Claims

1. Method (6) for inspecting an ophthalmic lens (2), in particular a contact lens such as a soft contact lens, in an automated lens manufacturing process, the method comprising the steps of

- acquiring (60) a plurality of images containing the ophthalmic lens (2) to be inspected as an imaged ophthalmic lens (2), wherein each image (4) of the plurality of images is of a different image type, wherein each image (4) of the acquired plurality of images contains a plurality of imaged reference marks (402a, 402b);
- registering (63) the images (4) of the plurality of images by applying a registration function to each image (4) of the plurality of images to obtain registered images, wherein registering the images (4) of the acquired plurality of images and updating (62) the registration function is performed based on the positions of the imaged reference marks (402a, 402b) contained in the images (4);
- determining (64), based on the registered images, whether the ophthalmic lens (2) is acceptable, and
- updating (62) the registration function to compensate for possible changes in the acquisition of the plurality of images,

characterized in that updating (62) the registration function is performed during the automated lens manufacturing process.

2. Method (6) according to claim 1, wherein the ophthalmic lens (2) is carried by a lens carrier (1), with the lens carrier (1) having reference marks (102) arranged thereon which are contained in the images (4) as the imaged reference marks (402a, 402b).

3. Method (6) according to claim 1, further comprising the step of identifying (61) those imaged reference marks (402a) which are located outside of the imaged ophthalmic lens (42), wherein only those imaged reference marks (402a) located outside of the imaged ophthalmic lens (42) are used for registering the images (4) of the plurality of images and updating (62) the registration function.

4. Method (6) according to claim 3, wherein each image (4) of the acquired plurality of images comprises five imaged reference marks (402a, 402b), with at least four (402a) of the

five (402a, 402b) imaged reference marks being located outside of the imaged ophthalmic lens (42).

5. Method (6) according to claim 1, wherein the acquired plurality of images comprises four images, the different image types of the four images being a telecentric bright-field image, a diffuse bright-field image, a dark-field image and a phase-contrast image.

6. Method (6) according to claim 1, wherein each image (4) of the plurality of images is acquired (60) by a separate optical imaging device, each separate optical imaging device comprising a camera (3).

7. Method (6) according to claim 1, wherein the registration function is an affine transformation.

8. Inspection system for inspecting an ophthalmic lens (2), in particular a contact lens (2) such as a soft contact lens, in an automated lens manufacturing process, the inspection system comprising:
- a plurality of optical imaging devices, each optical imaging device of the plurality of optical imaging devices being arranged and configured to acquire (60) an image (4) containing the ophthalmic lens (2) to be inspected as an imaged ophthalmic lens (42) thus obtaining a plurality of images, wherein each image of the plurality of images (4) is of a different image type, wherein each image (4) of the acquired plurality of images contains a plurality of imaged reference marks (402a, 402b);
- a processor configured to register the images (4) of the plurality of images by applying a registration function to each image (4) of the plurality of images to obtain registered images, wherein registering the images (4) of the acquired plurality of images and updating (62) the registration function is performed based on the positions of the imaged reference marks (402a, 402b) contained in the images (4), to determine (64), based on the registered images, whether the ophthalmic lens (2) is acceptable, and to update (62) the registration function to compensate for possible changes in one or more of the optical imaging devices of the plurality of optical imaging devices,
characterized in that the processor is further configured to update (62) the registration function during the automated lens manufacturing process.

9. Inspection system according to claim 8, wherein each image (4) of the acquired plurality of images contains a plurality of imaged reference marks (402a, 402b), and wherein the processor is further configured to register (63) the images (4) and to update the registration function based on the positions of the imaged reference marks (402a, 402b) contained in the images (4).

10. Inspection system according to claim 9, wherein the inspection system further comprises a lens carrier (1) configured to carry the ophthalmic lens, with the lens carrier having reference marks (102) arranged thereon which are contained in the images (4) as the imaged reference marks (402a, 402b).

11. Inspection system according to claim 10, wherein the lens carrier (1) is an inspection cuvette (1) having a bottom glass (10) with a concave bottom glass top surface (101) for the ophthalmic lens (2) to rest on.

12. Inspection system according to claim 9, wherein the processor is further configured to identify (61) those imaged reference marks (402a) which are located outside of the imaged ophthalmic lens (42), and wherein the processor is further configured to use only those imaged reference marks (402a) located outside of the imaged ophthalmic lens (42) to register the images (4) and to update (62) the registration function.

13. Inspection system according to claim 12, wherein the plurality of imaged reference marks (402a, 402b) comprises five imaged reference marks (402a, 402b), with at least four (402a) of the five imaged reference marks (402a, 402b) being located outside of the imaged ophthalmic lens (42), and wherein the processor is configured to use only the at least four imaged reference marks (402a) located outside of the imaged ophthalmic lens (42) to register the images (4) and to update the registration function.

14. Inspection system according to claim 10, wherein the reference marks (102) arranged on the lens carrier (1) are cylindrically shaped recesses (102) having a diameter (103) in the range of 250 micrometers to 350 micrometers, especially about 300 micrometers, the recesses (102) further having a depth (104) in the range of 3 micrometers to 6 micrometers, in particular about 6 micrometers, and wherein a bottom surface (105) of the recesses (102) has a surface roughness S_a in the range of 0.8 micrometers to 2 micrometers, in particular about 1.3 micrometers.

15. Inspection system according to claim 14, wherein the recesses (102) are generated by laser-machining.

16. Inspection system according to claim 8, wherein the plurality of optical imaging devices comprises four optical imaging devices including a first optical imaging device configured to acquire a telecentric bright-field image, a second imaging device configured to acquire a diffuse bright-field image, a third imaging device configured to acquire a dark-field image, and a fourth imaging device configured to acquire a phase-contrast image.

17. Inspection system according to claim 8, wherein each optical imaging device of the plurality of optical imaging devices is a separate optical imaging device comprising a camera (3).