

Claims

1. A defect analysis and tracing system for clear and cosmetic contact lenses using rear projection, comprising;
 - 5 a glass cuvette curved to hold a contact lens;
 - a pair of illumination modules directed towards the cuvette for back and front illumination;
 - 10 a diffuser mounted on a horizontal swivel arm to aid in diffusing the Backlit illumination when required;
 - 15 a rotary wheel mounted with at least two optical filters;
 - a first optical module focussed at the contact lens for capturing an aberration free image;
 - 20 a beam splitter to split the beam of light for capturing the image by a computer at one stage and for projection of the image on to a viewing screen at the second stage;
 - 25 a first camera connected to a computer for image capturing at a first stage, and second camera at a second stage for capturing images from the viewing screen;
 - a gauge holder for mounting a precision calibration made of glass for measurement of various dimensions and defects of the object under inspection;
 - 30 a second optical module mounted after the calibration gauge to project an overlaid image of the contact lens and the calibration pattern on the gauge, on to a viewing screening;
 - 35 a large viewing screen on which the image is projected for accurate measurement of various features of the contact lens.
2. A system of claim 1, further including a gauge holder that features an interchangeable mechanism to accommodate a variety of calibration gauges to inspect and measure different types of contact lenses.
- 40 3. A system of claim 1, further including a second camera mounted on a swivel arm, to manually position it in front of the viewing screen to capture magnified images of specific features on contact lenses.

4. A defect analysis and tracing method for clear and cosmetic contact lenses using rear projection, comprising the steps of;

5 capturing an image of the contact lens under inspection with backlit and front lit illumination;

10 pulsing the illumination modules dynamically at different time domains, to enhance defects such as bubbles, tears, scratches, pattern including lot information;

15 processing the captured an images from the first camera to identify the critical features and tagging them to the lot information for tracing purposes;

determining the critical features and creating a database by mapping the defects to the lot information;

20 triggering the second camera to capture magnified images of critical defects determined when processing the images from the first camera, by manually positioning the second camera close to the identified defects on the viewing screen;

25 consolidating and tagging the magnified images to the specified lot and enhancing the database effectiveness with the list of critical defects along with their magnified areas;

30 communicating the tabulated results and the database to an external interface or printing them for use by the quality assurance team to tweak the manufacturing process.
5. A method of claim 4, wherein the measurements of features or defects includes changing of measurement gauge to suit the defect type.
- 35 6. A method of claim 4, wherein the measurements of features or defects includes capturing of images of defects under multiple magnification settings for specific defect type.
- 40 7. A method of claim 4, wherein the measurements of features or defects includes utilising different optical filters mounted on a Rotary wheel to enhance features on contact lenses.