



**2026 WVU**  
**BENCH BASH**  
**Drager BG4**  
**CONTEST**  
**DAY 2**



## STATEMENT TO BENCH CONTESTANT

The bench participant will be provided with two BG-4 apparatus (one disassembled, one assembled), an RZ-25, RZ-7000 tester, or Test-It 6100 tester, a stopwatch, defogging solution, 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 at the bench will consist of:

1. A visual examination of a disassembled BG-4 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 BG-4 apparatus with a tester, and correct the predetermined problem(s) so that the apparatus is in proper working condition. Except for removing the sealing cap from the coupling on the breathing hoses, and removing the cover shell, the assembled BG-4 apparatus cannot be disassembled to look for problems, until the hoses are attached to the tester, and the apparatus fails a test. When testing is completed on the assembled BG-4 apparatus, the hoses shall be removed from the tester, connected to the facepiece, and the back cover 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.

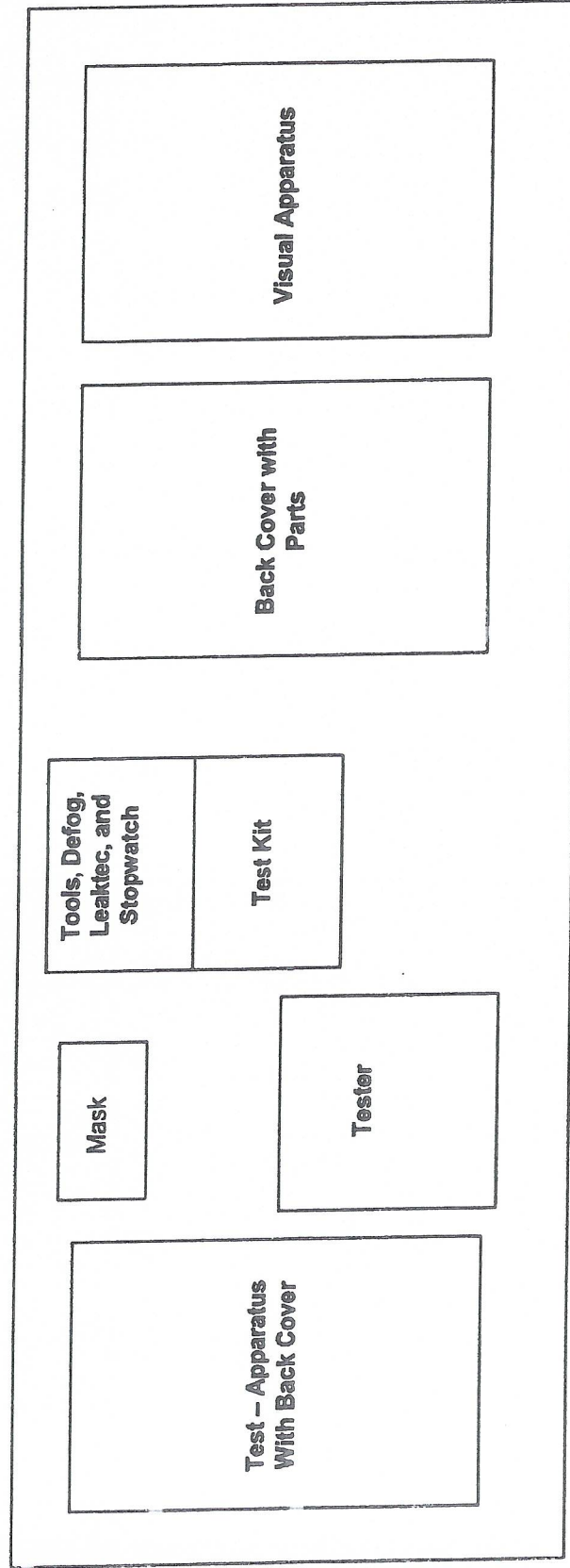
## **BG-4 VISUAL APPARATUS (BREAKDOWN)**

**Back Cover Removed  
Hoses – Disassembled  
Connector Removed  
Inhalation – Exhalation Valves Removed Cooler and Cooler Cap Removed  
Relief Valve (Intact)  
Lever Arm  
Canister  
Springs  
Breathing Bag  
O2 Bottle  
Retainer Clip for Minimum Valve  
Minimum Valve  
Drain Valve (Intact)  
Switchbox (Unlatched with Crossover line off and still attached to cables)**

## **BG-4 TOOL KIT**

**7mm – Open End/Box End  
8mm – 10mm Combination  
10mm – Open End  
12mm – 14mm Combination  
17mm – 19mm Combination  
10mm – 11mm Offset Box  
Flat Screwdriver  
Phillips Screwdriver  
Spanner Wrench  
2mm – Allen Wrench  
15mm – Open End  
Dow-Corning 111  
TORX – T-20  
Reaction Ring Tool**

# Table Layout for BG-4 Contest 2020 Contest Year





## 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.

# **2026 WVU Bench Bash**

## **Day 2 Bug List**

### **DAY 2 VISUALS**

**Cooler Cover Missing O-Ring**

**Cooler Cover Broken**

**Pressure Reducer O-Ring Cut**

**Reaction Ring on Switchbox Cut**

**Mask Cover Piece Clip Broken**

### **DAY1 TEST BUGS**

**Cannister Lid Has Hole**

**Relief Valve has Hole at Crossover Connection**

**Cross Over Line Has Hole**

**Bypass Line Has Hole**

**Drain Valve Disc Bent**



| VISUAL APPARATUS CHECKS |                                           |    | TEST APPARATUS |                                         |                   |
|-------------------------|-------------------------------------------|----|----------------|-----------------------------------------|-------------------|
| ✓                       | Check If ok                               |    | ✓              | Check If ok                             |                   |
|                         | FRAME/HARNESS ASSEMBLY                    |    |                | ZERO TESTER PRIOR TO TESTING            |                   |
|                         | BREATHING BAG                             |    |                | LOW PRESSURE WARNING TEST               | 1.4 MBAR MAX.     |
|                         | CYLINDER TEST                             |    |                | INHALATION VALVE TEST                   | 10 MBAR +         |
|                         | REGENERATIVE CANISTER                     |    |                | EXHALATION VALVE TEST                   | 10 MBAR -         |
|                         | SIMULATE ADDING DRAGERSORB                |    |                | DRAIN VALVE TEST                        | 10 MBAR           |
|                         | RELIEF VALVE                              |    |                | LEAK TEST with POSITIVE PRESSURE        | 1 MBAR IN 60 SEC. |
|                         | COOLER                                    |    |                | RELIEF VALVE TEST                       |                   |
|                         | SIMULATE ADDING ICE                       |    |                | State Opening Pressure                  | 2 TO 5 MBAR       |
|                         | HOSES                                     |    |                | HIGH PRESSURE LEAK TEST                 | OPEN CYL. ICON    |
|                         | COUPLING                                  |    |                | CONSTANT METERING VALVE TEST            |                   |
|                         | FACE PIECE TEST                           |    |                | State Final Reading                     | 1.5 TO 1.9 L/MIN  |
|                         | SIMULATE DEFOGGING MASK                   |    |                | MINIMUM VALVE TEST                      |                   |
|                         |                                           |    |                | State Opening Pressure                  | 0.1 TO 2.5 MBAR   |
|                         | CONNECTIONS CONNECTED OR GOOD             |    |                | BYPASS VALVE TEST                       |                   |
|                         | Cap on Drain Valve                        |    |                | ALTERNATE RELIEF VALVE TEST             | 2 TO 5 MBAR       |
|                         | Drain Valve to Breathing Bag              |    |                | LOW PRESSURE WARNING TEST               |                   |
|                         | Minimum Valve to Breathing Bag            |    |                | State Warning Reading                   | APPROX. 700 PSI   |
|                         | Minimum Valve to O2 Supply Line           |    |                | BATTERY TEST                            | BATT FULL/ ICON   |
|                         | Cylinder Connection                       |    |                |                                         |                   |
|                         | Regenerative Canister Connections         |    |                |                                         |                   |
|                         | Relief Valve to Regenerative Canister     |    |                |                                         |                   |
|                         | Crossover Hose Switchbox and Relief Valve |    |                |                                         |                   |
|                         | Cooler to Breathing Bag                   |    |                |                                         |                   |
|                         | Distribution Hose                         |    |                |                                         |                   |
|                         | Breathing Hoses                           |    |                |                                         |                   |
|                         | Hose Adapter on RZ-25 or Test-It 6100     |    |                |                                         |                   |
|                         |                                           | VI | C              | VISUAL APPARATUS                        |                   |
|                         |                                           |    |                | COOLER COVER MISSING O-RING             |                   |
|                         |                                           |    |                | COOLER COVER BROKEN                     |                   |
|                         |                                           |    |                | PRESSURE Reducer HIGH Press. O-RING-cut |                   |
|                         |                                           |    |                | REACTION RING ON SWITCH-BOX-cut         |                   |
|                         |                                           |    |                | MASK COVER PIECE CLIP-cut               |                   |
|                         |                                           |    |                | TEST APPARATUS                          |                   |
|                         |                                           |    |                | CANNISTER LID - HOLE                    |                   |
|                         |                                           |    |                | Relief Valve-Hole @ T-connection        |                   |
|                         |                                           |    |                | CROSS OVER LINE - HOLE                  |                   |
|                         |                                           |    |                | By Pass line - HOLE                     |                   |
|                         |                                           |    |                | DRAIN valve DISC BENT                   |                   |



2026 WVU Bench Bash  
BG4 - Day 2 Written Exam

Name \_\_\_\_\_ Working Number \_\_\_\_\_

1. A fully filled oxygen cylinder holds \_\_\_\_\_ liters of medical oxygen.
  - a. 440
  - b. 400
  - c. 5.5
2. The accuracy of the \_\_\_\_\_ pressure measurement is +or- 2% of the final value.
  - a. Sentinel
  - b. Apparatus
  - c. Sensor
3. Never replace the \_\_\_\_\_ in potentially explosive areas.
  - a. Battery
  - b. Cylinder
  - c. Tally-key
4. The weight of a fully charged BG-4 apparatus is 15kg (\_\_\_\_ lbs.).
  - a. 33
  - b. 30
  - c. 23
5. Check the supply of oxygen gas on the Sentinel at intervals of approximately \_\_\_\_\_ minutes.
  - a. 15
  - b. 20
  - c. 30
6. During the constant \_\_\_\_\_ test, the breathing bag is inflated, the RZ-25 tester is set to red dosage, and the pressure relief valve is capped.
  - a. Metering
  - b. Dosage
  - c. Flow

7. During the constant \_\_\_\_\_ test, the needle of the RZ-25 tester should automatically settle between 1.5 and 1.9 LPM.

- a. Metering
- b. Dosage
- c. Flow

8. The minimum valve provides greater than \_\_\_\_\_ L/min flow.

- a. 80
- b. 58
- c. 50

9. The breathing bag has a \_\_\_\_\_-liter volume.

- a. 5.5
- b. 440
- c. 4.4

10. Insert speech diaphragm, install retainer ring and tighten with \_\_\_\_\_.

- a. Spanner
- b. Wrench
- c. Tool

11. Pg 23: Part Number 1

- a. Coupling
- b. Coupler
- c. Connector

12. Pg 23: Part Number 2

- a. Inhalation Valve Seat
- b. Exhalation Valve Seat
- c. Valve seat



13. Pg 23: Part Number 3

- a. Inhalation Valve Seat
- b. Exhalation Valve Seat
- c. Valve Seat

14. Pg 23: Part Number 6

- a. Anti Crush Ring
- b. Quarter Turn Connector
- c. Bayonet Ring

15. Pg 23: Part Number 7

- a. Crush Ring
- b. Anti-Crush Rings
- c. Hose Supports

16. Pg 25: Part Number 2

- a. Crater Seat
- b. Valve Housing
- c. Crater Housing

17. Pg 25: Part Number 11

- a. Reaction Ring
- b. Compression Fitting
- c. Compression Ring

18. Pg 25: Part Number 14-16, 3-4

- a. Drainage Valve
- b. Drain Valve & Filter
- c. Drain Valve

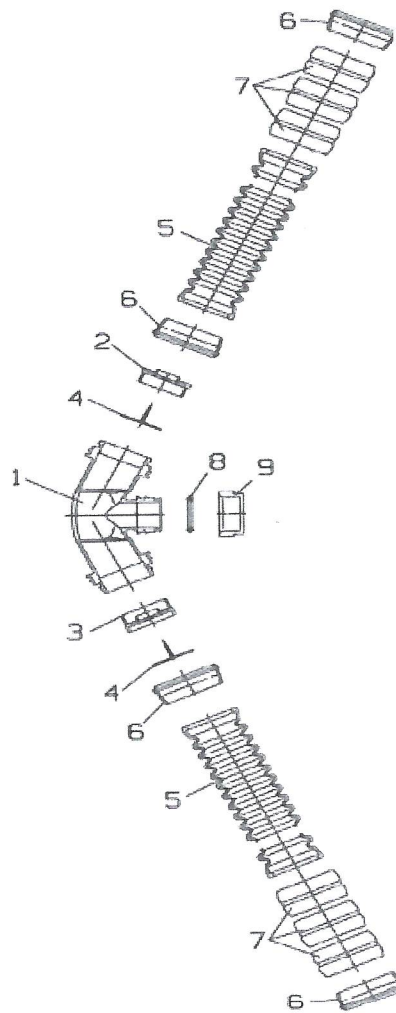
19. Pg 25: Part Number 15-16

- a. Drainage Valve
- b. Drain Valve & Filter
- c. Drain Valve

20. Pg 25: Part Number 17

- a. Valve Plate
- b. Housing
- c. Crater

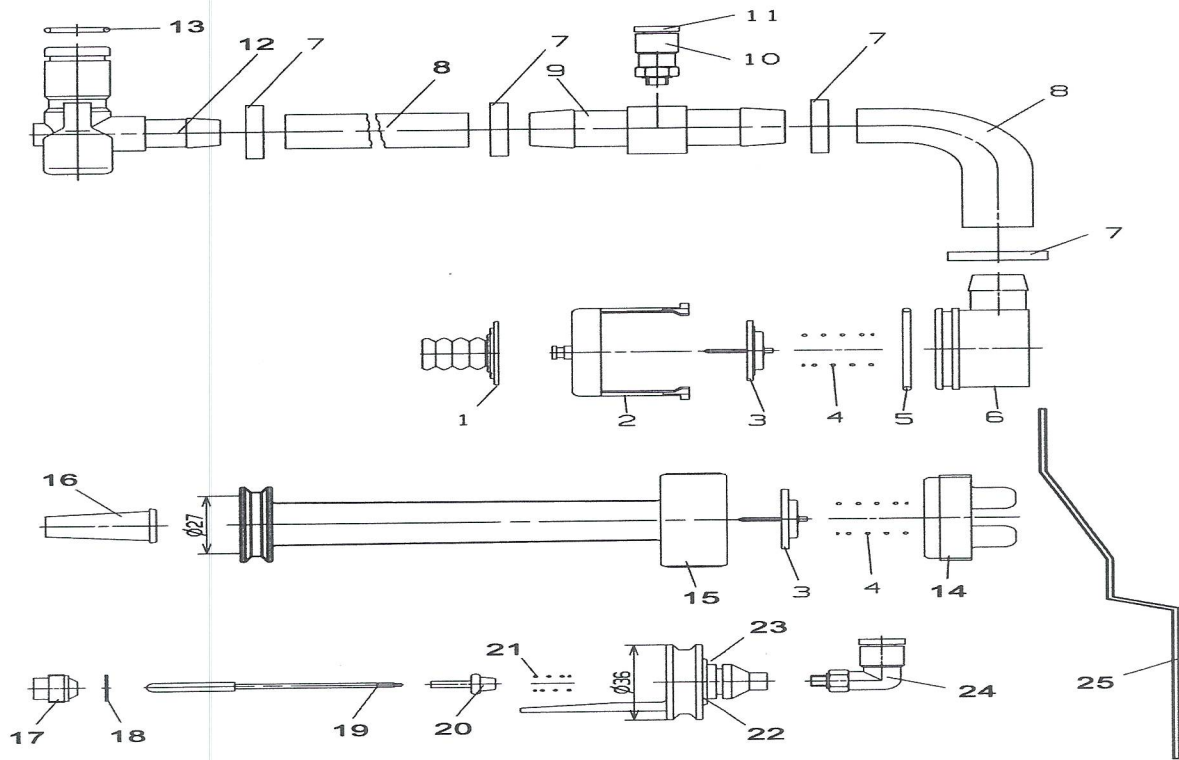
## Breathing Hose Assembly



| 1<br>Cons. No. | 2<br>Designation | 1<br>Cons. No. | 2<br>Designation      |
|----------------|------------------|----------------|-----------------------|
| 1              | _____            | 6              | _____                 |
| 2              | _____            | 7              | _____                 |
| 3              | _____            | 8              | Toroidal Sealing Ring |
| 4              | Valve Disc       | 9              | Sealing Cap           |
| 5              | Corrugated Hose  |                |                       |



## Drain/Relief/Minimum Valve Assembly (Revised Drawing)



| 1<br>Cons. No. | 2<br>Designation            | 1<br>Cons. No. | 2<br>Designation            |
|----------------|-----------------------------|----------------|-----------------------------|
| 1              | Valve Disc                  | 14             | Cap, Drain Valve            |
| 2              | <u>                    </u> | 15-16          | <u>                    </u> |
| 3              | Valve Disc                  | 17-24          | Minimum Valve               |
| 4              | Spring                      | 17             | <u>                    </u> |
| 5              | O-Ring                      | 18             | Washer                      |
| 6              | Cap                         | 19-20          | Rocker Arm                  |
| 11             | <u>                    </u> | 21             | Spring                      |
| 12             | Coupling                    | 24             | Angle Connector             |
| 13             | O-Ring                      | 25             | Holding Clamp               |
| 14-16, 3-4     | <u>                    </u> |                |                             |