Claims

1. Flexible Vision Inspector comprising
   - a first type of illuminator for illuminating an object,
   - a second type of illuminator for projecting light onto the object,
   - at least one type of camera for capturing an image of the object, and
   - an unitary framework that is connected to the first type of illuminator and the at least one type of camera for holding the first type of illuminator and the least one type of camera together at predetermined positions.

2. Flexible Vision Inspector of Claim 1, wherein
the unitary framework comprises a housing that encloses the first type of illuminator, the second type of illuminator, the at least one type of camera or a combination of any of these types of illuminators or camera for preventing interference of illumination to the object.

3. Flexible Vision Inspector of Claim 1 or 2, wherein
the unitary framework further comprises at least one panel for preventing external light from interfering illumination of the object.

4. Flexible Vision Inspector of Claim 3, wherein
the at least one panel comprises a light absorber, a light reflector, a light refractor, a light diffuser, a light polarizer, a lens or a combination of any of these.

5. Flexible Vision Inspector of Claim 3 or 4, wherein
the at least one panel comprises a front panel that is in the form of ground glass diffuser.

6. Flexible Vision Inspector of Claim 5, wherein
the front panel comprises a clear portion for exposing lens of the at least one type of camera.

7. Flexible Vision Inspector of any of the preceding Claims, wherein
the unitary framework comprises at least one rail for mounting at least one of these types of illuminators, the at least one camera or both.

8. Flexible Vision Inspector of Claim 7, wherein
the at least one rail comprises a first rail and a second rail for mounting the at least one of the cameras and any of these types of illuminators separately.

9. Flexible Vision Inspector of Claim 7 or 8, wherein
the at least one rail comprises a first rail and a third rail that are joined together for moving the at least one of the cameras, the types of the illuminators or both one the two rails.

10. Flexible Vision Inspector of any of the preceding claims 2 to 9, wherein
the unitary framework comprises a hub connector on the housing for bundling electrical connections.

11. Flexible Vision Inspector of Claim 10, wherein
the hub connector comprises a signal wire connector, a power cable connector or both for providing detachable electrical connectors.

12. Flexible Vision Inspector of Claim 2 or 10, wherein
the housing comprises a first opening and a second opening such that the object can be transferred between two robotic arms by accessing through the two openings.

13. Flexible Vision Inspector of Claim 2, 10 or 12, wherein
the housing further comprises a layer of anti-fogging coating for resisting moisture.

14. Flexible Vision Inspector of any of the preceding Claims 1 to 13 further comprising
a wiper for preventing fluid accumulation on the flexible vision inspector intermittently, continuously, periodically or on-demand.

15. Flexible Vision Inspector of any of the preceding Claims further comprising:
a fan mounted onto the unitary framework for cooling components of the flexible vision inspector.

16. Flexible Vision Inspector of any of the preceding Claims further comprising:
a distance sensor connected to the at least one type of camera for detecting distance between the object and a lens of the at least one type of camera.

17. Vision inspection station comprising
the flexible vision inspector of any of the preceding claims, and
at least one robotic arm for fetching the object to the at least one type of camera.

18. Vision inspection station of Claim 17, wherein
the at least one robotic arm comprises a first robotic arm and second robotic arm that are positioned next to the flexible vision inspector for transferring the object.

19. Vision inspection station of Claim 17 or 18 further comprising
a belt conveyor for transporting the object.

20. Method for inspecting an object by machine or computer vision, the method comprising:
- providing a robotic arm, a first type of illuminator, a second type of illuminator, a camera and an object for examination,
- moving the object to the at least one type of illuminator and the camera by the robotic arm,
- projecting light onto the object from the first type of illuminator or the second type of illuminator for vision inspection by the camera.

21. Method of Claim 20 further comprising:
receiving the object by another robotic arm via vision inspection by the camera or another camera.