

Grinding disc and use of such a grinding disc

The invention relates to a grinding disc according to the preamble of claim 1. Furthermore, the invention relates to the use of such a grinding disc for
5 rough machining and/or cutting off.

From EP 1 543 923 A1 a grinding disc is known which is used for rough machining by means of a hand-guided angle grinding machine. The grinding disc comprises a grinding layer formed of abrasive grains bonded by
10 means of a binding agent and reinforced by means of inner and outer reinforcing fabrics.

It is an object of the invention to create a grinding disc that has improved properties during rough machining and/or cutting off. In particular, the
15 grinding disc shall be usable at higher rotational speeds and a higher cutting speed and achieve a higher grinding performance and/or cutting-off performance. Furthermore, the grinding disc shall be usable for rough machining and for cutting off.

20 This task is solved by a grinding disc with the features of claim 1. The grinding disc comprises a central opening for attaching a grinding machine. By arranging at least one additional fabric or at least one stiffening fabric on at least one of the reinforcing fabrics, each of which has a smaller diameter D_i than the reinforcing fabrics, the grinding disc is stiffened and stabilized in the region around the central opening. Due to the at least one additional fabric, the number and/or the weight, in particular the glass weight,
25 of inner reinforcing fabrics lying in the grinding layer can be reduced without affecting the stiffness and stability of the grinding disc. The at least one fabric is arranged on a side of the at least one reinforcing fabric facing the

grinding layer and/or on a side of the at least one reinforcing fabric facing away from the grinding layer. If several fabrics are arranged on one of the reinforcing fabrics or a respective reinforcing fabric, these fabrics are thus arranged on a side of the reinforcing fabric or the respective reinforcing
5 fabric facing the grinding layer and/or on a side of the reinforcing fabric facing away from the grinding layer. The fabrics associated with a reinforcing fabric are accordingly arranged on the side facing towards and/or the side facing away from the grinding layer. The at least one fabric is in particular arranged concentrically to an axis of rotation of the grinding disc
10 and/or to the central opening. In particular, the at least one fabric is arranged immediately adjacent to the at least one reinforcing fabric. Preferably, the at least one fabric abuts the at least one reinforcing fabric. By reducing the number and/or the weight, in particular the glass weight, of the reinforcing fabrics in the grinding layer and/or in the working region of the
15 grinding disc, the grinding performance and/or cutting-off performance during rough machining and/or cutting off is improved. Furthermore, it is possible to use the grinding disc at comparatively higher rotational speeds, so that the grinding performance and/or cutting-off performance during rough machining and/or cutting off is additionally improved. The grinding
20 disc is configured in a straight or cranked manner.

The at least one additional fabric reinforces the central region around the central opening so that the number of reinforcing fabrics having a fabric diameter substantially corresponding to the grinding layer diameter D_s is reduced. The reduced proportion or number of reinforcing fabrics in the
25 working region of the grinding disc improves the properties, in particular the grinding performance and/or the cutting-off performance, of the grinding disc during rough machining and/or cutting off.

The first reinforcing fabric and/or the second reinforcing fabric is construed in particular as a glass fiber fabric. Preferably, the following applies to the first fabric diameter D_{A1} : $D_{A1} \geq 0.9 \cdot D_S$, in particular $D_{A1} \geq 0.95 \cdot D_S$, and in particular $D_{A1} \geq 0.99 \cdot D_S$. Furthermore, the following preferably applies to the second fabric diameter D_{A2} : $D_{A2} \geq 0.9 \cdot D_S$, in particular $D_{A2} \geq 0.95 \cdot D_S$, and in particular $D_{A2} \geq 0.99 \cdot D_S$. In particular, the following applies: $D_{A1} = D_{A2} = D_S$.

The at least one fabric is formed identically and/or differently to the first reinforcing fabric and/or the second reinforcing fabric. The at least one fabric has a smaller mesh size, a larger mesh size and/or the same mesh size as the first reinforcing fabric and/or the second reinforcing fabric. A plurality of fabrics is formed identically and/or differently. In particular, the at least one fabric is formed as a glass fiber fabric. The index i designates the respective fabric and D_i the diameter of the respective fabric. The number of fabrics arranged on the first reinforcing fabric is equal to or different from the number of fabrics arranged on the second reinforcing fabric.

Due to the reduced number of and/or the reduced weight, in particular glass weight, of reinforcing fabrics lying in the grinding layer, a grinding disc intended for rough machining can in particular be formed with a comparatively smaller thickness so that it is also suitable for cutting off and has a good cutting-off performance.

Due to the at least one additional fabric and the higher stiffness, a vibration or fluttering of the grinding disc and thus an uneven cut is avoided, in particular with a grinding disc intended for cutting off. This and the use at comparatively higher rotational speeds considerably improve the cutting-off performance. Furthermore, the grinding disc enables curved cuts, as the

at least one additional fabric protects at least one of the reinforcing fabrics from excessive deformation in the region of the central opening due to bending at fastening means, for example a nut, of an angle grinding machine.

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A grinding disc according to claim 2 ensures improved properties during rough machining and/or cutting off. Due to the fact that the grinding layer does not have a reinforcing fabric lying within the grinding layer, i.e. no central reinforcing fabric, between the reinforcing fabrics arranged on the
10 outer sides, the proportion of reinforcing fabric in the working region of the grinding disc is low. An internal reinforcing fabric is understood to be a reinforcing fabric which is arranged between the first reinforcing fabric and the second reinforcing fabric and which has a fabric diameter of at least $0.8 \cdot D_s$. In the at least one grinding layer, at least one fabric with the diameter D_i may be arranged, which is arranged at a distance from the reinforcing fabrics, in particular centrally with respect thereto. Preferably, the
15 grinding layer between the reinforcing fabrics is free of fabric, so that neither a reinforcing fabric nor an additional fabric is arranged between the first reinforcing fabric and the second reinforcing fabric.

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A grinding disc according to claim 3 ensures improved properties during rough machining and/or cutting off. Due to the fact that the at least one fabric is arranged on a side of the at least one reinforcing fabric facing away from the grinding layer, the grinding disc is stiffened on the one hand and
25 the at least one reinforcing fabric is protected by the at least one fabric on the other hand.

A grinding disc according to claim 4 ensures improved properties during rough machining and/or cutting off. By arranging at least one fabric on the

first reinforcing fabric and on the second reinforcing fabric, the grinding disc is reinforced and stiffened on both outer sides. The at least one fabric is arranged on a side facing away from the grinding layer and/or on a side facing the grinding layer of the first reinforcing fabric or the second reinforcing fabric.

A grinding disc according to claim 5 ensures improved properties during rough machining and/or cutting off. Preferably, a plurality of fabrics is arranged on the first reinforcing fabric and a plurality of fabrics is arranged on the second reinforcing fabric. Preferably, the plurality of fabrics is arranged exclusively on a side of the first reinforcing fabric and/or the second reinforcing fabric facing away from the grinding layer.

A grinding disc according to claim 6 ensures improved properties during rough machining and/or cutting off. The respective diameter D_i ensures that the respective fabric stiffens a clamping region or the central region around the central opening and does not substantially extend into an outer working region. Preferably, all fabrics have the same diameter D_i .

A grinding disc according to claim 7 ensures improved properties during rough machining and/or cutting off. The at least one fabric is arranged in the clamping region and reinforces it around the central opening. The at least one fabric is in particular not arranged in an outer working region usable for cutting off. In particular, the at least one fabric is arranged in an inner working region usable for rough machining. Preferably, the grinding disc comprises a clamping region, an inner working region and an outer working region. The inner working region is arranged in the radial direction between the clamping region and the outer working region. The at

least one fabric preferably extends in the clamping region and at least partially in the inner working region, whereas the at least one fabric does not extend in the outer working region. This stiffens the clamping region.

Rough machining is performed with the inner working region and/or the
5 outer working region with a high grinding performance. Cutting off is done with the outer working region with a high cutting-off performance. The inner working region and the outer working region are predetermined, for example, by an angle head of an angle grinding machine, which prevents the grinding disc from being used for cutting off in the inner working region.

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A grinding disc according to claim 8 ensures improved properties during rough machining and/or cutting off. By the grinding disc having a substantially uniform thickness d over the entire grinding layer diameter D_s , the working region of the grinding disc is not affected. Preferably, $d_1 = d_2 = d$,
15 wherein d denotes the uniform thickness of the grinding layer in the working region.

A grinding disc according to claim 9 ensures improved properties during
20 rough machining and/or cutting off. Due to the thickness d of the grinding disc in the working region, the grinding disc intended for rough machining is also suitable for cutting off. The grinding disc thus has a high grinding performance during rough machining and high cutting-off performance during cutting off. The roughing grinding disc can therefore also be used
25 for cutting off.

A grinding disc according to claim 10 ensures improved properties during cutting off. The grinding disc intended for cutting off can be used at a comparatively high rotational speed and thus a high cutting speed, so that the

cutting-off performance is improved. The grinding disc is thus used in particular as a cutting-off grinding disc. The grinding disc can also be used for rough machining.

- 5 A grinding disc according to claim 11 ensures improved properties during rough machining and/or cutting off. A higher weight per unit area G_j of the at least one fabric increases the stability and stiffness of the grinding disc. However, the weight per unit area G_j is sufficiently low to avoid a deterioration of the grinding performance or cutting-off performance due to the
- 10 fabric content. The weight per unit area G_j is determined per side, i.e. per reinforcing fabric, and for the fabrics arranged on the respective reinforcing fabric. If only one fabric is arranged on one of the reinforcing fabrics or on one side, the weight per unit area G_j corresponds to the weight per unit area of this fabric. If, on the other hand, a plurality of fabrics is arranged on one
- 15 of the reinforcing fabrics, the weight per unit area G_j is the sum of the weights per unit area of these fabrics. For example, if two fabrics are arranged on the first reinforcing fabric and two fabrics are arranged on the second reinforcing fabric, a first weight per unit area is determined as the sum of the weights per unit area of the fabrics arranged on the first reinforcing fabric and a second weight per unit area is determined as the sum
- 20 of the weights per unit area of the fabrics arranged on the second reinforcing fabric. The respective summed weight per unit area lies in the stressed region. For example, the following applies to the respective summed weight per unit area G_j of the at least one fabric associated with the first reinforcing fabric or the second reinforcing fabric: $150 \text{ g/m}^2 \leq G_j \leq 350 \text{ g/m}^2$, in particular $250 \text{ g/m}^2 \leq G_j \leq 300 \text{ g/m}^2$. The index j designates the respective reinforcing fabric to which the at least one fabric is associated.

A grinding disc according to claim 12 ensures improved properties during rough machining and/or cutting off. A higher thread width b_i of the at least one fabric increases the stability and stiffness of the grinding disc. However, the thread width is sufficiently low to allow the respective fabric to be
5 embedded in the grinding layer or grinding disc at the associated reinforcing fabric. The index i designates the respective fabric.

A grinding disc according to claim 13 ensures improved properties during rough machining and/or cutting off. The value R_i is a measure of the open-
10 ness of the respective fabric. The index i designates the respective fabric. A higher value R_i increases the stability and stiffness of the grinding disc. However, the value R_i is sufficiently low to allow the respective fabric to be embedded in the grinding disc. The grinding performance or cutting-off performance is not affected by the amount of fabric in the working region
15 of the grinding disc. The following applies to R_i :

$$R_i = R_{xi} + R_{yi},$$

with

$$R_{xi} = b_{xi} \cdot n_{xi}/l_{xi},$$

20

$$R_{yi} = b_{yi} \cdot n_{yi}/l_{yi},$$

wherein

25 b_{xi} , b_{yi} is a thread width or a web width of the threads in x-direction and y-direction, respectively,
 n_{xi} , n_{yi} is a number of threads or a number of webs in the x-direction and the y-direction, respectively,
 l_{xi} , l_{yi} is a length in the x-direction and the y-direction.

A grinding disc according to claim 14 ensures improved properties during rough machining and/or cutting off. The clamping ring forms the central opening. The clamping ring or the associated hole is generated by a bolt of
5 a torch stand during the flow of the binding agent, in particular the resin. The clamping ring additionally strengthens and stiffens the clamping region and/or the central opening. The clamping ring is in particular constructed as a steel ring.

10 It is one further object of the invention to enable the use of a grinding disc with improved properties during rough machining and/or cutting off.

This object is achieved by using the grinding disc according to claim 15. Preferably, the grinding disc is used for rough machining and for cutting
15 off. Due to the improved stability, the grinding disc can be used at higher rotational speeds and higher cutting speeds. This increases the grinding performance or cutting-off performance. With regard to the further advantages in the use of the grinding disc, reference is made to the advantages of the grinding disc according to the invention already described.

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Further features, advantages and details of the invention will be apparent from the following description of an embodiment, in which:

Fig. 1 shows a sectional view of a grinding disc according to the invention with reinforcing fabrics and additional fabrics,
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Fig. 2 shows an exploded view of the grinding disc in Fig. 1, and

Fig. 3 shows an enlarged top view of an additional fabric.

The grinding disc 1 shown in Fig. 1 is for the use on a hand-held angle grinder. The grinding disc 1 comprises a grinding layer 2, which is formed of grinding grains 4 bonded by means of a binding agent 3. The binding agent 3, for example, is a phenolic resin. The grinding layer 2 has a grinding layer diameter D_s which corresponds to a nominal diameter of the grinding disc 1.

A first reinforcing fabric 6 is embedded in the grinding layer 2 on a first outer side 5. Correspondingly, a second reinforcing fabric 8 is embedded in the grinding layer 2 on a second outer side 7. The first reinforcing fabric 6 has a first fabric diameter D_{A1} , which corresponds to the grinding layer diameter D_s . Correspondingly, the second reinforcing fabric 8 has a second fabric diameter D_{A2} , which corresponds to the grinding layer diameter D_s . The reinforcing fabrics 6, 8 are construed as glass fiber fabrics, for example.

The grinding disc 1 comprises additional fabrics W_1 , W_2 , W_3 and W_4 . The fabrics W_1 and W_2 are arranged on a side of the first reinforcing fabric 6 facing away from the grinding layer 2 and are embedded in the grinding layer 2, whereas the fabrics W_3 and W_4 are arranged on a side of the second reinforcing fabric 8 facing away from the grinding layer 2 and are embedded in the grinding layer 2.

The grinding disc 1 comprises a central opening 9 for attachment to an angle grinding machine. The central opening 9 defines an axis of rotation M of the grinding disc 1. For clamping to an angle grinding machine, the grinding disc 1 has a clamping ring 10 which is arranged in the central opening 9. The clamping ring 10, for example, is construed as a steel ring.

The clamping ring 10 abuts the fabric W_1 on the first outer side 5 and is connected to the grinding layer 2.

5 The grinding disc 1 is circular in shape. The reinforcing fabrics 6, 8 and/or the fabrics W_1 to W_4 are arranged concentrically to the axis of rotation M. The reinforcing fabrics 6, 8 and/or the fabrics W_1 to W_4 are annular.

10 The fabrics W_1 to W_4 have a respective diameter D_1 to D_4 . The fabrics are generally designated W_i and the corresponding diameter D_i with $i = 1, 2, 3, 4$. The index i specifies the respective fabric W_i . The following applies to the respective diameter D_i : $D_i < D_{A1}$ and $D_i < D_{A2}$. In particular, the following applies to the respective diameter D_i : $0.25 \cdot D_S \leq D_i \leq 0.75 \cdot D_S$, in particular $0.3 \cdot D_S \leq D_i \leq 0.7 \cdot D_S$, and in particular $0.35 \cdot D_S \leq D_i \leq 0.65 \cdot D_S$. Preferably, $D_1 = D_2 = D_3 = D_4$.

15 The grinding layer 2 is free of further reinforcing fabrics between the reinforcing fabrics 6, 8, so that the grinding layer 2 is in particular free of a reinforcing fabric arranged centrally in the grinding layer 2. Preferably, the grinding layer 2 is also free of further additional fabrics between the reinforcing fabrics 6, 8.

20 The grinding disc 1 forms a clamping region 11 in the radial direction to the axis of rotation M and a working region 12 surrounding the clamping region 11. The working region 12 is divided in the radial direction to the axis of rotation M into an inner working region 13 and an outer working region 14 surrounding it. The working region 12, i.e. the inner working region 13 and the outer working region 14, are annular. The inner working region 13 extends in the radial direction as far as the fabrics W_1 to W_4 extend. The clamping region 11 and the inner working region 13 thus form a

reinforced region 15 in which the fabrics W_1 to W_4 are arranged. The outer working region 14, on the other hand, forms an unreinforced region 16 which is free of additional fabrics W_1 to W_4 . The outer working region 14 is preferably used for cutting off a workpiece, whereas the inner working region 13 and the outer working region 14 are used for rough machining a workpiece.

The reinforced region 15 has a thickness d_1 , whereas the unreinforced region 16 has a thickness d_2 . The grinding disc 1 has a substantially constant thickness in the radial direction to the axis of rotation M, wherein: $0.95 \leq d_1/d_2 \leq 1.05$, in particular $0.99 \leq d_1/d_2 \leq 1.01$, and in particular $0.995 \leq d_1/d_2 \leq 1.005$. A thickness d of the grinding disc 1 results from the maximum of the thicknesses d_1 and d_2 . Preferably, the following applies: $d = d_1 = d_2$.

In a preferred use of the grinding disc 1 for rough machining a workpiece, the following preferably applies to the thickness d : $2 \text{ mm} \leq d \leq 7 \text{ mm}$, in particular $3 \text{ mm} \leq d \leq 6 \text{ mm}$, and in particular $4 \text{ mm} \leq d \leq 5 \text{ mm}$. In a preferred use of the grinding disc 1 for cutting off a workpiece, the following preferably applies for the thickness d : $0.8 \text{ mm} \leq d \leq 4 \text{ mm}$, in particular $1.2 \text{ mm} \leq d \leq 3.2 \text{ mm}$, and in particular $1.6 \text{ mm} \leq d \leq 2.5 \text{ mm}$.

Fig. 3 illustrates in general the structure of a fabric W_i . The fabric W_i has a plurality of weft threads 17 running in a y-direction and a plurality of warp threads 18 running transversely thereto in an x-direction. The respective fabric W_i is construed as a glass fibre fabric, for example.

The weft threads 17 have a thread width b_{xi} , whereas the warp threads 18 have a thread width b_{yi} . The thread width b_{xi} or b_{yi} is also referred to as the

web width. For the thread width b_{xi} , the following preferably applies: $0.1 \text{ mm} \leq b_{xi} \leq 1.8 \text{ mm}$, in particular $0.3 \text{ mm} \leq b_{xi} \leq 1.5 \text{ mm}$, and in particular $1 \text{ mm} \leq b_{xi} \leq 1.2 \text{ mm}$. For the thread width b_{yi} , the following preferably applies: $0.1 \text{ mm} \leq b_{yi} \leq 1.8 \text{ mm}$, in particular $0.3 \text{ mm} \leq b_{yi} \leq 1.5 \text{ mm}$, and in particular $1 \text{ mm} \leq b_{yi} \leq 1.2 \text{ mm}$. The thread widths b_{xi} and b_{yi} are generally referred to as thread width b_i . The thread widths b_{xi} and b_{yi} of the respective fabric W_i may be the same and/or different. Furthermore, the thread widths b_{xi} and b_{yi} of the fabrics W_i can be the same among each other and/or be different from each other.

10

The respective fabric W_i has a value R_i which characterizes the openness of the fabric W_i . The following applies to the respective value R_i :

$$R_i = R_{xi} + R_{yi} \quad (1)$$

15

with

$$R_{xi} = b_{xi} \cdot n_{xi}/l_{xi} \quad (2)$$

20 and

$$R_{yi} = b_{yi} \cdot n_{yi}/l_{yi} \quad (3).$$

In equations (2) and (3):

25

b_{xi} denotes the thread width of the weft threads 17,

n_{xi}/l_{xi} denotes the number of weft threads 17 in relation to a length l_{xi} in the x-direction,

b_{yi} denotes the thread width of the warp threads 18,

5 n_{yi}/l_{yi} denotes a number of warp threads 18 in relation to a length l_{yi} in the y-direction.

The values R_{xi} and R_{yi} of the respective fabric W_i can be the same or different. The values R_{xi} and R_{yi} of the fabrics W_i can be the same among each other and/or different. The values R_i of the fabrics W_i can be the same and/or different. The following preferably applies to the values R_i : $0.2 \leq R_i \leq 1.2$, in particular $0.3 \leq R_i \leq 1$.

The fabrics W_1 and W_2 are associated to the first reinforcing fabric 6 and have a total first weight per unit area G_1 . Correspondingly, the fabrics W_3 and W_4 are associated to the second reinforcing fabric 8 and have a total second weight per unit area G_2 . The respective weight per unit area is generally denoted by G_j , wherein the index j denotes the respective reinforcing fabric 6, 8 or the respective outer side of the grinding layer 2 to which the fabrics W_1 , W_2 or W_3 , W_4 are associated. For the index j , the following applies: $j = 1, 2$. For the respective summed weight per unit area G_j , the following applies preferably: $50 \text{ g/m}^2 \leq G_j \leq 500 \text{ g/m}^2$, in particular $75 \text{ g/m}^2 \leq G_j \leq 450 \text{ g/m}^2$, and in particular $100 \text{ g/m}^2 \leq G_j \leq 400 \text{ g/m}^2$. The weights per unit area G_j may be the same and/or different. The weights per unit area of the individual fabrics W_i may be the same and/or different.

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The mode of operation and the use of the grinding disc 1 are as follows:

The additional fabrics W_1 to W_4 reinforce and stiffen the grinding disc 1 so that the grinding disc 1 can be operated at a comparatively higher rotational

speed and a higher cutting speed v during rough machining and/or cutting off. The cutting speed v is at least 80 m/s, in particular at least 90 m/s, and in particular at least 100 m/s at the outer circumference of the grinding disc 1 or at the grinding layer diameter D_s . This increases the grinding performance and/or cutting-off performance.

When the grinding disc 1 is designed as a cut-off grinding disc, the additional fabrics W_1 to W_4 prevent vibration or fluttering at high rotational speeds or high cutting speeds v . When the grinding disc 1 is designed as a cut-off grinding disc, in particular it also allows for a curved cut, as the reinforcing fabric 6 is protected by the fabrics W_1 and W_2 when it is bent on fastening means of an angle grinding machine.

When the grinding disc 1 is designed as a rough grinding disc, the additional fabrics W_1 to W_4 enable the number of additional reinforcing fabrics within the grinding layer 2 to be reduced between the reinforcing fabrics 6, 8. This increases the grinding performance with comparable stability and stiffness, as additional reinforcing fabrics in the working region 12 have an adverse effect on the grinding properties or grinding performance. Furthermore, it is possible to make the rough grinding disc comparatively thin so that it can also be used for cutting off. For example, the outer working region 14 can be used for cutting off, whereas the inner working region 13 and additionally the outer working region 14 can be used for rough machining.

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In general:

The preferred structure of the grinding disc 1 is label/N - fabric W_i /reinforcing fabric 6/grinding layer 2/reinforcing fabric 8/N - fabric W_i /label/clamping ring 10. The grinding disc 1 can be configured in a cranked manner in the clamping region 11. The additional fabrics W_i may be finer-
5 meshed and/or coarser-meshed and/or of the same mesh size as the first reinforcing fabric 6 and/or the second reinforcing fabric 8.

Patent Claims

1. Grinding disc comprising
 - a grinding layer (2),
 - 5 -- which is formed of grinding grains (4) bound by means of a binding agent (3),
 - which has a grinding layer diameter D_S ,
 - which forms a first outer side (5) and a second outer side (7),
 - a first reinforcing fabric (6),
 - 10 -- which is embedded in the grinding layer (2) on the first outer side (5),
 - which has a first fabric diameter D_{A1} , wherein: $D_{A1} \geq 0.8 \cdot D_S$,
 - a second reinforcing fabric (8),
 - 15 -- which is embedded in the grinding layer (2) on the second outer side (7),
 - which has a second fabric diameter D_{A2} , wherein: $D_{A2} \geq 0.8 \cdot D_S$,

characterized

in that at least one fabric (W_1 to W_4) is arranged on at least one of the

20 **reinforcing fabrics (6, 8), and**

in that the at least one fabric (W_1 to W_4) has a respective diameter D_i , wherein: $D_i < D_{A1}$ and $D_i < D_{A2}$.
2. Grinding disc according to claim 1, **characterized**
- 25 **in that** the grinding layer (2) between the reinforcing fabrics (6, 8) is free of reinforcing fabrics.
3. Grinding disc according to claim 1 or 2, **characterized**

in that the at least one fabric (W_1 to W_4) is arranged relative to the at least one reinforcing fabric (6, 8) on a side facing away from the grinding layer (2).

- 5 4. Grinding disc according to at least one of claims 1 to 3, **characterized in that** at least one fabric (W_1 , W_2) is arranged on the first reinforcing fabric (6) and at least one fabric (W_3 , W_4) is arranged on the second reinforcing fabric (8).

- 10 5. Grinding disc according to at least one of claims 1 to 4, **characterized in that** a plurality of fabrics (W_1 to W_4) are arranged on at least one of the reinforcing fabrics (6, 8).

- 15 6. Grinding disc according to at least one of claims 1 to 5, **characterized in that** the following applies for the respective diameter D_i :
 $0.25 \cdot D_s \leq D_i \leq 0.75 \cdot D_s$, in particular $0.3 \cdot D_s \leq D_i \leq 0.7 \cdot D_s$, and in particular $0.35 \cdot D_s \leq D_i \leq 0.65 \cdot D_s$.

- 20 7. Grinding disc according to at least one of claims 1 to 6, **characterized in that** the at least one fabric (W_1 to W_4) is arranged in a clamping region (11) and/or outside an outer working region (14), which is usable for cutting off, and/or in an inner working region (13), which is usable for rough machining, of the grinding disc (2).

- 25 8. Grinding disc according to at least one of claims 1 to 7, **characterized in that** the at least one fabric (W_1 to W_4) delimits a reinforced region (15) of the grinding disc (2) with a thickness d_1 and an unreinforced re-

gion (16) of the grinding disc (2) with a thickness d_2 , wherein the following applies: $0.95 \leq d_1/d_2 \leq 1.05$, in particular $0.99 \leq d_1/d_2 \leq 1.01$, and in particular $0.995 \leq d_1/d_2 \leq 1.005$.

- 5 9. Grinding disc according to at least one of claims 1 to 8, **characterized**
by a thickness d , wherein the following applies: $2 \text{ mm} \leq d \leq 7 \text{ mm}$, in
particular $3 \text{ mm} \leq d \leq 6 \text{ mm}$, and in particular $4 \text{ mm} \leq d \leq 5 \text{ mm}$.
- 10 10. Grinding disc according to at least one of claims 1 to 8, **characterized**
by a thickness d , wherein the following applies: $0.8 \text{ mm} \leq d \leq 4 \text{ mm}$, in
particular $1.2 \text{ mm} \leq d \leq 3.2 \text{ mm}$, and in particular $1.6 \text{ mm} \leq d \leq 2.5$
mm.
- 15 11. Grinding disc according to at least one of claims 1 to 10,
characterized
in that the at least one fabric (W_1 , W_2 and W_3 , W_4) which is assigned
to one of the reinforcing fabrics (6, 8) has, in total, a respective weight
per unit area G_j , wherein the following applies: $50 \text{ g/m}^2 \leq G_j \leq 500$
 g/m^2 , in particular $75 \text{ g/m}^2 \leq G_j \leq 450 \text{ g/m}^2$, and in particular 100 g/m^2
20 $\leq G_j \leq 400 \text{ g/m}^2$.
12. Grinding disc according to at least one of claims 1 to 11,
characterized
in that the at least one fabric (W_1 to W_4) has a respective thread width
25 b_i , wherein the following applies: $0.1 \text{ mm} \leq b_i \leq 1.8 \text{ mm}$, in particular
 $0.3 \text{ mm} \leq b_i \leq 1.5 \text{ mm}$, and in particular $1 \text{ mm} \leq b_i \leq 1.2 \text{ mm}$.
13. Grinding disc according to at least one of claims 1 to 12,
characterized

- 20 -

in that the at least one fabric (W_1 to W_4) has a respective value R_i ,
wherein the following applies: $0.2 \leq R_i \leq 1.2$, in particular $0.3 \leq R_i \leq 1$.

14. Grinding disc according to at least one of claims 1 to 13,
5 **characterized,**
 by a clamping ring (10) for clamping the grinding disc (2) on a grinding machine.
15. Use of the grinding disc (1) according to one of claims 1 to 14 for
10 rough machining and/or for cutting off, wherein a cutting speed (v) is
 at least 80 m/s, in particular at least 90 m/s, and in particular at least
 100 m/s.