Only those that have the ability to 3D print should work on this project.

Tempus Pro : all- in-one remote medical diagnostic tool

- This Tempus Pro device has a fiberoptic camera that fits inside a laryngoscope blade (see photo). The Exploration Medical Team would like to remove the laryngoscope blade to expose the fiberoptic camera and have an adapter developed that can use an ear specula with the fiberoptic camera to perform diagnostic tasks of the ear like an otoscope typically would.

[Tempus Pro Monitor – Rugged, Advanced & Light ALS Monitor | Philips]

Fiberoptic camera with Laryngeal blade

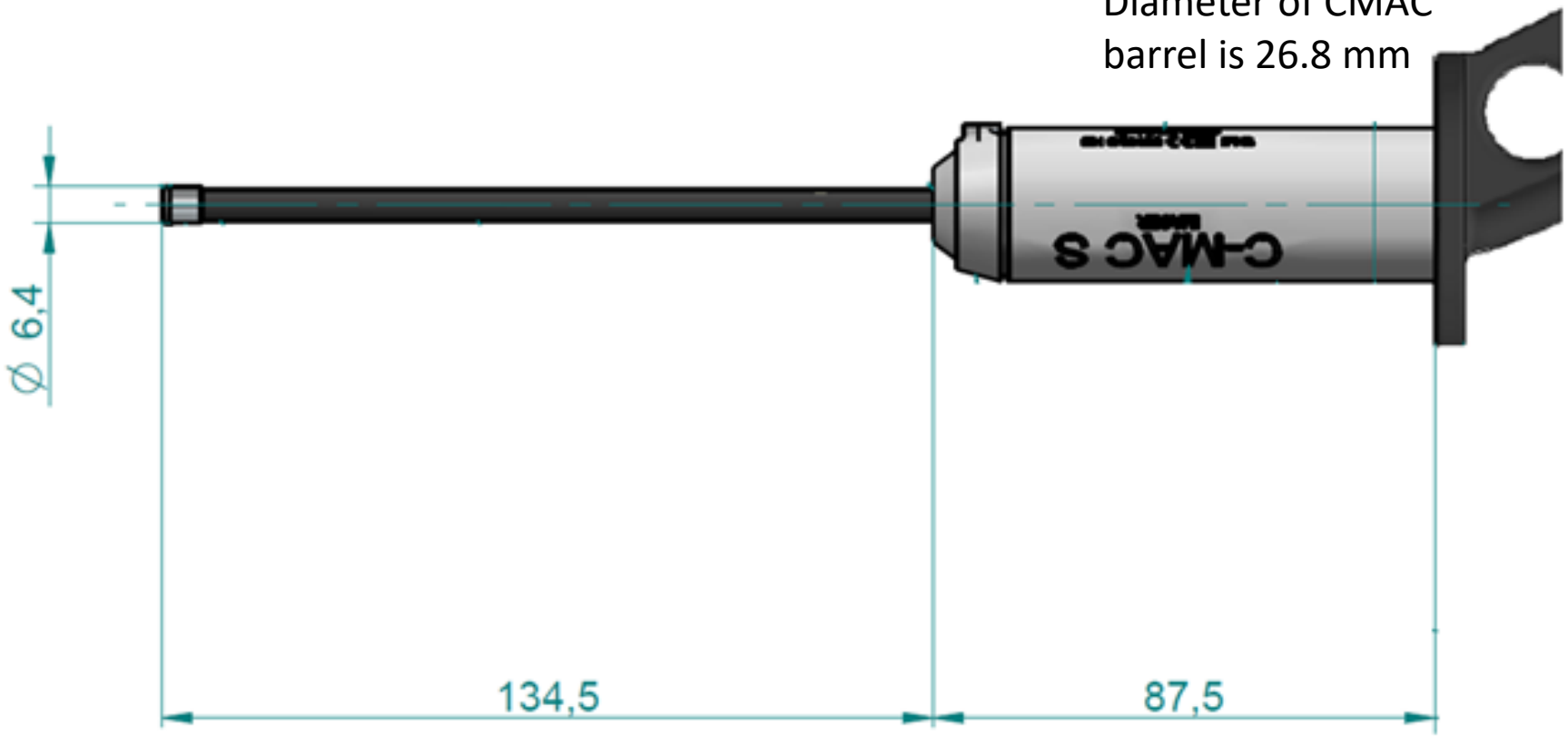
[C-MAC S Imager | KARL STORZ Endoskope | United States]

Fiberoptic Camera

https://www.karlstorz.com/us/en/product-detail-page.htm?productID=1000065163&cat=1000104632

Measurements in mm

Diameter of CMAC barrel is 26.8 mm



Standard Otoscope Removable Tip (specula)

The medical term for this device is specula (plural) or speculum (singular). These are commonly known as ear funnels because of their resemblance to a funnel. They are used with an otoscope to visually examine the eardrum and the passage of the outer ear.

This is general guidance on recommended size of ear specula to use. Each individual may vary. When choosing a speculum, the purpose is to ensure it fits comfortably in the ear canal and allows the examiner to view the entirety of the tympanic membrane.
This particular specula is a 4.25 mm (Adult Size) from Welch Allyn and can be found on Amazon for very cheap

Welch Allyn Specula Measurements

More measurements

Standard Fiberoptic Otoscope

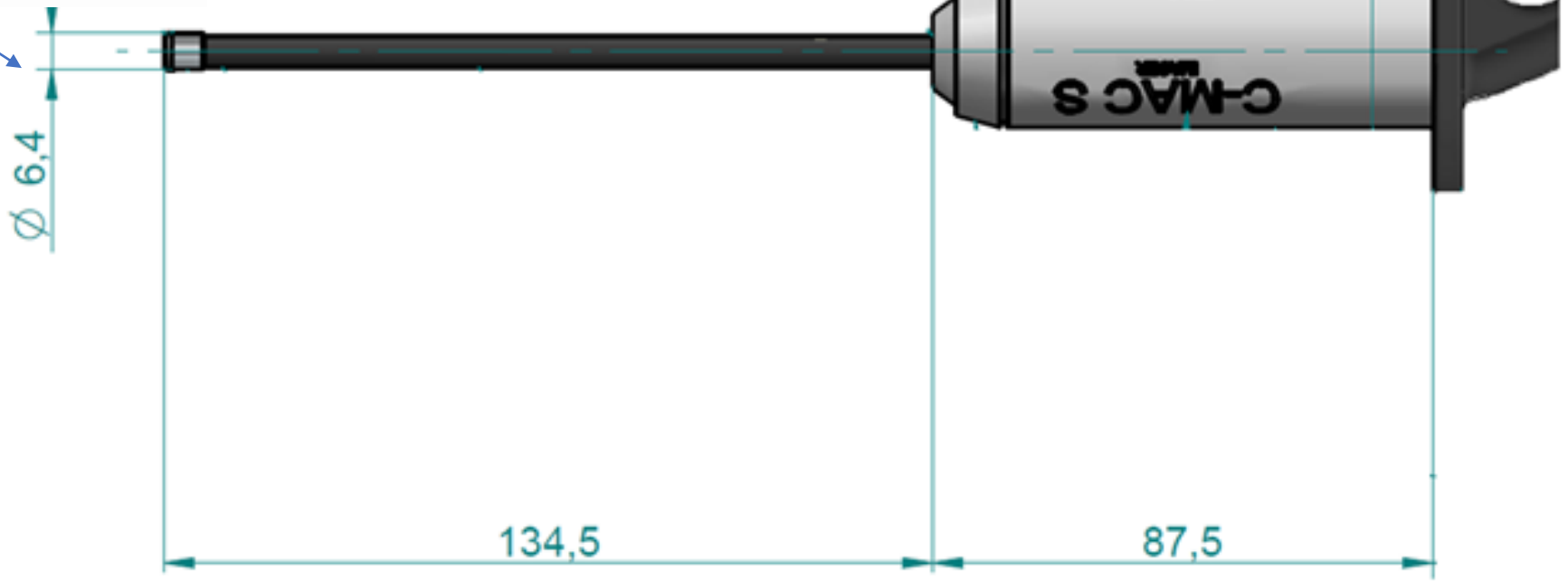
Ear Specula attachment

Place the Fiber optic camera into the ear specula from the larger end. There should be no pinching of the fiber optic camera

Create adapter from large end of ear specula and cover the CMAC barrel

Adapter should cover the entire barrel just like the laryngoscope blade did.

Diameter of CMAC barrel is 26.8 mm



All Measurements in mm

Requirements

1

Design an adaptor that covers the Tempus Pro camera and barrel (similar to the laryngoscope shown in the project description).

2

Keep the adapter compact. The adaptor must not pinch the camera and barrel, but must hold both securely.

3

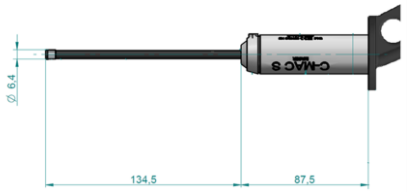
The adaptor must allow for attachment, and removal, of standard otoscope speculum - just like an otoscope using a disposable speculum.

4

The adaptor must be easy to manipulate with one hand, so the other hand of medical personnel can hold the patient's ear.

Testing

- Design on CAD a “test”version of the fiber optic camera and the CMAC barrel
- 3D Print the “test” version out
  - Use a flexible material to represent the fiber optic cable
  - You can use a regular material to represent that CMAC barrel



- Using the 4.25 mm ear specula (which can be purchased cheaply on Amazon), the adapter you have created, and the 3D model of the fiberoptic cable and CMAC barrel test the ability for all of the parts and pieces to be used.

  - Keep in mind – NO Gluing the ear specula to the adapter or adapter to the barrel. All parts must be able to be set in place but easily removable
    - The ear specula are single use
    - The CMAC barrel has different adapters for Intubation, etc so nothing permanently attached to the barrel.
    - Go to the website to see how the laryngoscope attaches.
    - [C-MAC S Imager | KARL STORZ Endoskope | United States]

Safety

SAFETY for YOU:

- Do not place an ear specula in your ear.

SAFETY for the CREW:

- Make sure adapter doesn’t have any sharp edges that could hurt the crew.