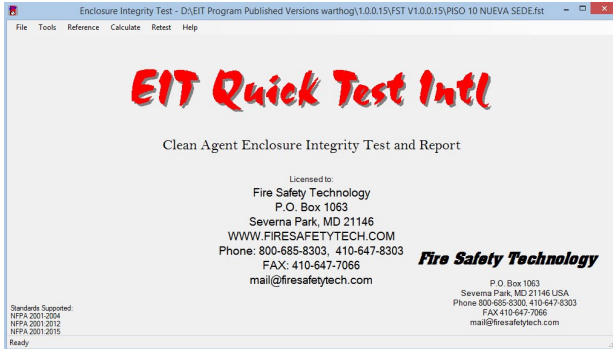




EIT Quick Test Intl.

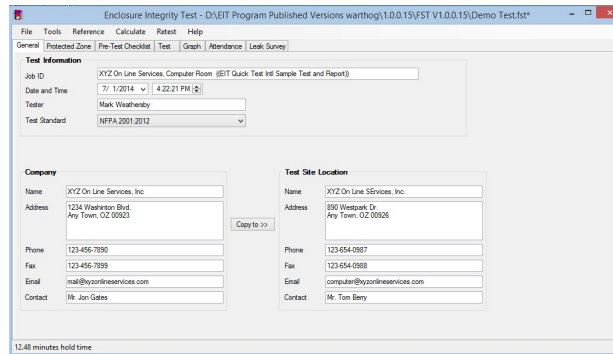
Manual Index Screen By Screen



Opening Screen

EIT Quick Test Intl. our program for enclosure integrity testing per NFPA 2001/2004, 2012 and 2015. Standard Windows format, easy to understand, easy to use, designed for quick one step inputting of test data, producing on the spot complete, professional quality test reports.

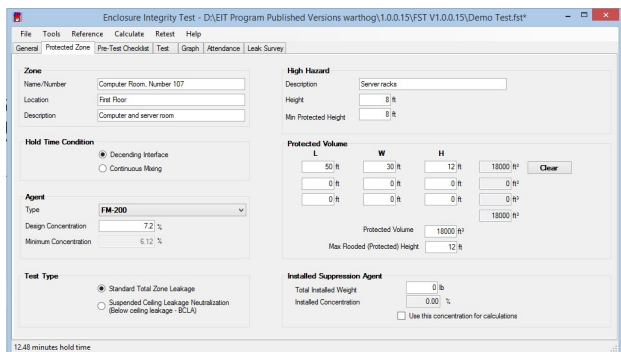
EIT Quick Test Intl.
Leads you through the test procedure step by step, screen by screen



Screen 2 General Test Information Customer and Test Site

Test file identification
Date, time, technician
Choice of NFPA standard
Customer name and details
Test Site location and contact

Protected zone details
Hold time conditions
Gas type and concentration
Test type



Screen 3 Protected Zone Zone Description Hold time Condition Clean Agent Selection

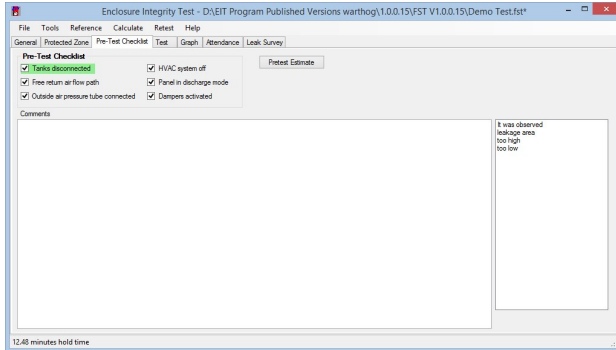
Fire Safety Technology

P.O. Box 1063
Severna Park, MD 21146 U.S.A.
Phone 800-685-8303, 410-647-8303
FAX 410-647-7066
e-mail: mail@firesafetytech.com
www.firesafetytech.com

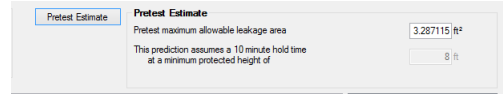


EIT Quick Test Intl.

Index Screen By Screen

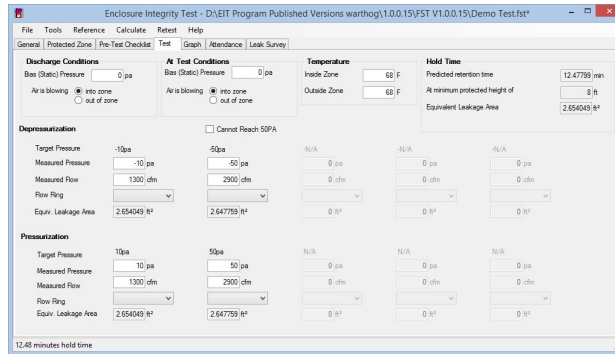


Pre-Test Checklist
Important do not forget items



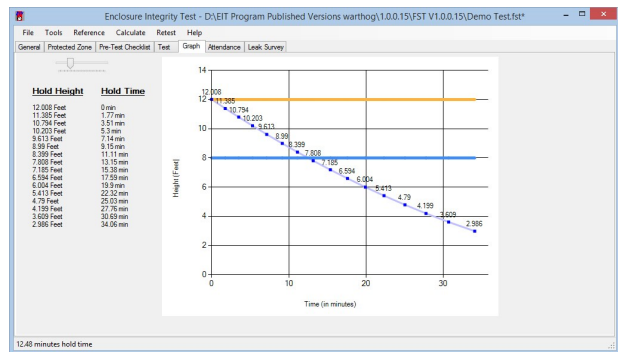
Pre-Test Estimate
Calculates maximum leakage area

Screen 4, Pre-Test Checklist
Pre-Test Estimate
Comments



Easy to follow “fill in the blanks” leads the technician through the test procedure

Screen 5, Test
Test Data and Results



Hold time vs. height graph
Easy to understand how the level of the suppression gas decreases over time.

Screen 6, Graph
Graph
Hold Height vs. Time Table



EIT Quick Test Intl.

Index Screen By Screen

Attendance
Capture, for the record, the names and companies of witnesses to the test including the AHJ if present.

Screen 7, Attendance
Authority Having Jurisdiction
Attendees

Leak Survey
Should the test fail, the optional leak survey lists the common leakage areas to help guide the customer in sealing the zone. This may or may not be included in the final test report depending on the tester's requirements.

Screen 8, Leak Survey
Optional Leak Survey



EIT Quick Test Intl.

Screen 2, General Test Information

1. **Job ID:** You may use your company filing system name here or other identifying name. This will appear at the top of each page of the report.
2. **Date and Time:** This is taken from your computer however it may be manually changed should the test be delayed after you have logged in to EIT Quick Test Intl.
3. **Tester:** The name of the technician actually conducting the enclosure integrity test.
4. **Test standard:** Here you select the NFPA Test Standard, depending on your local code requirements you have a choice of:

NFPA 2001/2004
NFPA 2001/2012
NFPA 2001/2015

5. **Company:** this is the name, address etc. for your customer.
6. **Job Site Location:** In many cases the company name is the company office but the test site is at a different location: for example your contract may be with Verizon at their local office but the test site is a cell tower at a different location.

If the test site is the same as the company then simply click the “Copy To” button to transfer the data

7. Lower left corner: When the test is completed the hold time will show here on all screens.

EIT Quick Test Intl. Screen 3, Protected Zone

1. Zone:

Name/Number: If known use the name and/or used by your customer or as noted on your drawings.

Location: This may be simply “first floor” or “ground floor” but in cases like a large hospital or college campus it may be “3rd Floor West Hall” or “Schaefer Hall Lower Level”

Description: Is the “computer room”, “server room”, “telcon room”, “MRI room” or ?

2. Hold Time Condition:

Decending Interface or Continuous Mixing

If all HVAC systems are shut down prior to discharge and there is no moving air in the zone the gas/air mixture will leak out the lower leakage areas and fresh air will enter through the high leakage areas. A layer or interface will form between the gas/air mixture and the fresh air. This interface will drop over time.

If the HVAC systems continue to operate after discharge, the heavy gas/air mixture will leak out of the lower leakage areas and fresh air will enter through the high leakage area. But since the HVAC system continues to operate mixing the room air the concentration of the suppression gas will drop.

See Special Notes, Page 19 Continuous Mixing

3. Agent

Type: This is a drop down listing all the NFPA 2001 clean agents (will all trade names), Halon, and CO₂

Concentration: When a gas is selected the nominal concentration is shown here. However it is important to check the drawings or contact the system designer to verify the actual design concentration.

Minimum Concentration: In case of “Continuous Mixing” the NFPA 2001 codes allow a minimum concentration of 85% of the design concentration. This is calculated from the above design concentration and is only active when “Continuous Mixing” is selected.

EIT Quick Test Intl.

Screen 3, Protected Zone, Continued

5. Test Type:

Standard Total Zone Leakage / Suspended Ceiling Leakage Neutralization
(Below Ceiling Leakage Area –BCLA)

Standard Total Zone Leakage: The zone during test is in its normal state with no special covering of the ceiling.

Suspended Ceiling Leakage Neutralization: The ceiling has been covered with sheet plastic to block of leakage through the drop ceiling. A technique which can be used when there is excessive un-sealable leakage area above the drop ceiling or a totally open plenum.

See Special Notes, Page 17

6. High Hazard:

Description: What is the hazard or what is being protected with the suppression gas, i.e. server racks, UPS, UPS Batteries, computer, art storage, rare books, or ?

Height: What is the height of the protected item? Height is measured from the lowest point if on the regular floor or slab then from the floor, if on a raised floor then from the slab or floor under the raised floor.

Minimum Protected Height: Normally this is the same as the Height and is automatically filled in. However in some cases the AHJ or owner may want the protected height to be higher than the height of the hazard. This can be changed by typing over. Note: the calculated hold time is based on this Minimum Protected Height.

Important Note:

Minimum Protected Height is the height of the hazard or the protected property.

Maximum Flooded (Protected) Height is the height of the zone.

The minimum height must always be less than the maximum height

6. Protected Volume:

For a normal cube shaped zone you may enter the length, width, height of up to three connected areas (all in one zone) and the program will calculate the total volume or you may simply type the total Protected Volume. This will be necessary when the protected volume is a unusual shape and not a cube. It is useful to sketch the zone and divide into squares, triangle or even in some case parts of a circle to calculate total volume. It is strongly recommended to do your own measurements on site and not rely on the submitted drawings as often there can be changes in the zone during or after construction.

7. Max (Maximum) Flooded (Protected) Height:

In case of a cube shaped zone this is the over all height of the zone. Note: This Maximum height is always greater than the Minimum Protected Height. If you mistakenly enter a height greater than the minimum protected height you will get an error message.

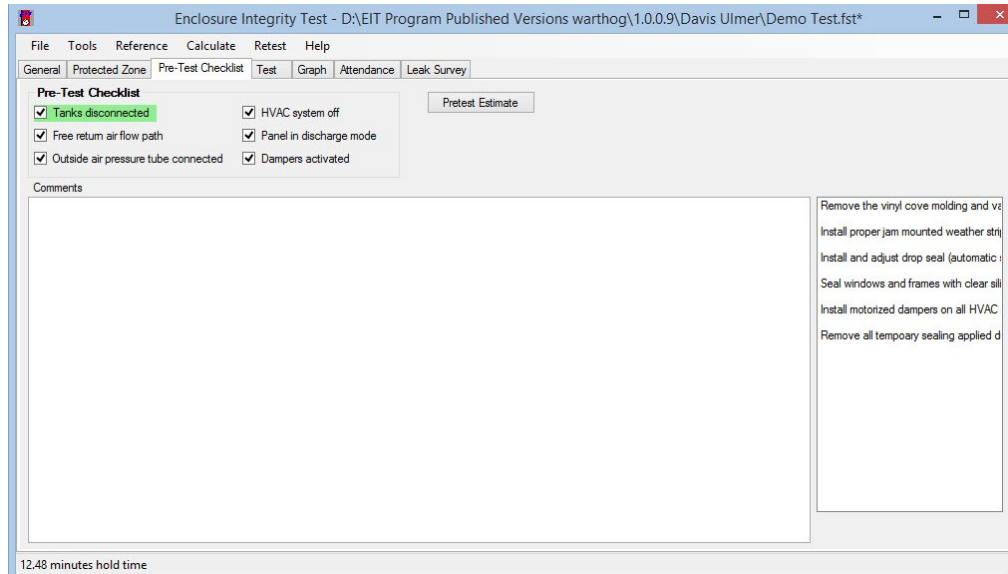
In case of more than one connected rooms (one zone) of different heights the program will calculate an weighted average height of the zone based on the area of each protected room.

8. Installed Suppression Agent:

Total Installed Weight: The total weight of the gas in the tank(s) taken off the label of the tank. Only used with the gases such as FM-200 which are measured by weight not the high pressure gasses like nitrogen or Inergen which are measured by volume.

The program calculates the Installed Concentration. You may use this concentration for calculating hold time by checking the box: Use this concentration for calculations.

EIT Quick Test Intl. Screen 4, Pre-Test Checklist, Comments

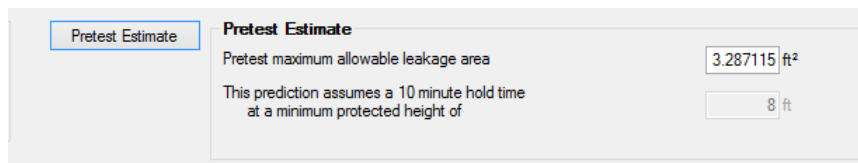


1. Pre-Test Checklist:

This is a reminder list for the testing technician cover a few important items that might be overlooked. This does print in the test report.

2. Pretest Estimate:

Clicking on the button will bring up the pretest Estimate showing the maximum allowable leakage area for the zone.



Useful comparing the found leakage area or as guide to the owner or contractor prior to a test.

3. Comments:

An open field to type in any special comments on the test which will print in the test report.

For example: “All areas temporary sealed (such as with duct tape or plastic sheeting) must be permanently sealed prior to final acceptance.”

Or “Satisfactory quality weather stripping must be installed on test door prior to final acceptance.”

4. Comment right field:

We have included a few often used comments. These may be double clicked and added to the comment field and modified as necessary. If your company has standard clauses or disclaimers to be included in each report these may be added to the selection. They are entered in the Tools tab.



EIT Quick Test Intl.

Screen 5, Test

1. Bias (Static) Pressure (See “Static (Bias) Pressure Notes” page 18 and “Conducting an Enclosure Integrity Test, A photo Summary Photo 30”, and “Conducting a NFPA 2001 Enclosure Integrity Test Part 2”)

Discharge Conditions; This is the static (bias) pressure at discharge conditions. If the gauge is properly connected enter the pressure from the gauge including the sign (+/-) the program will set the proper air blowing state which may be difficult to determine visually.

At Test Conditions: This is the static (bias) pressure at test conditions.

2. Temperature:

Inside zone: This is the temperature of the protected zone. If this is a computer/server room with special HVAC systems the temperature may be taken off the HVAC control system.

Outside Zone: This is the temperature of the area surrounding the protected zone, often the office area. Not “outside” the building unless the protected zone is something like a cell site control building (box).

3. Hold Time:

Will be calculated by the program when the test is completed.

4. Test Data:

NFPA 2001/2004 Enclosure Integrity Test

(see “Conducting a Enclosure Integrity Fan Test, a Photo Summary, “The Cheat Sheet” and ?)

The 2004 code requires both a depressurization and pressurization test at one pressure within the Target Pressure range.

With the fan in the door panel and the gauge properly connected and tester inside the zone

Start by depressurizing the zone, that is with the white flow rings facing you and the fan blowing out. For a small zone that is well sealed start with the C ring, with large zone start with the A ring. Turn fan on and bring up to target pressure range. If you can not reach the target pressure turn fan off and remove one flow ring. If the flow reading flashes LO LO LO, turn fan off and add a flow ring.

When pressure and flow stabilize record **Measured Pressure** and **Measured Flow** readings along with **Flow Ring** which is a drop down selection.

Turn fan around a repeat above steps. Most often the fan flow ring configuration will be the same but sometimes you make have change the flow rings.



EIT Quick Test Intl.

Screen 5, Test

NFPA 2001/ 2012, 2015 Enclosure Integrity Test

(see “Conducting a Enclosure Integrity Fan Test, a Photo Summary, “The Cheat Sheet” and “Conducting a NFPA 2001 Enclosure Integrity Test Part 2)

The 2012 and 2015 code requires two depressurization tests and two pressurization tests at 10pa and 50pa.

With the fan in the door panel and the gauge properly connected and tester inside the zone

Start by depressurizing the zone, that is with the white flow rings facing you and the fan blowing out. For a small zone that is well sealed start with the C ring, with large zone start with the A ring. Turn fan on and bring up to 10pa. If you can not reach 10pa turn fan off and remove one flow ring. If the flow reading flashes LO LO LO, turn fan off and add a flow ring.

When pressure and flow stabilize record readings along with flow ring.

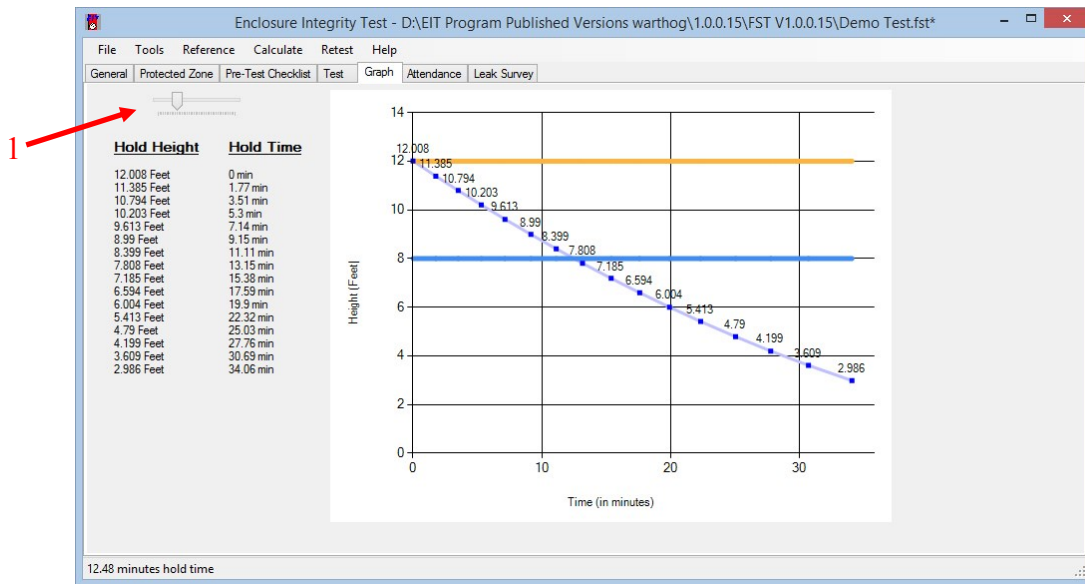
Repeat above step and depressurize to 50pa. Often you may have to change flow rings to reach 50pa.

Turn fan around a repeat above steps. Again you may have to change flow rings to meet the required test pressures.

When both depressurization and pressurization data are entered the calculated hold time will show in the upper right hand corner and the lower left hand corner on all screens.

The NFPA code requires a 10 minute hold time but a lesser time may be approved by the local AHJ depending on several factors.

EIT Quick Test Intl. Screen 6, Graph



Graph and Hold Height vs. Hold Time Table

When the test is complete the program produces the above graph and table. The graph is very useful to show the rate that the interface is falling in the zone.

By moving the slider **1** the graph may be adjusted to the best presentation of the data.

Note: The graph function only is available for the heavy gases i.e. FM-200.



EIT Quick Test Intl.

Screen 7, Attendance

Authority Having Jurisdiction (AHJ)	
Name	Lt. Stan Carr
Title	Inspector, Fire Prevention Division
Company	Any Town Fire Department
Address	123 Main Street Any Town, 00928
Phone	123-456-9111
Fax	123-456-8766
Email	scarr@anytownfd.org

Other Attendee 1	
Name	Mr. Jon Gates
Title	Manage IT Services
Company	XYZ On Line Services

Other Attendee 2	
Name	Mr. Tom Barry
Title	Site manager
Company	XYZ On Line Services, Inc.

Other Attendee 3	
Name	Mr. Jerry Wolf
Title	President
Company	Wolf Contracting, Inc.

Other Attendee 4	
Name	
Title	
Company	

Attendance

Add the names of individuals who are present at the test, including any company employees that may be assisting the testing technician. These names will be printed in the test report.

Note: It is recommended that the Enclosure Integrity Test Data Form is used to make a hard copy of the test data in case there is a computer problem and loss of the test data.

It is easy to pass around the last page of the Data Form and have the individuals fill in their names and company.



EIT Quick Test Intl.

Screen 8, Leak Survey

Item	Corrected	Status	Comments
Walls floor to deck?	<input type="checkbox"/>	Yes	
Walls caulked at floor?	<input type="checkbox"/>	Yes	
Walls caulked at deck?	<input type="checkbox"/>	Partially	Pockets on west wall to be sealed
Doors weather-stripped?	<input type="checkbox"/>	Yes	
Doors, drop seals?	<input type="checkbox"/>	Yes	Metal thresholds to be installed
Door closers installed and adjusted?	<input type="checkbox"/>	Yes	
Windows Caulked	<input type="checkbox"/>	None	
Exiting conduits sealed?	<input type="checkbox"/>	Reported Yes	
Exiting cables sealed?	<input type="checkbox"/>	Reported Yes	
Cable trays sealed?	<input type="checkbox"/>	None	
All holes, penetrations sealed?	<input type="checkbox"/>	Yes	
Floor drains trapped and filled?	<input type="checkbox"/>	None	
Dampers installed on all exiting ducts?	<input type="checkbox"/>	Reported Yes	
Dampers working and adjusted?	<input type="checkbox"/>	Reported Yes	
Block walls painted?	<input type="checkbox"/>	Not Applicable	
Ceiling tiles clipped?	<input type="checkbox"/>	Yes	

Leak Survey

If the zone does not meet the required hold time it is due to too much leakage. The tester can by both observation based on his experience and by using the door fan and smoke help identify the leakage areas.

The survey form list the most common leakage areas with room for comments.

The completed form can be very helpful for the owner and/or contractor.

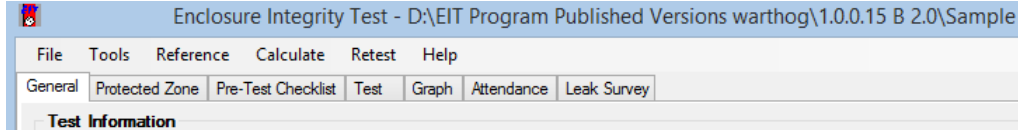
If the owner and/or contractor has not already received a copy of "Sealing of Rooms for Containment of Fire Suppression Agents" a copy should be included with the test report.

Again it is recommended that the above survey is completed manually on the Test Data Form and copied into the computer form later.

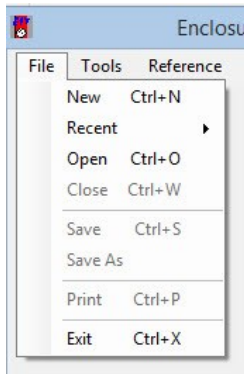


EIT Quick Test Intl.

Toolbar: File, Tools



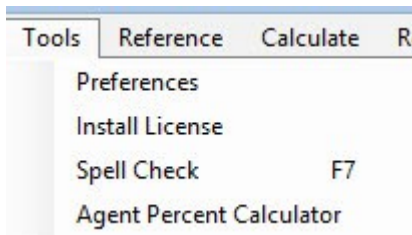
EIT Quick Test Intl. is formatted in the very familiar standard Windows format including a toolbar making it easy to learn and use.



File

The standard Windows functions New, Open, Close, Save, Save As, Print, Exit.

Also included is Recent, useful in quickly finding



Tools

Preference for setting and locking your desired units and adding standard comments to the comment field.

Install License

Only used is moving program from one folder to another or changing computers.

Spell Check

Useful especially when making comments in the comment field.

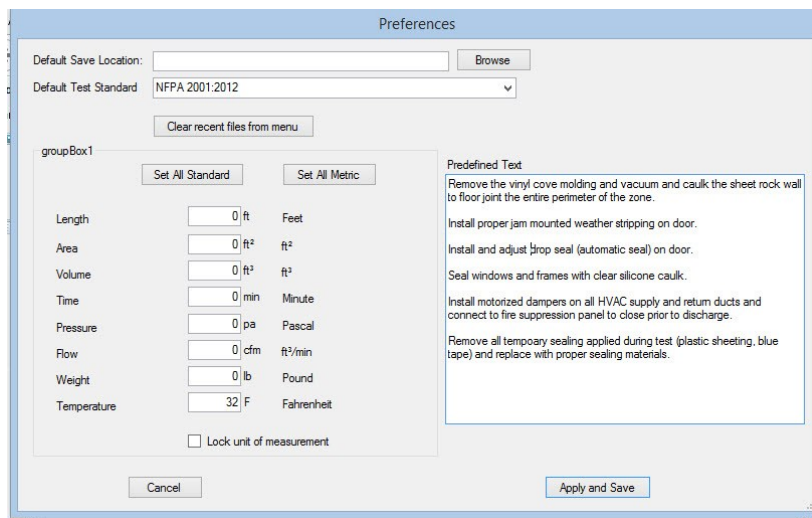
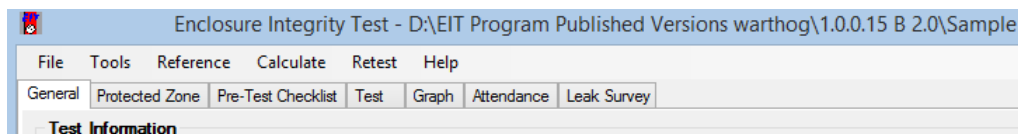
Agent Percent Calculator

No longer being used



EIT Quick Test Intl.

Toolbar Tools>Preferences



Tools>Preferences

Default Save Location: Normally the program will save your test files in the same folder as the program. If you wish to save the test files in a different folder you may select it here.

Default Test Standard: You may set your preferred test standard here. You may always change it for a specific test requirement in the **General** screen.

Clear recent files from the menu: Click this button to clear the files that come up when **Recent** is selected in **File**.

Group Box 1: The program may be run in many different units, metric, standard (also known as Imperial or SAE) or a mix of units depending on your preference. You may Set all Standard or Set all Metric by clicking on the button or you may select or change an individual unit.

Lock unit of measurement [Important]: Once you have selected your preferred units check this box (or uncheck if you need to change the units). If this is not checked you may inadvertently change the units while working in the program and not realize it.

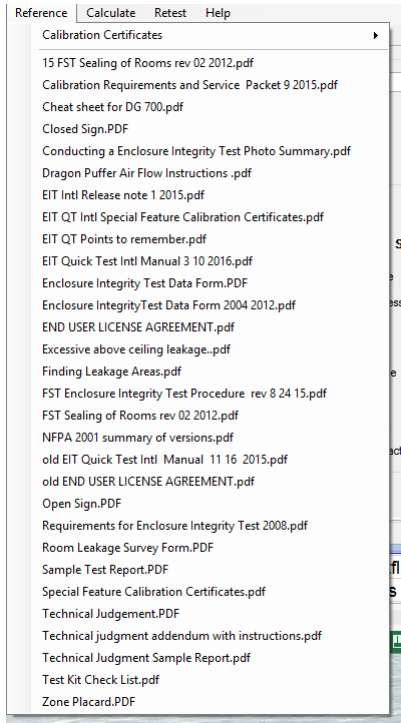
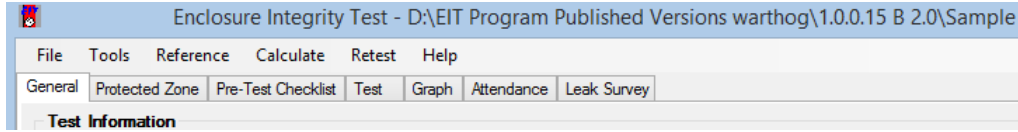
Predefined Text: We have included standard comments which we have often needed to include in the test report. You may add any of these to your report by double clicking on the comment. You may also add your own standard comments (boiler plate) which will appear in Screen 4 and may be double clicked to add them to the comment field.

Apply and Save: Click this button after any changes of units or Predefined Text.



EIT Quick Test Intl.

Toolbar: Reference, Calculate

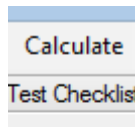


Reference: A collection of our handouts and helpful documents in .pdf format which you are welcome to read, print and give to your customers.

Especially useful for your customers and contractors is our document on sealing a zone "Sealing of Zones"

Useful and recommended for the testing technician is "Enclosure Integrity Test Data Form" for collecting a hard copy of the test data should you have a computer problem and lose the test data.

Calibration Certificates: V 1.0.015+ Contains the calibration certificates for your fan and gauge. They will pop up in **Help** should you need to show them to an AHJ. When a gauge is recalibrated, scan the new certificate as a .pdf and add it to this folder.

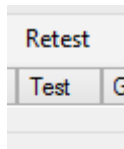
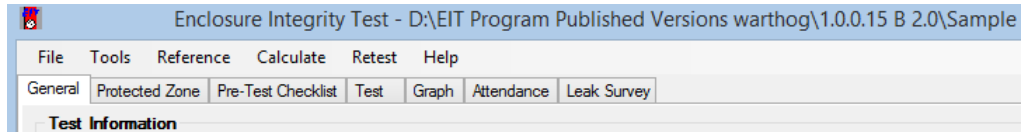


Calculate: Forces a recalculation of the hold time. Whenever there is new data or a change of data entered the program recalculates. However sometimes it may seem that there was no recalculation. Clicking on Calculate forces a recalculation

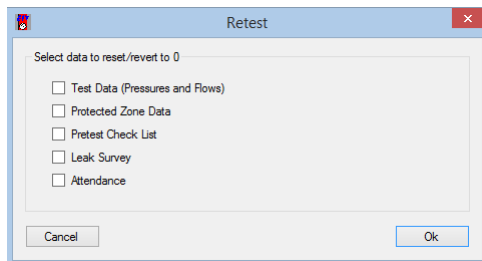


EIT Quick Test Intl.

Toolbar: Retest, Help



Retest: One of our most useful features. Often you will be retesting a zone, either the same day or later after there is additional sealing. Retest allow you to delete portions of the earlier test so that you do not have start from scratch or manually delete certain data fields and you can select just which fields to delete.



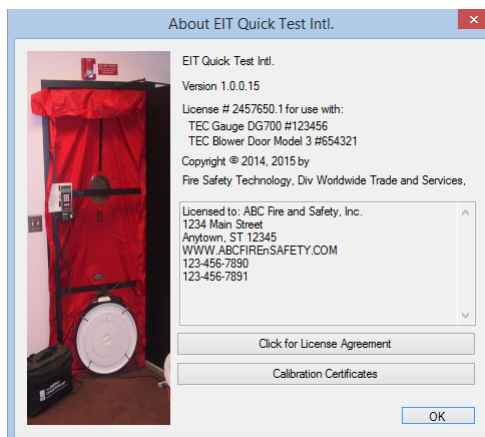
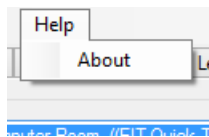
Test Data: Only erases the last test data.

Protected Zone Data: If you are going to test another zone in the same facility at the same date you would check both Test Data and Protected Zone Data and add the Zone Data for the new zone and do a test.

Pretest Check List:

Leak Survey:

Attendance: All function as above.



Help>About: Basic data about your copy of EIT Quick Test Intl. including Version, License Number, Gauge and Fan Serial Numbers, and your company details.

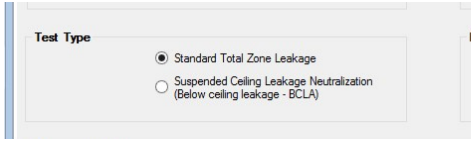
Click for License Agreement: Brings up a copy of the license agreement.

Calibration Certificates: Brings up copies of your calibration certificates, and information sheets on calibration requirements and recalibration order forms.



EIT Quick Test Intl. Special Notes

Suspended Ceiling Leakage Neutralization (Below Ceiling Leakage Area-BCLA)



Test Type: In screen 3, Protected Zone , Test Type you have the choice between Standard Total Zone Leakage and Suspended Ceiling Leakage Neutralization (Below Ceiling Leakage Area–BCLA)

Almost all tests are “Standard Total Zone Leakage”, that is we test the entire zone high and low for leakage.

The Suspended Ceiling Leakage Neutralization (Below Ceiling Leakage Area– BCLA) test is a special test used in cases where there is excessive above ceiling leakage areas, for example in a case where the side wall do not go to the over head deck and there is an open plenum covering the entire building area or where the walls do go to the overhead deck but are not sealed at the deck and/or there are above ceiling holes in the side walls.

We know that the gases are heavy and leak out of the lower leakage areas. In calculating hold time the standard procedure assumes that half of the found leakage area is high and half is low. The size of the low leakage area and the weight of the gas/air mixture determines the rate of leakage.

However when we test a zone with a drop ceiling and an open plenum the found leakage area is not half high and half low but normally the high leakage area is much greater than the low leakage area.

In order to correct for this difference there is a special test procedure.

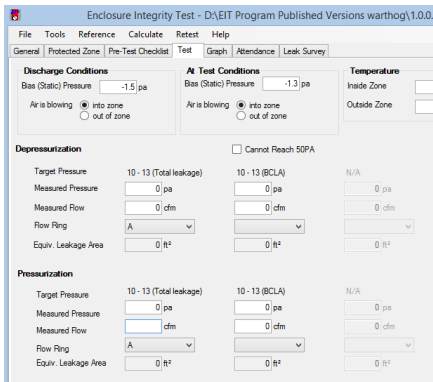
First we test the zone in the normal way with all ceiling tiles in place.

Second we cover the ceiling with plastic sheeting and retest the zone (the BCLA test)

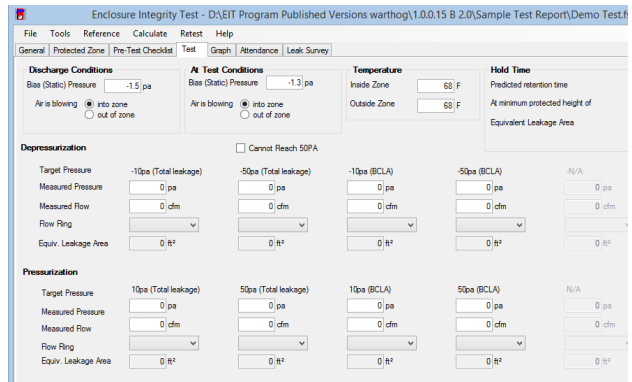
The program then calculates the hold time.

After selecting the Suspended Ceiling Leakage Neutralization (Below Ceiling Leakage Area–BCLA) option when you select the **Test** tab you will see data fields for both tests.

For more information NFPA 2001/ 2004 C.2.6.2 or NFPA 2001/2012, 2015 C.2.7.2



NFPA 2001/2004 BCLA Test



NFPA 2001/2012,2015 BCLA TEST

Bias (Static) Pressure:

The bias or also known as static pressure is the pressure acting on the zone, that is pressure or de-pressure out side the zone. This may be due to building HVAC systems, possibly due to an unbalanced system creating a negative or positive pressure in the area outside the zone, or wind effect on the building, a special lab or kitchen exhaust located near the protected zone or even fluctuations of air pressure due to the elevators.

Excessive bias pressure could shorten the predicted hold time by sucking or forcing out the gas/air mixture at an accelerated rate. By code the bias pressure must not exceed 25% of the pressure created in the zone by the gas/air mixture, the target pressure in NFPA 2001/2004 (and is calculated with warnings in EIT Quick Test Intl for NFPA 2001/2012, 2015).

The NFPA 2001 Enclosure Integrity Test Procedure has always required measurement of the bias pressure. See “Conducting an Enclosure Integrity Test, Photo Summary” photo 30, and “Conducting a NFPA 2001 Enclosure Integrity Test, Part 2”

The test procedure always required the zone and the area to be in the expected discharge condition when the test is conducted. The test is conducted with dampers, HVAC, doors, etc. in the discharge state, but beyond these items it is of course impossible for the tester to accurately predict the state of the zone or surrounding area at the time of an emergency.

The exception to this is in the case where we have opened a normally closed door to an adjoining room in order to obtain a free return air path during the test. Therefore in such case measure the bias pressure with the door closed, then open it for the test.

If the underfloor is pressurized at discharge (HVAC system on) then measure bias (static) pressure between the underfloor and the area outside the protected zone with HVAC on.

NFPA 2001/ 2012 and 2015 require the entry of both the bias pressure at discharge condition and at test condition. Unless there is a situation with an adjoining zone enter the normally measured bias pressure for both the discharge and at test condition.

See below C.2.6.2 from NFPA 2001/2012,2015

C.2.6.2 Bias Pressure Measurement.

C.2.6.2.1 Bias pressures are the background pressures that exist in the enclosure when the fan is stopped and sealed. Bias pressure must be measured or estimated for two different conditions. The first condition (which can always be measured) is the bias pressure present during the actual enclosure integrity test (P_{bt}). The second condition (which may need to be estimated) is the bias pressure expected after discharge, during the hold time (P_{bh}). To measure bias pressure, seal the fan opening with the door fan properly installed but without the fan operating. Observe the room pressure gauge for at least 30 seconds. Look for minor fluctuations in pressure. Determine the flow direction with smoke or other indicating method.

C.2.6.2.2 With the room set up as it would be under hold time conditions, measure the bias pressure P_{bh} across a section of envelope containing the largest quantity of leaks expected to leak clean agent. If the subfloor is pressurized during the

hold time, measure the *differential* between the subfloor and outside the envelope. If the room cannot be set up as would be under discharge conditions, P_{bh} will need to be estimated.

C.2.6.2.3 With the room set up for the room integrity test, measure the bias pressure P_{br} . If P_{br} has an absolute value greater than 25 percent of the column pressure calculated in C.2.7.1.4, it must be permanently reduced. Large bias pressures decrease the level of certainty inherent in this procedure. The most common causes of excessive bias pressure are leaky dampers, ducts, and failure to shut down air-handling equipment serving the enclosure.

C.2.6.2.4 Record the position of all doorways, whether open or shut, when the bias pressure P_{bh} is measured.

EIT Quick Test Intl.

Special Notes

Continuous Mixing:

It is normally recommended that all HVAC systems, computers, UPS equipment, switch gear etc. in the protected zone be shut down (de-powered) prior to discharge of the fire suppression gas. It is easy to understand that in case of a fire emergency shutting down this equipment this would minimize the risk of damage to the equipment and minimize the risk of re-ignition. There have been cases in which the HVAC / air handlers have been the source of smoke setting off the fire suppression system.

However some owners demand that the equipment and in particular the HVAC system is not shut down. In such cases because the air handlers are operating and moving air in the zone one has a situation referred to as “continuous mixing” of the suppression gas / air mixture. This is different from the standard discharge condition where the interface of the gas / air mixture is falling in the zone at a predictable rate. Briefly with “continuous mixing” there is a loss of the gas / air mixture out of the lower leakage areas but due to the mixing action of the air handlers the percentage of the suppression gas in the whole zone decreases. For this condition the calculation of the “hold time” is different from the standard Enclosure Integrity Test Procedure. We actually need to calculate the time lapse, “hold time” until the falling concentration reaches the minimum acceptable concentration.

NFPA 2001 /2012, 2015 5.6 and C.2.8.1.5 requires a minimum of 85% of the design concentration be held in the zone for 10 minutes.

If you have a zone with a continuous mixing then In the Protected Zone Screen, Hold Time Condition click Continuous Mixing. EIT Quick Test Intl. will then calculate the hold time using the Minimum (Allowable) Concentration.