



HACETTEPE ÜNİVERSİTESİ

BREATHABLE AIR TEST REPORT OF SUMER OXYFRESH PRODUCTS

Designed to meet medical supply systems requirements, the Dräger MultiTest med. Int. measures the purity of medical gases. A single test system is sufficient to detect contaminants in compressed air, nitrous oxide, carbon dioxide and oxygen.

Set Contents:

- O2 pressure regulator,
- Measuring Tube (7 Pieces)
- Parser adapter,
- NIST connector,
- Closing Coupling,
- Stopwatch,
- Tube opener Dräger

TO 7000

- Air Bubble Test Hose,
- User guide,
- Carrying Case (blue)

Measuring Tubes Included in the Set

- 1 Box of Carbon Dioxide 100 / aP (100 - 3000 ppm)
- 1 Box of Carbon Monoxide 5 / aP (5 - 150 ppm)
- 1 Box of Hydrogen Sulphide 1 / d (1 - 20 ppm)
- 1 Box of Nitrous Fumes 0.2 / a (0.2 - 6 ppm)
- 1 Box of Sulfur Dioxide 0.5 / a (1 - 25 ppm)
- 1 Box of Water Vapor 20 / aP (20 - 1500 mg/m3)
- 1 Box of Oil-Impactor



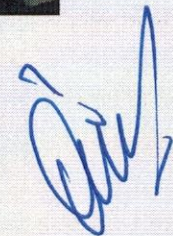
TEST METHOD

Dräger MultiTest Med. Int medical gas measurement is made with 2 methods. All measurements, except for oil mist, are made with the gas sampling apparatus that comes with the Dräger kit, as seen below.

1. First, a hose is drawn from the tank to be tested.
2. This hose is connected to the pressure regulator that comes with the Dräger test kit, the pressure regulator is adjusted to the pressure written in each test brochure (usually 3 barg).
3. Pressure regulator output is connected to the input of the gas sampling kit, which is depicted in the picture below.
4. When the pressure regulator is adjusted to the correct pressure, the orifices in the pressure sampling kit pass through the desired flow rate, these quantities are written at the relevant connection point.
5. The relevant tube is placed into the flexible hose after cutting its two ends.
6. The time related to the test is written in the brochure that comes with the relevant tube. These tests last usually between 2.5 minutes to 10 minutes.
7. The relevant tube is exposed to flow for the period specified in the brochure.
8. The tube is then removed from the flexible hose and the color change is observed.
9. The ppm value is determined by matching the time on the tube with the color change in time.
10. For oil measurement, after the oil measurement kit is placed in the plastic pipe, it is placed in the flexible hose.
11. After waiting for the time written on the brochure, it is removed from the flexible hose and the paper on it is torn and oil measurement sample is directed towards the light.
12. By observing the holes of the measuring device and the amount of wetting around it, the amount of oil in the sample gas is determined by comparing it with the picture on the brochure.



Figure 1. Dräger MultiTest Med. Int Test Kit.



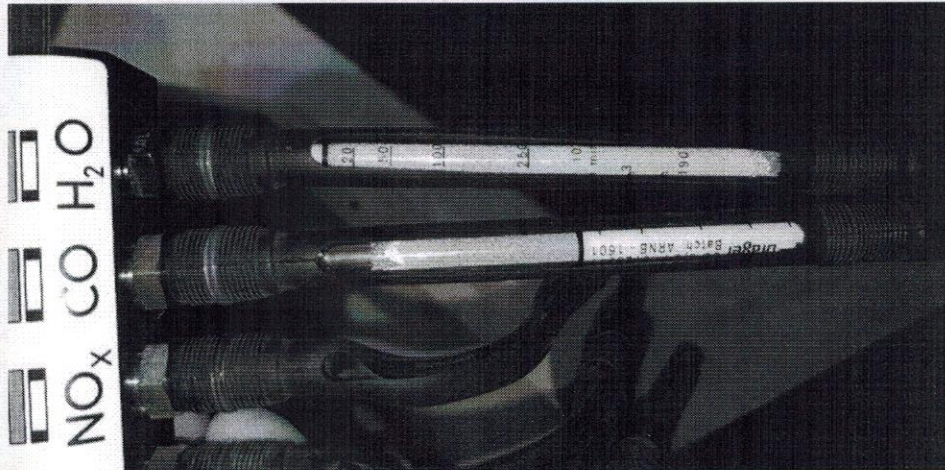


Figure 2. Dräger MultiTest Med. a photo taken during the Int Test sequence

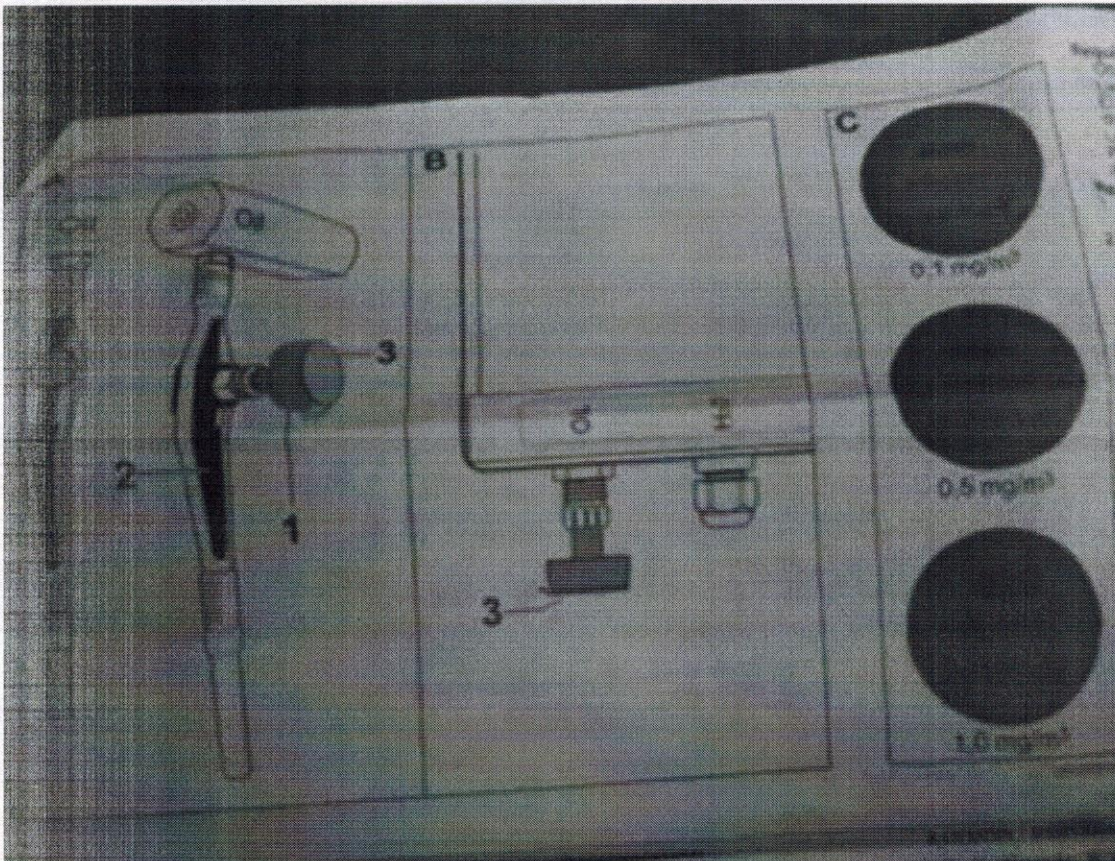


Figure 3. Dräger MultiTest Med. Int Oil Test brochure comparison pictures

A handwritten signature in blue ink, located in the bottom right corner of the page.

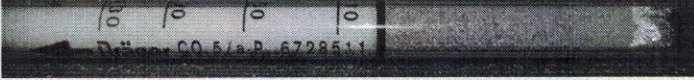
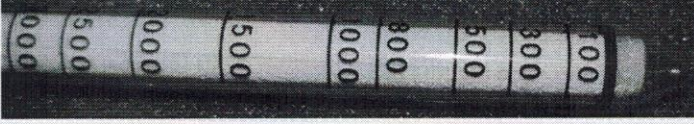
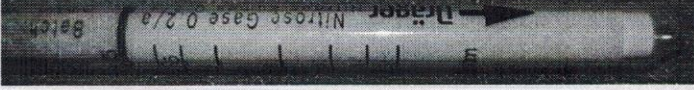

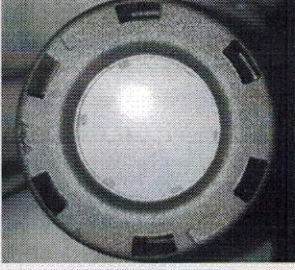
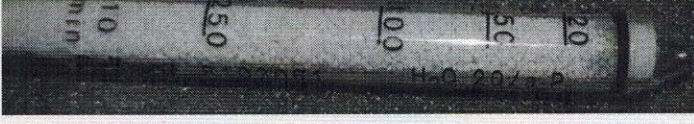
TEST RESULTS

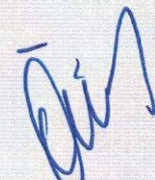
Date : 04.03.2021

Result : PASSED

Test Made By : Oktay Çetinel (Ph.D.)

Test Location : Başkent OSB Başkent Bulvarı No: 81 Malıköy -Sincan / Ankara / Turkey

TEST	RESULT	DESCRIPTION / PICTURES
Ambient temperature	13.5 C	PT100
Gas Temperature	12.6 C	PT100
System Tank Pressure	5 barg	KELLER Pressure Sensor
Oxygen Purity Value	95.1%	Envitec OOM102 Chemical Oxygen Sensor
Carbon Monoxide (ppm)	0.5 ppm	
Carbon Dioxide (ppm)	10 ppm	
NOx gases (ppm)	0 ppm	
SO2 (ppm)	0 ppm	
Oil (mg / m3)	< 0.003 mg / m3	
Water Vapor (Dew Point)	10 ppm	



SENSOR LIST

Producer	Measuring Method	Part Number	Time	Uncertainty
Envitec	Oxygen Sensor	OOM102	60 seconds	± 1 %
Keller	Pressure Sensor		60 seconds	± 0.2 bar
Tetcis	Temperature Sensor	PT100	60 seconds	± 5% Degree
Dräger	Tube - CO	5 / ap	Five min	± 5% ppm
Dräger	Tube - CO2	100 / ap	Five minutes	± 5% ppm
Dräger	Tube - NOx	2 / ap	Five minutes	± 5% ppm
Dräger	Tube - SO2	0.5 / ap	2.5 minutes	± 5% ppm
Dräger	Oil-Impactor	0.1 / ap	10 minutes	± 5% ppm
Dräger	Tube - H2O	20 / ap	10 minutes	± 5% ppm

LIMIT VALUES

Medical Oxygen Quality

Parameters		European Pharmacopoeia	OXYFRESH
Oxygen	O2	90 - 96%	Up to 95%
Carbon Monoxide	CO	<5 ppm	0.5 ppm
Carbon Dioxide	CO2	<300 ppm	10 ppm
Sulfur Dioxide	SO2	<1 ppm	0 ppm
Nitrogen Oxide	NOx	<2 ppm	0 ppm
Water vapor	H2O	<67 ppm	10 ppm
Oil Mist	-	0.01 mg / m3	<0.003 mg / m3



Approved By: Asst. Prof. Özgür ÜNVER

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Beytepe, Çankaya / Ankara / TURKEY