

诚信经营 / 质量领先
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Site Inspection Report – Chemical Industry

Customer:	Fude Energy New Materials Co., Ltd.
Contact person:	Lu Hongwei
Service Scope:	Replace bearings
Service Date:	December 6, 2021
Executive Engineer:	Zhao Jie
Whether First-time Service:	Yes
Customer Order Number:	WS21246S31130
Gearbox Model:	316F-311 ; S/N: 4587716-0020-1
The Report Contains:	Total 16 Pages

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1. Site Situation

2020-12-06 For the faulty gearbox (model - 316F-311; serial number 4587716-0020-1), appearance and preliminary inspection are shown in Fig. .



Fig. 1

Appearance normal
Oil Leakage of Output Shaft
Oil Leakage on End Cover

Spectrum report from customer
indicates several bearings are abnormal

2. Gearbox Structure

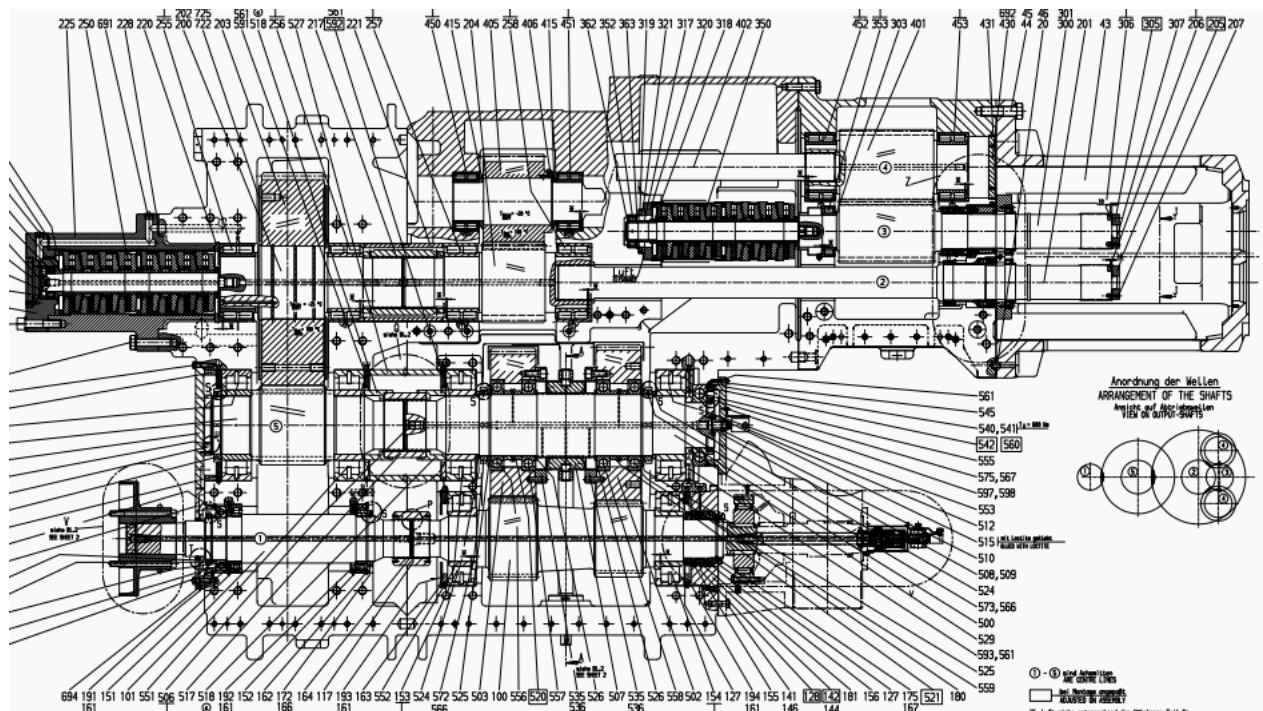


Fig. 2: Diagram of Gearbox Structure and Names of Components

3. Gearbox Information

Model	<u>316F-311</u>	Serial Number	<u>4587716-0020-1</u>
Power (KW)	16380/14180	Lubricating Oil	MIN
Input Speed (RPM)	N1=1480	Viscosity	VG320
Output Speed (RPM)	N2=251.5/217.7	Latest Time of Changing	Unknown
Manufacturing Date	2012	Cooling water Inlet Temperature (°C)	Shutdown not detected
Motor Manufacturer	Siemens	Cooling Water Outlet Temperature (°C)	Shutdown not detected
Motor Factory Date	2012	Gas station Outlet Pressure (Bar)	Shutdown not detected
Motor Rated Power (KW)	14700	Vibration (mm/s)	Shutdown not detected
Motor Real-time Power (KW)	shutdown state	Cooling Water Inlet Temperature (°C)	Shutdown not detected
Operation Temperature (°C)	15 °C	Cooling Water Outlet Temperature (°C)	Shutdown not detected

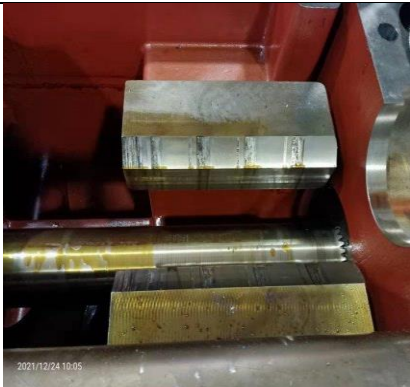




Fig. 3 Equipment Nameplate

4. Overall Status

- Gear/Gear Shaft: 204 gear has peeling points on three tooth surfaces; the 405 gear tooth surface, meshed with the 204 gear, shows slight signs of wear; the erosion width on 589 bearing position (500 shaft) is 80mm; diameter after wear is approximately 4 mm smaller than original size; 350 bearing position has rotary wear.
- For 150 four-point contact bearing, one area of the inner roller is peeled off, about 1 mm*2.5mm, and the rest of the bearings wear normally.
- Accessories and others: spacer rings 525/526 for high and low speed gear end have concave wear, and the 630 clutch hose is distorted and deformed by external forces.

4.1. Gear/Pinion

 <p>2021/12/24 10:05</p>	<p>Fault type:</p> <p>Slight wear on the bearings</p>
<p>204 gear</p> <div>   <p>2022/01/03 15:07</p> </div>	<p>Fault type:</p> <p>Peeling off at three locations on the tooth surface</p> <p>Repair and open diversion channel</p>

<p>500 pinion shaft</p> 	<p>Fault type:</p> <p>559 bearing position is worn;</p> <p>558 bearing position is slightly worn</p> <p>Cladding repair by laser</p>
<p>502 gear</p> 	<p>Fault type:</p> <p>559 Bearing: end face wear of inlay outer ring</p> <p>Simple grinding</p>
<p>607 overrunning clutch</p> 	<p>Fault type:</p> <p>The arc surface of the inner sleeve has multiple corrosion points</p> <p>Replace</p>

<p>525 spacer rings</p> 	<p>Fault type:</p> <p>Contact surface wear</p> <p>Replace</p>
<p>405 gear</p> 	<p>Fault type:</p> <p>Mesh of 204 gear is peeled off, and the tooth surface is worn.</p> <p>Simple grinding</p>
<p>630 hose</p> 	<p>Fault type:</p> <p>The hose is deformed by external force</p> <p>Replace</p>


Bearings (Abnormal vibration frequency of the following bearings is detected in Vibration Spectrum Report)

<p>150-Bearing</p> 	<p>Bearing Type: 1052QJN2MA/C3</p> <p>Fault type: Surface of rotary parts is in good condition;</p> <p>There is a peeling spot on the inner sleeve, the size is about 1mm*2.5mm (the size of a grain of rice)</p>
<p>154-bearing</p> 	<p>Bearing Type: 192356LSLTBC3BR</p> <p>Fault type: Normal wear, no problems found</p>
<p>155-bearing</p> 	<p>Bearing Type: 29248 D728</p> <p>Fault type: Normal wear, no abnormalities found</p> <p>There are black spots on the rollers in the outer ring. It could be contact points between roller and roller table when gearbox is unused</p>

<p>156- Bearing</p>  <p>中国, 浙江省, 宁波市</p>	<p>Bearing Type: 29248 D728</p> <p>Fault type: Normal wear, no abnormalities found</p> <p>There are black spots on the rollers in the outer ring. It could be contact points between roller and roller table when gearbox is unused</p>
<p>550- Bearing</p>  <p>2021/12/27 10:01</p>	<p>Bearing Type: NU LSL F-574392</p> <p>Fault type: Normal wear, no abnormalities found</p>
<p>551- Bearing</p>  <p>2021/12/27 10:01</p>	<p>Bearing Type: NU LSL F-574392</p> <p>Fault type: Normal wear, no abnormalities found</p>

<p>552- Bearing</p> 	<p>Bearing Type: NU LSL F-574392</p> <p>Fault type: Normal wear, no abnormalities found</p>
<p>553- Bearing</p> 	<p>Bearing Type: NU LSL F-574392</p> <p>Fault Type: There are radial scratches on the rotary parts, but the parts touch smooth</p> <p>The inner sleeve wears normally and no abnormalities are found.</p>
<p>555- Bearing</p> 	<p>Bearing Type: 1256 QJ N2MAC3 D628</p> <p>Fault type: Normal wear, no abnormalities found</p>

<p>250- Bearing</p> 	<p>Bearing Type: F21084</p> <p>Fault Type: Normal wear, no abnormalities found</p>
<p>252- Bearing</p> 	<p>Bearing Type: 2222NU EC/C3 D5412</p> <p>Fault type: Normal wear, no abnormalities found</p>
<p>257- Bearing</p> 	<p>Bearing Type: 185064 SL XL TB C3 BR</p> <p>Fault Type: Normal wear, no abnormalities found</p>

<p>452- Bearing</p> 	<p>Bearing Type: 185056 SL XL C3 BR</p> <p>Fault Type: Normal wear, no abnormalities found</p>
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Summarize

Replace all bearings of the reducer, measure and adjust installation according to original parameter. Bearing position of 500 shaft has been repaired by laser cladding; start installation when PT test shows that there are no cracks. All worn spacer rings are replaced. Adjust the output shaft and make new spring sleeve. Grind the peeling surface of the 204 gear and check with PT if there is crack. Grind and repair high points of the tooth surface on 405 gear, and assembly according to the original standards.

5. BOM for Maintenance

Serial Number	Position Number	Item Number	Model	QTY	Maintenance	Remarks/Specifications
1	153		1052QJN2MA/C3 D628	1	replace	
2	154		1056NUM1/C3 BR	1	replace	
3	155		1056NUM1/C3 BR	1	replace	
4	156		192356LSLTBC3BR	1	replace	
5	550		192356LSLTBC3BR	1	replace	
6	551		29248 D728	1	replace	
7	552		29248 D728	1	replace	
8	556		NU LSL F-574392	1	replace	
9	557		NU LSL F-574392	1	replace	
10	558		NU LSL F-574392	1	replace	
11	559		6076 M/C3 VQ561 D625	1	replace	

12	553		6076 M/C3 VQ561 D625	1	replace	
13	555		6076 M/C3 VQ561 D625	1	replace	
14	252		6076 M/C3 VQ561 D625	1	replace	
15	250		Bearing NU LSL F-574392	1	replace	
16	255		Bearing 1256 QJ N2MAC3 D628	1	replace	
17	256		Bearing 2222 NU EC/C3 D5412	1	replace	
18	257		Bearing F21084	1	replace	
19	258		Bearing 185064 SL XL TB C3 BR	1	replace	
20	254		Bearing 185064 SL XL TB C3 BR	1	replace	
21	251		Bearing 185064 SL XL TB C3 BR	1	replace	
22	450		Bearing 185064 SL XL TB C3 BR	1	replace	
23	451		Bearing 024844 SL C3 BR	1	replace	
24	452		Bearing 81244 D722	1	replace	
25	453		Bearing 185048 SL XL C3 BR	2	replace	
26	352		Bearing 185048 SL XL C3 BR	2	replace	
27	350		Bearing 185056 SL XL C3 BR	2	replace	
28	353		Bearing 185056 SL XL C3 BR	2	replace	
29	354		Bearing 2222 NU EC/C3 D5412	1	replace	

30	351		Bearing F81661	1	replace	
31	605		Bearing 183040 SL C3 BR	1	replace	
32	525		spacer ring	2	replace	
33	526		spacer ring	2	replace	
34	630		Hose	1	replace	
35	607		overrunning clutch	1	replace	
36	128		Adjustment ring	1	replace	
37	110		Labyrinth Seal A	1	replace	
38	111		Labyrinth Seal B	1	replace	
39	262		circlip	1	replace	

6. Suggestion

1. Regularly check the contact and gap of the bevel teeth;
2. Check the lubricating oil regularly and replace the lubricating oil on time according to gearbox operating instructions;
3. Implement vibration status monitoring every six months;
4. Avoid overload operation and frequent impact loads.

End of report