



## **Automation Job Tray Standard**

Version 1.0

September 2006

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## FORWARD

The automation of work flow in optical laboratories has placed new emphasis on the interoperability of lens processing machines, their control and communication hardware and software, and the job handling systems.

Where a variety of manufacturers provide equipment for use in an integrated laboratory a degree of standardization is necessary. The members of VCA's Lens Processing Technology group have agreed to develop such standards.

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## 1. Scope

This standard addresses the lens-holding tray or job tray used to move the lens and related items through the laboratory in an automated system. It provides minimum specifications to make possible job trays that can be accommodated by a wide variety of processing machines and handling systems.

## 2. Definitions

1. Automation Job Tray
  - The carrier for a pair of ophthalmic lenses, the tools used for fining and polishing and associated materials such as the spectacle frame and related information.
2. Lens-side
  - The long side of the tray closest to the lenses.
3. Tool-side
  - The long side of the tray closest to the tools.
4. Tray wall
  - The vertical walls forming the outer boundary of the tray.
5. Tray floor
  - The lowest horizontal surface of the tray. Small parts placed in the tray rest on this floor.
6. Tray skirt
  - The portion of the tray below the floor. The skirt bottom contacts the conveyor belt or table top.
7. Lens block
  - The device the lens is affixed to before this assembly is placed in the tray.
8. Tool
  - The device used in fining and polishing the lens surface. This is sometimes called a lap.
9. Tool base curve axis
  - The meridian of the tool that corresponds to the flattest curvature. In the case of a spherical tool any meridian can be used as the base curve.

## 3. Requirements

1. General
  - a. All dimensions are in millimeters with a tolerance of  $\pm 0.25$  mm unless otherwise stated.
  - b. When a feature to be measured has molding draft, measurement of the feature shall be at a point where the dimension being measured is greatest.

- c. The test lens used to evaluate compliance with this standard shall be a flat disc of any suitable material, 100mm in diameter, 2mm thick and mounted on a lens block of the type normally used with this tray to support a lens with a flat front surface.
- d. Trays from different manufacturers should not be intermixed since this may result in tray handling problems.

1. Lens location and orientation

- a. Lens center-to-center spacing shall be 130mm.
- b. A cylindrical space 100mm in diameter is reserved for each lens. The axis of these cylindrical spaces is vertical and centered on each lens block location. The reserved space begins at the bottom surface of the test lens when placed in the tray and extends upward to the highest part of the tray.
- c. Both lens centers shall be 55mm from the lens side of the tray.
- d. The upper surface of each lens shall be at least 20mm above the bottom of the skirt. Compliance with this requirement shall be determined using the test lens.
- e. Lens-block features are not specified in this standard.

2. Tool location and orientation

- a. Tool center-to-center spacing shall be 130mm.
- b. Both tool centers shall be 160mm from the lens-side of the tray and directly adjacent to the corresponding lenses.
- c. If the tool has a base curve axis, that axis shall be parallel to the lens-side of the tray.
- d. Tool receiving features are not specified in this standard.

3. Outside dimensions

- a. The tray shall be generally rectangular in plan view; 260mm long by 220mm wide.
- b. The tray shall be designed for conveyor travel in the direction of the 260mm tray length.
- c. There are no requirements for height of the tray.
- d. Outside corner radius of the four walls shall be 15 mm on all four corners. The skirt shall have corner radii that nest into the wall corners
- e. Tray features above the floor and associated with lenses and tools shall be symmetrical to allow travel in either direction. Underside features need not be symmetrical.

4. Wall features

- a. The two short sides of the tray, referred to as end walls, may have recesses suitable for automated gripping. If such recesses are included they shall have dimensions as follows:
  - i. Length shall be at least 140mm.
  - ii. Depth shall be at least 8mm.

- iii. Height shall be at least 30mm.
    - iv. The recesses shall be at least 6mm below the top of the end wall. This is to allow gripping from above using pinch grippers.
  - b. The wall corresponding to the lens-side shall not exceed 40mm in height from the bottom of the skirt in the area adjacent to the two lenses and their reserved spaces. This is to allow access by gripping tools.
  - c. There are no other limitations on wall height.
  - d. Features for holding a paper job ticket shall be provided in the tool-side wall. These features shall securely retain a folded 8.5x11 inch ticket positioned so that the 5.5 inch dimension is vertical. The features shall also accommodate a tri-folded (~3.7 inch) and a quad-folded (~2.8 inch) ticket. These features and the installed job ticket shall not interfere with stacking of multiple trays.
- 5. Trays shall be able to be stacked. Trays stacked 10 high shall be stable when handled and shall be reasonably constrained against misalignment in all directions. Stacking trays 10 high is for compliance evaluation purposes only and does not indicate that this is safe or recommended practice in normal use.
- 6. Vertical clearance for lenses and tools inside stacked trays shall be a minimum of 25mm measured from the top surface of the test lens to the bottom of the tray stacked above. This minimum clearance shall be maintained across the full diameter of the reserved cylindrical space above each lens.
- 7. Underside features and dimensions
  - a. The lower part of the tray, know as the skirt, shall be rectangular in plan view and uniform in height with the following dimensions:
    - i. Overall length shall be 252 +/-1mm.
    - ii. Overall width shall be 212 +/-1mm.
    - iii. Height shall be 12mm.
    - iv. The corner radius of all four outside corners shall nest into the corner radius of the tray walls to provide alignment when trays are stacked.
  - b. The floor shall be a maximum of 16mm above the skirt bottom.
  - c. If the skirt and any associated ribs have notches that provide clearance for sensors and stops, these notches shall be the full height of the skirt and at least 25mm wide.
  - d. There are no other limitations on features in the area of the skirt including embedded devices used to sense presence or data carriers.
- 8. The tray may be constructed of any material suited to the application.
- 9. Trays claimed to comply with this standard may be marked with "VCA Automation Job Tray" and the standard's revision year.