Troubleshooting Guide for the N95-Companion™ Model 8095

Application Note ITI-084

Before troubleshooting the N95-Companion you must make certain that the PORTACOUNT is working properly when run by itself. Do not use this procedure unless the PORTACOUNT (by itself) passes all 3 of the Daily Checks. Refer to the *Troubleshooting Guide for the PORTACOUNT Plus Model 8020 (ITI-083)*.

Assuming that the PORTACOUNT has passed all three of the Daily Checks by itself, reconnect the N95-Companion and begin troubleshooting by performing the 4 Daily Checks on the pair of instruments together. Perform the checks in the order specified. If all 4 Daily Checks pass, that means the system is in good operating condition. Any remaining problems getting good fit factors are probably caused by leaks in the face seal area, improper filters on the mask, an improperly configured mask sampling adapter, or a defective mask. (see note L)

Step 1 of 4 - Perform Particle Check: (see manual or training video for procedure)

RESULT: Particle count above 70. (see note A)

Unit passes Particle Check. Proceed to Zero Check.

RESULT: Particle count below 70.

Operator confusion:
- Are filters and masks disconnected from sample tubes?

Room air too clean:
- Generate aerosol with candle or particle generator. (see note B)
- Relocate to better room. (see note C)

Sampling pendant clogged
- Perform cleaning procedure from manual (see note D)

Model 8026 Particle generator has low output or is not functioning:
- Increase output by turning adj. screw clockwise.
- Mix fresh salt solution.
- Clean atomizer assembly using procedure in manual.

RESULT: Particle count in the thousands. (see note E)

N95-Companion not connected properly:
- Check interconnect tube in front between PORTACOUNT and N95-Compainon.

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- Make sure green N95-Companion status light is on. Check interconnect cable in back between PORTACOUNT and N95-Companion (see note M).

Step 2 of 4 - Perform Classifier Check: (see manual or training video for procedure)

RESULT: Particle count drops to zero.

Unit passes Classifier Check. Proceed to Zero Check.

RESULT: Particle count does not drop significantly.

N95-Companion internal problem:
- Obtain factory service.

RESULT: Particle count very low, but not zero.

Internal leak or dirty particle classifier.
- Clean classifier. See N95-Companion manual.
- Most likely will require factory service.

Step 3 of 4 - Perform Zero Check: (see manual or training video for procedure)

RESULT: Count drops to zero quickly and stays there.
Unit passes Zero Check. Proceed to Max Fit Factor Check.

RESULT: Count does not drop at all, or drops significantly,
but never reaches zero or does not stay on zero. (see note F)

Leaking zero check filter: (see note G)
- Try another filter.
- Attach 2 filters in-line.

Leaking water trap:
- Tighten the top of the water trap and the 2 fittings.

Worn out (leaking) sample tube end:
- Cut 1/4-inch from end of sample hose where filter attaches.

Water drops inside N95-Companion: (see note H)
- Run in count mode for a while or overnight.

Valve stuck on ambient side: (see note I)
- Perform pendant purge procedure in manual.

Twin tube is reversed between mask and sampling pendant:
- Match color code on fittings.

Internal leak inside N95-Companion: (see note L)
- Obtain factory service.

Step 4 of 4 - Perform Max Fit Factor Check: (see manual or training video for procedure)

RESULT: Fit Factor of 200.
Unit Passes Max Fit Factor Check. If all 4 Daily Checks have now passed, the system is in good operating condition and ready to perform fit tests. (see note L)

RESULT: Fit factor below 200:

Leaking zero check filter:
- Go back and perform zero check again. Look for occasional particle.

Internal leak inside N95-Companion: (see note L)
- Obtain factory service.

RESULT: Low particle warning message.

Zero check filter on ambient (wrong) tube:
- Filter must be on clear sample (mask) tube.

Pendant electrical connector pulled out: (see note J)
- Make sure connectors on both ends of pendant interconnect cable remain fully inserted at all times.

Ambient hose blocked:
- Remove obstruction or pinch in tubing.

Sampling pendant clogged:
- Perform cleaning procedure from manual (see note D).

Defective interconnect cable between PORTACOUNT and N95-Companion:
- See note M.

Valve stuck on mask side: (see note I)
- Perform pendant purge procedure in manual.

RESULT: Fit Factor very low (below 5).

Zero check filter not attached:
- Attach filter, wait 20 seconds, restart Daily Checks from step 1.

Valve stuck on ambient side: (see note I)
- Perform pendant purge procedure in manual.

Internal leak inside N95-Companion: (see note L)
- Obtain factory service.

Notes:

A- While 70 particles per cm^3 is technically enough for the N95-Companion, it's desirable to have more. If the unit has historically counted higher concentrations in the same location, try some of the solutions offered for "Particle count below 70."

B- Some areas do not have a sufficient number of naturally occurring particles, so it's necessary to add particles from some local source. The Model 8026 Particle Generator is provided with the N95-Companion specifically for this purpose (see note D). Another method, if you are allowed to have an open flame in the building, is to light a candle in the room. Use an ordinary unscented candle. One candle in an average size (150 ft^2) is usually enough. It helps if the candle is in a holder with a simple hood of some kind. This allows combustion particles that may be too small for the PORTACOUNT to see to coagulate into larger particles. Light the candle 15 minutes prior to fit testing and leave it burning all the time. The room will fill with particles and stabilize when it reaches equilibrium with the ventilation system. Keep the candle away from the PORTACOUNT in a corner of the room where it won't get knocked over. Note that some rooms may have such a high ventilation rate that artificial particle generation cannot possibly keep up. Reduce the ventilation or find a different location.

C- It's very difficult to tell if low particle counts are due to a malfunctioning PORTACOUNT, N95-Companion or due to naturally clean air. Some buildings use high efficiency filters in the ventilation system which reduces particle concentrations significantly. If available, a second PORTACOUNT can be used to verify concentrations. If both units read low, the ambient concentration probably is very low. Sometimes the best solution is to do fit testing in a different location with a more suitable ambient particle concentration.

D- Its normal for the valve inside the sampling pendant to become clogged on occasion. This is especially true if the Model 8026 Particle Generator is being used to supplement the ambient particle concentration. The problem can usually be remedied quickly by performing the pendant purge procedure outlined in the N95-Companion manual. It's a good idea to purge the pendant out on a regular basis to preclude problems. Also, if you are using the particle generator, don't keep it too close to the PORTACOUNT because large salt particles can be drawn in. A distance of at least 5 feet causes the unwanted large particles to fall to the floor before they get near the PORTACOUNT. Attaching the zero check filter to the sample line while not fit testing will also reduce salt buildup.

E- With the N95-Companion attached and running, it is unusual to get an ambient particle concentration above 2000. While not impossible, a concentration of several thousand often means the N95-Companion is not connected properly and that the sample is not being drawn through it.

F- The best way to locate a leak on the N95-Companion is to use a process of elimination. With the PORTACOUNT in count mode, put the zero check filter on the end of the sample hose. If it does not zero, remove the sample pendant and attach the filter to the hose where the pendant was attached. If the PORTACOUNT goes to zero, the leak was in the pendant. If it still does not zero, remove the next component and try again. Eventually you will identify the leaking component. You may find that bypassing the N95-Companion altogether still results in a non-zero reading. This means you didn't follow the instructions at the beginning of this procedure! Don't waste time troubleshooting the N95-Companion unless you have checked the PORTACOUNT by itself first.

G- Zero Check Filters (TSI p/n 1206066) can develop small leaks as they age. TSI supplies 2 filters with each PORTACOUNT for this reason. If the PORTACOUNT fails to zero, try it with the other filter. If the second one fails too, try attaching both filters together in-line. Two leaky filters usually add up to one good one.

H- If the PORTACOUNT is left idle (running, with no test in progress) it will shut itself off after about 15 minutes. This is a power saving feature. To force the PORTACOUNT to run forever, put it into count mode.

I- If the switching valve gets stuck, both samples will be taken through the same tube. If both samples are taken through the sample tube that is connected to the zero filter, a low particle warning will result during what should be the ambient sample, because the PORTACOUNT thinks the ambient air has a concentration below 70. If both samples are taken through the blue ambient tube that has no filter on it, a fit factor near 1 will be measured since both samples are the same concentration of unfiltered ambient air. In either case, the solution is usually to perform the pendant purge procedure outlined in the N95-Companion manual. (See note D)

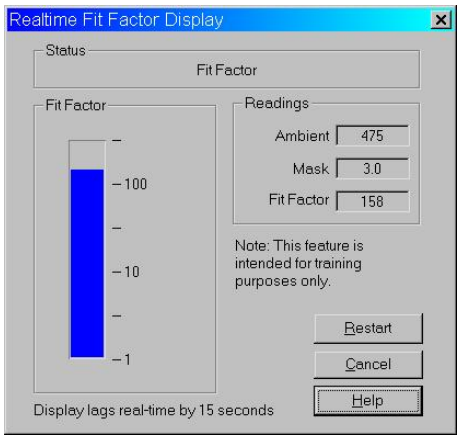
J- If someone pulls on the pendant interconnect tube/cable it may cause the connector on one end or the other to pull out slightly from the socket. This will disconnect power from the switching valve inside the pendant and prevent it from switching when an ambient sample is needed. The result is a low particle warning message. You can prevent this from happening by making sure the clear tube-side of the assembly is a bit shorter than the connector side. That way, the tube side becomes a strain relief for the connector side. The tubing should have been trimmed this way originally. If necessary, trim about 1/4 inch off the tube side. Pull gently on the cable to make sure the connector does not pull out. If it does, trim a little more off as needed. Do this to both ends.

K- When the PORTACOUNT/N95-Companion passes all of the Daily Checks, it means the instruments are working properly. If you are still having problems getting people to pass a fit test, you need to take a close look at the respirator, adapter, or connection to them.

L- An internal leak can allow particles to enter. Test by putting the PORTACOUNT into Count Mode. Then remove the water trap and tube from the N95-Companon inlet. Plug the port where the water trap was attached with your finger. This stops all flow through the system. When the flow is zero the particle count must also be zero, otherwise there is a leak someplace. Double-check all external connections. Internal leaks require factory service.

M- The interconnect cable between the PORTACOUNT and N95-Companion is critical for operation. Make sure the connectors are fully inserted and that internal pins are not bent. Try reversing the ends of the cable. Try another cable if you have one.

Tip: One very effective way to find respirator leaks is to utilize the Real-Time Fit Factor Display that is a feature of FitPlus Software. Hook the respirator wearer who is having difficulty getting a good fit up to the PORTACOUNT like normal and initiate the Real-Time display (look under the PORTACOUNT Menu in FitPlus software). This will display the fit factor on a vertical bar graph in near real-time. Start by pressing the edges of the mask tightly against the face with both hands. If that causes the fit factor to go way up, you know that the problem is face seal leakage. The mask needs to be adjusted better or it may be the wrong size.



TSI Incorporated – 500 Cardigan Road, Shoreview, MN 55126 U.S.A

USA	**Tel:** +1 800 874 2811	**E-mail:** info@tsi.com	**Website:** www.tsi.com
UK	**Tel:** +44 149 4 459200	**E-mail:** tsiuk@tsi.com	**Website:** www.tsiinc.co.uk
France	**Tel:** +33 491 95 21 90	**E-mail:** tsifrance@tsi.com	**Website:** www.tsiinc.fr
Germany	**Tel:** +49 241 523030	**E-mail:** tsigmbh@tsi.com	**Website**: www.tsiinc.de
India	**Tel:** +91 80 41132470	**E-mail:** tsi-india@tsi.com	
China	**Tel:** +86 10 8260 1595	**E-mail:** tsibeijing@tsi.com	

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