INDIANA CTSI Clinical and Translational Sciences Institute

STANDARD OPERATING PROCEDURE
Indiana CTSI Specimen Storage Facility

TITLE: STANDARD OPERATING PROCEDURE FOR DRÄGER QUICK AIR EMERGENCY ESCAPE BREATHING APPARATUS UNITS

CHAPTER: 3-Equipment

SOP #: SF-3-9.08

SUPERSEDES SOP #: N/A

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AUTHORED BY: _____ DATE: 29 July 2021
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APPROVAL: _____ DATE: 08-02-2021
Indiana CTSI SSF Director

QA APPROVAL: _____ DATE: 08.02.2021
Quality Compliance Specialist

1. REVISION
   1.1. Significant changes incorporated in this version include:
      1.1.1. Clarified title to indicate SOP applies only to Dräger Quick Air EEBA Units.
      1.1.2. Revised EEBA brand to "Dräger" throughout.
      1.1.3. Revised to indicate EEBA use is specific to room C156 only.
      1.1.4. Revised Scope to include all trained personnel.
      1.1.5. Removed references to NOW Courier in Section 6.2.3.1.2 and Section 7.
      1.1.6. Revised Steps 6.1.3.3.3 and 6.2.1.1 to reference ¾ full acceptance criteria for canisters.
      1.1.7. Revised Sections 6.2.1 and 6.2.2 to clarify weekly and monthly maintenance is required for in-service units only.
      1.1.8. Added Step 6.2.2.2.6 directive to return EEBA to station following testing.
      1.1.9. Added Step 6.2.2.3.8 directive to return EEBA to station per Section 6.1.3.3 after function testing.
      1.1.10. Moved note regarding refill during hydrotesting from Step 6.2.4.1 to 6.2.3.1.
      1.1.11. Corrected Step reference in Step 6.2.3.1.5 from 6.2.4.1.7 to 6.2.3.1.4.
      1.1.12. Revised Steps 6.2.3.1.5 and 6.2.4.1.4.7 to include function testing.
      1.1.13. Added Section 10.
      1.1.14. Revised Appendices A and B to reference ¾ full acceptance criteria for canisters.
      1.1.15. Revised Appendix C to include documentation of function testing following canister refill.
      1.1.16. Added Appendix D, Collaborating Biorepository Personnel (CBP) Training.

2. PURPOSE
   2.1. This Standard Operating Procedure (SOP) defines the Indiana CTSI Specimen Storage Facility (SSF) policy for when the Dräger Quick Air Emergency Escape Breathing Apparatus (EEBA) is appropriate to be used and the procedure for using and maintaining the unit appropriately. This procedure satisfies guidance set forth in ISBER "Best Practices."

3. PRINCIPLE
   3.1. Dräger Quick Air Emergency Escape Breathing Apparatuses are utilized when the oxygen level becomes dangerous (below 19%) in the R3-C156 Liquid Nitrogen Freezer Room and supplemental air is required for escape from the environment. In order for the device to be an effective safeguard, personnel must be trained in proper operation. This unit does not need to be specifically fitted for individuals and is specifically stated to be unsuitable for rescue purposes.

4. SCOPE
   4.1. The SOP applies to all trained personnel, SSF Staff or personnel who are trained per SSF SOPs, who have access to the R3-C156 Liquid Nitrogen Freezer Room. The procedure is to be used by personnel who (1) are in R3-C156 at the time a low oxygen condition occurs **AND** (2) are not able to vacate the low oxygen level area immediately. It is the responsibility of the SSF staff and SSF-trained personnel to direct non-SSF staff and untrained Collaborating Biorepository Personnel in the use of the units should this be necessary.

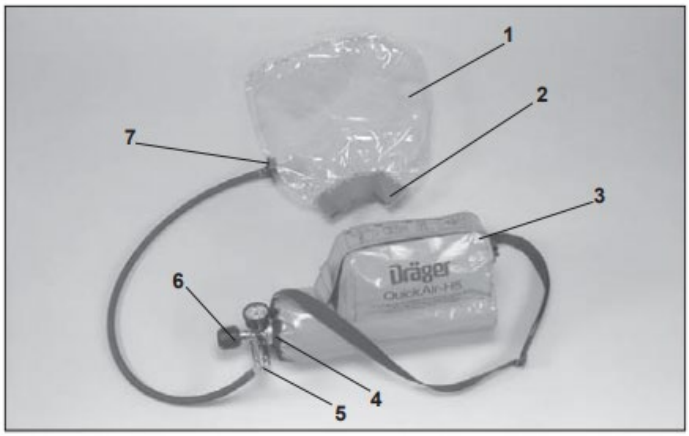
5. MATERIALS
   5.1. Emergency Escape Breathing Apparatus – Dräger QuickAir-5 Minutes, Order number: 4054953, or equivalent
   5.2. Mild Soap
   5.3. Clean Cloth
   5.4. Airkem 33 disinfectant or equivalent
   5.5. Spanner Wrench
   5.6. Screwdriver
   5.7. Water - not specified
   5.8. Duct Tape

6. PROCEDURE
   6.1. **When used for escape from R3-C156 and associated area(s) due to low oxygen condition:**
      6.1.1. **Don the emergency escape breathing apparatus:**
         6.1.1.1. Open the storage box by pulling on the black latch.
         6.1.1.2. Remove the emergency escape breathing apparatus.
         6.1.1.3. With the cylinder valve facing forward, place the strap over your neck or shoulder.
         6.1.1.4. Pull back the Velcro tab.
         6.1.1.5. Remove hood from pouch.
         6.1.1.6. Don hood by stretching the elastic collar open with both hands and pull the hood over the head.
         6.1.1.7. Open cylinder valve completely until a rush of air flows into the bag.
         6.1.1.8. Adjust the hood so the diffuser/hose assembly is in front of the nose and mouth.
         6.1.1.9. Exit to a safe area.

      6.1.2. After reaching a safe environment, remove hood from head.
         6.1.2.1. Stretch the elastic collar open with both hands and pull hood off of the head.
         6.1.2.2. Close cylinder valve completely.
         6.1.2.3. Remove unit by lifting strap over the head.

6.1.3. **Prepare and return to the area for re-use:**

6.1.3.1. Equipment Schematic Reference:



1 Hood
2 Elastic Collar
3 PVC Carrying Case
4 Cylinder
5 Regulator Assembly
6 Valve Assembly
7 Diffuser

Figure 1

QuickAir™ 2

6.1.3.2. Clean and disinfect.

6.1.3.2.1. Pneumatics and case

6.1.3.2.1.1. Wipe all surfaces with a mild soapy solution.

6.1.3.2.1.2. Rinse thoroughly with water.

6.1.3.2.1.3. Wipe all surfaces with a disinfectant solution.

6.1.3.2.1.4. Rinse thoroughly with water.

6.1.3.2.1.5. Dry completely.

6.1.3.2.1.6. Document results and actions on Appendix A.

6.1.3.2.2. Hood and Manifold

6.1.3.2.2.1. Disassemble the manifold from the hood.

6.1.3.2.2.1.1. Loosen the manifold with a spanner wrench and unscrew the manifold halves.

6.1.3.2.2.1.2. Refer to equipment manual, located in the SSF Management Office, as needed.

6.1.3.2.2.2. Immerse the hood in a disinfectant solution.

6.1.3.2.2.3. Rinse parts thoroughly in water.

6.1.3.2.2.4. Air Dry completely.

6.1.3.2.2.5. Reassemble the manifold by securing it to the housing unit using the spanner wrench.

6.1.3.2.2.5.1. Refer to equipment manual, located in the SSF Management Office, as needed.

CAUTION: ***Care should be taken to ensure that the holes in the manifold are directed towards the top of the hood.***

6.1.3.2.2.6. Document results and actions on Appendix A.

6.1.3.3. Return to the station for re-use.

6.1.3.3.1. Fold the hood and hose assembly and place into the pouch.

6.1.3.3.2. Close the Velcro strap.
6.1.3.3.3. Re-check that the gauge indicates the cylinder is minimally three-quarters full.
6.1.3.3.3.1. If not, notify SSF Management to schedule a fill for the cylinder and remove the unit from the area.
6.1.3.3.4. Once above rechecks are satisfactory, replace the emergency escape breathing apparatus into the storage container on the wall.
6.1.3.3.5. Close the black latch.
6.1.3.3.6. Document results and actions on Appendix A.

6.2. Routine Maintenance and Monitoring
6.2.1. Weekly (for in-service units only)
6.2.1.1. Ensure cylinder is minimally three-quarters full.
6.2.1.1.1. Verify that the gauge needle indicates the canister is minimally three-quarters full.
6.2.1.1.2. If less than three-quarters full, remove from the area and notify SSF Management to schedule a fill for the cylinder, see Section 6.2.4.
6.2.1.1.3. Document what is observed and any actions taken, if applicable, on Appendix B.

6.2.2. Monthly (for in-service units only)
6.2.2.1. Hood
6.2.2.1.1. Check for any tears, cracking or holes.
6.2.2.1.2. If present, remove from the area and notify SSF Management to replace.
6.2.2.1.3. Document what is observed and any actions taken, if applicable, on Appendix B.

6.2.2.2. Carrying Case
6.2.2.2.1. Check for any tears, cracking or holes deemed likely to compromise integrity of the case.
6.2.2.2.1.1. Minor tears may be mended by SSF personnel with duct tape.
6.2.2.2.1.2. Request management evaluation of case if unsure about case integrity.
6.2.2.2.2. Ensure all hardware is intact.
6.2.2.2.3. Inspect Velcro for lint or dirt that could prevent it from adhering properly.
6.2.2.2.4. Evaluate additional signs of degradation with SSF Management for determination of replacement – DO NOT REMOVE.
6.2.2.2.5. Document what is observed and any actions taken, if applicable, on Appendix B.
6.2.2.2.6. Return EEBA to station per Section 6.1.3.3.

6.2.2.3. Function testing
6.2.2.3.1. Open the storage box by pulling on the black latch.
6.2.2.3.2. Remove the emergency escape breathing apparatus.
6.2.2.3.3. Place the strap over your neck or shoulder.
6.2.2.3.3.1. Verify the cylinder valve is facing forward.

6.2.2.3.4. Pull back the Velcro tab.
6.2.2.3.5. Remove hood from pouch.
6.2.2.3.6. Open cylinder valve completely.
6.2.2.3.6.1. A rush of air should begin to flow into the bag.
6.2.2.3.6.2. If there is no air flow, remove from service and notify SSF Management to return cylinder to manufacturer, or qualified vendor, for repair/replacement.
6.2.2.3.7. Document observations and any actions taken, if applicable, on Appendix B.
6.2.2.3.8. Return EEBA to station per Section 6.1.3.3.

6.2.3. Every five years
6.2.3.1. Hydrotest the aluminum cylinders (Note: cylinder is refilled by vendor at time of hydrotesting)
6.2.3.1.1. Dräger Safety or other qualified, non-local vendor
6.2.3.1.1.1. Contact Dräger Safety, Inc., or qualified vendor to obtain instructions on the process.
6.2.3.1.1.2. Before shipping, disconnect the regulator assembly from the valve assembly, retaining the hood/valve assembly at the SSF.
6.2.3.1.1.3. Drain the cylinder completely of air by opening the cylinder valve.
6.2.3.1.1.4. Record the serial number of the unit (NAxxx…) found engraved on the neck of the cylinder on Appendix C.
6.2.3.1.1.5. Ship ONLY the cylinder (not the entire apparatus).
6.2.3.1.1.6. Record the date unit is shipped out on Appendix C.

6.2.3.1.2. Hoosier Fire, Inc. or other qualified, local vendor
6.2.3.1.2.1. Contact Hoosier Fire, Inc, or qualified vendor to obtain instructions on the process.
6.2.3.1.2.2. Before shipping, disconnect the regulator assembly from the valve assembly, retaining the hood/valve assembly at the SSF.
6.2.3.1.2.3. Record the serial number of the unit (NAxxx…) found engraved on the neck of the cylinder on Appendix C.
6.2.3.1.2.4. Transport ONLY the cylinder (not the entire apparatus).
6.2.3.1.2.5. Request transport to qualified vendor with a qualified hazardous goods courier.
6.2.3.1.2.6. Record date unit is couriered to vendor on Appendix C.
6.2.3.1.2.7. Upon notification of maintenance completion, schedule a qualified hazardous goods courier to return equipment to the SSF.

6.2.3.1.3. Obtain documentation and/or testing report upon completion and receipt of cylinder. Record serial number (engraved on the neck of the cylinder) of unit received on Appendix C. Verify serial number of unit received is the same serial number recorded for the unit sent out for service.

6.2.3.1.3.1. If report is not acceptable, remove equipment from service. Contact applicable vendor for further directives.

6.2.3.1.4. Document observations and actions on Appendix C. Attach documentation and/or testing report to Appendix C.

6.2.3.1.5. Cylinder will have been refilled as part of the testing. Therefore, per Section 6.2.4.1.4, perform a leak test and function test, and document relevant actions once unit has been returned.

6.2.3.1.6. Notify SSF Management if unable to complete testing.

6.2.4. As needed

6.2.4.1. Cylinder re-fill

6.2.4.1.1. Assess the unit as follows:

6.2.4.1.1.1. Verify that the cylinder hydrotest date is not past due.

6.2.4.1.1.1.1. If it is past due, do NOT use the cylinder until the hydrostatic re-test is completed as described in Section 6.2.3.

6.2.4.1.1.2. Inspect the cylinder for damage.

6.2.4.1.1.2.1. If damaged, remove from service and notify SSF Management to replace the cylinder.

6.2.4.1.2. Contact approved vendor, such as Dräger Safety, Inc. or Hoosier Fire Equipment, Inc., to obtain instructions on the process.

NOTE: Hoosier Fire will fill Dräger EEBAs as long as the cylinder requires no repairs. They will only repair Scott Safety Emergency Escape Breathing Devices, which may be purchased from Hoosier Fire.

6.2.4.1.3. Follow Steps 6.2.3.1.1 or 6.2.3.1.2 and Steps 6.2.3.1.3 – 6.2.3.1.4 to refill cylinder.

6.2.4.1.4. After the fill, run a leak test:

6.2.4.1.4.1. Make a solution of water and soap.

6.2.4.1.4.2. Using a clean cloth, wipe the solution around the cylinder-to-cylinder valve connection, the cylinder valve burst disc assembly, and the cylinder valve pressure gauge.

6.2.4.1.4.3. Look to see if any bubbles are present.

6.2.4.1.4.4. If there are no bubbles present, dry the equipment with a soft cloth.

6.2.4.1.4.5. If bubbles are present, (indicative of a leak) notify SSF Management to repair the cylinder.

6.2.4.1.4.6. Document results and actions on Appendix C.

6.2.4.1.4.7. Complete a Function Test as described in Steps 6.2.2.3.3-6.2.2.3.6 and return unit to holder.

6.2.4.1.4.8. Document results and actions on Appendix C.

7. REFERENCES

7.1. ISBER Best Practices-current version

7.2. QuickAir-5 Minute Emergency Escape Breathing Apparatus, Operating Manual – located in SSF Management Office

7.3. Dräger Safety, Inc.

Shipping Address:
Repair Center / Safety
3124 Commerce Drive, Building B-4
Telford, PA 18969
1-800-437-2437
www.draeger.com/en-us_us/Home

7.4. Hoosier Fire Equipment, Inc.
3863 N. Commercial Parkway
Greenfield, IN 46140
317-891-8375
www.hoosierfire.com

8. DOCUMENTATION
   8.1. Usage and maintenance logs are submitted for review to SSF Management and are maintained per SF-1-6 Controlled Document Management SOP.
   8.2. All Deviations are managed per the SF-1-9 Deviation Management SOP.

9. APPENDICES
   9.1. The current version of each of the following appendices is used to guide and/or implement this SOP:
   APPENDIX A – Dräger Quick Air Emergency Escape Breathing Apparatus Usage Log (1 Page)
   APPENDIX B – Dräger Quick Air Emergency Escape Breathing Apparatus Weekly/Monthly Maintenance Log (1 Page)
   APPENDIX C – Dräger Quick Air EEBA Service Maintenance Log (1 Page)
   APPENDIX D – Collaborating Biorepository Personnel Training (1 Page)

10. COLLABORATING BIOBANK TRAINING DIRECTIVES
   10.1. CBP comply with Read and Understand training on SOP SF-3-09 (SOP for Dräger Quick Air Emergency Escape Breathing Apparatus Units) by continuing to and reading Collaborating Biorepository Personnel Training, Appendix D, of this SOP.
   10.2. CBP comply with directives defined in Appendix D.

Dräger Quick Air Emergency Escape Breathing Apparatus Usage Log					Year:	
Serial Number *(Record engraved # from neck of cylinder)*	Date and Time of Use	Clean and Disinfect Pneumatics and Case *(Expected Result = Completed)*	Clean and Disinfect Hood and Manifold *(Expected Result = Completed)*	Return to Station *(Expected Result = Completed)*	Gauge Reading ≥ ¾ Full (Y or N) *(Expected Result = Y)*	Initials/Date
Comments / Corrective Actions:						
Reviewed By / Date:						

				Month / Year:	
Dräger Quick Air EEBA Weekly and Monthly Maintenance Log					
Serial Number: _____ *(Record engraved Serial Number from neck of cylinder)*					
Weekly	Observation/Action	Acceptable Range	Acceptable	Initials/ Date	Comments / Corrective Actions (required if not acceptable)
Gauge Reading	☐ ≥ ¾ full ☐ < ¾ full - See comments.	≥ ¾ full	☐ Yes ☐ No		
Gauge Reading	☐ ≥ ¾ full ☐ < ¾ full - See comments.	≥ ¾ full	☐ Yes ☐ No		
Gauge Reading	☐ ≥ ¾ full ☐ < ¾ full - See comments.	≥ ¾ full	☐ Yes ☐ No		
Gauge Reading	☐ ≥ ¾ full ☐ < ¾ full - See comments.	≥ ¾ full	☐ Yes ☐ No		
Gauge Reading	☐ ≥ ¾ full ☐ < ¾ full - See comments. ☐Not Applicable	≥ ¾ full	☐ Yes ☐ No ☐ N/A		
Monthly	Observation/Action	Acceptable Range	Acceptable	Initials/ Date	Comments / Corrective Actions (required if not acceptable)
Hood	☐Completed. No Visible defects. ☐Other. See comments.	Completed. No visible defects.	☐ Yes ☐ No		
Carrying Case	☐Completed. No visible defects deemed likely to compromise integrity of the case noted. ☐Other. See comments.	Completed. No visible defects deemed likely to compromise integrity of the case.	☐ Yes ☐ No		
Function Test	☐Completed. Air flow observed. ☐Other. See comments.	Completed. Air flow observed.	☐ Yes ☐ No		
Reviewed By / Date:					

Dräger Quick Air EEBA Service Maintenance Log
Year:

Serial Number: _____ Next Hydrotest Retest Due Date: _____

Hydrotest (every 5 years)	Observation/Action	Acceptable Range	Acceptable	Initials/Date
Pre-shipment Assessment: Cylinder Inspection	❑ Completed. No repairs indicated. ❑ Other. See comments.	Completed / No repairs indicated.	❑ Yes ❑ No	
Record serial number	**S/N:**	Completed.	❑ Yes ❑ No	
Unit drained of air and shipped	❑ Completed. Date_____ ❑ Not Applicable ❑ Other. See comments.	Completed.	❑ Yes ❑ No	
Unit received **S/N:_____**	❑ Completed. S/N recorded before shipping matches S/N recorded upon receipt. Date_____ ❑ Other. See comments.	Completed. Serial numbers match.	❑ Yes ❑ No	
Hydrotesting report received	Testing Date_____ ❑ Completed. No repairs indicated. ❑ Other. See comments.	Completed / No repairs indicated.	❑ Yes ❑ No	
Fill documentation and/or report received	Fill Date_____ ❑ Completed. No repairs indicated. ❑ Other. See comments.	Completed / No repairs indicated.	❑ Yes ❑ No	
After fill: Leak test	❑ Completed. No leaks. No repairs indicated. ❑ Other. See comments.	Completed. No leaks / No repairs indicated.	❑ Yes ❑ No	
After fill: Function test	❑ Completed. Airflow observed. No repairs indicated. ❑ Other. See comments.	Completed. Airflow observed / No repairs indicated.	❑ Yes ❑ No	
Air Cylinder Refill (as needed)	Observation/Action	Acceptable Range	Acceptable	Initials/Date
Pre-shipment Assessment: Cylinder Inspection	❑ Completed. No repairs indicated. ❑ Other. See comments.	Completed / No repairs indicated.	❑ Yes ❑ No	
Record serial number	**S/N:**	Completed.	❑ Yes ❑ No	
Unit drained of air and shipped	❑ Completed. Date_____ ❑ Not Applicable ❑ Other. See comments.	Completed.	❑ Yes ❑ No	
Fill documentation and/or report received	Fill Date_____ ❑ Completed. No repairs indicated. ❑ Other. See comments.	Completed / No repairs indicated.	❑ Yes ❑ No	
Unit received **S/N: _____**	❑ Completed. S/N recorded before shipping matches S/N recorded upon receipt. Date_____ ❑ Other. See comments.	Completed. Serial numbers match.	❑ Yes ❑ No	
After fill: Leak test	❑ Completed. No leaks. No repairs indicated. ❑ Other. See comments.	Completed. No leaks / No repairs indicated.	❑ Yes ❑ No	
After fill: Function test	❑ Completed. Airflow observed. No repairs indicated. ❑ Other. See comments.	Completed. Airflow observed / No repairs indicated.	❑ Yes ❑ No	

Comments / Corrective Actions (required if results are not acceptable)

Reviewed By / Date:

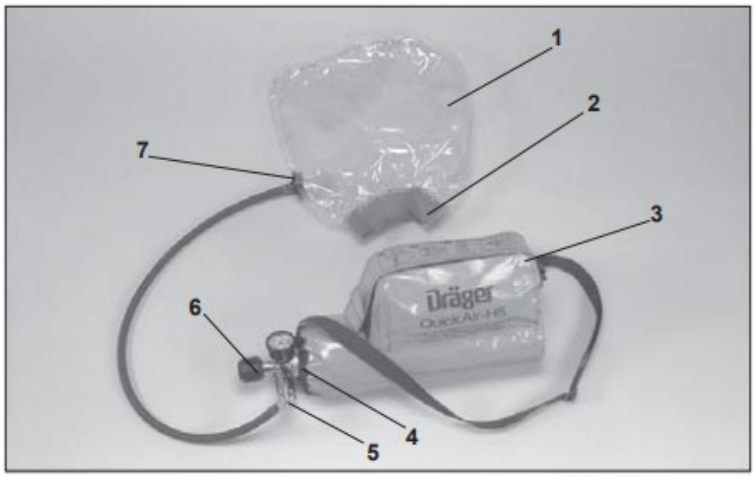
Collaborating Biorepository Personnel (CBP) Training

1. This Standard Operating Procedure (SOP) SF-3-09, SOP for Dräger Quick Air Emergency Escape Breathing Apparatus (EEBA) Units defines use of a Dräger EEBA in the R3-C156 Liquid Nitrogen Freezer Room in the Indiana CTSI Specimen Storage Facility (SSF). The Dräger EEBA is used by personnel who (1) are in R3-C156 at the time the oxygen level becomes dangerous (below 19%) **AND** (2) are not able to vacate the low oxygen level area immediately.

2. **Donning the Dräger EEBA to escape from C156 and associated area(s) due to low oxygen condition:**
   - 2.1. Open the yellow storage box by pulling on the black latches.
   - 2.2. Remove the emergency escape breathing apparatus.
   - 2.3. With the cylinder valve facing towards you, place the strap over your neck or shoulder.
   - 2.4. Pull back the Velcro tab.
   - 2.5. Remove hood from pouch.
   - 2.6. Don hood by stretching the elastic collar open with both hands and pulling the hood over the head.
   - 2.7. Open cylinder valve completely until a rush of air flows into the bag.
   - 2.8. Adjust the hood so the diffuser/hose assembly is in front of the nose and mouth.
   - 2.9. Exit to a safe area.
   - 2.10. After reaching a safe environment:
     - 2.10.1. Remove hood from the head by stretching the elastic collar open with both hands and pulling hood off of the head.
     - 2.10.2. Close cylinder valve completely.
     - 2.10.3. Remove unit by lifting strap over the head.

3. **After use:**
   - 3.1. Promptly notify SSF personnel that the EEBA has been used.
   - 3.2. Bring the unit to the SSF Management Office (R3-C153) or alternative location as directed for inspection and maintenance.

4. **Equipment Schematic Reference:**



1 Hood
2 Elastic Collar
3 PVC Carrying Case
4 Cylinder
5 Regulator Assembly
6 Valve Assembly
7 Diffuser

Figure 1

QuickAir™ 2