

## 

# LR Motor Shop Repairs

### **Job Number 103620**

Prepared for Welspun Tubular (11685)

9301 Frazier Pike Little Rock AR 72206

### **Table of Contents**

AC Inspection as Found - LR MOTORSHOP

AC Inspection - Rev. 2: ID: U017549530-001T0002

1.0



Hi-Speed Industrial Service 7030 Ryburn Dr Millington, Tn 38053 901-873-5300

> FolderID: 103620 FormID: 21895675

### **AC Inspection as Found**

Welspun Tubular (11685)

9301 Frazier Pike Little Rock, AR 72206

#### AC Inspection - Rev. 2

Location: LR MOTORSHOP Serial Number: ID: U017549530-001T0002 Description: 150HP US NIDEC VERTICAL

Hi-Speed Job Number:	103620
Manufacturer:	US Motors/Nidec
Product Number:	M: DN11
Spec/ID #:	U017549530-001T0002
HP/kW:	150 (HP)
RPM:	1780 (RPM)
Frame:	H444TP
Voltage:	460
Phase:	Three
Hz:	60 (Hz)
Service Factor:	1.15
Enclosure:	WPI
# of Leads:	6
J-box Included:	None
Coupling/Sheave:	None
Date Received:	10/08/2024
Bearing RTDs:	No
Stator RTDs:	No
Repair Stage:	Final
Rewind:	No
Shaft Machined Fit Repairs Required:	Yes
Bearing Housing Machined Fit Repairs Required:	Yes
Heaters:	Yes
Winding Type :	Random Wound
Bearing Type:	Rolling Element

Priorities Found: 6 - High

10 - Good

**Overall Condition** 

1. Report Date 10/14/2024

#### 2. Nameplate Picture



#### 3. Photos of all six sides of the machine.















































	_	D 11 11 0 110 120 141	F :		
	4.	Describe the Overall Condition of the	Equipment as Received		
		Covered with oil and extremely dirty			
	5.	Report Date [COPY]			
h	nitial	Mechanical/Electrical			
	6.	Does Shaft Turn Freely?			(Y) Yes
	7.	Does the shaft require T.I.R in Lathe	to identify additional repairs?		(No) No
	8.	Does Shaft Have Visible Damage?			(No) No
	9.	Assembled Shaft Runout			Inches
	10.	Assembled Shaft End Play			inches
	11.	Air Gap Variation <10%			
	12.	Lead Condition			(P) Pass
	13.	Lead Length			18 Inches
	14.	Does it have Lugs?, If so what is the	Stud Size?		
	-	Yes			
	15.	Lead Numbers			1-6
	16.	Frame Condition			pass
	17.	Fan Condition			(N) NA
	18.	Heater Quantity, Ratings			
		Quantity	Volts/Watts	Pass/Fail	
	19.	19. Broken or Missing Components j-box and bolts			j-box and bolts
h	nitial	<b>Electrical Inspection</b>			

Hi-Speed Industrial Service disclaims all warranties, both express and implied, relating to the information, reports, opinions and analysis disclosed to the Customer by Hi-Speed. Hi-Speed shall not be liable for any errors or omissions, or any losses, injury or damages arising from the use of such information, reports, opinions and analysis by the Customer.

#### 20. Insulation Resistance/Megger









21. Winding Resistance
1-2 1-3 2-3

22. Perform Surge Test(P) Pass



23.	Number of Stator Slots	72
24.	Stator Condition	
-	Extremely dirty	
25.	Stator Thermistors/Ohms	
26.	Stator Overloads/Ohms	

Hi-Speed Industrial Service disclaims all warranties, both express and implied, relating to the information, reports, opinions and analysis disclosed to the Customer by Hi-Speed. Hi-Speed shall not be liable for any errors or omissions, or any losses, injury or damages arising from the use of such information, reports, opinions and analysis by the Customer.



Med	Mechanical Inspection			
2	27.	Drive End Bearing Brand	FAG	
2	28.	Drive End Bearing Number-	7322	
2	29.	Drive End Bearing Qty.	1	
3	80.	Drive End Bearing Type	(Thrust) Thrust	
3	31.	Drive End Lubrication Type	(Grease) Grease Lubricated	
3:	32.	Drive End Bearing Insulation or Grounding Device?		
-		Belzona		



33.	Drive End Wavy Washer/Snap-Ring Other Retention Device?	
34.	Drive End Bearing Condition	
35.	Opposite Drive End Bearing Brand	
36.	Opposite Drive End Bearing Number-	6215
37.	Opposite Drive End Bearing Qty.	1
38.	Opposite Drive End Bearing Type	(Ball) Ball Bearing
39.	Opposite Drive End Lubrication Type	(Grease) Grease Lubricated
<b>4</b> 0.	Opposite Drive End Bearing Insulation or Grounding Device?	
-	Aegis ring- 3.8390	
41.	Opposite Drive End Wavy Washer/Snap-Ring Other Retention Device?	spacer and snap ring
42.	Opposite Drive End Bearing Condition	
-	Contamination	
43.	Drive End Seal	
44.	Opposite Drive End Seal	

Hi-Speed Industrial Service disclaims all warranties, both express and implied, relating to the information, reports, opinions and analysis disclosed to the Customer by Hi-Speed. Hi-Speed shall not be liable for any errors or omissions, or any losses, injury or damages arising from the use of such information, reports, opinions and analysis by the Customer.

Rotor	Inspection			
	Rotor Type/Material		(Squirrel Aluminum) Squirrel Cage Aluminum Die Cast	
46.	Growler Test		(Pass) Pass	
47.	Number of Rotor Bars			
48.	Rotor Condition		needs cleaned	
49.	List the Parts needed for the Repair E 7322 6215 Aegis ring- 3.8390 Belzona 6215 bearing fit sleeve	Below		
50.	Signature of Technician that Disassembled Motor  Cw			
	anical Fits- Rotor			
	Shaft Runout		inches	
52.	Rotor Runout			
	Drive End Bearing Fit	Rotor Body	Opposite Drive End Bearing	
53.	Coupling Fit Closest to Bearing Hous	ing		
	0 Degrees	90 Degrees	120 Degrees	
54.	Coupling Fit Closest to the end of the	Shaft		
	0 Degrees	60 Degrees	120 Degrees	
55.	Drive End Bearing Shaft Fit			
	0 Degrees	60 Degrees	120 Degrees	
_	Belzona needs to be redone			
56.	Drive End Bearing Shaft Fit Condition		(F) Fail	
	Opposite Drive End Bearing Shaft Fit		(171 a	
• • •	0 Degrees	60 Degrees	120 Degrees	
	2.9533	2.9533	2.9532	
58.	Opposite Drive End Bearing Shaft Fit		(P) Pass	
	Shaft Air Seal Fits			
	Drive End Air Seal	Opposite Drive End Air Seal		
Nechanical Fits- Bearing Housings				
	Drive End - Endbell Bearing Fit			
30.	0 Degrees	60 Degrees	120 Degrees	
61	Drive End - Endbell Bearing Fit Cond	ition	(NA) Not Applicable	
62.	•		(IAA) IAAL Applicable	
υZ.	0 Degrees	60 Degrees	120 Degrees	
	-	oo Degrees	120 Deglees	
•	Excessive lip			
63.	Opposite Drive End - Endbell Bearing	Fit Condition	(F) Fail	

Hi-Speed Industrial Service disclaims all warranties, both express and implied, relating to the information, reports, opinions and analysis disclosed to the Customer by Hi-Speed. Hi-Speed shall not be liable for any errors or omissions, or any losses, injury or damages arising from the use of such information, reports, opinions and analysis by the Customer.

<b>6</b> 4	Pagring Can Condition		
04.	Bearing Cap Condition	Opposite Drive End Bearing Con	
	Drive End Bearing Cap	Opposite Drive End Bearing Cap	
65.	End Bell Air Seal Fits		
	Drive End Air Seal	Opposite Drive End Air Seal	
66.	List Machine Work Needed Below		
	DE shaft bearing fit and ODE end bell be	earing fit	
67.	Technician		Cw
-	Co sign: TRH		
Root	Cause of Failure		
68.	Failure locations		
	Bearings, DE shaft bearing fit, ODE end	bell bearing fit	
69.	Root cause of failure		
	Wear and water contamination		
_	nic Balance Report		
70.	Rotor Weight and Balance Grade		
	Rotor Weight	Balance Grade	
71.	Initial Balance Readings		
	Drive End	Opposite Drive End	
72.	Final Balance Readings		
	Drive End	Opposite Drive End	
73	Technician		
	anical Fits- Rotor - Post Repair		
	Shaft Runout Post Repair		
75.	·		
	Drive End Bearing Fit	Rotor Body	Opposite Drive End Bearing
	<u> </u>		,,
76.	Coupling Fit Closest to Bearing Housi	ng Post Repair	
	0 Degrees	90 Degrees	120 Degrees
77.	Coupling Fit Closest to the end of the	Shaft Post Repair	
	0 Degrees	60 Degrees	120 Degrees
78.	Drive End Bearing Shaft Fit Post Repa	air	
	0 Degrees	60 Degrees	120 Degrees
=-	0 1 5 5 5 6 6 6 6	D 1 D 1	
79.	Opposite Drive End Bearing Shaft Fit	•	400 D
	0 Degrees	60 Degrees	120 Degrees

Hi-Speed Industrial Service disclaims all warranties, both express and implied, relating to the information, reports, opinions and analysis disclosed to the Customer by Hi-Speed. Hi-Speed shall not be liable for any errors or omissions, or any losses, injury or damages arising from the use of such information, reports, opinions and analysis by the Customer.

Brive End Air Seal Opposite Drive End Air Seal  81. Shaft Repair Sign-off  Mechanical Fits- Bearing Housings - Post Repair  82. Drive End - Endbell Bearing Fit Post Repair  0 Degrees 60 Degrees 120 Degrees  83. Opposite Drive End - Endbell Bearing Fit Post Repair  0 Degrees 60 Degrees 120 Degrees  84. Bearing Cap Condition Post Repair Drive End Bearing Cap Opposite Drive End Bearing Cap  85. End Beill Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Beill Repair Sign-off  Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Runout  91. Assembled Shaft Runout  92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes  99. Document Final Condition with Pictures after paint  100. Final Pics and QC Review	80.	Shaft Air Seal Fits Post Repair			
Mechanical Fits- Bearing Housings - Post Repair       82. Drive End - Endbell Bearing Fit Post Repair     120 Degrees       83. Opposite Drive End - Endbell Bearing Fit Post Repair     120 Degrees       84. Bearing Cap Condition Post Repair Drive End Bearing Cap     120 Degrees       85. End Bell Air Seal Fits Post Repair Drive End Bearing Cap     Opposite Drive End Air Seal       86. End Bell Repair Sign-off     Opposite Drive End Air Seal       86. End Bell Repair Sign-off     Seasembly       87. QC Check All Parts for Cleanliness Prior to Assembly     88. Photograph All Major Components prior to assembly       88. Photograph All Major Components prior to assembly     99. Final Insulation Resistance Test       90. Assembled Shaft Endplay     91. Assembled Shaft Endplay       91. Assembled Shaft Runout     92. Test Run Amperage       Volts     Volts       93. Test Run Amperage     Amps       Amps     Amps       94. Drive End Vibration Readings - Inches Per Second     Horizontal       Horizontal     Vertical     Axial       95. Opposite Drive End Vibration Readings - Inches Per Second     Horizontal     Axial       96. Ambient Temperature - Fahrenheit     9. Drive End Bearing Temps - Fahrenheit     5 Minutes     15 Minutes       98. Opposite Drive End Bearing Temps - Fahrenheit     5 Minutes     15 Minutes       99. Document Final Condition with Pictures after paint <th></th> <th>Drive End Air Seal</th> <th>Opposite Drive End Air Seal</th> <th></th>		Drive End Air Seal	Opposite Drive End Air Seal		
82. Drive End - Endbell Bearing Fit Post Repair 0 Degrees 60 Degrees 120 Degrees  83. Opposite Drive End - Endbell Bearing Fit Post Repair 0 Degrees 60 Degrees 120 Degrees  84. Bearing Cap Condition Post Repair Drive End Bearing Cap Opposite Drive End Bearing Cap  85. End Bell Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  **Assembly**  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test 90. Assembled Shaft Runout 91. Assembled Shaft Runout 92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	81.	I. Shaft Repair Sign-off			
83. Opposite Drive End - Endbell Bearing Fit Post Repair 0 Degrees 60 Degrees 120 Degrees  84. Bearing Cap Condition Post Repair Drive End Bearing Cap Opposite Drive End Bearing Cap  85. End Bell Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  **Assembly**  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test 90. Assembled Shaft Endplay 91. Assembled Shaft Endplay 92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps  4mps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	Mecha	anical Fits- Bearing Housings - P	ost Repair		
83. Opposite Drive End - Endbell Bearing Fit Post Repair 0 Degrees 60 Degrees 120 Degrees  84. Bearing Cap Condition Post Repair Drive End Bearing Cap Opposite Drive End Bearing Cap  85. End Bell Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test 90. Assembled Shaft Endplay 91. Assembled Shaft Runout 92. Test Run Voltage Volts Volts Volts Volts  93. Test Run Amperage Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	82.	Drive End - Endbell Bearing Fit Post F	Repair		
84. Bearing Cap Condition Post Repair Drive End Bearing Cap Opposite Drive End Bearing Cap  85. End Bell Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Endplay  91. Assembled Shaft Runout  92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes		0 Degrees	60 Degrees	120 Degrees	
84. Bearing Cap Condition Post Repair Drive End Bearing Cap Opposite Drive End Bearing Cap  85. End Bell Air Seal (Opposite Drive End Air Seal)  86. End Bell Repair Sign-off Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Endplay  91. Assembled Shaft Runout  92. Test Run Voltage Volts (Volts (Volts)  93. Test Run Amperage Amps (Amps (Amps)  94. Drive End Vibration Readings - Inches Per Second Horizontal (Vertical (Axial)  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal (Vertical (Axial)  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes (10 Minutes)  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes (10 Minutes)  99. Document Final Condition with Pictures after paint	83.	Opposite Drive End - Endbell Bearing	Fit Post Repair		
85. End Bell Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Runout  91. Assembled Shaft Runout  92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes		0 Degrees	60 Degrees	120 Degrees	
85. End Bell Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Runout  91. Assembled Shaft Runout  92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes	0.4	Description Con Condition Deat Descrip			
85. End Bell Air Seal Fits Post Repair Drive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Endplay  91. Assembled Shaft Runout  92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps  Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	84.	· · · · · · · · · · · · · · · · · · ·	Occasio Di la Fall Bassica Occ		
Brive End Air Seal Opposite Drive End Air Seal  86. End Bell Repair Sign-off  Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Endplay  91. Assembled Shaft Runout  92. Test Run Voltage Volts Volts Volts  93. Test Run Amperage Amps Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit 5 Minutes  10 Minutes  10 Minutes  15 Minutes		Drive End Bearing Cap	Opposite Drive End Bearing Cap		
Assembly  87. QC Check All Parts for Cleanliness Prior to Assembly  88. Photograph All Major Components prior to assembly  89. Final Insulation Resistance Test  90. Assembled Shaft Endplay  91. Assembled Shaft Runout  92. Test Run Voltage  Volts  Volts  Volts  Volts  Volts  93. Test Run Amperage  Amps  Amps  Amps  Amps  Amps  Amps  94. Drive End Vibration Readings - Inches Per Second  Horizontal  Vertical  Vertical  Axial  95. Opposite Drive End Vibration Readings - Inches Per Second  Horizontal  Vertical  Axial  96. Ambient Temperature - Fahrenheit  5 Minutes  10 Minutes  15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes  10 Minutes  15 Minutes	85.	End Bell Air Seal Fits Post Repair			
### Assembly    87. QC Check All Parts for Cleanliness Prior to Assembly     88. Photograph All Major Components prior to assembly     89. Final Insulation Resistance Test     90. Assembled Shaft Endplay     91. Assembled Shaft Runout     92. Test Run Voltage     Volts		Drive End Air Seal	Opposite Drive End Air Seal		
87. QC Check All Parts for Cleanliness Prior to Assembly 88. Photograph All Major Components prior to assembly 89. Final Insulation Resistance Test 90. Assembled Shaft Endplay 91. Assembled Shaft Runout 92. Test Run Voltage Volts Volts Volts Volts Volts Volts  33. Test Run Amperage Amps Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 115 Minutes	86.	End Bell Repair Sign-off			
88. Photograph All Major Components prior to assembly 89. Final Insulation Resistance Test 90. Assembled Shaft Endplay 91. Assembled Shaft Runout 92. Test Run Voltage Volts Volts Volts Volts Volts  93. Test Run Amperage Amps Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes 15 Minutes 99. Document Final Condition with Pictures after paint	Assen	nbly			
89. Final Insulation Resistance Test 90. Assembled Shaft Endplay 91. Assembled Shaft Runout 92. Test Run Voltage Volts Volts Volts Volts Volts  93. Test Run Amperage Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 115 Minutes	87.	QC Check All Parts for Cleanliness P	rior to Assembly		
90. Assembled Shaft Endplay 91. Assembled Shaft Runout 92. Test Run Voltage Volts Volts Volts Volts Volts  93. Test Run Amperage Amps Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes  10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes  10 Minutes  15 Minutes	88.	Photograph All Major Components pr	ior to assembly		
91. Assembled Shaft Runout 92. Test Run Voltage Volts Volts Volts Volts Volts  93. Test Run Amperage Amps Amps Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 115 Minutes	89.	Final Insulation Resistance Test			
92. Test Run Voltage Volts Volts Volts Volts Volts  93. Test Run Amperage Amps Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 11 Minutes	90. Assembled Shaft Endplay				
93. Test Run Amperage Amps Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	91.	Assembled Shaft Runout			
93. Test Run Amperage Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	92.	Test Run Voltage			
Amps Amps Amps  94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes		Volts	Volts	Volts	
94. Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	93.	Test Run Amperage			
Horizontal  Vertical  Axial  95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal  Vertical  Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit 5 Minutes  10 Minutes  15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes  10 Minutes  15 Minutes		Amps	Amps	Amps	
95. Opposite Drive End Vibration Readings - Inches Per Second Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit 97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes	94.	Drive End Vibration Readings - Inches	s Per Second		
Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes		Horizontal	Vertical	Axial	
Horizontal Vertical Axial  96. Ambient Temperature - Fahrenheit  97. Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit  5 Minutes 10 Minutes 15 Minutes	95.	Opposite Drive End Vibration Reading	gs - Inches Per Second		
97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  99. Document Final Condition with Pictures after paint				Axial	
97. Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  99. Document Final Condition with Pictures after paint	96.	96 Ambient Temperature - Fahrenheit			
5 Minutes 10 Minutes 15 Minutes  98. Opposite Drive End Bearing Temps - Fahrenheit 5 Minutes 10 Minutes 15 Minutes  99. Document Final Condition with Pictures after paint		·			
5 Minutes 10 Minutes 15 Minutes  99. Document Final Condition with Pictures after paint		- · ·		15 Minutes	
5 Minutes 10 Minutes 15 Minutes  99. Document Final Condition with Pictures after paint					
99. Document Final Condition with Pictures after paint	98.				
·		5 Minutes	10 Minutes	15 Minutes	
100. Final Pics and QC Review	99.	Document Final Condition with Pictures after paint			
	100.	Final Pics and QC Review			

Hi-Speed Industrial Service disclaims all warranties, both express and implied, relating to the information, reports, opinions and analysis disclosed to the Customer by Hi-Speed. Hi-Speed shall not be liable for any errors or omissions, or any losses, injury or damages arising from the use of such information, reports, opinions and analysis by the Customer.



#### STANDARD TERMS AND CONDITIONS FOR PURCHASE OF GOOD AND/OR SERVICES

- 1. APPLICABILITY. The sale of any and all goods and/or services by Mock, Inc. d/b/a Hi-Speed Industrial Service ("Hi-Speed") shall be specifically conditioned upon and subject to the following terms and conditions which are incorporated by reference into any contracts and purchase orders with Hi-Speed, and which shall form and become a part of any agreement related thereto. Buyer's acceptance of any offer or quotation made by Hi-Speed for sale of any goods or services is expressly made subject to the terms and conditions set forth herein and to be so effective, Buyer need not sign or approve these Terms and Conditions to be bound hereunder provided a copy of same is provided to Buyer through any means. None of the terms and conditions contained herein may be added to, expanded, changed, modified, superseded or otherwise altered except as revised in writing and duly executed by Hi-Speed, and all orders received by Hi-Speed shall be governed only by the terms and conditions contained herein, notwithstanding any terms, conditions or provisions of any purchase order, release order, authorization or any other form issued by the Buyer. Hi-Speed hereby objects to any additional, modified, changed, deleted, altered or other terms and conditions not contained herein and notifies Buyer that any such terms or provisions are expressly rejected by Hi-Speed.
- 2. PRICE. All quoted prices shall remain firm and binding for a period of thirty (30) days from the date of quotation or for the period specifically stated in the quotation. The price for any and all goods and/or services ordered or approved by Buyer after thirty (30) days from the date of any quotation are subject to any increase in price that may occur after the expiration of thirty (30) days from the issuance of the quotation and the date the Buyer releases any shipment.
- 3. SCOPE OF GOODS AND/OR SERVICES. The goods and/or services provided by Hi-Speed pursuant to any quotation shall be limited exclusively to those goods and/or services expressly identified therein. Hi-Speed does not assume any responsibility and/or liability for the failure to provide any other goods and/or services not identified in any quotation. Modifications, additions or deletions to or from the scope referenced in any quotation shall only bee effective if evidenced in writing and signed by Hi-Speed. The sale of any of all goods and/or services affected by such modification, addition or deletion shall be subject to these same Standard Terms and Conditions whether or not referenced therein.
- 4. <u>BILLING AND PAYMENT TERMS.</u> Hi-Speed shall invoice Buyer for all goods and/or services as same are rendered at the address listed on the quotation. Payments for all goods and/or services shall be due thirty (30) days from the date of the current invoice or as otherwise set forth in the quotation. Late payments are subject to a late fee of 5% of the total invoice amount. Recurring late payments may lead to a deposit requirement on future services or sale of goods. Buyer shall be liable to Hi-Speed for any and all fees and expenses incurred by Hi-Speed to collect any invoices or to enforce these Standard Terms and Conditions, including but not limited to, attorney's fees.
- 5. <u>DELIVERY OF GOODS AND/OR SERVICES.</u> Unless otherwise identified in the quotation, all shipments are F.O.B. Hi-Speed's warehouse and the title to and all risk of loss with respect to any goods shipped shall pass to Buyer when such goods are delivered to the carrier at Hi-Speed's warehouse. Hi-Speed will use its best efforts to affect delivery by the date or dates specified in the quotation. However, Hi-Speed shall not be liable for delay in or failure to make shipment, or to perform services, by any identified date for any reason whatsoever, including but not limited to, causes beyond its reasonable control, such as strikes, fires, floods, epidemics, quarantines, restrictions, severe weather, embargos, acts of God, or public enemy, war, riot, delays in transportation or the inability to obtain necessary labor, materials or manufacturing facilities.
- **DELIVERY SITE AND TIME FOR PERFORMANCE.** Hi-Speed and Buver agree that time is of the essence for the purchase order and that Buyer shall fully cooperate with Hi-Speed in order to allow Hi-Speed full access to prosecute its work diligently and in an orderly manner. Buyer shall assist Hi-Speed in every way possible to avoid delaying, disrupting or interfering with the progress of Hi-Speed's work at the project site. In the event Hi-Speed's work is delayed, hindered, suspended, disrupted, re-sequenced or interfered with or rendered less efficient or more costly or adversely affected in any way as a result of acts or omissions of Buyer or other contractors or employees of Buyer or by any other reason beyond Hi-Speed's control and without the fault of Hi-Speed, then, in such event, Buyer shall be liable to Hi-Speed for any damages, additional costs, expenses, labor, materials, man hours, acceleration costs, overtime, additional jobsite overhead, extended home office overhead, and any and all other direct and indirect expenses of whatsoever nature or kind, caused in whole or in part, as a result of any of the above-referenced occurrences. Hi-Speed's project records will be the basis for computing the additional costs and damages of Hi-Speed's labor, materials, expenses and overhead related to such changes. BUYER WARRANTS THAT THE SITE FOR DELIVERY OR INSTALLATION OF ANY GOODS AND/OR FOR THE PERFORMANCE OF ANY SERVICES SHALL BE READY AND ADEQUATE FOR HI-SPEED'S DELIVERY OF GOODS AND/OR PERFORMANCE OF SERVICES AND THAT HI-SPEED SHALL HAVE FULL ACCESS THERETO, FREE OF ALL OBSTRUCTIONS. BUYER SHALL ASSUME ALL EXTRA COSTS ASSOCIATED WITH HI-SPEED'S INABILITY TO INSTALL ANY GOODS OR PERFORM ANY SERVICES AS A RESULT OF BUYER'S FAILURE TO COMPLY WITH THIS PROVISION. HI-SPEED MAY NOT INSPECT THE SITE PRIOR TO DELIVERY AND/OR INSTALLATION OF GOODS AND/OR PERFORMANCE OF SERVICES AND MAKES NO WARRANTY AS TO THE SUFFICIENCY OF THE SITE FOR THE DELIVERY AND/OR INSTALLATION OF GOODS AND/OR THE PERFORMANCE OF SERVICES AT SUCH SITE.
- 7. INSPECTION/ACCEPTANCE. All goods and services ordered pursuant to any quotation shall be subject to inspection by Buyer after delivery or performance to determine conformity with the quotation and/or purchase order and Hi-Speed's advertised or published specifications. Buyer shall have a period of thirty (30) days from shipment of goods at the delivery destination specified in the quotation within which to inspect the goods for conformity with the quotation, order and/or Hi-Speed's advertised and published specifications and to provide Hi-Speed with written notice of any discrepancy or rejection. Buyer shall have a period of thirty (30) days following completion of any services within which to inspect the services for conformity with the quotation, purchase order and/or Hi-Speed's advertised and published specifications and to provide Hi-Speed with written notice of any discrepancy or rejection. If the goods delivered or services performed do not so conform, upon delivery of notice to Hi-Speed of any discrepancy, nonconformance or rejection, Hi-Speed shall have sixty (60) days to cure the alleged discrepancy and/or nonconformance. If Hi-Speed fails to cure in this time period, Buyer shall have the right to reject such goods or services. After the cure period, goods that have been delivered and rejected, in whole or in part, shall be returned to Hi-Speed. Buyer shall notify Hi-Speed and arrange for the return of the goods as required. Should such non-conforming services be rejected Hi-Speed shall, at its sole cost, re-perform the non-conforming services. Inspection or failure to inspect on any occasion shall not affect Buyer's rights under the warranty provisions herein.
- 8. WARRANTIES. Hi-Speed warrants that all goods shall conform in all material aspects to the goods identified in the quotation to Buyer and/or purchase order, and Hi-Speed makes to Buyer the manufacturer's express warranty for any goods sold to Buyer, which is offered by the manufacturer at the time of acceptance of any quotation by Buyer. This warranty is conditioned upon the installation, operation, and maintenance of the goods in accordance with the manufacturer's recommendations and/or standard industry practice and the goods at all times being operated or used under normal operating conditions for which they were designed. Hi-Speed, at its sole option, will repair or

replace any defective or non-conforming goods in accordance with the applicable manufacturer's warranty. Warranty for any defective or incorrect parts is limited to the repair or replacement of those parts. Hi-Speed warrants that all services will conform in all material respects to the description of services identified in the quotation and will be performed in a good and workmanlike manner in accordance with industry practices and standards. Should the services be reasonably rejected or not conform with the foregoing warranties, Hi-Speed shall, at its sole cost, re-perform the defective or nonconforming services. Notwithstanding the foregoing, these warranties do not extend to goods or services to the extent that such goods have been subject to misuse, neglect or abuse not caused by Hi-Speed or have been used in violation of the approved written instructions furnished to Buyer. THE FOREGOING REPRESENTS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY HI-SPEED WITH RESPECT TO ALL GOODS SOLD AND IS IN LIEU OF ALL OTHER WARRANTIES EITHER EXPRESS OR IMPLIED. HI-SPEED EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICLAR USE OR PURPOSE. BUYER WAIVES ANY CLAIM THAT THESE EXCLUSIONS OR LIMITATIONS DEPRIVE IT OF AN ADEQUATE REMEDY AT EQUITY OR LAW OR CAUSE THIS AGREEMENT TO FAIL IN ITS ESSENTIAL PURPOSE. BUYER SHALL BE ENTITLED TO NO OTHER REMEDY OTHER THAN AS SET FORTH HEREIN, REGARDLESS OF THE CLAIM OR CAUSE OF ACTION, WHETHER BASED IN CONTRACT, TORT, NEGLIGENCE, GOODS LIABILITY, STRICT LIABILITY OR OTHERWISE.

- 9. <u>LIMITATION OF DAMAGES.</u> HI-SPEED SHALL HAVE NO LIABILITY TO BUYER WITH RESPECT TO THE SALE OR DELIVERY OF ANY GOODS OR THE REPAIR THEREOF OR WITH RESPECT TO THE SALE OR PERFORMANCE OF ANY SERVICES, FOR LOST PROFITS, SPECIAL, CONSEQUENTIAL, EXEMPLARY, PUNITIVE OR INCIDENTAL DAMAGES OF ANY KIND OR NATURE WHETHER ARISING IN CONTRACT, TORT, GOODS LIABILITY OR OTHERWISE, EVEN IF HI-SPEED WAS ADVISED OF THE POSSIBILITY OF SUCH LOSS OR DAMAGES. HI-SPEED SHALL NOT BE LIABLE FOR ANY DAMAGES OR DELAYS CAUSED BY ANY FAILURE TO MAKE ANY DELIVERY OF GOODS BY ANY EXPECTED TIME OR DATE OR THE FAILURE TO PROVIDE OR COMPLETE ANY SERVICES BY ANY EXPECTED DATE OR TIME. IN NO EVENT SHALL HI-SPEED BE LIABLE TO BUYER FOR ANY DAMAGES WHATSOEVER IN EXCESS OF THE TOTAL PRICE PAID FOR ALL GOODS AND/OR SERVICES HEREUNDER OR REFERENCED IN ANY QUOTATION OR THE PURCHASE ORDER.
- 10. <u>SEVERABILITY.</u> The partial or complete invalidity of any provision of these Standard Terms and Conditions shall not affect the enforceability of the remainder of these Standard Terms and Conditions. If any provision is found to be invalid or unenforceable, that portion shall be modified to make it enforceable or shall be stricken and the remainder of these Standard Terms and Conditions shall enforced.
- 11. **GOVERNING LAW AND JURISDICTION.** Any controversy arising out of any quotation, the purchase order, the goods sold or delivered, repair or replacement thereof, or any services provided pursuant to any quotation or any purchase order, or these Standard Terms and Conditions shall be governed by the laws of the state of Tennessee without regard to any choice of law provisions and any cause of action related in any manner thereto shall be brought only in the state or federal courts of Shelby County, Tennessee.
- 12. <u>ABANDONED EQUIPMENT.</u> Hi-Speed requires that Buyer promptly pick up or provide shipment instructions for Buyer equipment or other Buyer property in Hi-Speed's possession. If equipment or other Buyer property is left with Hi-Speed and not picked up within six (6) months after Hi-Speed's final action related to the applicable property (e.g. evaluation, teardown, estimate, completion of services), Hi-Speed will consider such property abandoned and may dispose of it in accordance with applicable law. Buyer agrees to hold Hi-Speed harmless for any damage or claim for such abandoned property and acknowledges that Hi-Speed may discard or recycle it at Hi-Speed's sole and absolute discretion. Specifically, Hi-Speed may sell Buyer's abandoned property at a private or public sale and retain the proceeds to offset Hi-Speed's storage, inspection and servicing costs. For the avoidance of doubt, Hi-Speed reserves its statutory and other lawful liens for unpaid charges related to abandoned property.
- 13. FORCE MAJEURE. Neither party shall be responsible for any delay or failure in performance of any party of the quotation, purchase order or these Standard Terms and Conditions to the extent that such delays or failures are caused by fire, flood, earth quake, explosion, war, embargo, government requirement, civil or military authority, acts of God, or any other circumstances beyond its reasonable control and not involving any fault or negligence on the party affected ("Condition"). If any such Condition occurs, the party delayed or unable to perform shall promptly give written notice to the other party and, if such Condition remains at the end of thirty (30) days, the party affected by the other party's delay and inability to perform may elect to (i) terminate such order or part thereof, or (ii) suspend the order for the duration of the Condition, if the Buyer is the suspending party, buy elsewhere comparable material to be sold under the order and apply to any commitment the purchase price of such purchase, and resume performance of the order once the Condition ceases, with an option in the affected party to extend the period of this order up to the length of the time the Condition endures.
- 14. <u>NONWAIVER.</u> No course of dealing or failure of either party to strictly enforce any term, right, or condition of these Standard Terms and Conditions will be construed as a waiver of such term, right or condition. Any waiver by Hi-Speed will only be in writing and will waive no succeeding breach of a term, right or condition.
- 15. **ASSIGNMENT.** The rights and obligations of the parties shall neither be assigned nor delegated without the prior written consent of the other party. However, any party may assign or delegate its respective rights and obligations, in whole or in part, (i) to any subsidiary, (ii) pursuant to other financing, merger or reorganization or (iii) pursuant to any sale or transfer of substantially all of the assets of the assigning party. These Standard Terms and Conditions shall bind the heirs, successors and assigns of the parties hereto.
- 16. NO INDIVIDUAL LIABILITY. Notwithstanding any other agreement to the contrary, the Buyer agrees that in no event will the Buyer hold and HI-Speed owner, director, officer or employee personally liable for unintentional tortious conduct or conduct that constitutes the breach of any contract between HI-Speed and the Buyer, even if the HI-Speed owner, director, officer or employee is or could be construed to be a party to such contract.