel         ppm         ASIM D518n         >5         1             Silver         ppm         ASIM D518n         >5         1         1            Qopper         ppm         ASIM D518n         >30         0             Valuminum         ppm         ASIM D518n         >1         1            Valuminum         ppm         ASIM D518n         >2         1			la va					
Filter Age         ins         Client Indo         250         250            OIC Changed         Client Indo         No Changed         C		Ũ						
Oil Changed Filter Changed         Client Info         Not Changed Changed         ···           VEAP         Iron         pp         ASILOSIES         5100         8         10         -           NORMAN         NORMAN         NORMAN         NORMAN         NORMAN         -           Norman         pp         ASILOSIES         50         1         -         -           Norman         pp         ASILOSIES         55         1         -         -         -           Norman         pp         ASILOSIES         55         5         2         -         -         -           Silver         pp         ASILOSIES         50         2         -		-						
Filter Changed Sample Status         Changed NORMAL		-	hrs					
Sample Status         NORMA         NORMA         NORMA         NORMA         NORMA         NORMA         Norma           Norma         ppm         ASTM 05168m         >10         8         10		-					-	
Iron         ppm         ASTM D3156m         > 10            All component wear rates are normal.         Iron         ppm         ASTM D3156m         >         1         <1		-		Client Info			0	
All component wear rates are normal.         Chromium         ppm         ASTM D585m         >5         1         <1		Sample Status				NORMAL	NORMAL	
All component wear rates are normal.         Chromium         ppm         ASTM D585m         >5         1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1	WEAR	Iron	ppm	ASTM D5185m	>100	8	10	
Nucker         p.pm         ASTM 2586s	All component wear rates are normal.	Chromium	ppm	ASTM D5185m	>5	1	<1	
Silver         ppm         ATM D515m         -3         0         0		Nickel	ppm	ASTM D5185m	>5	<1	0	
Silver         ppm         ATM D515m         -3         0         0		Titanium				<1	<1	
Aluminum         ppm         ASTM D5185m         >15         5         2		Silver	ppm	ASTM D5185m	>3	0	0	
Copper         ppm         ASTM D5185n         >125         21         81            Tin         ppm         ASTM D5185n         -5         1         1            Vanadium         ppm         ASTM D5185n         -5         1         1            White Metal         scalar         *Visual         NONE         NONE         NONE         NONE            CONTAMINATION         Scalar         *Visual         NONE         NONE         NONE            There is no indication of any contamination in the oil.         Silicon         ppm         ASTM D5185n         >60         8         5            Water         WC Method         >50         4.1.0              Water         WC Method         >0.2         NEG         NEG             Glycod         WC Method         >0.2         NEG         NEG             Solf %         %         *ASTM D784         >20         1.1             Sold %         %         *ASTM D784         >20         1.7.5         21.8		Aluminum		ASTM D5185m	>15	5	2	
Copper         ppm         ASTM D5185n         >125         21         81            Tin         ppm         ASTM D5185n         -5         1         1            Vanadium         ppm         ASTM D5185n         -5         1         1            White Metal         scalar         *Visual         NONE         NONE         NONE         NONE            CONTAMINATION         Scalar         *Visual         NONE         NONE         NONE            There is no indication of any contamination in the oil.         Silicon         ppm         ASTM D5185n         >60         8         5            Water         WC Method         >50         4.1.0              Water         WC Method         >0.2         NEG         NEG             Glycod         WC Method         >0.2         NEG         NEG             Solf %         %         *ASTM D784         >20         1.1             Sold %         %         *ASTM D784         >20         1.7.5         21.8		Lead				<1	2	
Tin         ppm         ASTM D5185m         >5         1         1         1		Copper		ASTM D5185m	>125	21		
Vanadium         ppm         ASTM D5185m								
White Metal Yellow Metal         scalar         *Visual         NONE		Vanadium		ASTM D5185m			<1	
Yellow Metal         scalar         *Visual         NONE         NONE         NONE					NONE			
Potassium         pp         ASTM D5185m         >20         3         2		Yellow Metal		*Visual			NONE	
Potassium         pp         ASTM D5185m         >20         3         2		Silioon		ACTM DE10Em	. 60	0	5	
Fuel         WC Method         >5         <1.0         <1.0         <1.0           Water         W         WC Method         >0.2         NEG         NEG         <	JONTAMINATION							
Water         W C Method         >0.2         NEG         NEG            Glycol         WC Method         NEG         NEG         NEG            Sot %         %         7ASTM D764         >30         0.1         0.1            Nitration         Abs/(mr)         ASTM D764         >30         17.5         21.8            Sulfation         Abs/(mr)         ASIM D7145         >30         17.5         21.8            Sulfation         Abs/(mr)         ASIM D7145         >30         17.5         21.8            Sulfation         Abs/(mr)         ASIM D7145         >30         17.5         21.8            Sulfation         Abs/(mr)         NONE         NONE         NONE         NONE            Sulfation         scalar         *Visual         NONE         NONE         NONE            Appearance         scalar         *Visual         NORM         NORML         NORML            Odor         scalar         *Visual         NORML         NORML         NOR            The BN result indicates that there is suitable alkalinity rem	There is no indication of any contamination in the oil.		ppm					
Glycol         WC Method         NRG         NNEG         NNEG         NNEG           Soot %         %         'ASTM D784/         >3         0.1         0.1            Nitration         Abs/cm         'ASTM D784/         >30         8.4         10.3            Sulfation         Abs/cm         'ASTM D784/         >30         8.4         10.3            Sulfation         Abs/cm         'ASTM D784/         >30         8.4         10.3            Sulfation         Abs/cm         'ASIM D784/         >30         8.4         10.3            Sulfation         Abs/cm         'Visual         NONE         NONE         NONE         NONE            Sand/Dirt         scalar         'Visual         NOR         NORM         NORM         NORM            Appearance         scalar         'Visual         NOR         NORM         NORM         NORM            Thubsfield Wate         scalar         'Visual         NOR         NORM         NORM            Thubsfield Wate         scalar         'Visual         NORM         NORM         NORM         -								
Soot %         %         *ASTM D7844         >3         0.1         0.1            Nitration         Abs/m         *ASTM D7824         >20         8.4         10.3            Sulfation         Abs/m         *ASTM D7815         >30         17.5         21.8            Sulfation         Abs/m         *ASTM D7415         >30         17.5         21.8            Silt         scalar         *Visual         NONE         NONE         NONE            Sand/Dit         scalar         *Visual         NONE         NONE         NONE            Appearance         scalar         *Visual         NORM         NORML         NORML            Odor         scalar         *Visual         NORM         NORML         NORML            The BN result indicates that there is suitable alkalinity remaining in the bil. The condition of the oil is suitable for further service.         Sodium         ppm         ASTM D5185m         10         0            Magnesium         ppm         ASTM D5185m         100         0             Magnesium         ppm         ASTM D5185m         13					20.2			
Nitration         Abs/cm         *ASTM D7624         >20         8.4         10.3            Sulfation         Abs/tm         *ASTM D715         >30         17.5         21.8            Silt         scalar         *Visual         NONE         NONE         NONE         NONE            Debris         scalar         *Visual         NONE         NORM		•	0/_		13			
SulfationAbs/.tmm*ASTM D7415>3017.521.8Siltscalar*VisualNONENONENONENONEDebrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORNORMNORMNORMOdorscalar*VisualNORNORMNORMLNORMLEmulsified Watescalar*VisualNORNORMNORMLSodiumppmASTM D5185mSol00BoronppmASTM D5185mImage00BariumppmASTM D5185mImage1691111ImageMolybdenumppmASTM D5185mImage111ImageImageManganeseppmASTM D5185mImage3083ImageMangensiumppmASTM D5185mImage1211829ImagePhosphorusppmASTM D5185mImage13031066ImageSulfurppmASTM D5185mImageImageImageImageImageImageAstimutppmASTM D5185mImageImageImageImageImageImageImageImageImageImageImageImageImageImageImageImageImageImage <th></th> <td></td> <td></td> <td></td> <th></th> <td></td> <td></td>								
Siltscalar*VisualNONENONENONEDebrisscalar*VisualNONENONENONENONESand/Dirtscalar*VisualNONENONENONEAppearancescalar*VisualNORMNORMLNORMLNORMLOdorscalar*VisualNORMNORMLNORMLNORMLOdorscalar*VisualNORMNORMLNORMLNORMLEmulsifiedWatescalar*VisualNORNORMLNORMLBoronppASTM D5185mIn00BariumppASTM D5185mIn00ManganeseppASTM D5185mInIn1ManganesiumppASTM D5185mIn33PhosphorusppASTM D5185mInIn-1ManganesiumppASTM D5185mInIn-1ManganesiumppASTM D5185mInInInManganesiumppASTM D5185mInInInIncppASTM D5185mInInInInManganesiumppASTM D5185mInInInInManganesiumppASTM D5185mInInInInInInInInIn <t< td=""><th></th><td></td><td></td><td></td><th></th><td></td><td></td></t<>								
Debrisscalar*VisualNONENONENONESand/Dirtscalar*VisualNONENONENONENONEAppearancescalar*VisualNORMLNORMLNORMLNORMLNORMLOdorscalar*VisualNORMLNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGBoronppmASTM D5185m33BoronppmASTM D5185m000BariumppmASTM D5185m60MalganesseppmASTM D5185m<11								
Sand/Dirt       scalar       'Visual       NONE       NONE       NONE          Appearance       scalar       'Visual       NORML       NORML       NORML          Odor       scalar       'Visual       NORML       NORML       NORML       NORML          Emulsified Water       scalar       'Visual       >0.2       NEG       NEG          Boron       pp       ASTM D5185m        0       0          Barium       pp       ASTM D5185m        0       0          Molybdenum       ppm       ASTM D5185m        169       111          Maganese       ppm       ASTM D5185m       1300       5565       3914          Magnesium       ppm       ASTM D5185m       1300       5565       3914          Calcium       ppm       ASTM D5185m       1300       5565       3914          Magnesium       ppm       ASTM D5185m       1300       5565       3914          Magnesium       ppm       ASTM D5185m       1300       1373       10666 <t< td=""><th></th><td></td><td></td><td></td><th></th><td></td><td></td></t<>								
Appearance Odorscalar*VisualNORML<								
Odorscalar*VisualNORMLNORMLNORMLNORMLNORMLEmulsified Waterscalar*Visual>0.2NEGNEGFLUID CONDITIONSodiumppmASTM D5185m33BoronppmASTM D5185m000BariumppmASTM D5185m<								
Emulsified Waterscalar*Visual>0.2NEGNEGNEGSodiumppmASTM D5185m3BoronppmASTM D5185m00BariumppmASTM D5185m<								
Sodium       ppm       ASTM D5185m       3       3          Boron       ppm       ASTM D5185m       0       0          Barium       ppm       ASTM D5185m       <10								
Boron       ppm       ASTM D5185m       0       0          Barium       ppm       ASTM D5185m        <1       0          Molybdenum       ppm       ASTM D5185m        <169       1111          Manganese       ppm       ASTM D5185m        <1       <1          Magnesium       ppm       ASTM D5185m        <1       <1          Magnesium       ppm       ASTM D5185m        <30       833          Calcium       ppm       ASTM D5185m       1300       5565       3914          Phosphorus       ppm       ASTM D5185m       1300       1373       1066          Sulfur       ppm       ASTM D5185m       1300       1333           Oxidation       Abs/.1mm       *ASTM D7141       >25       9.5       13.3								
Barium       ppm       ASTM D5185m       <1	FLUID CONDITION	Sodium				3	3	
DarkinippmASTM D5185mIIIIMolybdenumppmASTM D5185mII69111IIIIIIManganeseppmASTM D5185mIIIIIIIIIIIIMagnesiumppmASTM D5185mIII	The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.		ppm					
Molybodenum       ppm       ASIM D5185m       169       111          Manganese       ppm       ASTM D5185m       <       <1       <1          Magnesium       ppm       ASTM D5185m       I       <1       <1          Magnesium       ppm       ASTM D5185m       I       300       833          Calcium       ppm       ASTM D5185m       1300       5565       3914          Phosphorus       ppm       ASTM D5185m       1300       1211       829          Zinc       ppm       ASTM D5185m       1300       1373       1066          Sulfur       ppm       ASTM D5185m       0       5836       4399          Oxidation       Abs/.1mm       *ASTM D7414       >25       9.5       13.3								
Magnesium       ppm       ASTM D5185m       300       833          Calcium       ppm       ASTM D5185m       1300       5565       3914          Phosphorus       ppm       ASTM D5185m       1300       1211       829          Zinc       ppm       ASTM D5185m       1300       1373       1066          Sulfur       ppm       ASTM D5185m       0       5836       4399          Oxidation       Abs/.1mm       *ASTM D7414       >25       9.5       13.3		•						
Calcium       ppm       ASTM D5185m       1300       5565       3914          Phosphorus       ppm       ASTM D5185m       1300       1211       829          Zinc       ppm       ASTM D5185m       1300       1373       1066          Sulfur       ppm       ASTM D5185m       C       5836       4399          Oxidation       Abs/.1mm       *ASTM D7414       >25       9.5       13.3		-						
Phosphorus         ppm         ASTM D5185m         1211         829            Zinc         ppm         ASTM D5185m         1300         1373         1066            Sulfur         ppm         ASTM D5185m         1300         5836         4399            Oxidation         Abs/.1mm         *ASTM D7414         >25         9.5         13.3		J J						
Zinc       ppm       ASTM D5185m       1300       1373       1066          Sulfur       ppm       ASTM D5185m       0       5836       4399          Oxidation       Abs/.1mm       *ASTM D7414       >25       9.5       13.3					1300			
Sulfur         ppm         ASTM D5185m         5836         4399            Oxidation         Abs/.1mm         *ASTM D7414         >25         9.5         13.3			ppm					
Oxidation         Abs/.1mm         *ASTM D7414         >25         9.5         13.3			ppm		1300			
			ppm					
Base Number (BN) mg KOH/g ASTM D2896 14 15.26 12.27								
		Base Number (BN)	mg KOH/g	ASTM D2896	14	15.26	12.27	

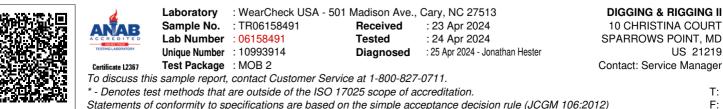
Visc @ 100°C cSt

ASTM D445 15.5

14.7

14.8





Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Contact/Location: Service Manager - DIGSPA Page 2 of 2