

# VULASTIK L

## SERVICE LIFE OF HIGHLY FLEXIBLE COUPLINGS

### THEORETICAL EXPECTED LIFETIME

VULKAN couplings are produced and tested under the most stringent quality controls. As a result, apart from a high level of functional safety across several hours of operation, they even offer the user a long service life of several years. The expected service life of the flexible elements is depending on the individual operating or storage conditions. Even with optimal operating or storing condition, the elastomer of the coupling ages and wears out. This results in changes in the dynamic characteristic and functional performance of the coupling over the lifetime.

Impermissible or excessively high element stresses caused by the connected machinery reduces the expected service life. The alignment of the connected parts has also an influence on the total lifetime. Hence, we recommend that you regularly inspect the elements at least twice a year. The inspection procedure should include the operating hours, the visual shape, permanent set, cracks and other signs of damage and wear. This inspection can be completed on-site by the crew referring to the data on the attached tables or by a VULKAN Technician. Additionally, we recommend to check the alignment between the connected machinery, especially with elastic mounted systems in regular terms.

Normal ageing of natural rubber causes a certain hardening and changing of dynamic properties. After 10 years, the stiffness and damping of highly flexible rubber couplings has changed significantly.

In case of changes in dynamic properties of the rubber elements we recommend, to replace them in order to ensure the function and the dynamic behavior of the drive line.

In case of impermissible cracks, the flexible elements have to be replaced. Permissible lengths and depths of cracks, permissible permanent set, wear of teeth and the theoretical expected lifetime may be selected from the tables enclosed. For cracks in the bonding zone between rubber and metal parts the same values in the tables are valid.

VULKAN Service is also pleased to provide support in the inspection and assessment of couplings that have been installed.



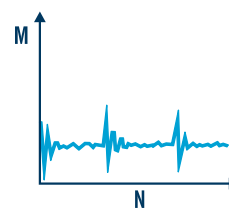
Coupling	Natural Rubber		Silicon	
VULASTIK L	20,000 h	10 years	20,000 h	10 years



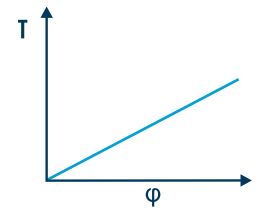
10 years service life



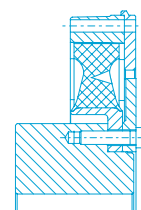
20,000 operation hours



Dynamic characteristic



Static twist angle



Tearing

# VULASTIK L

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Checking the permissible permanent set of a VULASTIK L element takes place by obtaining **S** measurement of the distance from inner to the outer side as shown in the Figure 1 and Figure 2. In case the maximum value is reached, the flexible element has to be replaced.

Figure 1

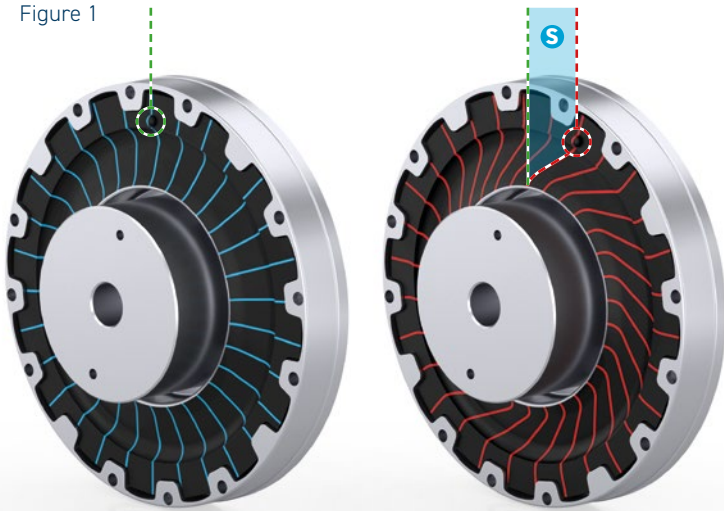
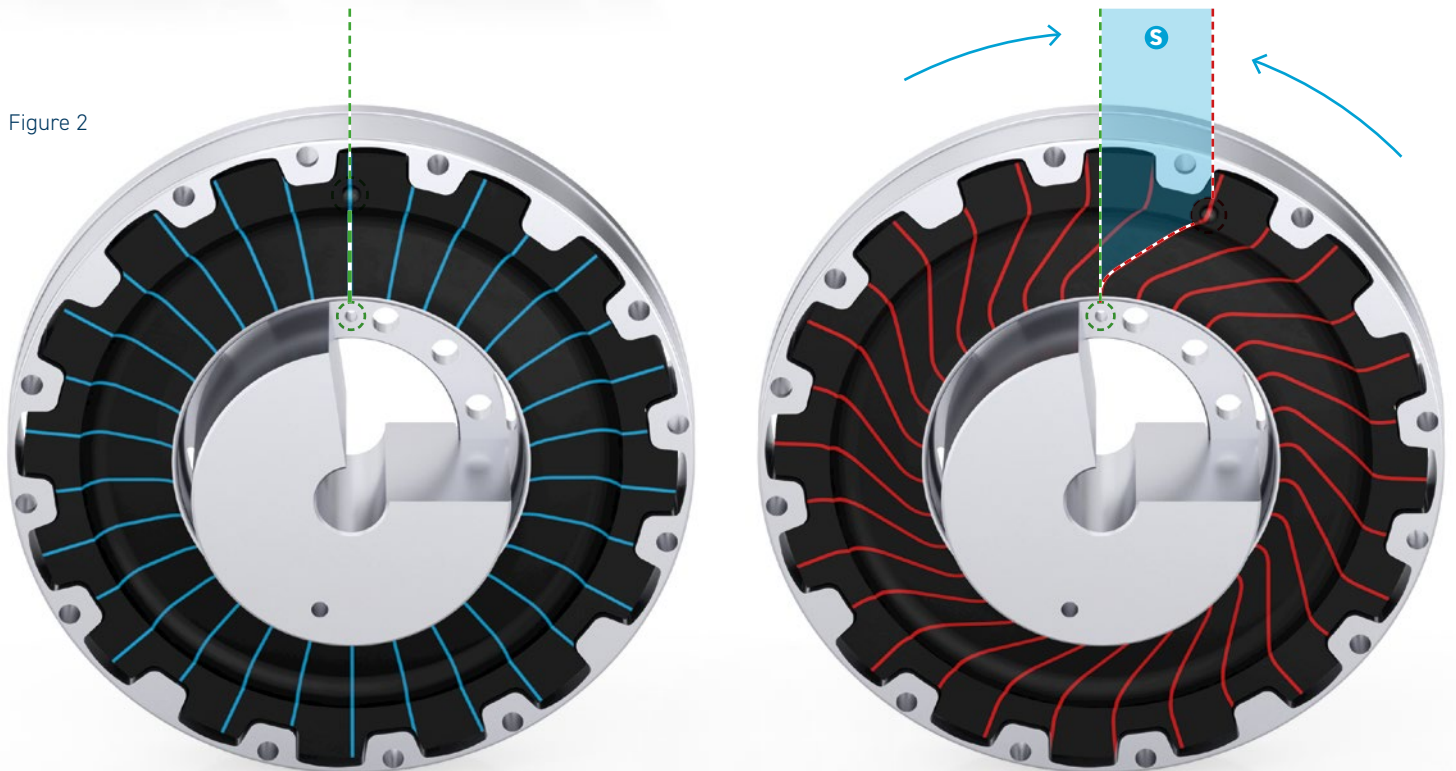


Figure 2



### PERMISSIBLE PERMANENT SET

Size	S [mm]	Size	S [mm]
X14	12	X34	19
X16	16	X34 - 6 8 A	6
X19	18	X36	24
X22	22	X37	19
X26	24	X37 - 6 8 A	6
X26 - 6 8 A	7	X40	23
X30	24	X40 - 6 8 A	11
X30 - 6 8 A	7	X43	23
X31	24	X43 - 6 8 A	11
X32	24	X50 - 6 8 A	23
X33	16		

## SERVICE LIFE OF HIGHLY FLEXIBLE COUPLINGS

As a result of the deformation, ageing and load during normal operation of the flexible element, cracks may get formed in the rubber. These cracks are permissible up to a certain limit. We differentiate cracks in the main rubber body, cracks in the ground of the rubber teeth and if the mentioned cracks occur predominantly on one side of the elastic element or on both sides.

For cracks in the rubber body see Figure 3, Figure 4 and Table 1. For cracks in the teeth ground see Figure 5, Figure 6 and Table 2 (X depth onesided, Y depth bothsided and Z length).

If the permissible influenced area as a combination of the mentioned cracks is exceeded, it is recommended to replace the flexible element as soon as possible. In case of cracks in Silicone elements we recommend to renew them soonest because Silicone is less resistant against crack development.

Figure 3

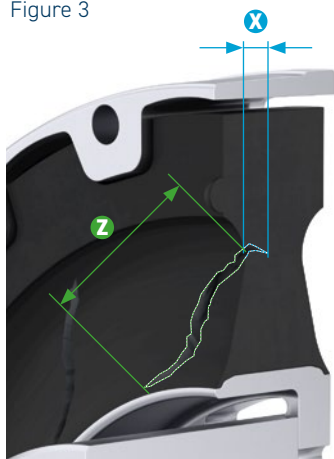


Figure 4

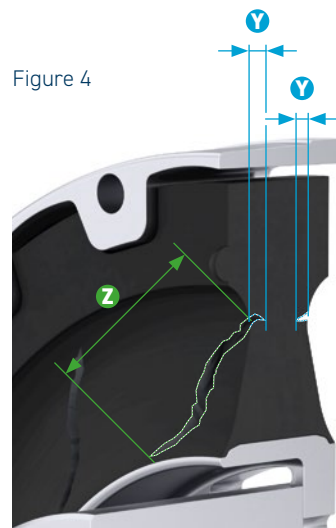


Figure 5

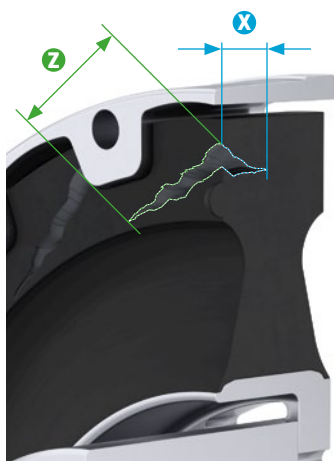
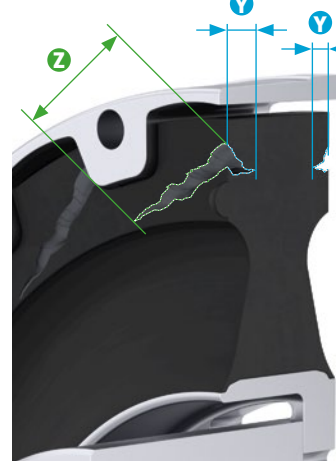


Figure 6



### PERMISSIBLE DEPTHS OF CRACKS - RUBBER BODY

Size	X [mm]	Y [mm]	Z [mm]	Size	X [mm]	Y [mm]	Z [mm]
X14	2	1	10	X34	6	3	16
X16	2	1	13	X34 - 6 8 A	8	4	8
X19	2	1	14	X36	8	4	20
X22	2	1	17	X37	8	4	16
X26	4	2	19	X37 - 6 8 A	10	5	8
X26 - 6 8 A	6	3	7	X40	6	3	19
X30	6	3	19	X40 - 6 8 A	10	5	10
X30 - 6 8 A	8	4	7	X43	12	6	19
X31	12	6	19	X43 - 6 8 A	14	7	10
X32	8	4	19	X50 - 6 8 A	16	8	24
X33	8	4	13				

Table 1

### PERMISSIBLE DEPTHS OF CRACKS - TEETH GROUND

Size	X [mm]	Y [mm]	Z [mm]	Size	X [mm]	Y [mm]	Z [mm]
X14	4	2	10	X34	4	2	15
X16	4	2	10	X34 - 6 8 A	4	2	15
X19	4	2	10	X36	4	2	15
X22	2	1	10	X37	4	2	15
X26	4	2	10	X37 - 6 8 A	4	2	15
X26 - 6 8 A	4	2	10	X40	4	2	15
X30	4	2	10	X40 - 6 8 A	4	2	15
X30 - 6 8 A	4	2	10	X43	4	2	15
X31	4	2	10	X43 - 6 8 A	4	2	15
X32	4	2	10	X50 - 6 8 A	4	2	20
X33	4	2	10				

Table 2

## SERVICE LIFE OF HIGHLY FLEXIBLE COUPLINGS

Wear at the rubber teeth is always caused by misalignment. Provided that there are no cracks in the ground of the teeth, an abrasion of the rubber teeth is permissible up to the defined minimum mentioned in Figure 7 and Table 3. The T-value has to be measured at half of the height of the tooth. The mentioned values are valid for natural rubber and silicon coupling elements. If the teeth width becomes less than the mentioned limit, it is recommended to replace the flexible element as soon as possible.

Attention in case of coupling elements with a vulcanized aluminum ring in the teeth: Such element is worn out as soon as the elastomer layer above the vulcanized ring is gone and it is recommended to replace the flexible element as soon as possible. The specification of the permissible tooth width is irrelevant for this kind of elements.

### PERMISSIBLE TEETH WIDTH

Size	T [mm]	Size	T [mm]
X14	20	X34	30
X16	20	X34 - 6 8 A	30
X19	20	X36	30
X22	20	X37	30
X26	20	X37 - 6 8 A	30
X26 - 6 8 A	20	X40	30
X30	20	X40 - 6 8 A	30
X31	20	X43	30
X32	20	X43 - 6 8 A	30
X33	20	X50 - 6 8 A	40
X30 - 6 8 A	20		

Table 3

Figure 7

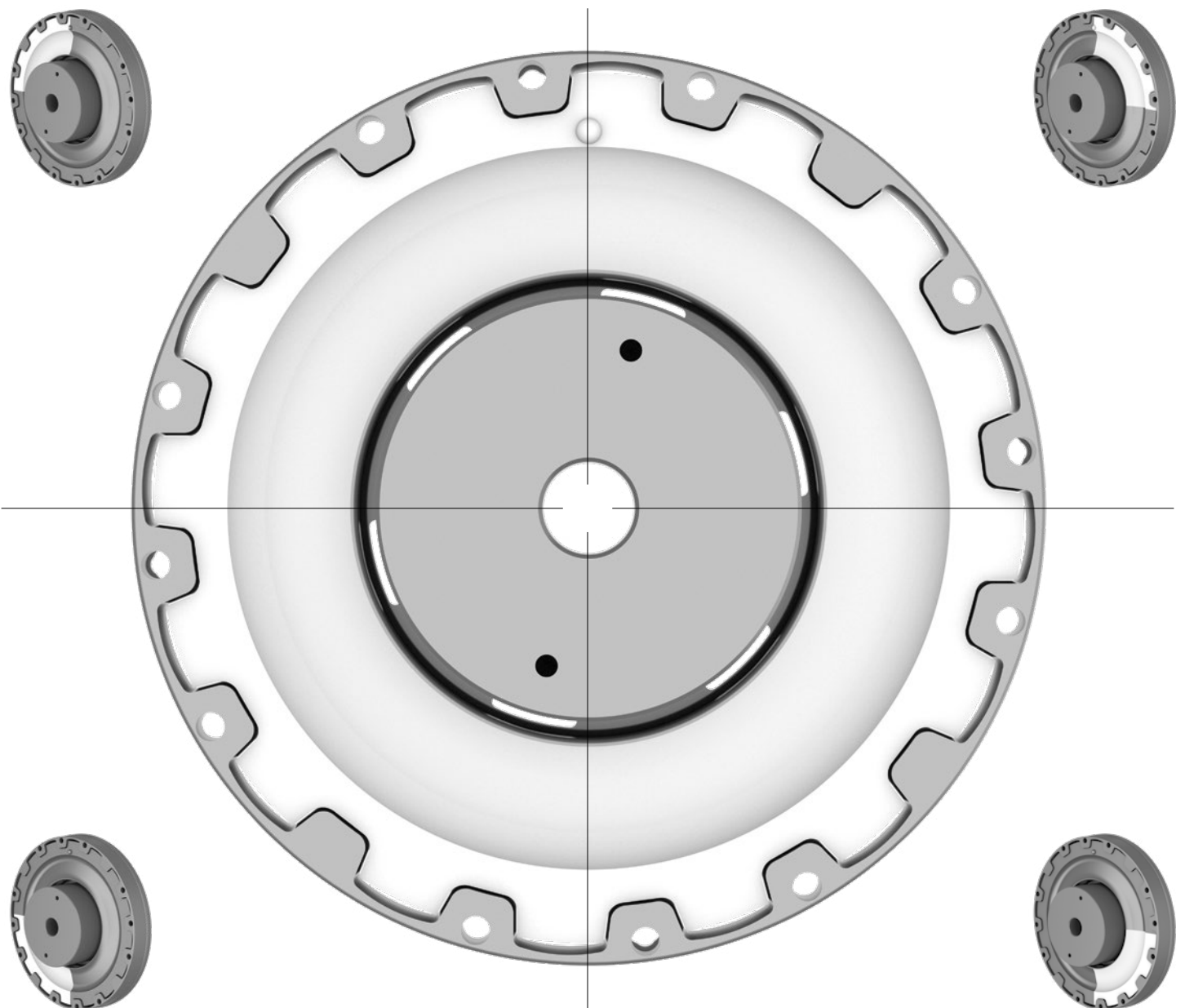


# VULASTIK L

## ELEMENT INSPECTION SHEET

Vessel:		Coupling:	Size:
Date:	Location:	Comm-Nr.:	Permanent set:
Running Hours:	Engine:	Engine < <input type="checkbox"/> > Gearbox < <input type="checkbox"/> > Shaft Generator	
Power:	Speed:	<input type="checkbox"/> Element 1 <input type="checkbox"/> Element 2 (dual execution)	

### FRONT SIDE



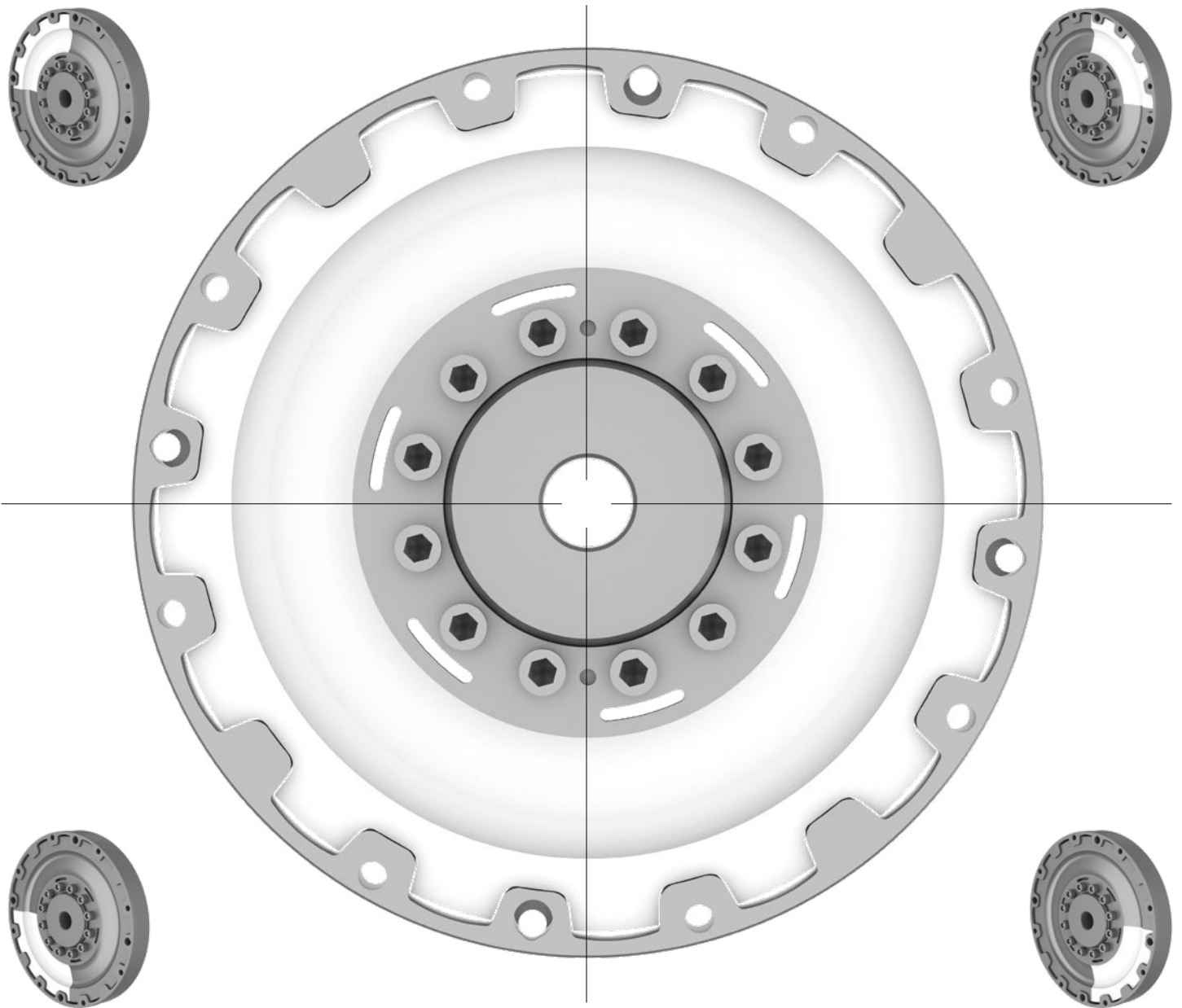
Please make a sketch of the cracks on the shown segments. Use one sheet for one element side. Mark the cracks with "length / depth" if possible.

# VULASTIK L

## ELEMENT INSPECTION SHEET

Vessel:		Coupling:	Size:
Date:	Location:	Comm-Nr.:	Permanent set:
Running Hours:	Engine:	Engine < <input type="checkbox"/> > Gearbox < <input type="checkbox"/> > Shaft Generator	
Power:	Speed:	<input type="checkbox"/> Element 1 <input type="checkbox"/> Element 2 (dual execution)	

### BACK SIDE



Please make a sketch of the cracks on the shown segments. Use one sheet for one element side. Mark the cracks with "length / depth" if possible.