Test-Report iglidur®

Test Intention

Rotating wear tests of different iglidur® and competitor bearings against two customer shafts
To find the perfect iglidur® material for a manufacturer of high-end mountainbike pedals, chromoly and titanium shafts as well as competitor bearings where sent to us. With this setup, we put iglidur® bearings to the test in our igus® lab to compare their performance.

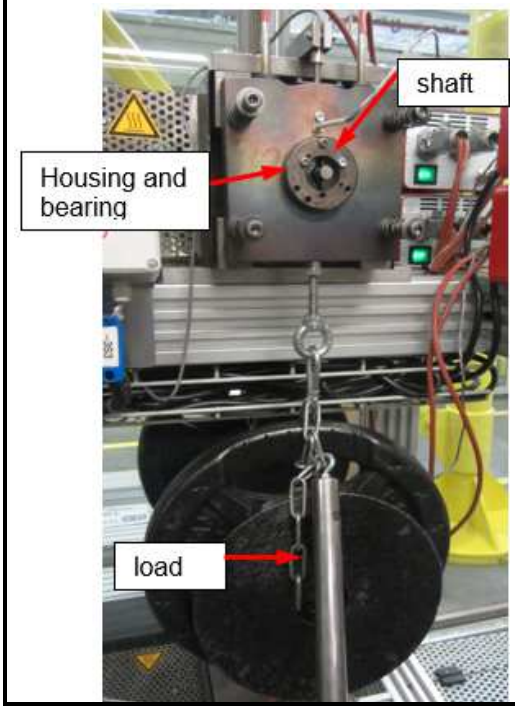
Client:		
Name: Michael Pfordt	Team: iglidur® bearings	Date: KW 04/2015

Order-Info:			
Customer / No.: intern			
Customer test:	Yes X No ☐	Development test:	Yes ☐ No X
Technical data			
Bearing materials:	iglidur® P210, iglidur® J, iglidur® J3, competitor material	Shaft materials:	titanium and chromoly
load	4.53 MPa	speed	0.03 m/s
movement	rotation		

Experimental setup

The bearings were tested in two sequences on the same igus® laboratory test machine (picture 1). In the first sequence every bearing material was tested with every shaft material. In the second sequence only the two best bearing materials were tested again to confirm the first tests. The shaft damage was divided into four grades from 1 to 4. Grade 1 means that there is no visible and measurable damage, grade 2 is just visible damage, grade 3 is visible and measurable damage and grade 4 is heavy visible and measurable damage.

picture 1



The measuring results of the performed tests are shown in table 1.

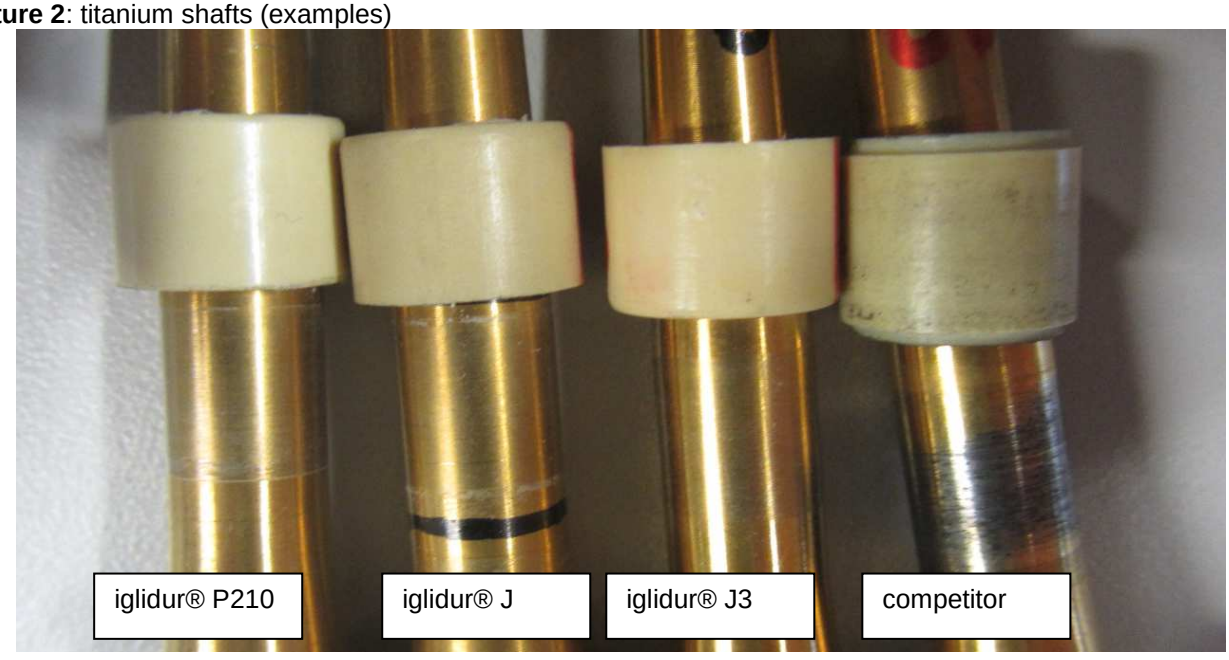
table 1

bearing	shaft	p [MPa]	v [m/s]	shaft damage	running distance [km]	inner diameter before testing [mm]	inner diameter after testing [mm]	**wear rate [µm/km]**
iglidur® P210	titanium	4,53	0,03	2	3	10,11	10,90	**241,1**
iglidur® P210	titanium	4,53	0,03	2	3	10,11	10,68	**174,0**
iglidur® P210	chromoly	4,53	0,03	2	3	10,11	10,33	**67,2**
iglidur® P210	chromoly	4,53	0,03	2	3	10,11	10,46	**106,8**
iglidur® J	titanium	4,53	0,03	2	2	10,16	10,91	**336,0**
iglidur® J	chromoly	4,53	0,03	2	3	10,17	10,32	**45,8**
iglidur® J3	titanium	4,53	0,03	2	3	10,18	10,39	**64,1**
iglidur® J3	titanium	4,53	0,03	2	3	10,16	10,40	**73,3**
iglidur® J3	chromoly	4,53	0,03	2	3	10,16	10,28	**36,6**
iglidur® J3	chromoly	4,53	0,03	2	3	10,12	10,28	**48,8**
competitor	titanium	4,53	0,03	4	3	10,17	12,14	**776,2**
competitor	chromoly	4,53	0,03	3	3	10,16	11,24	**329,7**

The iglidur® J3 bearings had the lowest wear rate against both kinds of shafts (36.6 µm/km to 73.3 µm/km). This was the best test result. The wear rate of the competitor bearings against both shafts was 329.7 µm/km to 776.2 µm/km. This was the worst test result.

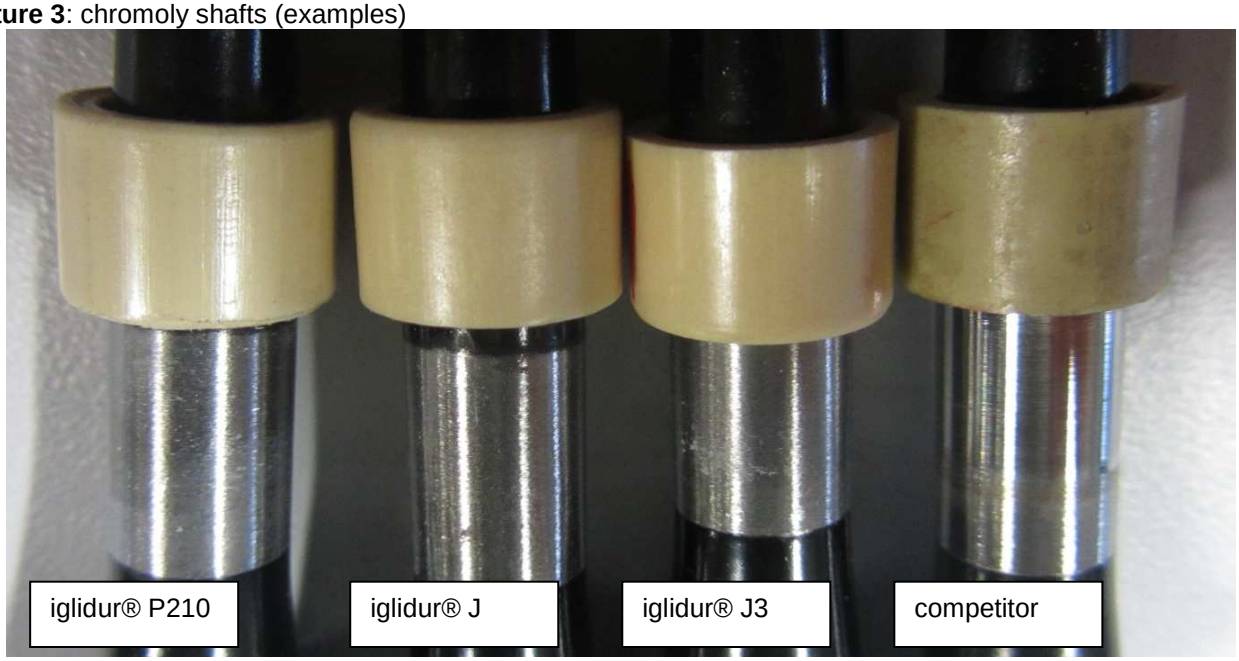
After the performed tests the bearings and shafts were visually analyzed. The results of this analysis are shown in the pictures 2 and 3.

picture 2: titanium shafts (examples)



There are just a few running marks visible on the gliding area of the shaft except the shaft that was tested with the competitor bearing. There are deep running marks on the gliding area.

picture 3: chromoly shafts (examples)

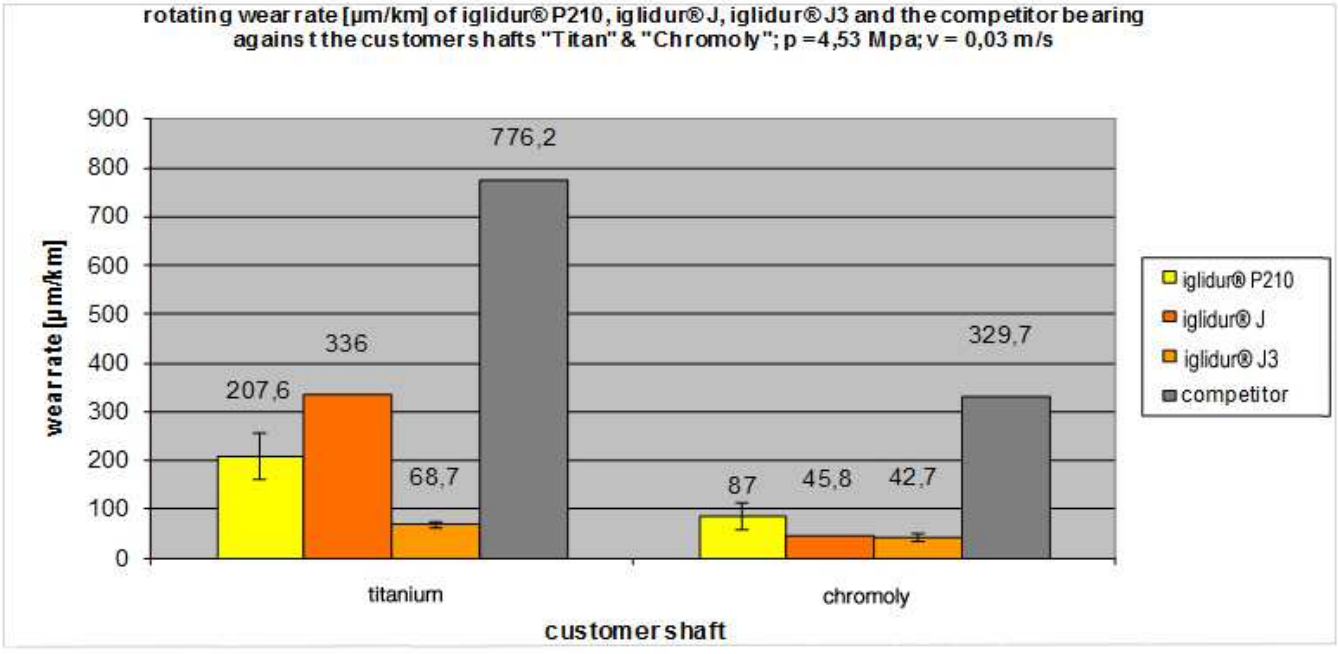


There are also just a few running marks visible on the gliding area of the shaft except the shaft that was tested with the competitor bearing. There are deep running marks on the gliding area.

Conclusion / optimization:

The performed tests show that iglidur® J3 is probably the most suitable material out of the tested materials against both kinds of tested shafts (chart 1). Its wear rate is in both tests lower than the wear rate of the other tested materials. The wear rate of all tested materials is lower on the chromoly shafts than on the titanium shafts. All tested iglidur® materials have a better wear rate than the competitor bearings.

chart 1: comparison of different bearing materials and different shafts



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The managing data show the results of the accomplished examinations. With all data it still acts neither around one or more warranties of certain characteristics around one or more warranties regarding the suitability of a product for a certain targeted application, since the examinations on laboratory conditions took place. The warranty of certain characteristics of the products and/or their suitability for a certain application requires writing in the confirmation of order. Finally we recommend user-specific measurements under genuine operating conditions.

Evaluation			
The material iglidur® J3 seems to be the best tested material for this application. It has the best wear rate against both shaft materials. Also the damage of the tested shafts is the lowest. The wear in this application can be optimized by using the iglidur® J3 bearing and the chromoly shaft. This is the best tested combination.			
Name:		**Date:**	KW 04/2015