

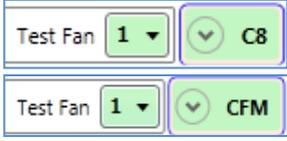
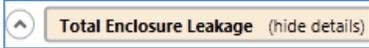
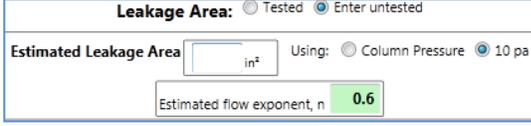
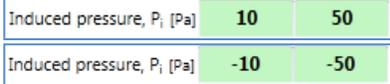
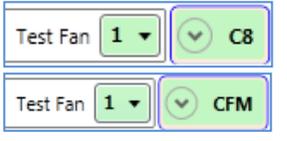
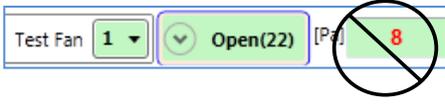
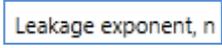


# Enclosure Integrity Verification Form

Building:   
 Room:   
 Test technician:   
 Witness:   
 Date & Time of test:

<input checked="" type="checkbox"/>	Heading/tab	Label of interest	Verification
<input type="checkbox"/>	Test and Technician Details	<b>NFPA 2001 (2012 edition)</b>	Does the software comply with the latest edition of the standard (2012)?
<input type="checkbox"/>	Test and Technician Details	Gauges last calibrated: <input type="text"/>	Is the pressure gauge calibration certificate less than 1 year old? Ask for the Gauge Calibration Verification Report.
<input type="checkbox"/>	Test and Technician Details	Fans last calibrated: <input type="text"/>	Is the Door Fan system calibration certificate less than 5 years old? Ask for the System Calibration Verification Report.
<input type="checkbox"/>	Test and Technician Details	Level <input type="text" value="3"/>	Does the technician have the correct level of training? Ask for training certificate.
<input type="checkbox"/>	Test and Technician Details	<div style="border: 1px solid black; padding: 2px;">             Test type <input type="text" value="(Select Test)"/>              (Select Test)              Descending Interface              Extended Discharge              Continual Mixing           </div>	Has the correct test type been selected? If "Continual Mixing" is chosen, verify that there is enough air convection that mixing will indeed occur during discharge.
<input type="checkbox"/>	Building details	Elevation above sea level <input type="text"/>	Is the elevation correct within 600 ft or 200 m?
<input type="checkbox"/>	Building details	Protected enclosure volume, V <input type="text"/>	Was the volume calculated by taking individual measurements of the room, rather than copying it from blueprints?
<input type="checkbox"/>	Building details	Enclosure height, H <sub>0</sub> <input type="text"/>	Was the Enclosure height measured from the floor slab to highest point that is flooded with agent?
<input type="checkbox"/>	Building details	Minimum protected height, H <input type="text"/>	Was the height measured from the floor slab (which includes the subfloor height) to the top of the equipment being protected? This entry only applies for a "Descending Interface" test type, but it is useful to have it recorded either way.
<input type="checkbox"/>	Enclosure Operating Conditions	Operating temperature, T <sub>e</sub> <input type="text"/>	Was the minimum anticipated enclosure temperature entered? If the temperature is unavailable, it is ok to enter the current room temperature.

<input checked="" type="checkbox"/>	Heading/tab	Label of interest	Verification
<input type="checkbox"/>	Enclosure Operating Conditions	Bias pressure during hold time, $P_{bh}$ <input type="text"/> Pa	Was the enclosure set up in discharge conditions? (e.g. If fans will be on during discharge, were these fans running during this bias pressure measurement?)
<input type="checkbox"/>	Agent details	Agent <input type="text" value="(select an agent)"/>	Have they selected the correct agent?
<input type="checkbox"/>	Agent details	<div style="border: 1px solid black; padding: 5px;">           Agent quantity by <input type="text" value="(select method)"/>            Initial <input type="text" value="(select method)"/>                      mass            Minimum c <input type="text" value="volume"/>                      concentration    <input type="text"/> lb    <input type="text"/> ft<sup>3</sup>    <input type="text"/> %         </div>	Did they enter the agent quantity, taken directly from the labels on the tanks? (Mass is almost always labeled on the tanks, and in rare cases, volume is displayed for some Inergen systems). Concentration should not be used unless no mass or volume is known.
<input type="checkbox"/>	Agent details	Minimum concentration, $C_{min}$	Do you agree that the minimum concentration recorded will prevent re-ignition at the end of the retention period? Only applies if there is mixing but it is useful to have it recorded either way.
<input type="checkbox"/>	Agent details	Design concentration, $C_{design}$	Is the correct design concentration entered from the system design specs? Only applies for extended discharge systems.
<input type="checkbox"/>	Agent details	Specified hold time	Do you agree with the Hold time? (i.e. Will this specified Hold time be sufficient for fire safety personnel to arrive on site? Can this be lower than 10 minutes because of the 'Small Room' problem? Does this need to be higher than 10 minutes because of continuous/hazardous ignition fuels?)
<input type="checkbox"/>	N/A	N/A	Was all temporary tape removed or was there sufficient assurance they will be replaced with permanent sealing?
<input type="checkbox"/>	Total Enclosure Leakage	<div style="border: 1px solid black; padding: 5px;"> <b>Leakage Area:</b> <input type="radio"/> Tested <input checked="" type="radio"/> Enter untested            Estimated Leakage Area <input type="text"/> in<sup>2</sup> Using: <input type="radio"/> Column Pressure <input checked="" type="radio"/> 10 pa            Estimated flow exponent, n <input type="text" value="0.6"/> </div>	If untested values were entered, do you agree with the validity of the assumed values? It is not common practice to use untested values.
<input type="checkbox"/>	Total Enclosure Leakage	Bias pressure during fan test, $P_{bt}$ [Pa] <input type="text"/>	Was the Door Fan covered, and the HVAC system turned off during this bias pressure measurement?
<input type="checkbox"/>	Total Enclosure Leakage	<div style="border: 1px solid black; padding: 5px;"> <b>Pressurization set</b>  <b>Depressurization set</b> </div>	Was the enclosure tested in both directions?
<input type="checkbox"/>	Total Enclosure Leakage	<div style="border: 1px solid black; padding: 5px;">           Induced pressure, <math>P_i</math> [Pa]    <input type="text" value="10"/>    <input type="text" value="50"/>            Induced pressure, <math>P_i</math> [Pa]    <input type="text" value="-10"/>    <input type="text" value="-50"/> </div>	Was the enclosure tested at 10Pa and 50Pa in both directions? If 50Pa could not be achieved, are you comfortable with the highest pressure reached?

<input checked="" type="checkbox"/>	Heading/tab	Label of interest	Verification
<input type="checkbox"/>	Total Enclosure Leakage	N/A	Were the pressures checked across each wall or was there sufficient return path from the Door Fan to the enclosure leaks to ensure the pressure was the same across all enclosure boundaries.
<input type="checkbox"/>	Total Enclosure Leakage		<p>If Fan Pressures are entered, does the installed Range Configuration on the Door Fan match the selection in FanTestic Integrity?</p> <p>If Flows are entered, does the Flow unit on the gauge match the selection in FanTestic Integrity?</p>
<input type="checkbox"/>	Total Enclosure Leakage		<p>Was the Fan Pressure accurately entered, and without the flow being too low? (Fan Pressures will display in red font if the flow is too low)</p>
<input type="checkbox"/>	Total Enclosure Leakage		<p>Must be between 0.45 and 0.9 to be acceptable (shown in the "Detailed Results")</p>
<input type="checkbox"/>	BCLA Test		<p>Was a Total Enclosure Leakage test completed first?</p>
<input type="checkbox"/>	BCLA Test		<p>Was the bias pressure re-measured at the time of the BCLA test?</p>
<input type="checkbox"/>	BCLA Test		<p>If untested values were entered, do you agree with the validity of the assumed values? It is not common practice to use untested values.</p>
<input type="checkbox"/>	BCLA Test		<p>Was the enclosure tested at 10Pa and 50Pa in both directions? If 50Pa could not be achieved, are you comfortable with the highest pressure reached?</p>
<input type="checkbox"/>	BCLA Test	N/A	<p>Were the pressures checked across each wall or was there sufficient return path from the Door Fan to the enclosure leaks to ensure the pressure was the same across all enclosure boundaries.</p>
<input type="checkbox"/>	BCLA Test		<p>If Fan Pressures are entered, does the installed Range Configuration on the Door Fan match the selection in FanTestic Integrity?</p> <p>If Flows are entered, does the Flow unit on the gauge match the selection in FanTestic Integrity?</p>
<input type="checkbox"/>	BCLA Test		<p>Was the Fan Pressure accurately entered, and without the flow being too low? (Fan Pressures will display in red font if the flow is too low)</p>
<input type="checkbox"/>	BCLA Test		<p>Must be between 0.45 and 0.9 to be acceptable (shown in the Detailed Results)</p>

<input checked="" type="checkbox"/>	Heading/tab	Label of interest	Verification										
<input type="checkbox"/>	Total Enclosure Leakage or BCLA Test	<p>Predicted hold time (descending interface) [min.] <b>9.5</b></p> <p><b>Results Summary:</b> FAIL - The lower leakage fraction F was determined to be 0.27 which gives a predicted Hold time of 9.5 minutes. The predicted Hold time of 9.5 minutes is less than the required 10 minutes, therefore the enclosure FAILS the predicted Hold time requirements.</p> <p>Predicted hold time (continual mixing) [min.] <b>21.6</b></p> <p><b>Results Summary:</b> PASS - The lower leakage fraction F was determined to be 0.27 which gives a predicted Hold time of 21.6 minutes. The predicted Hold time of 21.6 minutes is greater than the required 10 minutes, therefore the enclosure PASSES the predicted Hold time requirements.</p> <p>Required extended discharge rate [kg/min.] <b>1.09</b></p> <p><b>Results Summary:</b> FAIL - The extended discharge rate of 1.00 kg/min is less than the minimum required rate of 1.09 kg/min. The discharge may not maintain the required concentration for the duration of the discharge.</p>	Did the Enclosure Integrity Test pass? (A "PASS" or "FAIL" should appear in the "Results Summary" section)										
<input type="checkbox"/>	Venting and Peak Pressure Analysis	<p><a href="#">Venting and Peak Pressure Analysis (show details)</a></p>	If there is a Pressure Relief Vent installed, was it tested?										
<input type="checkbox"/>	Venting and Peak Pressure Analysis	<p><b>Positive Results</b></p> <table border="1"> <tr> <td>Vent area used, ELA<sub>p</sub></td> <td><b>363.6</b> cm<sup>2</sup></td> </tr> <tr> <td>Leak to Volume ratio, LVR<sub>p</sub></td> <td><b>2.1</b> cm<sup>2</sup>/m<sup>3</sup></td> </tr> <tr> <td>Minimum required leakage, ELA<sub>min,pos</sub></td> <td><b>171.6</b> cm<sup>2</sup></td> </tr> <tr> <td>Additional vent area needed</td> <td><b>0.0</b> cm<sup>2</sup></td> </tr> <tr> <td>Positive peak pressure, P<sub>pos</sub></td> <td><b>338.1</b> Pa</td> </tr> </table> <p><b>Positive pressure result:</b> PASSES - Measured ELA of 363.6 exceeds the minimum allowable ELA of 171.6, and the peak pressure of 338.1 Pa is less than the enclosure pressure limit of 500.0.</p>	Vent area used, ELA <sub>p</sub>	<b>363.6</b> cm <sup>2</sup>	Leak to Volume ratio, LVR <sub>p</sub>	<b>2.1</b> cm <sup>2</sup> /m <sup>3</sup>	Minimum required leakage, ELA <sub>min,pos</sub>	<b>171.6</b> cm <sup>2</sup>	Additional vent area needed	<b>0.0</b> cm <sup>2</sup>	Positive peak pressure, P <sub>pos</sub>	<b>338.1</b> Pa	Under positive pressure, is the measured Equivalent Leakage Area (ELA) greater than the minimum allowable ELA? See the "Positive pressure result" section.
Vent area used, ELA <sub>p</sub>	<b>363.6</b> cm <sup>2</sup>												
Leak to Volume ratio, LVR <sub>p</sub>	<b>2.1</b> cm <sup>2</sup> /m <sup>3</sup>												
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	Venting and Peak Pressure procedure summary →												
	Note any other concerns you had about the test →												