

# Nasal Ranger® Field Olfactometer

## QUICK START GUIDE

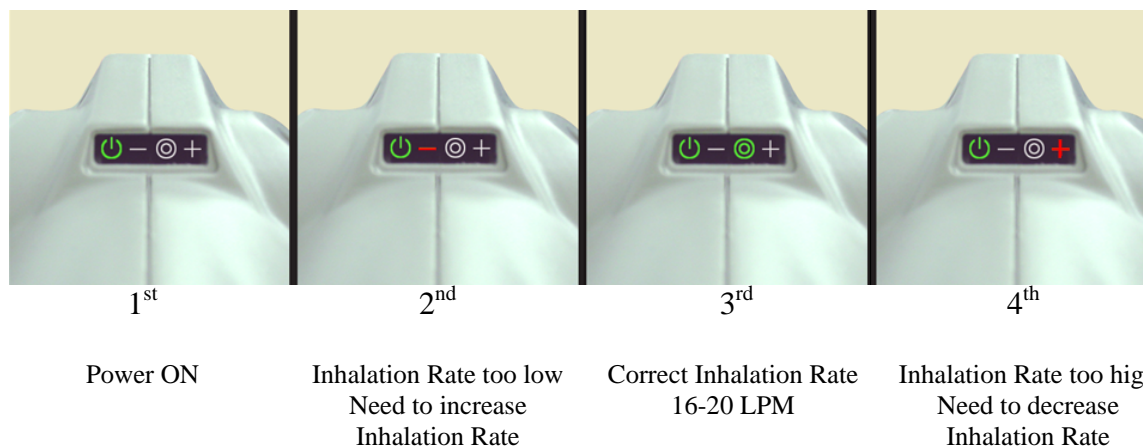
The Nasal Ranger® Field Olfactometer, a portable odor detecting and measuring device developed by St. Croix Sensory, Inc., is the “state-of-the-art” in field olfactometry for confidently measuring and quantifying odor strength in the ambient air using the Operating Principle of mixing odorous ambient air with odor-free filtered air in discrete volume ratios called “Dilution-to-Threshold” ratios (D/T ratios).

Field olfactometry with the Nasal Ranger® Field Olfactometer is a cost effective means to quantify odor strength. Facility operators, community inspectors, and neighborhood citizens can confidently monitor odor strength at specific locations around a facility’s property line and within the community.

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The following information allows an informed user to quickly understand the operation of the Nasal Ranger Field Olfactometer. It assumes the user has some familiarity with field olfactometry and odor monitoring concepts. [See also “Operation Principles” and “Application Guide”]

1. Hold the Nasal Ranger Field Olfactometer parallel to the ground and press the power button which is located below the nasal mask. All four LED lights should illuminate for one second, and then the 1<sup>st</sup> (left) Power LED will stay illuminated.
2. Follow the Test Procedure Flow Chart for the sequenced testing procedure.
3. The LED's on the Nasal Ranger Field Olfactometer provide feedback for the user to inhale at the “factory calibration flow rate”. The LED's are labeled as follows:

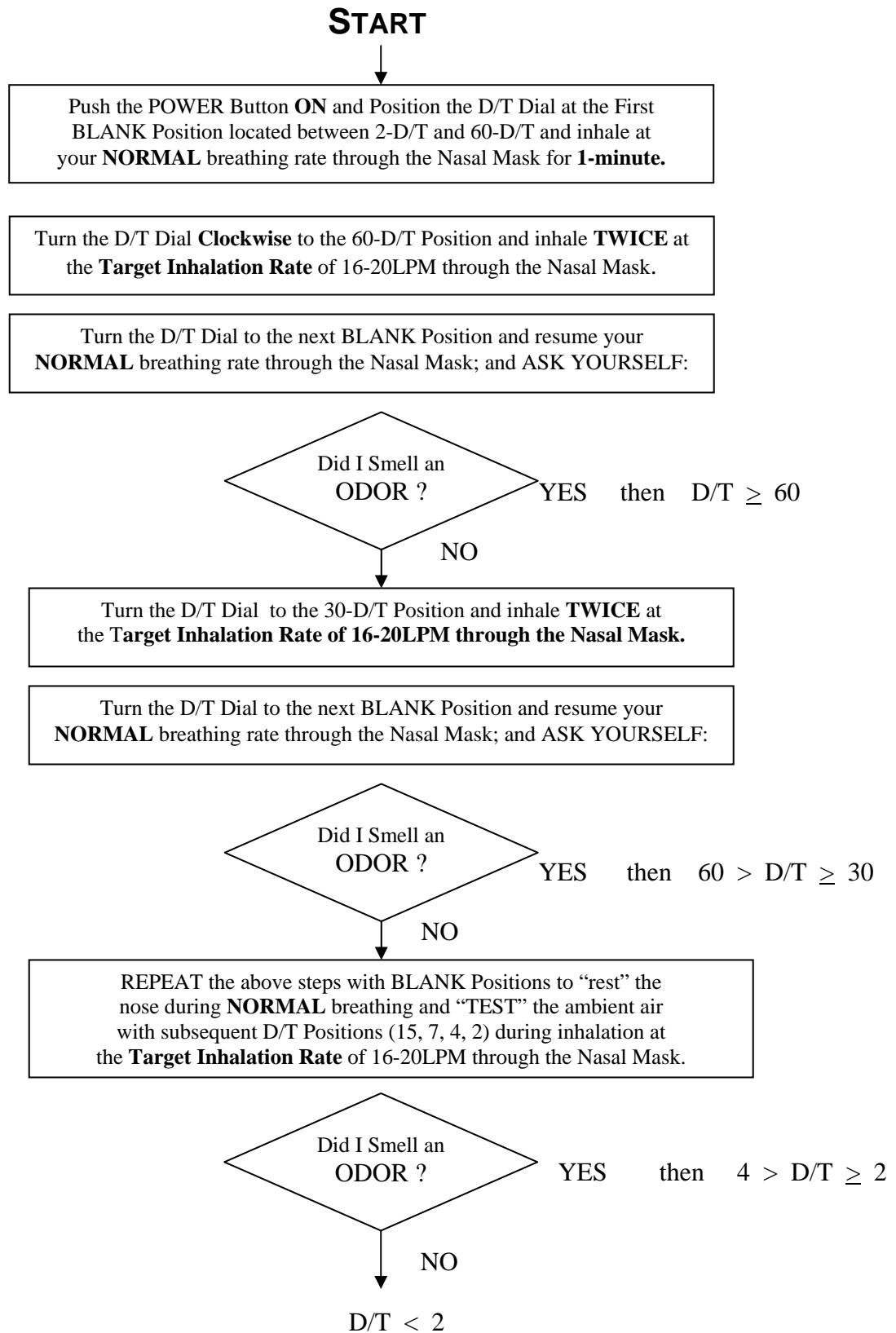


4. After 45 seconds of non-use, the 1<sup>st</sup> LED will blink slowly in a “Power Save” mode.
5. After five minutes of non-use, the Power will automatically turn OFF.
6. To turn off the Nasal Ranger Field Olfactometer manually, press and hold the power button for 3 seconds. All four LEDs will illuminate and then power off. The Nasal Ranger Field Olfactometer is now OFF.

Thank you for joining the ranks of Nasal Ranger® owners. The Nasal Ranger® Field Olfactometer is a precision calibrated tool and will yield reliable odor strength results for your monitoring and measurement needs.

# NASAL RANGER® FIELD OLFACTOMETER

## TEST PROCEDURE FLOW CHART



# NASAL RANGER® FIELD OLFACTOMETER

## OPERATING PRINCIPLE

The Nasal Ranger® Field Olfactometer, a nasal organoleptic instrument, directly measures and quantifies odor strength in the ambient air using the Operating Principle of mixing odorous ambient air with odor-free filtered air in discrete volume ratios. The discrete volume ratios are called “Dilution-to-Threshold” ratios (D/T ratios).

The user’s nose is placed firmly inside the nasal mask against the replaceable “comfort seal”. The user inhales through the nasal mask at a comfortable breathing rate while standing at rest. The nasal mask has an outlet for exhaled air to exhaust downward. Therefore, the user inhales through the Nasal Ranger and exhales downward through the outlet check valve. The user can stand at rest and continue comfortable breathing exclusively through the Nasal Ranger Field Olfactometer.

A Power Button located on the Nasal Ranger Housing, directly below the nasal mask, is pushed once by the user to turn the Power ON. To turn the Power OFF manually the Power Button must be pressed for 3-seconds. After 5-minutes of non-use the Power will automatically turn OFF.

A set of LED lights that are recessed on top of the Nasal Ranger housing indicate when the inhalation flow rate is within the “factory calibration flow rate” of 16-20 liters per minute. The four (4) LED lights have the following functions:

**1<sup>st</sup> LED** (on Left): Indicates POWER ON. After 45-seconds of non-use this first LED blinks slowly in a “Power Save Mode”. When the user inhales and initiates flow the LED will “wake” from the Power Save Mode and remain ON. After 5-minutes of non-use the Power will turn OFF. The Power Button must be pushed once by the user to restart the Power.

**2<sup>nd</sup> LED**: ON when the user is inhaling at a flow rate of less than 16-lpm.

**3<sup>rd</sup> LED**: ON when the user inhales at a flow rate of greater than 16-lpm and less than 20-lpm.

**4<sup>th</sup> LED**: ON when the user inhales at a rate greater than 20-lpm.

Therefore, the user of the Nasal Ranger Field Olfactometer learns to inhale at a rate sufficient to ONLY light up the third LED and be assured that the inhalation is within the factory calibrated flow rate range of 16-20lpm.

The Nasal Ranger’s Operating Principle of mixing odorous ambient air with odor-free filtered air in discrete volume ratios is achieved using two airflow paths:

1. Flow through the odor-filter cartridge and
2. Flow through one of the orifices in the D/T (Dilution-to-Threshold) Dial.

The first airflow path is the “filtered air” path through both odor-filter cartridges that are attached to each side of the Nasal Ranger housing. Ambient air, that may be odorous, enters through the outside of both odor-filter cartridges and travels through the multi-media odor-filter cartridges to remove odors.

The filtered odor-free air then flows forward inside the Nasal Ranger® and mixes with the second flow path, which is the odorous air that has entered through one of the orifices on the D/T Dial. The mixture of filtered air and odorous air then travels down the PTFE Barrel to the users nose that is in place inside the Nasal Ranger® mask.

# NASAL RANGER® FIELD OLFACTOMETER

## OPERATING PRINCIPLE (CONTINUED)

A precision electronic flow meter that is built in to the Nasal Ranger® Barrel measures the “total volume” of mixed airflow that is traveling down the PTFE Barrel on the way to the nasal mask. The LED lights recessed on top of the Nasal Ranger housing indicate to the user when the inhalation flow rate is within the “factory calibration flow rate” of 16-20 liters per minute.

The rotational position of the Nasal Ranger D/T Dial determines the orifice size and, therefore, the volume of odorous air that enters through the selected orifice. A large orifice allows more odorous air through the D/T Dial to mix with odor-free filtered air. A small orifice allows less odorous air through the D/T Dial to mix with odor-free filtered air. The volume ratio of the filtered odor-free air and odorous air is called the Dilution-to-Threshold (D/T) ratio. The principle of field olfactometry calculates the “Dilution to Threshold” (D/T) ratio as:

$$\text{D/T} = \frac{\text{Volume of Carbon-Filtered Air}}{\text{Volume of Odorous Air}}$$

The D/T Dial contains twelve (12) orifice positions. Six (6) positions are “BLANK” positions for the user to inhale only odor-free filtered air. Alternating on the D/T Dial with the six “BLANK” positions are six “D/T” positions with discrete “Dilution-to-Threshold” (D/T) orifices with traceable calibration.

The following table summarizes the “Dilution-to-Threshold” (D/T) ratios on the standard Nasal Ranger® D/T Dial.

<u>Position Number</u>	<u>D/T</u>
1	Blank
2	60
3	Blank
4	30
5	Blank
6	15
7	Blank
8	7
9	Blank
10	4
11	Blank
12	2

A raised arrow is on the rim of the D/T Dial adjacent to the Blank “Starting Position”, Position No. 1.

A Braille raised DOT is on the rim of the D/T Dial adjacent to each of the D/T Positions.

Please contact St. Croix Sensory, Inc. at 1-800-879-9231 (+651-439-0177), or visit [www.NasalRanger.com](http://www.NasalRanger.com) with inquiries regarding Nasal Ranger D/T Dials with other “Dilution-to-Threshold” (D/T) ratios.