

Claims:

1. System for identifying defects and measuring geometric dimensions in cosmetic ophthalmic lens immersed in a Saline solution, said system, comprising:
 - a) at least one camera for obtaining images of said cosmetic ophthalmic lens, said camera having an optical axis;
 - b) at least one electronically controlled illumination module designed with Visible and infrared LEDs, segmented accordingly and suitably integrated to be positioned along the vertical optical axis for directing light at different angles of the cosmetic ophthalmic lens;
 - c) a customised glass cuvette designed with concave, concentric and spherical surfaces to avoid adding more optical power to the cosmetic ophthalmic lens under inspection and with the radius of the interior surface of the cuvette designed to be bigger than the lens to enable locating the cosmetic ophthalmic lens to the centre of the cuvette during inspection;
 - d) a strobe controller integrated to the illumination module and Camera that is capable of capturing multiple images in quick succession under different lighting conditions, utilising Visible LED and Infrared LED segments;
 - (e) image processing means for capturing, processing and analysing multiple images to determine if the cosmetic ophthalmic lens is acceptable or rejected.

2. System according to claim 1 wherein: said the illumination controller is designed to control the segments, intensity of the segments, type of illumination, duration of illumination, time delay for camera shutter trigger with respect to illumination trigger pulse for image capture, to minimise power consumption.
3. System according to claim 1 wherein: Illuminated Infrared LED segments in the illumination module are selected to enhance deformity defects in the cosmetic ophthalmic lens within a printed pattern area and optical zone.
4. System according to claim 1 wherein: Infrared LED based illumination exhibits low refractive index when passing through Saline solution effectively eliminating distortions in image capture of a saline immersed cosmetic ophthalmic lens.
5. System according to claim 2 wherein: all configurations related to illumination module setup are programmed according to the parameters stored in the recipe file for a particular type of cosmetic ophthalmic lens.
6. System according to claim 1 wherein: the illumination module lighting configuration selection may vary for each defect type such as tear, scratches, and air bubbles trapped within the printed area and optical zone of the cosmetic Ophthalmic lens.
7. System according to claim 1 wherein: said image processing means being further operable to analyze said obtained images to provide an indication of predetermined defects in a said cosmetic ophthalmic lens.

8. A method for inspecting cosmetic ophthalmic lenses, comprising the steps of:
 - a) placing said lens within the customised glass cuvette with an illumination module positioned below the cuvette and a camera to capture images of the lens;
 - b) capturing at least one image of the said lens immersed in saline solution with the visible LEDs segments illuminated and at least a second image of the said lens with the infrared LEDs segments illuminated;
 - c) analyzing and determining if additional images are to be captured after processing the images and appropriately modifying the illumination module parameters such as trigger pulse width, intensity and segmentation along with camera shutter capture delay with respect to illumination trigger and finally deciding whether to choose Infrared LEDs or Visible LEDs or a combination of both based on the defect to be highlighted;
 - d) further processing the said images and identifying the defect, followed by classifying and sorting the lens according to the defects;
 - e) utilising the refractive index characteristic of the Saline solution when illuminated with Infrared LED illumination to accurately identify the position and dimension of mold defects within the printed area and optical zone of the lens.
9. Method according to claim 8 wherein: said image processing means includes recipe files for every different type of cosmetic ophthalmic lens in relation to configurations comprising intensity, LEDs segmentation, type of illumination

namely Infrared or Visible LEDs, position of the illumination with respect to the lens cuvette, trigger pulse timing delays between camera and illumination, and the number of images to be captured under each illumination configuration.

10. Method according to claim 8 wherein: said image processing means utilizes illumination with longer wavelength to enhance defects such as mold defects within the printed pattern and the optical zone of the lens as the refractive index is lower at said wavelengths.