Design of Inscentometer

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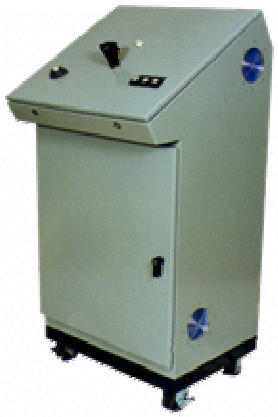
Objective:

- To design an apparatus to dilute the sample odor into 4 different ratios that can give constant flow rate of 1.5L/min.
- The apparatus has to be table top and portable, also it has to be quiet, safe and low maintenance.
- It should not take more than 2 minutes to operate.
- Its repeatability and accuracy has to be tested to make sure the result is within 10% accuracy.

Two ways to evaluate odor:

- **N-butanol**
  - 8 well trained panelists press sample bag and sniff its content to compare it with 6 different strength of n-butanol to determine its odor intensity.
- **Olfactometer**
  - gives 14 different ratios with 20L/min or 10L/min.
  - same 8 panelists evaluate detection threshold as well as its intensities.



Olfactometer

What is the features???

- Gives constant 1.5L/min flow rate.
- Dilute contaminated air with clean air to obtain dilution ratios of 0%, 5%, 50%, 100%.
- Works with batteries (24VDC) that it can be brought to the field to test odor intensity.
- Carbon

How does it work???

1. Turn on a switch by selecting switch number 1 - 4.
2. Following position will give these dilution ratios.

switch number	dilution ratio
1	0% odor
2	5% odor
3	50% odor
4	100% odor

3. Switch is connected to precision orifices and each of them can produce different flow rate.

Example:

When switch is turn to 2, 0.075L/min of odor and 1.425L/min of clean air are vacuumed and total of 1.5L/min, 5% diluted air are comes out from a nose piece.

Why did the original design failed and how did I improved???

- The pump has so strong pressure that the orifices could not get such small flow rate.
  - buy a smaller pressure pump
  - buy precision orifices that gives suitable flow rate under known pressure to make it more precise.
- The "clean air" was not actually "clean".
  - install carbon cartridge filter.
- Too large and too heavy.
  - by replacing pump it reduces 6lbs.
  - replaces to smaller size cross fitting

Is there any other use for this apparatus???

- This can be hooked up with n-butanol, so that odor sample and n-butanol can be compared at the same flow rate.
- By replacing precision orifices to different sizes, this can produce different flow rate as you needed.

Original design

Zoom in

Cost

Given	$2,000.00
Wooden Board	$6.35
Rotary Switch	$2.99
Knob for the switch	$1.69
1/8"OD tubing	$10
2 of cross fittings	$140
Micro pump	$345
Precision Orifices	$120
Total spent	$626.03
Total left	$1,373.97

Final touch

- Design a box to fit and place an order
- Fit everything together
- Test its accuracy
- Test its repeatability