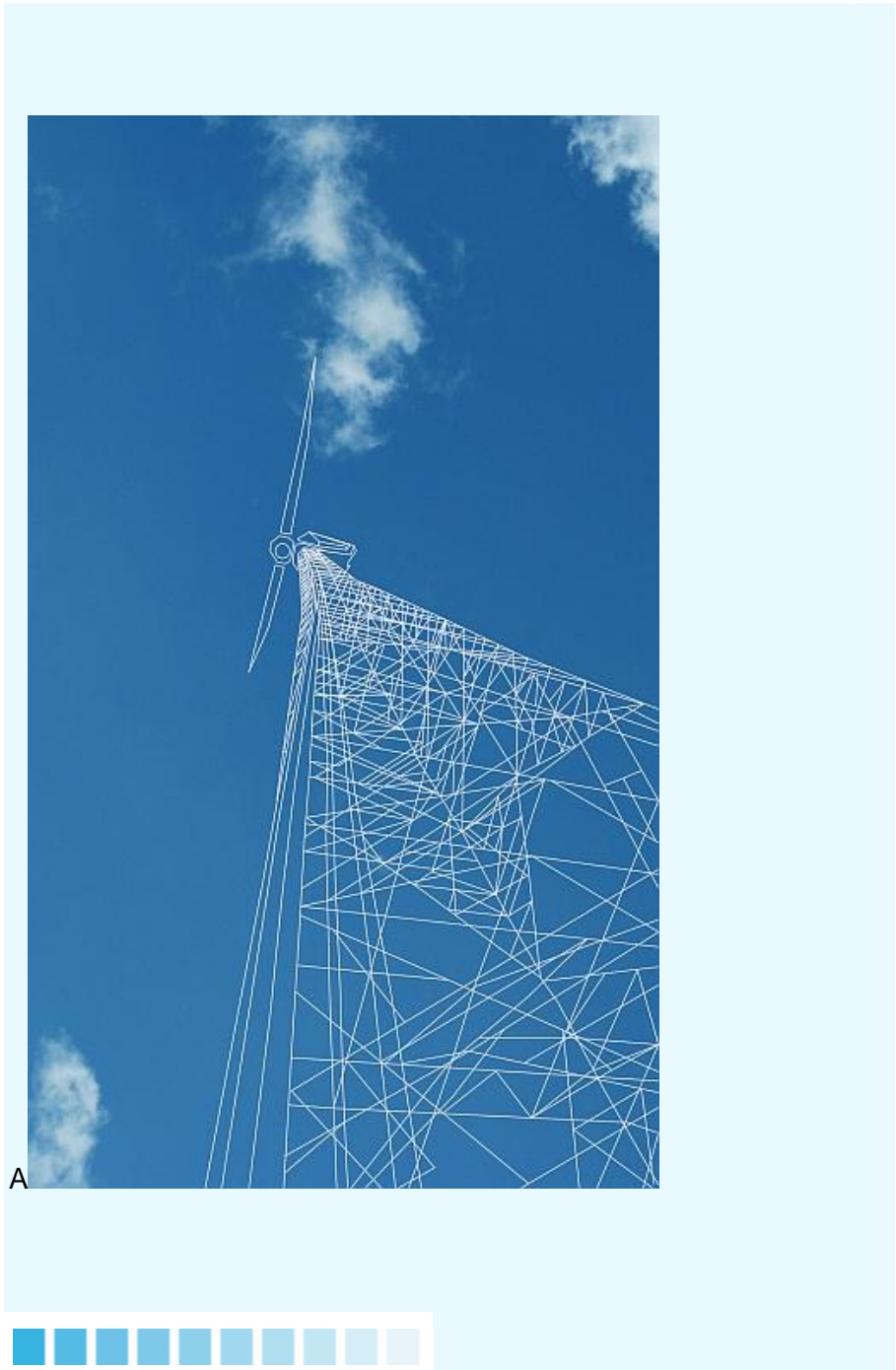


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Change Record

Version	Date	Change Description
1	28.08.2014	First issue

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1. Inspection of hub cast dimensions

The present document illustrates an amendment to the specification rotor “Hub Cast W90/W100” [1].

The defined values in the table below represent a basis of dimensions which should be included in an inspection protocol. Generally it has to be stated that the dimensions, position tolerances and form tolerances as well as information on surface finish defined in the technical drawings [2], [3], [4] and [5] have to be met and have to be controlled.

The layout of the inspection protocol can be designed differently than show exemplarily in the table below.

1.1. General information regarding the inspection

The functional surfaces of the pitch drives as well as the blade bearings have to be checked separately. For better identification of these surfaces they have to be numbered form 1 to 3 in the table below.

In general all threads have to be carried out as standard metric threads in case it is not differently defined in technical drawings. At random some threads should be checked with the corresponding bolts.

In order to check the surface roughness at minimum 10 measurement points distributed over the entire surface have to be measured.

1.2. Measurement of the axial run-out at the rotor bearing flange

For the length of the lifetime of the rotor bearing the axial run out of the main bearing surface at the rotor hub is extremely important.

In case the defined value is exceeded, the corresponding surface has to be reworked as long as all tolerances and dimensions are met.

For the measurement of the axial run-out the flange surface of the main bearing at the rotor hub should be divided evenly in 30 segments. In order to detect tilting or twisting of the surface, this surface shall be divided in an inner and outer ring as it can be seen in Figure 1. As a result of this 60 inspection points have to be defined for measuring the axial run-out.

The inspection points and corresponding values have to be provided in a separate protocol to the purchaser until no later than the delivery of the main shaft.

1.3. Measurement of the axial run-out at the blade bearing flanges and pitch drive flanges

Just as the main bearing flange surface, the surface of the blade bearing flanges and the pitch drive flanges have to be measured in regard to the axial run-out. In order to measure the axial run-out the surface shall be divided in 15 evenly distributed segments. Here again a measurement procedure at the inner as well as outer ring shall be performed. The resulting 30 inspection points shall be adhered in a separate protocol.



Component	Hub cast	Date of inspection:
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Position	Detail/ Cut	Inspection criteria	Nominal dimension	Tolerance		Actual dimension	Deviation	Comment
				LTL	UTL			
GS								
C-6	Cut A-A	Length	1300,00	-1,000	1,000			
B-12		Length	290,00	-1,000	1,000			
C-9		Angle	85,00	-0,050	0,050			
F-8		Length	1390,00	-0,200	0,200			
F-10		Length	1600,00	-0,500	0,500			
G-3	Detail A	Axial run-out (1)	0,2/A					
		Axial run-out (2)	0,2/A					
		Axial run-out (3)	0,2/A					
G-2		∅ (1)	2593,00	0,000	0,300			
		∅ (2)	2593,00	0,000	0,300			
		∅ (3)	2593,00	0,000	0,300			
G-2		BCD ∅ (1)	2515,00	-0,200	0,200			
		BCD ∅ (2)	2515,00	-0,200	0,200			
		BCD ∅ (3)	2515,00	-0,200	0,200			
J-3	Detail A	Length (1)	56,50	-3,0	3,0			
		Length (2)	56,50	-3,0	3,0			
		Length (3)	56,50	-3,0	3,0			
H-18	Detail E	∅	1900,00	-10	0,000			
H-18		∅	1935,00	-0,5	-0,200			
H-19		∅	2090	-0,500	0,500			



Component	Hub cast	Date of inspection:
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Position	Detail/ Cut	Inspection criteria	Nominal dimension	Tolerance		Actual dimension	Deviation	Comment
				LTL	UTL			
GS								
M-22	Detail F	H7 (1)	320	-0,000	0,057			
		H7 (2)	320	-0,000	0,057			
		H7 (3)	320	-0,000	0,057			
K-22		H7 (1)	280	0,000	0,052			
		H7 (2)	280	0,000	0,052			
		H7 (3)	280	0,000	0,052			
L-24		Length (1)	351	-0,200	0,200			
		Length (2)	351	-0,200	0,200			
		Length (3)	351	-0,200	0,200			
L-5	CUT E-E	Angle (1)	45	-0,2°	0,2°			
		Angle (2)	45	-0,2°	0,2°			
		Angle (3)	45	-0,2°	0,2°			
M-7	CUT E-E	Length (1)	944	-0,100	0,100			
		Length (2)	944	-0,100	0,100			
M-7	CUT E-E	Length (3)	944	-0,100	0,100			
L-11		Length (1)	1330	-1,000	1,000			
		Length (2)	1330	-1,000	1,000			
		Length (3)	1330	-1,000	1,000			
H-3	Detail A	Roughness	Ra6,3 (1)					
		Roughness	Ra6,3 (2)					



Component				Hub cast				Date of inspection:			
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Revision:								Component no.:			
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Position	Detail/ Cut	Inspection criteria	Nominal dimension	Tolerance		Actual dimension	Deviation	Comment			
				LTL	UTL						
GS											
H-3		Roughness	Ra6,3 (3)								
I-19	Detail E	Axial run-out	0,1/B								
I-19		Axial run-out	0,1/B								
K-22	Detail F	Axial run-out	0,05/C (1)								
			0,05/C (2)								
			0,05/C (3)								
M-22		Axial run-out	0,05/C (1)								
			0,05/C (2)								
			0,05/C (3)								
L-22		Roughness	Ra6,3 (1)								
		Roughness	Ra6,3 (2)								
		Roughness	Ra6,3 (3)								
M-22	Detail F	Roughness	Ra6,3 (1)								
		Roughness	Ra6,3 (2)								
		Roughness	Ra6,3 (3)								
M-20		Parallelism	0,05/D (1)								
			0,05/D (2)								
			0,05/D (3)								
H-18		LKø	2010	-0,200	0,200						



Component: Hub cast				Date of inspection:				
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Revision:				Component no.:				
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Position	Detail/ Cut	Inspection criteria	Nominal dimension	Tolerance		Actual dimension	Deviation	Comment
				LTL	UTL			
GS								
H-21		LKø	400	-0,200	0,200			
B-12		Rauheit	Ra3,2					
I-10		Radius	R2	-0,200	0,200			

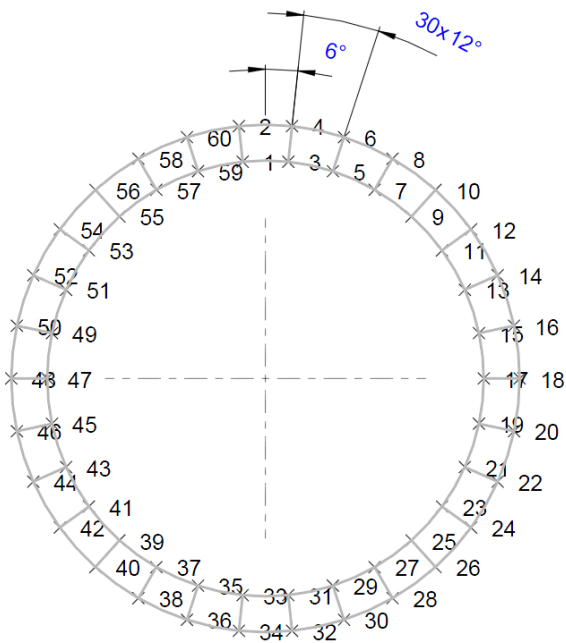


Figure 1: Distribution measurement point main frame

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2. Abbreviation

Long form

Lower tolerance limit
 Upper tolerance limit
 Grid square
 Bolt circle diameter

Short form

LTL
 UTL
 GS
 BCD

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3. Cross references

The technical data which are specified in this document will be extended by references to additional technical documents or drawings. The referenced documents are named via unique file names. They are named in a table below. This document will be updated to change a several modifications. The licenser has the discretionary authority for updates.

For following developments especially for components production the current state of development respectively of the referenced documents the licenser has to be requested.

References, dealing with product supporting documents of suppliers / manufacturers, are only used as exemplary explanation. The valid product documentation is part of the delivery.

No.	Document no. W2E, title	Classifikation	Additional information
[1]	W0402-H05-DASH-304-W2E-001	Customer	Hub Cast W90 / W100
[2]	W0402-H05-000-000-001-02-DMDR-W2E	Customer	Hub W90/W100 casting
[3]	W0402-H05-000-000-002-02-DMDR-W2E	Customer	Nabe W90/W100 Bearbeitung
[4]	W0402-H05-000-000-003-02-DMDR-W2E	Customer	Hub W90/W100 cast inspection
[5]	W0402-H05-000-000-004-02-DMDR-W2E	Customer	Hub W90/W100 3D-views