Claims:

1. An illuminating system intended for substantially illuminating a multidimensional object with perforations and angular surfaces, to inspect for defects such as foreign material contamination, inaccurate dimensions of perforations, defects in marking and damaged surfaces, the system comprising:

a) a high resolution camera for image capture, mounted on an XY table for positioning the camera at a predetermined location;

b) an array of LEDs mounted on a flat plate that operates as a backlight illumination that are suitably segmented to enable selected and pre-programmed segments to be illuminated using a strober, to illuminate one end of a series parallel mounted acrylic based light guides;

c) a circular LED based Ring light used as Front illumination wherein the LEDs are suitably segmented to enable selected and pre-programmed segments to be illuminated using a strober;

d) a plurality of retractable spring mounted lightguides to propagate light, arranged parallel to each other on a pair of plates mechanically coupled to the Backlight illumination;

e) at least a pair of air cylinder based displacement mechanism to move the Backlit illumination to more than one predetermined positions;

f) a first mounting system to rotate the Backlit illumination sub-assembly around the central axis of the Camera & optical system;

g) a second mounting system to rotate the Backlit illumination sub-assembly in an axis perpendicular to the first mounting system;

h) an object positioning mechanism to suitably position the object to be inspected at several predetermined locations;

i) a strobing system to control the trigger pulse duration, and illumination intensity.

2. The illuminating system of claim 1 wherein the surface of the object to be inspected comprising several types of cavities, holes and angular surfaces which are not equidistant from the camera.

3. The illuminating system of claim 1 wherein the ends of the lightguides mechanically integrates with a flatbed Backlit illumination.

4. The illuminating system of claim 1 wherein the Ring light located on the opposite side of the Backlit illumination is used for Top illumination.

5. The illuminating system of claim 4 wherein the Ring light is user programmed to illuminate the markings on the surface of the object to inspect for defects in symbols.

6. The illuminating device of claim 1 wherein the Backlight illumination is segmented to enable a programmable illumination to implement selective segment illumination, intensity control and trigger pulse width control.

7. The illuminating system of claim 1 wherein the retractable lightguides disposed on at least two mounting plates are uniquely positioned to take the profile of the object to be inspected, so as to enable substantially uniform illumination distribution.

8. A method for substantially illuminating a multidimensional object with perforations and angular surfaces, to inspect for defects such as presence of foreign material contamination, inaccurate dimensions of perforations, damaged surfaces and defects in marking, the process comprising:

j) a positioning method to locate the object to be inspected, close to the light guides to ensure all uneven surfaces are uniformly illuminated;

k) a program to strobe the Backlight illumination and Front light illumination concurrently or alternately to enhance different features of the object at different angles;

l) a set of air cylinders mechanically integrated to the vertically movable Backlight illumination to emit light at one end of all the lightguides for the light to propagate and illuminate the object under inspection at the other end;

m) moving a set of air cylinders mechanically integrated to the Backlight illumination, to reset the light guides at a predetermined reference position after the completion of image capture;

n) a moving Front light illumination Ring light suitably integrated to the camera XY table, for positioning at different locations for illuminating the area of the object under inspection;

o) an angular positioning method to rotate the object to several preset locations determined during calibration, and to ensure the images of the entire area of the object are captured at a high resolution;

p) a method to operate a first motor to rotate the Backlit illumination sub-assembly around the central axis of the inspection system;

q) a method to operate a second motor to rotate the Backlit illumination sub-assembly in an axis perpendicular to the first Backlit illumination system to position the object at an angle at several angular surfaces of the object;

r) a method to trigger the strobing system to control the trigger pulse duration, LED segment selection and intensity of the illumination;

9. The illuminating method of claim 8 wherein the surface of the object to be inspected comprises several types of cavities, multi dimensional holes and angular surfaces which are not equidistant from the camera.

10. The illuminating method of claim 8 wherein the ends of several lightguides rests on the surface of the object so as to illuminate angular surfaces and uneven surfaces to achieve uniform illumination across the entire inspection area.

11. The illuminating method of claim 8 wherein the illumination sources are selectively illuminated through LED segments, to enable illumination of specific predetermined areas to enable detection of defects in marking, presence of foreign material, abnormal perforations and damaged surfaces.

12. The illuminating method of claim 8 wherein the positioning method is programmed to uniquely align the object relative to the array of lightguides for enhanced illumination of all predetermined surface areas to enable detection of defects in marking, presence of foreign material, abnormal perforations and damaged surfaces.