RESPIRATORY MASK
LEAK TESTER
NBC 04 ISSUE II

INTRODUCTION FOR LEAK TESTERS

The threat of being encircled by lethal gaseous environment for the fighting personnel cannot be ruled out in the present military scenario. The fighting personnel are provided with Nuclear Biological & Chemical (NBC) Equipment which provides whole body protection and protection to the respiratory tract and face. NBC respirator forms an important part of NBC protective ensemble. The Respiratory Mask Leak Testers, for evaluating the functional integrity of the respiratory masks before it is issued to the user, is developed by and manufactured by **IEICOS - M/s Industrial Engineering Instruments, Bangalore,** in collaboration with DEBEL, Bangalore

DESCRIPTION

Each Leak Tester Set Comprises of the following:

1. Leak Tester (A) with Medium & Small Dummy head.
2. Leak Tester (B) with Medium & Large Dummy head.
3. Power Inverter [OPTIONAL]
4. Tool Box.

The Leak Tester essentially consists of two dummy heads and a suction generator, which is connected to a needle valve and a flow meter. The flow meter outlet is connected at the mouth of the dummy head. A pressure sensor located below the dummy head is also connected to the mouth through an adjacent steel pipe.

When the mask is not fitted on the dummy head, the Flow display shows maximum inward flow and Suction display shows zero. When mask is fitted, the leak flow rate decreases; the cavity suction level goes on increasing depending on the degree of fitment and tightness of the mask.

The Leak Tester is provided with digital display and a logic circuit, which indicates within 40 seconds whether a mask has passed/failed. This facility simultaneously compares the test values with admissible values and a comparator network decides whether the mask satisfies the pass/fail criteria. The glowing of green LED indicates the mask has passed. In the event of failure the reason is also indicated as, Suction fail or Flow (leak rate) fail by glowing of respective red LED.

The admissible values for Suction and Flow are engraved on the top of the panel for quick reference.

The ***"POWER ON"*** switch is provided to Switch on or Switch off the power. ***"PUMP ON"*** button is provided to Switch on or Switch off the Suction generator.

A ***"RESET"*** button is provided on the front panel, when pressed, gives on audible beep, then the Flow rate and Suction level is continuously displayed and readings are frozen after 40 seconds.

A circuit consisting of two 3/2 way solenoid valves connected in such a way that both the pressure and Flow connections are changed from one dummy head to the other simultaneously. "Head selector switch" when pressed changes the connections from one head to other.

The Suction ***"ZERO"*** knob provided on the front panel beneath the Suction display is used to adjust the initial zero value of the display by rotating the knob.

The ***"Flow Control"*** knob is provided with anti-tampering cap lock. For adjustment the cap has to be removed and the knob can be adjusted to get 500 ± 50cc/min quiescent flow when the Suction generator is switched on (without the mask fitted). By rotating the knob clockwise the flow decreases, by rotating anti-clockwise the Flow increases.

TECHNICAL SPECIFICATIONS:

a) **Dummy heads:** made of FRP and compatible with their size of Indigenous Respiratory NBC Masks.

b) **Suction Pump:** Max suction 40 Inches water column, AC 230 V operated.

c) **Needle Valve:** 0-1000 CC/min max flow capacity.

d) **Flow Sensor:** in the range of 100-1000 cc/min Calibrated to ± 50 CC/min accuracy.

e) **Pressure Sensor:** 0-600mm of water column suction; calibration to ± 10mm of water column accuracy. Diaphragm type using four strain gauges.

f) **Digital Indicator cum Controller:** 90x90x150 mm unit complete with input transformer, Power Supply Board, press to set point, set adjust, calibration / zero adjust knob and 3½ digital LED display unit on front panel.

g) **Freeze Circuit:** RC timer using IC 555 set for 40 sec. Monostable multi-vibrator mode. It runs a beep buzzer and also gives pulse to freeze both the display at a time.

h) **Switches:** DPDT and SPDT type switches.

i) **Solenoid Valve:** 3/2 way, 1/4inch size AC Operated, power dissipation less than 5 watts.

j) **Auto priming Solenoid Valve:** 2/2 way AC operated, power dissipation less than 5 watts.

k) **Power requirement:** 230 V AC, 50 Hz, or 12 V DC vehicle battery with Power Inverter (Optional).

l) **Operating temperature:** Capable of working normally from + 10^0 C to 65^0 C, RH up to 95%.

m) **Storage temperature:** Ambient to 40^0 C.

n) **CALIBRATION:** Calibration certificate will be provided with the equipment, (if third party Certification is required it will be provided at extra cost).

o) **LITERATURE:** One Technical Literature/ Operating manual will be provided with equipment.

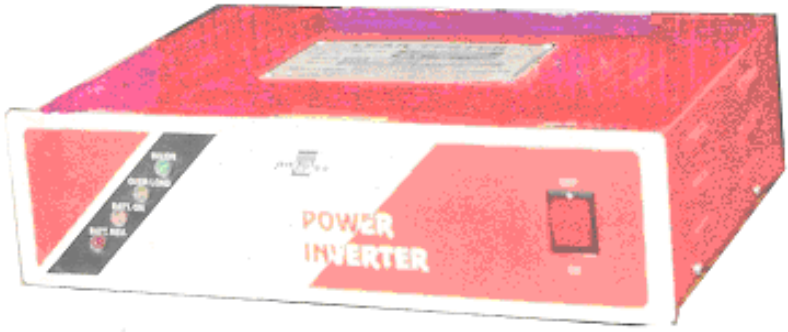
A. <u>TOOL KIT</u>

which is provided with the Leak Tester Sets and consists of the following spares:

1. Spanner OJDE 10-11	Qty-1	6. Pipe PVC OD 8.5mm, ID 6mmx10mm	Qty-1
2. Screw Driver 250mm	Qty-1	7. Teflon tape 12mmx10mm	Qty-2
3. Nut Driver M6 (10mm)	Qty-1	8. Fuses 2A	Qty-2
4. Line Tester	Qty-1	9. Fuses 50mA	Qty-6
5. Banking cap	Qty-2	10. UPHB/PIL Book	Qty-1

B. <u>POWER INVERTER</u> (Optional)

Input: 12V ±10% DC Powered by customer's existing battery. 12V/300VA Power Inverter with 3 Power Sockets, 2 meter of color coded wire with 2 crocodile clips.



<u>Note</u>: We are registered with

1) CQA(FFE) vide CQAFE/CAP/1514/428 Dt:11/12/2008 which is valid up to 2011.
2) Approval of quality assurance drawings from DGQA vide No. CQAFE/NBCQA/2004-02/LT Dt: 23/06/2005
3) Quality Assurance Plan approved by DQAN vide approval No. DQAN/QAP/EL-06/079. Dt: 30/10/2006
4) National Small Industries Ltd. vide permanent registration No.NSIC/BNG/GP/20(938)/91/3515 Dt. 31-03-1993

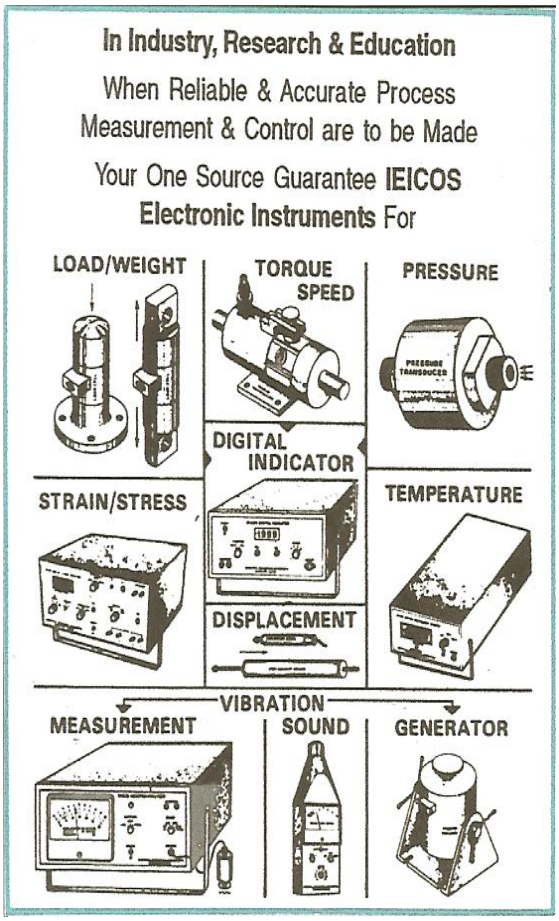
PAST PERFORMANCE AND SUPPLY DETAILS OF THE LEAK TESTERS

User Organization

1) Dept. of Defence Production, New Delhi, Ministry of Defence (C.O.D Mumbai) - 121 Sets.
2) Garden Reach Shipbuilders & Engg's Ltd, Kolkata. - 3 Sets.
3) Defence Bio-Engg & Electro-medical Lab, Bangalore, - 20 Nos.
4) Defence Material Stores, Research & Development Estd, Kanpur. - 2 Nos.
5) Special Protection Group, New Delhi – 2 Sets
6) Central Reserve Police Force, New Delhi – 1 Set
7) Indo- Tibetian Border Police – 1 Set
8) Mazagon Dock Ltd, Mumbai – 6 Sets

Supplied for Evaluation of Face Mask

1. M/s Vijay Sabre Safety Ltd	10 Nos.
2. M/s Joseph Leslie Drager	5 Nos.
3. M/s Univest Technologies Pvt Ltd.	5 Nos.



MANUFACTURERS OF:

ELECTRONIC MICROPROCESSOR BASED DIGITAL INSTRUMENTS, SYSTEMS AND TRANSDUCERS FOR MEASURING, RECORDING, PRINTING, TESTING, PROCESS AND QUALITY CONTROL, ANALYSIS, EVALUATION, SIMULATION OF TORQUE SPEED, POWER, PRESSURE, STRESS, STRAIN LOAD, FLOW LEVEL, DISPLACEMENT, VIBRATION, SOUND TEMPERATURE, HUMIDITY, ELECTRICAL PARAMETERS, DYNAMOMETERS FOR TESTING AND EVALUATION OF MACHINE TOOLS, ROTATING MACHINERY, LOADING FRAME WITH ELECTRONIC DATA LOGGERS FOR STRUCTURAL STUDIES IN THE FIELDS OF : INSTRUMENTATION, MECHANICAL ENGINEERING, PRODUCTION TECHNOLOGY, FLUID MECHANICS/HYDRAULIC LABORATORY, CIVIL/STRUCTURAL ENGINEERING, ELECTRICAL/ELECTRONICS ENGINEERING IN EDUCATION, R & D, INDUSTRY AND DEFENCE INSTITUTIONS.

INDUSTRIAL ENGINEERING INSTRUMENTS

Manufacturers of Electronic Test and Measuring Instruments, PC/Microprocessor based automated test equipment and systems, transducers and sensors, technical/engineering laboratory equipments.

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