



**2026 WVU
BENCH BASH
BIO 240-R
CONTEST
DAY 1**

Table Layout for Bio-Pak 240-R Contest

Test Apparatus With Upper Housing And Hose Connector Installed		Test Apparatus Mask	Upper Housing With Parts	Visual Apparatus
Test Kit				

STATEMENT TO BENCH CONTESTANT

The bench participant will be provided with two Bio-Pak 240- R apparatus (one disassembled, one assembled), a stopwatch, leak detector fluid, test kit, and tool kit. Only the tools and fluid provided will be used for testing and assembly of the apparatus. The work at the bench will consist of:

1. A visual examination of a disassembled Bio-Pak 240-R and the proper assembly and preparation for use in rescue work. This will include correcting any predetermined problem(s) so that the apparatus is in proper working order. Simulating defogging of the facepiece lens will be done as a part of the visual examination. This visual examination, correcting predetermined problem(s), and proper assembly can be done at any time allowed for the working of the problem.
2. Test the assembled Bio-Pak 240-R apparatus with a tester, and correct the predetermined problem(s) so that the apparatus is in proper working condition. Except for removing the facepiece storage plug from the breathing hoses, the assembled Bio-Pak 240-R apparatus cannot be disassembled to look for problems, until the apparatus fails a test. When testing is completed on the assembled Bio-Pak 240-R apparatus, the hoses shall be removed from the tester, connected to the facepiece, and the upper housing installed. This shall be done before the clock is stopped.

When an unplanned deficiency is encountered in the apparatus, the participant will be notified by the judge(s) that the deficiency is not part of the problem. The judge will stop the clock and any time used to correct the deficiency will not be charged to the working time.

A maximum of 30 minutes will be allowed to complete the problem. The judge will tell you when 25 minutes has passed. At the completion of the problem, the judge(s) and the participant will note the working time of the problem with the official timekeeper. Work done after the clock is stopped will not be recognized.

BIO-PAK 240-R VISUAL APPARATUS (BREAK DOWN)

Upper Housing Assembly-Removed
Hoses-Removed
Coolant Lids and Ice Canisters - Removed
Center Section Lid Assembly - Removed
Moisture Pads - Removed
Carbon Dioxide Scrubbers and Gasket - Removed
PCM Canister - Removed
Loosen (But do not remove) Flow Restrictor
Center Section – Removed
Diaphragm and worm gear-Removed
Vent Valve Assembly - Removed as a unit
Oxygen Cylinder-Removed

BIO-PAK 240-R TOOL KIT

Leak Check Adapter Fitting
Flow Test Fixture
Test Key
Vent Valve Hand Wrench
Center Section Pneumatic Plug
Regulator Wash Cover
Combination Pick Tool
#00 Phillips Head Screwdriver
#1 Phillips Head Screwdriver
#2 Phillips Head Screwdriver
1/4" Hex Driver
3/16" Nut Driver
5/16" Nut Driver
9/32" Nut Driver
3/8" x 5/16" Open End Wrench
7/16" Combination Wrench
1/2" Combination Wrench
5/8" x 9/16" Open End Wrench
Stop Watch
Bypass Valve Tool

BENCH DISCOUNTS

Contestant does not call out each test being conducted.

They should be discounted for failure to verbally identify each test being conducted under A1 (2 point discount for each test)

Contestant does not find a bug on either the Test or Visual unit.

They should be discounted for failing to identify the bug under A2 (5 point discount) for failing to identify and under A3 (5 point discount) for failing to correct the bug. (Total 10 point discount) for every bug that is missed on either unit.

If the problem design only calls for the contestant to identify a bug and not correct it. In that case they should still be discounted under A2 and A3 for failing to identify and correct the bug (10 point discount).

Contestant does not perform any visual exam or test. (This means they did not do the visual exam or test at all).

They should be discounted for not performing a Visual Exam or Test under A5 (5 point discount) for failing to conduct a visual exam or test.

Contestant does not call out one of the connected or good connections required by the rules to be called out. (Any similar terminology should be accepted)

They should be discounted under A6 (1 point discount for each connection) for failure to tighten connections properly during assembly or testing. This discount is used if they did not call out any of the connected or good connections on your judge's checklist.

Contestant blows into a hose or uses body fluid in any way on the units during the problem or the contestant uses a tool or anything else that they brought with them (Multi- Tool, Keys, Pocket knife, etc.).

They should be discounted under A8 (2 point discount each infraction) for rules not covered on the discount sheet. It is covered in the rules that only the tools and fluid provided will be used during the problem.

Contestant fails to call out any of the required items on your judge's checklist when conducting any of the visual exams

They should be discounted under B2 thru B8 (2 point discount for each item not called out)

Contestant fails to zero the tester or mag gauge before testing

They should be discounted under A7 (10 point discount).

Contestant runs out of time or for any other reason does not have the visual unit assembled properly including having the back cover and face mask installed. This includes leaving something unhooked, partially hooked, or something hanging out the side of the unit. The hoses on the visual unit do not need to be buckled in the straps at the end of the problem.

They should be discounted under B9 (5 point discount) visual apparatus not ready for use. This should only be discounted once no matter how much they left wrong with the visual unit. Do not dock them for this because they missed a bug and didn't correct the bug.

Contestant fails to do a proper test on any of the required tests to be conducted.

They should be discounted under C1 thru C8 (2 point discount each). This discount should only be used for a test not done properly. Example: Pumps the tester too hard and fast to actually see when the low pressure warning activates or doesn't state the opening pressure of the relief valve. Etc. C1 thru C8 should not be used for tests not done due to running out of time. Those tests not done due to running out of time should be docked under A5 as a 5 point dock.

Contestant runs out of time or for any other reason does not have the test unit assembled properly including having the unit disconnected from the tester, and the back cover and face mask installed. This includes leaving something unhooked, partially hooked, or something hanging out the side of the unit. This also includes leaving the test cap inside the unit. The hoses on the test unit do not need to be buckled in the straps at the end of the problem.

They should be discounted under C9 (5 point discount) Test apparatus not ready for use. This should only be discounted once no matter how much they left wrong with the Test unit.

Contestant Cuts and Runs.

They should be discounted under A4 (40 point discount) for failing to correct each problem for cutting and running.

They should be discounted under A2 (5 point discount) for not identifying the bug.

They should be discounted under A3 (5 point discount) for not correcting the bug.

They should be discounted under C1 thru 8 (2 point discount) for whatever test they couldn't pass due to the bug they couldn't find.

They should be discounted under C9 (5 point discount) for failure to have the test unit ready for use.

The initial 40 point discount for cutting and running can only be removed if the contestant returns and finds the bug and corrects the bug and then continues from that point and completes all the remaining tests in sequence from that point to completion.

Day#1 Bench Bash

BioPak 240 R BENCH CONTESTANT

WORKING TIME

MIN.

SEC.

VISUAL APPARATUS CHECKS

TEST APPARATUS

✓	Check If ok	✓	Check If ok	
	UPPER HOUSING			
	LOWER HOUSING		Zero Adjust the Mag. Gauge	
	CENTER SECTION ASSEMBLY		CONSTANT FLOW TEST	
	CARBON DIOXIDE SCRUBBER		State Reading per Rev.D p. 10	
	SIMULATE ADDING SCRUBBERS IF NOT PRESENT		DEMAND VALVE TEST Flow stops 1-3 Sec.	
	CENTER SECTION LID ASSEMBLY		EMERGENCY BYPASS TEST Flow no more 1-2 Sec.	
	SIMULATE ADDING ICE IF NOT PRESENT		VENT VALVE TEST	
	CYLINDER TEST		State Reading 2 inches of water or less	
	Manufactured Date		LOW PRESSURE LEAK TEST No more than -.02" WC	
	Hydrostatic Date		RMS GAUGE AND TRIM TEST	
	Face Peice Test		State Reading Observe lights/gauges +/- 10%	
	Hoses		HIGH PRESSURE LEAK TEST	
	CONNECTIONS CONNECTED OR GOOD		LOW PRESSURE ALARM TEST	
	Vent Valve Assembly - Connected or good		State Reading Alarm 650-1000 psig	
	Diaphragm Worm Gear - Connected or good			
	Flow Restrictor - Connected or good			
	Breathing Hose Worm Gear - Connected or good			
	Add / Constant Fittings - Connected or good			
	Center Section Lid - Connected or good			
	Center Section Push Pins - Connected or good			
	Cylinder Connection - Connected or good			
	Adapter to Facepiece - Connected or good			
	Test Fixture Connections - Connected or good			
VI	VC	VI	VC	TEST
				Crack in upper housing
				Damaged ice lid
				Head strap improperly installed
				Red and Green lines damaged
				Missing large o-ring
				O-ring on coupling missing
				Demand valve missing center pen

Bio 240R Day 1

WVU MINE RESCUE

Name _____

Number _____

1. The _____ module will require replacement if any damage to the housing is Discovered. (#59)
 - A. RMS
 - B. Alarm
 - C. Manifold

2. The battery is to be changed in _____ air only. (#2)
 - A. fresh
 - B. ambient
 - C. zero

3. If the optional magnetic wiper is utilized soak both _____ surfaces of the wiper pieces with water. (#34)
 - A. soft
 - B. cloth
 - C. chamois

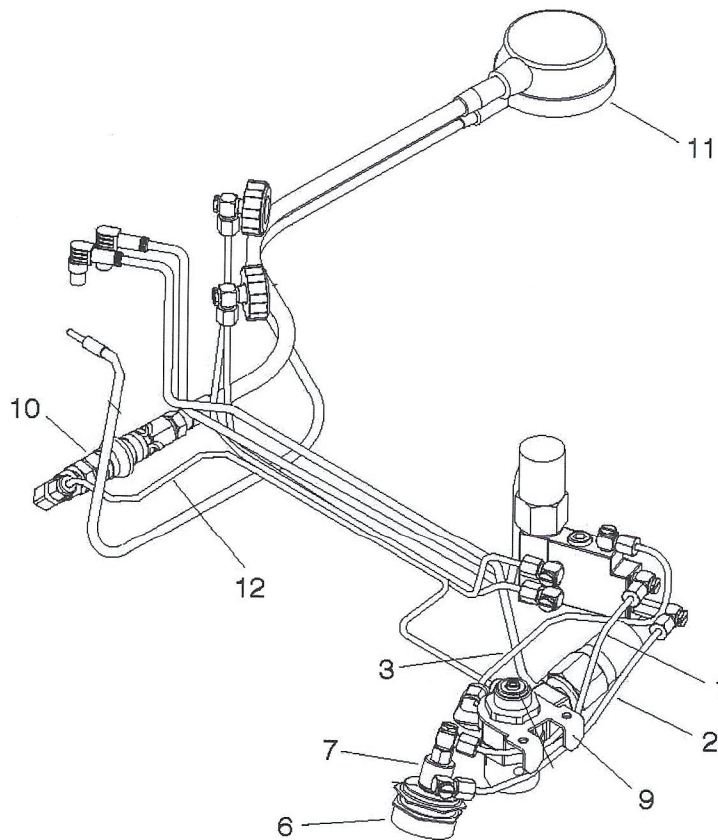
4. The BioPak breathing chamber has a _____ Volume greater than 6 liters. (#71)
 - A. Total
 - B. Pressure
 - C. Tidal

5. The use of an _____ will add to the workload and stress of the user. (#10)
 - A. 240R
 - B. BioPak
 - C. SCBA

6. During an alarm test the LED indication should turn to a flashing red with a horn sounding when the pressure gauge reads between _____ psi. (#78)
 - A. 550-1000
 - B. 650-1000
 - C. 750-1000

7. Claustrophobia or _____ when wearing a SCBA could limit or prevent the use of the BioPak 240 Revolution. (#85)
- A. Hypertension
 - B. Anxiety
 - C. Anxiousness
8. The _____ gauge is protected against sudden loss of oxygen in the event of the gauge line severing by a manual disconnect located at the gauge pass through point of the housing. (#82)
- A. pressure
 - B. exterior
 - C. oxygen
9. A foreign gas may cause cylinder _____. (#14)
- A. corrosion
 - B. deterioration
 - C. failure
10. Cylinders that have been hydro-static tested shall be cleaned for high-pressure oxygen service per _____. (#57)
- A. manufacturer Standards
 - B. Industry Standards
 - C. national standards

Pneumatic Assembly



No.	Designation	No.	Designation
1	Bypass Feed Tube	9	Oxygen _____ Assembly (14)
2	Bypass Return Tube	10	Remote Gauge Shut Off Assembly
3	_____ Feed Tube (11)	11	Remote Gauge _____ (15)
6	_____ Push Button (12)	12	Remote Gauge Feed Tube Assembly
7	_____ Valve (13)		

(11)

A. Bypass
B. Return
C. Oxygen

(12)

A. Relief Valve
B. Bypass Valve
C. Minimum Valve

(13)

A. Relief
B. Bypass
C. Minimum

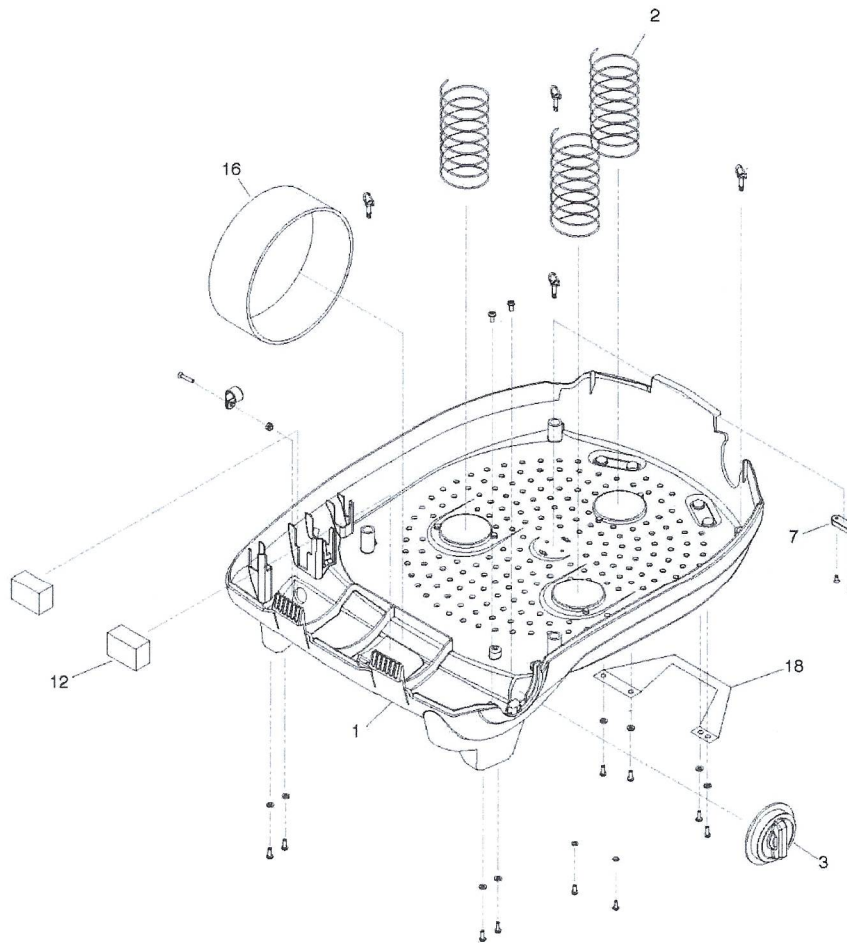
(14)

A. Regulator
B. Distributor
C. Sensor

(15)

A. Unit
B. Display
C. Assembly

Lower Housing Assembly



No.	Designation	No.	Designation
1	Lower Housing Shell	12	Latch _____ Pad (19)
2	_____ Springs (16)	16	Oxygen _____ Hold-Down Strap (20)
3	External Oxygen _____ (17)	18	Carrying Handle
7	_____ Spacer (18)		

(16)
A. Air Bag
B. Housing
C. Diaphragm

(17)
A. Knob
B. Cap
C. Adjustment

(18)
A. Drain
B. Shell
C. Vent

(19)
A. Rubber
B. Foam
C. Cushion

(20)
A. Cylinder
B. Bottle
C. Canister