

# Blood Extraction and Dispensing Device for Guthrie Card PKU Test

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## Medical Need

Nurses screen every newborn for PKU

Inaccurate blood quantities and rejection lead to delays in results and burden for healthcare workers

**Objective:** collect 315  $\mu\text{L}$  of blood in a capillary action tube and dispense it equally onto the center of each Guthrie card circle.

## Requirements

**R.1.1** Dispense 63 microliters of blood to each circle  
**R.2** Minimum Extraction tube flow rate of 1.75  $\mu\text{L/s}$

## Verification

**V.1.1:** Blood Dispensing Test  
**V.1.2:** Blood Extraction Test  
**V.2:** Tube Diameter Test  
**V.3:** Hemolysis Test

## Solution

Extraction

Dispensing

70 mm

240 mm

## Results

Req.	Pass/Fail	Result (Trials)
1.1	Pass	105.5 $\pm$ 6.6% fill or 66.5 $\pm$ 4.4 $\mu\text{L}$ (N=25)
2	Pass	35.2 $\mu\text{L/s}$ (N=8)

## Societal Impact

A controlled method for PKU screening alleviates stress on health care workers and increases the likelihood of a conclusive result, allowing for earlier dietary restriction of newborns.