Claims

1. A polishing tool (100) for polishing a spectacle lens (L) in a surface machining process, comprising a tool body (110) for being rotatably supported about a rotational axis (RA1),

wherein the tool body (110) comprises a polishing surface (130) being outwardly exposed at a first axial end (101) of the tool body (110), the polishing surface (130) being axially bulged convexly or concavely with respect to the rotational axis (RA1) for polishing an optical surface (L1, L2) of the spectacle lens (L),

wherein the tool body (110) comprises a channel (140) extending axially through the tool body (110) from an inlet (142), which is provided at a second axial end (102) being opposite to the first axial end (101) with respect to the rotational axis (RA1), to an outlet (141), which is provided at the first axial end (101), to supply the polishing surface (130) with a polishing agent,

characterized in that

the polishing surface (130) comprises at least one groove (150) that extends radially away from the outlet (141), the outlet (141) being the groove's (150) starting point, to the perimeter of the polishing surface (130) to distribute the polishing agent across the polishing surface (130).

2. The polishing tool (100) according to claim 1, wherein the groove (150) extends radially along a main extension direction, preferably in a linear, straight, curved and/or arcuate manner, more preferred in a wave or zigzag manner.

3. The polishing tool (100) according to claim 1 or claim 2, wherein the groove (150) comprises different sections, preferably straight, angled, arcuate and/or curved sections, wherein adjoining sections extend circumferentially in opposite directions, wherein preferably the adjoining sections are connected to each other by an arcuate portion that more preferred forms a gradual transition between the respective adjoining sections.

4. The polishing tool (100) according to any one of the preceding claims, wherein the groove (150) has a width (W) ranging from 0.1mm to 1.0mm, or from 0.2mm to 0.8mm, or from 0.4mm to 0.6mm, or of 0.5mm, and/or

wherein the groove (150) has a depth (T) ranging from 0.1mm to 1.0mm, or from 0.2mm to 0.8mm, or from 0.4mm to 0.6mm, or of 0.5mm.

5. The polishing tool (100) according to any one of the preceding claims, comprising a plurality of the said grooves (150), wherein the grooves (150) are preferably radially diverging and/or preferably distributed, more preferred evenly distributed about the outlet (141) or the rotational axis (RA1), wherein the grooves (150) preferably have the same or at least partially a different shape and/or cross-section.

6. The polishing tool (100) according to any one of the preceding claims, wherein the tool body (110) comprises a polishing film (113) forming the first axial end (101) of the tool body (110), wherein the polishing film (113) comprises the outlet (141) and the groove (150), and wherein preferably the polishing film (113) has a thickness ranging from 0.5mm to 2.5mm, or from 0.8mm to 2.0mm, or of 1.3mm.

7. The polishing tool (100) according to any one of the preceding claims, wherein the tool body (110) comprises a base portion (111) for rotatably supporting the polishing tool (100), wherein the base portion (111) preferably comprises the inlet (142), and

wherein preferably the tool body (110) further comprises a holder portion (112) being sandwiched between the polishing film (113) and the base portion (111), wherein preferably the holder portion (112) is deformable for adapting to the optical surface (L1, L2) of the spectacle lens (L).

8. The polishing tool (100) according to any one of the preceding claims, wherein the channel (140) extends along the rotational axis (RA1) of the polishing tool (100) and preferably, if present, penetrating the polishing film (113), the base portion (111) and the holder portion (112), respectively.

9. The polishing tool (100) according to any one of the preceding claims, wherein the tool body (110), preferably the base portion (111) if present, comprises a port (143) for fluidly connecting the channel (140) with a polishing agent supply unit (240),

wherein preferably the port (143) comprises a gasket (144) for radially sealing against the polishing agent supply unit (240) to prevent the polishing agent from leakage and to enable only the polishing agent entering the channel (140) via the inlet (142).

10. A system (200) for polishing of at least one optical surface (L1, L2) of a spectacle lens (L), comprising

- a surface processing unit (210) for processing the optical surface (L1, L2) of the spectacle lens (L), wherein the surface processing unit (210) comprises
    - the polishing tool (100) according to any one of the preceding claims 1 to 9, and
    - a polishing agent supply unit (240) being fluidly connected to the channel (140) via the inlet (142) of the polishing tool (100) to supply the groove (150) or grooves (150) of the polishing surface (130) with a polishing agent via the channel (140) and the outlet (141),
- a lens support unit (220) for supporting the spectacle lens (L) during the polishing process, and
- a drive unit to apply a relative motion between the polishing tool (100) and the lens support unit (220) at least by rotating the polishing tool (100) about the rotational axis (RA1) to allow polishing of the optical surface (L1, L2).

11. The system (200) according to claim 10, wherein the relative motion further comprises tilting, pivoting and/or linearly moving the polishing tool (100) relatively to the lens support unit (220) to apply the relative motion, and/or

wherein the drive unit is preferably adapted to rotate the lens support unit (220) about a second rotational axis (RA2) to apply the relative motion, and/or

wherein the drive unit is preferably adapted to displace the polishing tool (100) relative to the lens support unit (220) to obtain a defined distance therebetween.

12. The system (200) according to claim 10 or 11, further comprising a control unit (230) for controlling the relative motion by the drive unit based on processing features, like the lens type, form and thickness, the polishing tool type, the polishing agent type,

wherein preferably the control unit (230) is configured to adapt a relative rotational speed between the optical surface (L1, L2) and the polishing tool (100), and/or a pressure for supplying the polishing agent to the polishing tool (100), and/or a flow rate of the polishing agent.

13. The system (200) according to any one of claims 10 to 12, wherein the polishing agent supply unit (240) is fluidly connected to the polishing tool (100) through the port (143), wherein preferably the gasket (144) radially seals against the polishing agent supply unit (240) to prevent the polishing agent from leakage and to enable the polishing agent entering the channel (140) only via the inlet (142).

14. A process of polishing an optical surface (L1, L2) of a spectacle lens (L) comprising:

- providing a system (200) for surface processing having a polishing tool (100) according to any one of claims 1 to 9, preferably a system (200) according to any one of claims 10 to 13,
- seating a spectacle lens (L) in a lens support unit (220) of the system (200),
- relatively rotating the polishing tool (100) with respect to the spectacle lens (L),
- delivering a polishing agent through the channel (140) to the polishing surface (130) facing an optical surface (L1, L2) of the spectacle lens (L) to be polished, so that the polishing agent is delivered through the grooves (150) radially outwards from the outlet (141) to distribute the polishing agent across the polishing surface (130) for polishing the optical surface (L1, L2).

15. The process of claim 14, further comprising controlling a thickness of a layer of the polishing agent between the optical surface (L1, L2) and the polishing surface (130) by adapting a flow rate and/or supply pressure of the polishing agent based on a rotational speed of the polishing tool (100) and/or the spectacle lens (L).