VESDA® ASPIRE™

Product Guide

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VESDA by xtralis®

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We strongly recommend that this document is read in conjunction with the appropriate local codes and standards for smoke detection and electrical connections. This document contains generic product information and some sections may not comply with all local codes and standards. In these cases, the local codes and standards must take precedence. The information below was correct at time of printing but may now be out of date, check with your local codes, standards and listings for the current restrictions.

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures; re-orientate or relocate the receiving antenna, increase the separation between the equipment and receiver, connect the equipment to a power outlet which is on a different power circuit to the receiver or consult the dealer or an experienced radio/television technician for help.

FDA

This product incorporates a laser device and is classified as a Class 1 laser product that complies with FDA regulations 21 CFR 1040.10. The laser is housed in a sealed detector chamber and contains no serviceable parts. The laser emits invisible light and can be hazardous if viewed with the naked eye. Under no circumstances should the detector chamber be opened.

FM Hazardous Applications

3611 Hazardous Approval Warning: Exposure to some chemicals may degrade the sealing of relays used on the detector. Relays used on the detector are marked “TX2-5V”, “G6S-2-5V” or “EC2-5NU”.

Xtralis detectors must not be connected or disconnected to a PC while the equipment is powered in an FM Division 2 hazardous (classified) location (defined by FM 3611).

FM Approved Applications

The product must be powered from VPS-100US-120, VPS-100US-220 or VPS-220 only.

ONORM F3014

ONORM F3014, transport times for all tubes (including capillaries) must not exceed 60 seconds from any hole. This means that the pre-designed pipe networks that include capillaries cannot be used.

AS1603.8

The performance of this product is dependent upon the configuration of the pipe network. Any extensions or modifications to the pipe network may cause the product to stop working correctly. You must check that ASPIRE approves alterations before making any changes. ASPIRE is available from your Xtralis distributor.

AS1851.1 2005

Maintenance Standards. Wherever this document and the AS1851.1 differ, AS1851.1 should be followed in preference to this document.

European Installations

The product must use a power supply conforming to EN54: Part 4.

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Convention	Description
Bold	**Used to denote:** emphasis. Used for names of menus, menu options, toolbar buttons
Italics	**Used to denote:** references to other parts of this document or other documents. Used for the result of an action.

The following icons are used in this document:

Convention	Description
	**Caution:** This icon is used to indicate that there is a danger to equipment. The danger could be loss of data, physical damage, or permanent corruption of configuration details.
	**Warning:** This icon is used to indicate that there is a danger of electric shock. This may lead to death or permanent injury.
	**Warning:** This icon is used to indicate that there is a danger of inhaling dangerous substances. This may lead to death or permanent injury.

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1 Introduction to ASPIRE

ASPIRE helps you rapidly evaluate the performance of proposed pipe network solutions.

It allows you to enter site specific information and then automatically test a range of possible sample hole solutions. ASPIRE also allows you to configure the design parameters to suit your local fire codes and standards. The default settings can also be configured to accommodate installation or materials restrictions such as hole sizes.

Through the use of ASPIRE and the good design principles outlined in the VESDA Pipe Network Design Guide you will be able to determine good designs, and you can then select the most appropriate design for your project.

ASPIRE allows you to automatically create a bill of materials, an installation data pack (IDP), and a 3D model of the pipe network.

For ease of access, information on the definition and use of fields in the software is covered in the ASPIRE online help. Press the F1 key while on any screen for further details.

1.1 Product Guide

The ASPIRE Product Guide has been written for pipe network designers. It will assist you to understand and use the ASPIRE software.

This Guide covers the installation, configuration of default settings and the use of the ASPIRE software to design and test pipe network solutions.

The guide contains information on the possible ways to resolve limitations in a pipe network design, and to arrive at an acceptable solution.

It is assumed that you have already attended Xtralis accredited training and are knowledgeable about local codes and standards that apply to system design.

For further information on the theory of pipe network design, refer to the VESDA Pipe Network Design Guide.

1.2 Where Does ASPIRE Fit in the Customer Life Cycle?

Before you can successfully use ASPIRE you need to:

- Attend Xtralis accredited training in the use of ASPIRE
- Have a good understanding of the principles of pipe network design
- Have a good understanding of the local codes and standards
- Conduct a site survey to determine the size, scope and obstructions at the customer site

Once you have completed the ASPIRE design you will be able to create a bill of materials and an installation data pack.

1.3 Features

ASPIRE contains the following features:

- Navigation Tree to browse the whole project rather than a single detector
- Pipe wizards for the simple set up of common pipe designs
- Region specific defaults to suit local pipe specifications
- AutoBalance to automatically set hole sizes
- Introduction of groups for target sensitivity setting
- 3D isometric models to aid design and installation
- Bill of Materials generated for the final pipe network solution
- Installation Data Pack captures the installation information
- Commissioning Report to generate all forms used to commission the system
- Set multiple detector alarm thresholds within a detector
- Sampling Point Sensitivity tab to confirm EN54-20 compliance

ASPIRE also has the ability to build your own application defaults which suit:

- Customer design specifications,
- Local codes and standards, and
- Project conditions.

1.4 What ASPIRE Can Do

ASPIRE will allow designers to;

- Design systems with multiple aspirated smoke detector units
- Design systems with pipe networks fitted to the sample inlet ports of detectors
- Design systems with up to 25 holes per pipe (depending on the detector type)
- Design systems which use up to 20 bends per pipe (depending on the detector type)
- Design systems containing inlet sample pipe runs with multiple branch points
- Set multiple threshold levels within a detector

Remember that while ASPIRE can accept very large complex pipe designs, each of the detectors has a physical limit to the amount of protection they can offer.

1.5 What ASPIRE can NOT do

It will not fix a poor design by re-configuring your pipe runs. We trust that you have laid the pipes in a way to accommodate project requirements.

For information on improving the way you configure pipe runs, refer to the Pipe Network Design Guide and attend Xtralis accredited training.

ASPIRE can check that your design meets your configured set of criteria and defaults but does not check that these will meet the local codes and standards for the customer site. It is expected that you, as the designer, will use the correct codes and standards.

2 Installing ASPIRE

Copies of the ASPIRE software can be obtained from Xtralis. The latest copy of the ASPIRE software can be downloaded from www.xtralis.com.

From time to time the ASPIRE range of software is upgraded with new functions. These improvements come from the results of extensive laboratory research and as a result of customer feedback. We highly recommend that you update your copy of ASPIRE every six months. If you have not updated in the last six months please download a copy from www.xtralis.com today.

The instructions for installation are slightly different depending on how you received your copy of ASPIRE.

Close all other programs before installing ASPIRE as they may interfere with the installation process.

2.1 System Specification

ASPIRE is designed to run on Windows 7 and Windows 10 operating systems.

2.1.1 Installing ASPIRE from a CD

Insert the CD into the CD ROM drive. Wait 10 seconds, if nothing happens run SETUP.EXE on the CD.

The Installation splash screen will appear. Click **Next >** and follow the instructions on the screen.

2.1.2 Installing ASPIRE from a downloaded file

Double-click on the downloaded file and the installation files will be decompressed onto your computer. The installation will automatically start and display the installer splash screen, click **Next >** and follow the instructions on the screen.

2.2 Running ASPIRE

Double-click the VESDA ASPIRE icon on your desktop, or alternatively, select **Start | Programs | Xtralis | VESDA ASPIRE**.

If you have an ASPIRE file then double-clicking it will start ASPIRE and load the file.

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3 Creating a New Project

Each time you start ASPIRE it will automatically open a new project. A project contains the detectors, pipes and holes required for a project.

Click on the project icon in the tree view and enter the name of the project.

3.1 Adding a Detector

To add a detector to your project, right-click the project name in the tree view and select **Add Detector.** You should give each detector a meaningful name so that the installer will easily be able to determine the detector location. To name each detector, right-click, select **Rename Detector** and enter the name for the detector.

Use the General tab that appears on the Detector View to choose the settings for the new detector.

Note: IFT-15 detectors do not require modeling, as tube lengths are the same for a given installation.

3.1.1 Adding a Note

ASPIRE allows you to store information on any element of a design. This information is included in the Installation Data Pack which will be printed out and given to the installers, so it is useful to include details that will assist the engineers to correctly identify and install the detector.

To add or edit notes for a detector, right-click and select **Edit Notes**. Enter the information into the pop up window and select **OK** to save the details.

3.2 Adding a Pipe

There are a number of different ways to add pipes to a project. To create the first pipe you can right-click the detector in the tree view, select **Add Pipe** and use the Pipe Wizard.

Once the first pipe has been created you can either continue to use the Pipe Wizard or you can quickly and consistently create duplicates of the pipe using copy and paste. To duplicate an existing pipe, select the pipe in the tree view, press **Ctrl+C**. You have now copied all the details of the pipe. In the tree view, select the detector where you want to copy the pipe, press **Ctrl+V**. Another way to duplicate a pipe is to drag a pipe with the Ctrl key down. The plus that appears on the drag icon indicates that a copy (rather than a move) operation will occur.

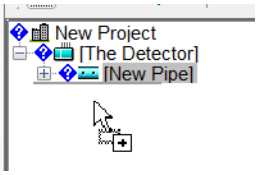

Figure 3-1: Add a Pipe

Remember to name each of the pipes to help the installer install the pipes in the right place. To name a pipe, right-click on the pipe in the tree view and select **Rename Pipe**. Enter the pipe name then press **Enter**. Notes can also be used to record extra information on a pipe.

To add or edit notes for a pipe, right-click and select **Edit Notes**. Enter the information into the pop up window and select **OK** to save the details. To add or edit notes for an individual subsection of pipe, click on the relevant cell in the Pipe View and click the **Edit Item Note** button.

Once the pipe has been added you can modify any aspect of the pipe network to suit your customer environment. Refer to The Pipe View for details.

3.2.1 Adding Extra Bends

Perform the following steps to insert an extra bend into a pipe.

Select the pipe in the tree view window, select the item where you want the new bend to be inserted, click the **Bend** button.

3.2.2 Changing Pipe Direction

You can change the pipe direction by using a branch, elbow or bend. Perform the following steps to change the direction of a pipe branch.

Select the pipe in the tree view window, then select the Direction of the bend or elbow in the Direction column in the Pipe View window. A drop-down list of directions will open and allow you to select from the following directions:

Code	Direction
U	Up
D	Down
L	Left
R	Right
F	Forward
B	Back
LD	Left & Down

Table 3-1: Changing Bend or Elbow Direction

3.2.3 Modifying Hole Sizes

Perform the following steps to change the size of a hole.

To modify one hole:

Select the pipe in the tree view window, then select the piece of pipe that contains the hole. Select the hole from the Hole Diameter column and a drop-down list will offer all the hole sizes that can be used in this project.

To use a new hole size for just this project:

Select the project in the tree and add the hole size to the list in the **Hole Sizes** field. Alternatively, you can add a new hole size when setting the **Hole Diameter** for any sampling point by typing in the required hole size. When the size you have entered is not part of the default set of hole sizes a message box will pop up to let you know, and also let you confirm that this hole size can now be used for other pipes in this project.

To change the default hole sizes:

To add a new hole size to the default list for future projects, select **Tools | Preferences | Project Defaults** and enter the new size in the Hole Sizes field.

3.2.4 Modifying Pipe Diameter

Reducing the size of a pipe can improve the sensitivity of holes at the end of a pipe network.

To reduce the diameter of the pipe, select the pipe in the tree view window, then select the piece of pipe where the reducer is to be installed. Select the reducer button, and edit the pipe diameter size to suit your needs.

3.3 Testing for a Good Design

As you enter the details for the pipe network it is a good idea to frequently save your results. Select **File | Save**, enter the name of the project and click **Save**.

If you have specifically entered information about the size and distance between holes, click the calculate button (or hit the F5 key) to see if the design meets your design criteria. While calculating if the design will work, ASPIRE will not modify any of your configuration.

If you click the Auto-Balance button, ASPIRE will begin automatically modifying your hole sizes and the detector's fire threshold in an attempt to find a solution that satisfies all design constraints.

After Calculating or Auto-Balancing your design ASPIRE will indicate if your design will work*.

The numbers are color coded, green is good, red requires further investigation. For further information on the color coding refer to The Colors used in ASPIRE.

If the design is not accepted, refer to Resolving Common Site Design Problems for assistance in improving the design.

Note: * Your design will only be as good as the quality of your site survey.

3.4 Saving your Results

At any point during design you can choose to save the project file. Select **File | Save** to save. Project files can be shared with other people. To share your project file with users who do not have the latest version of ASPIRE installed, select **File | Save As** and save the file as the appropriate version.

Auto-Save

Auto-save will capture and save your project at regular intervals (the default is 5 minutes) to the standard program data folder (usually *C:\ProgramData\Xtralis\Aspire*) as the file *aspireAutoSave.asp*. This is really an ASPIRE file so to reload it you must first rename it to have the *.ASPIRE* extension. To enable Auto-save and set its properties go to **Tools | Preferences | General**.

Note: The ProgramData folder is hidden by default on Windows 7. To view and access it go to *Control Panel > Appearance and Personalization > Folder Options > Show hidden* files and folders and click on the radio button *Show hidden files, folders, and drives*.

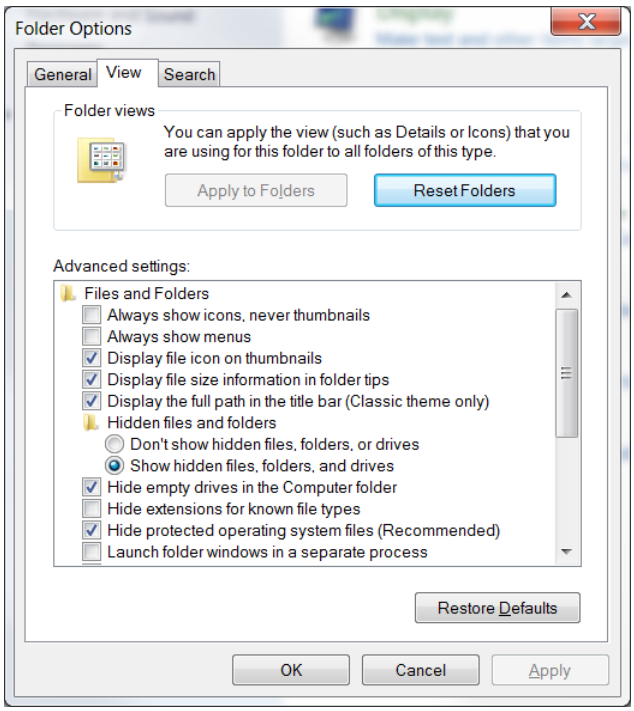

Figure 3-2: Show ProgramData Folder

3.5 Generating Reports

A complete set of instructions for the installer can be produced by selecting **File | Generate IDP**. The Installation Data Pack contains 3D schematics with all the pipe lengths and sizes for the installer to be able to successfully install the project.

$ You can generate a BOM (Bill of Materials) by selecting the project and clicking the Bill of Materials button. The BOM contains a list of the components required to install the project, individual detectors, and each pipe.

Select **File | Commissioning Report** to generate a Commissioning Report. The Commissioning Report will contain all of the forms used to commission your system.

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4 Creating an Effective Design

While you can put all the site survey information into ASPIRE and get an acceptable design, how can you tell if it is the **best** design? An effective design requires the designer to have detailed knowledge about many disciplines. At a minimum you should;

- Have a good understanding of the local codes and standards for the site
- Attend Xtralis accredited training
- Study the VESDA Pipe Network Design Guide and applicable Application Design Guides
- Enter into ASPIRE the site survey information which has been gathered using the principles of good design
- Test the results for several different possible designs for the site. This 'What if...' testing process allows you to test the design under different operating conditions, such as with different hole sizes or with the use of Auto Balance.

Provided you have configured ASPIRE with the rules of your local codes and standards, any 'Green' design will work. For information on how to configure application defaults, refer to Configuring Your Applications and Defaults.

4.1 Achieving EN 54-20 Compliance

EN 54-20 is a European standard which classifies aspirating smoke detectors into Class A, B or C. Class C is normal sensitivity, Class B is enhanced sensitivity, and Class A is very high sensitivity. The classification system specifies the maximum concentration of smoke required at a sampling point (to trigger an alarm) and the maximum transport time. The hole sensitivity target is the maximum smoke level allowable to achieve the detector threshold setting.

4.1.1 EN 54-20 Defaults

ASPIRE uses the transport time and hole sensitivity targets that have been approved for a range of Xtralis detectors. The tables below show the transport time targets and hole sensitivity targets respectively.

ASPIRE allows you to choose multiple threshold levels for one detector. When this occurs, ASPIRE uses the transport time of the selected classification for the Fire 1 threshold. ASPIRE indicates which classes a detector complies with.

If any sampling holes do not meet the target hole sensitivity, ASPIRE displays the detector threshold level needed to achieve target hole sensitivity. You may choose to apply the recommended detector threshold level. You may also switch off the EN 54-20 class and manually modify the transport time or target hole sensitivities. If those values render the detector non-compliant, ASPIRE displays the hole sensitivities in red text.

Detector	Class A	Class B	Class C
VESDA-E VEU	70	90	110
VESDA-E VEP	60	90	110
VESDA VLP, VESDA VLC	60	90	120
VLF-250	60	60	60
VLF-500	90	90	90
VESDA VLS	75	75	90

Table 4-1: EN 54-20 transport time targets (seconds)

Detector	Class A	Class B	Class C
VESDA-E VEU	1.5	3.0	10
VESDA-E VEP	1.5	3.0	8.0
VESDA VLP, VESDA VLC, VESDA VLF	1.5	4.5	10
VESDA VLS (non-scanning)	1.5	4.5	10

Table 4-2: EN54-20 target hole sensitivities (%obs/m) used by ASPIRE

4.1.2 Multiple Threshold Sensitivity

ASPIRE allows you to specify a particular detector threshold class to achieve EN54-20 compliance. ASPIRE will calculate the hole sensitivity needed to achieve compliance. You may also specify multiple threshold levels for each detector (for example Alert = Class A, Alarm = Class B and Fire 1 = Class C) so that very early warning of low levels of smoke occurs. Table 4 shows the default detector alarm threshold used by ASPIRE. ASPIRE allows you to choose which detector alarm thresholds are displayed and printed. Selected thresholds are printed in the installation data pack and on the commissioning form (the Fire 1 threshold is always displayed and printed). The threshold levels must increase in the order Alert < Action/Pre-Alarm < Fire 1/ Fire < Fire 2. The difference between two thresholds must not be less than 0.005% obs/m. The minimum Alert threshold value is 0.005 % obs/m (0.025 % obs/m for VLF detectors).

Threshold Level	Default Detector Alarm Threshold
Fire 2	2.0% obs/m
Fire 1/Fire	0.2% obs/m
Action/Pre-alarm	0.14% obs/m
Alert	0.08% obs/m

Table 4-3: The default detector alarm thresholds used by ASPIRE

4.1.3 Hole Aggregation

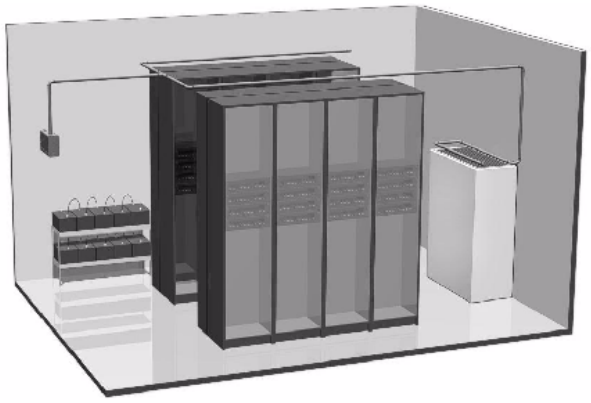
When a sampling hole is not able to meet the required hole sensitivity target, you may choose to aggregate holes. The hole aggregation option allows you to aggregate holes so that smoke detected across a set of aggregated holes (with clean air at other holes) will trigger the detector. In this way the aggregated group of holes acts as a large sampling hole. This allows the detector to respond earlier when smoke is present across a wide area. ASPIRE calculates the number of holes that need to be aggregated to achieve target sensitivity.

Refer to the following section for more information.

4.2 Advanced Design Using Groups

The concepts and best practices used in this section are for system designers who wish to have a more detailed technical understanding of the ASPIRE software. These features should only be used after you have attended Xtralis accredited training.

The use of groups allows a collection of holes to be treated as an integrated super-hole so that smoke from all the holes in the group aggregates together to provide greater sensitivity than would be provided by a single hole. The 'Aggregate Sensitivity' refers to the smoke level required at all holes in the group (with clean air at all other holes) to trigger the detector.



Legend	
A	Normal Protection
B	Group over air grille

Figure 4-1: Grouped holes

Groups can also be used for a collection of holes that are in a slightly different environment to the other holes in the pipe network. The use of groups allows you to place different aggregate sensitivity constraints on each group. So, if you have pipes which are protecting a room, and also have four holes over an air grille, you can place the air grille holes in one group, so they are treated consistently, and place the other holes in other group (s). This allows you to set a different aggregate sensitivity at the return air grille to the ceiling.

Holes should only be grouped if:

1. They are in the same room.
2. The holes are monitoring the same grille (unless the grilles are close together and feed into the same duct).
3. Are of the same type and so have the same performance target. For example, holes monitoring a grille with high air-flow should not be mixed with holes that are monitoring the room where there is normal air flow. Instead the grille and room holes should be placed in separate groups.

Generally, the holes belonging to different groups should be on separate pipes. This especially applies to groups of different types. So, for the above example, the group of holes monitoring a grille should be on a different pipe from the holes that are monitoring the room. If this is not possible then the different groups should at least be on completely separate branches.

Groups can be assigned a standard type so that their balance and sensitivity settings are standardized. See The Group Types Dialog for more details on defining the standard Group Types.

Auto Balance will treat holes within a group consistently and optimize the balance of each group independently from other groups.

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5 Resolving Common Site Design Problems

AutoBalance may return a number of concerns about the proposed pipe network design. The following information explains each of the concerns and provide suggestions on how to resolve the issue.

5.1 The Group Sensitivity Needs to Improve

The aggregate sensitivity of a group of sample holes has dropped below your target sensitivity.

- Check that the target sensitivity is correctly set, it may be that your default settings are set too high and a lower sensitivity is acceptable.
- Check to see that the sample points outside the group are not extreme and that a relatively consistent hole size has been used. The group sensitivity may have dropped due to the sensitivity of other points being too high.
- Check that holes belonging to other types of groups are on separate pipes, or at least on separate branches.
- Check that you have selected the right number and set of sample points.

5.2 The Transport Time Needs to Improve

It will take too long for a smoke sample to travel from the sample point to the detector. Transport time is the time taken for smoke entering a sample hole to reach the detector. It does not include the detector alarm delay period, which can be configured for each detector.

- Check that the target transport time is appropriate for this design. Many local codes and standards require a maximum transport time of 90 seconds. The VESDA laser detector default for systems typically require the sample to be detected within 60 seconds. If your transport time is between 60 and 90 seconds, check to see if the transport time is acceptable to your local codes and standards.
- VEU, VLP and VLS detectors allow you to increase the aspirator speed which will increase the speed of air in the pipe network. To change aspirator speed select the detector in the tree view, if the aspirator speed is displayed in the details panel, increase the speed and recalculate the design to see if the transport time is now acceptable.
- Using larger holes in the pipe endcaps will improve the transport time (but may lower the sample point sensitivity for all holes in the pipe).
- Shortening the length, and increasing the number of pipes covering an area will normally reduce the transport time.

If the system has already been installed and you are using ASPIRE to troubleshoot you should also check:

- That the pipe network that has been installed matches the pipe network that has been designed and tested in ASPIRE.
- All of the holes have actually been drilled, and are in the right location.
- For breaks or blockages such as excess glue in pipe joints.

5.3 The Flow Balance Needs to Improve

Sensitivity (and air flow) varies from one hole to another. Holes with low flow require higher smoke levels and so may miss a marginal smoke event, while holes with high flow are sensitive to low smoke levels and so may generate false alarms. Therefore minimizing the range of hole flows minimizes the risks of missed events and false alarms. The flow balance is a measure of this flow variation. The balance is defined as a ratio of flows, the hole with the least flow is compared with the hole with the largest flow. So a balance of 70% means that every hole has at least 70% as much flow as the best hole. Hence the higher the balance, the more uniform is the flow through all the holes.

If all holes are the same size, the flow rate through each hole reduces with distance from the detector, many designs offset this by increasing hole size as distance increases.

If the balance of your system is too low you can:

- Check that the size of the sampling holes used is relatively the same. A small increase in the size of holes is to be expected as you get further away from the detector. Large differences in holes size will need to be reviewed to improve the balance.

- Use the AutoBalance function to determine the appropriate hole sizes.
- Reduce the size of the endcap hole.
- If the pipe has a collection of sampling points in the pipe and capillaries, remember that the capillary holes will need to be slightly larger than the hole size used in the pipe.
- You could also try a different pipe configuration (for example, use an H configuration instead of one long pipe).

5.4 The Minimum Hole Flow Needs to Improve

There is not enough air being sampled from some sample holes. ASPIRE is warning that the sensitivity of the hole will be prone to fluctuation as a result of air currents in the protected environment.

If a hole has low flow you can improve the flow by:

- Checking the hole sizes being used. Increasing the hole size and re-calculating should resolve this problem.
- Increasing the aspirator speed (where supported by the detector eg VEU, VEP, VLP) and the flow of air in the pipe network. Select the detector in the tree view. If the aspirator speed is displayed in the details panel increase the speed and recalculate the design to see if the transport time is now acceptable.

5.5 The Minimum Hole Pressure Needs to Improve

There is not enough air being sampled from a sample hole(s) due to lack of air pressure. Low pressure may also make the sample flow vulnerable to cross draughts.

- Check the hole sizes being used. Decreasing the hole size and re-calculating should resolve this problem.
- Increase the aspirator speed and so increase the speed of air in the pipe network. To change the aspirator speed, select the detector in the tree view; if the aspirator speed is displayed in the details panel increase the speed and recalculate the design to see if the minimum hole pressure is now acceptable.
- The pipe may be too long. If the pipe is protecting a room, try using an H configuration pipe network instead.
- There may be too many holes or the holes may be too large for the type of detector chosen. Either select a more powerful detector or add another detector to the project or reduce the size of the holes on the pipe.

5.6 The Hole Sensitivity Needs to Improve

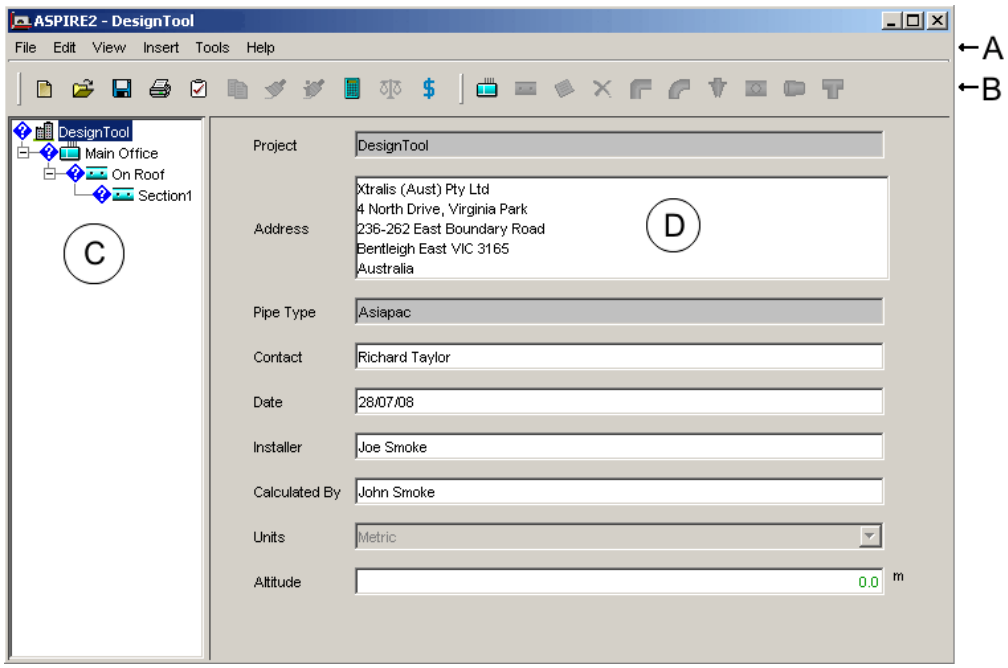
Hole Sensitivity is the smoke level required at a particular sample point - assuming clean air at the others - to produce a fire alarm at the detector. Notice that as this number increases, the detector requires more smoke - so the system is less sensitive.

- Relax the Target Hole Sensitivity
- Lower the EN 54-20 (or UL) target classification, for example, from A to B
- Increase the hole sizes
- Decrease the detector threshold
- Reduce the number of holes

6 The ASPIRE Interface

This section contains information about each of the components of the interface and how to work with them.

6.1 The ASPIRE Window



Legend	
A	Menu Bar
B	Toolbar Buttons
C	Tree View
D	Details Pane

Figure 6-1: Project Screen of ASPIRE

- **Title Bar:** Shows the project name or the name of the loaded file.
- **Menu Bar:** Shows the available menus. Refer to The Menus for further information.
- **ToolBar Buttons:** Offers a faster way to perform alterations without having to use the Menus. Place your cursor over the button for popup information on each button. Refer to The Toolbars for further information.
- **Tree View:** Shows the current configuration of the proposed project. As you add extra detectors and pipes this view will change to reflect your changes. Refer to The Tree View for further information.
- **Details Pane:** This window presents different sets of options to allow you to configure the pipe network. For details on the options presented on the first screen, refer to The Detector View.
- **3D View:** This window shows the pipe network associated with whatever detector is selected in the tree view.

6.1.1 The Tree View

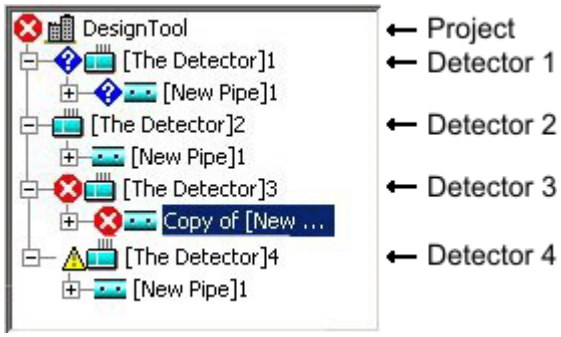


Figure 6-2: The Tree View

The Tree View allows you to browse across all of the detectors and pipes that will be used in the project. Being able to look over all the details that are used in a project site allows you to cut and paste sections to rapidly and consistently build new sections of a customer site. An example of what may appear in your Tree View is shown below.

Project

The project has a red cross next to it as one of the pipes for Detector 3 is unacceptable. All detectors and pipes must be within your design criteria for the project to be accepted.

Detector 1

This detector has had some modification to its pipe work and the project has not been recalculated yet. Select **Tools | Calculate** to recalculate the flows and pressures within the pipe network and check if the modifications are within your design criteria

Detector 2

This detector and its pipe network have been tested and found to be acceptable.

Detector 3

The pipe connected to detector three is outside your design criteria. You need to investigate, modify the pipe network (or your defaults) and recalculate to clear the cross.

Detector 4

The pipe connected to detector four is acceptable but has warnings. Expand the detector settings to find the warning and if possible modify your design to avoid it.

6.2 Interacting with the ASPIRE Interface

There are many ways of performing actions in ASPIRE, for example if you want to duplicate an existing pipe on a detector, select the pipe then;

- click the **Copy** button, select the pipe in the tree view and click **Paste Insert**
- click **Ctrl+C**, then select the detector and click **Ctrl+V**
- select **Edit | Copy**, select the pipe, then select **Edit | Paste Insert**
- drag the pipe while holding down the Ctrl key. A + will appear on the drag icon to indicate that the original pipe will be duplicated.

You can place the pipe in the desired location using the drag and drop feature.

To keep things simple, this document will only describe one method of performing a particular action. It is anticipated that you may discover other ways to perform an action that you may prefer to use.

6.2.1 The Colors used in ASPIRE

While working on a site plan you will see that different figures appear in different colors. The colors are used to let you know if a figure is acceptable, not acceptable, suspect, or not applicable.

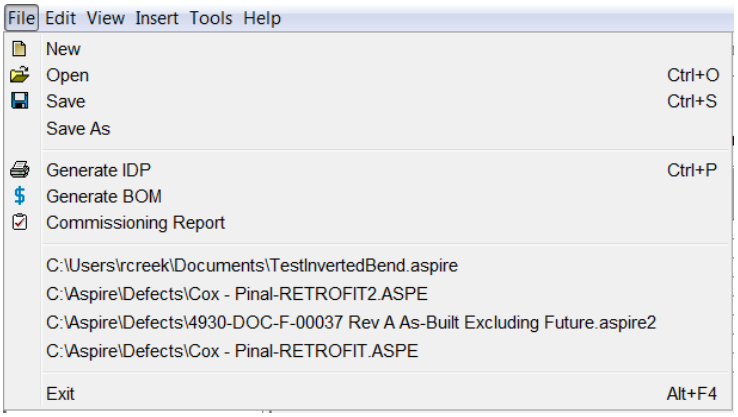
- **Green:** The figure is acceptable and within the parameters you have set for the project.
- **Blue:** The value is unknown. Usually applies to calculated values that depend on flows and pressures and indicates that the design has changed since the last flow calculation was run.
- **Red:** Indicates that the figure is outside the parameters you have specified for your project.
- **Amber/Orange:** This is a warning. You may be pushing the boundaries of your project and should review the warning. If possible make changes to remove the warning but in some cases you can proceed with caution.
- **Black:** This figure is used to indicate a value setting that does not require validation.

6.3 The Menus

Menus can be accessed at the top of the ASPIRE screen.

6.3.1 The File Menu

The file menu allows you to create new project files, open existing files, and save the files you are working on.



The **Generate IDP** (Installation Data Pack) option provides an easy way to gather and store all the information that the installers will need to install the pipework and commission the system.

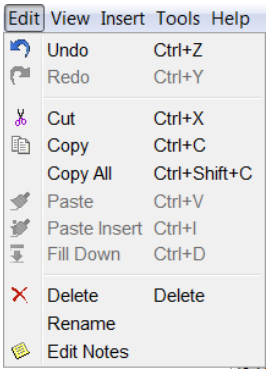
The **Generate BOM** (Bill Of Materials) option provides an easy way to create a list of all the materials required to install your project.

The **Commissioning Report** option generates a report containing all of the forms used to commission the system.

Recently opened files are listed. Clicking on any of these will open them.

Exit will close ASPIRE.

6.3.2 The Edit Menu



The Edit functions can help you rapidly and consistently build a complex model by duplicating sections of an existing design. Elements copied to the clipboard can now be pasted to other instances of ASPIRE.

Undo will undo the last operation. There are 8 levels of undo.

Redo will reapply the operation that has just been undone.

The **Cut**, **Copy** will copy the currently selected element to the clipboard. **Paste** will replace the selected element with the clipboard element. Pasting a detector over an existing detector will only replace its properties. Pasting a pipe over another pipe will also replace all sections under that pipe. The **Paste Insert** function allows you to duplicate an element inside a pipe network.

Fill Down applies to fields on the Pipe table. If a range of cells is selected then the top value is copied into the lower selected cells. If only the top cell is selected then the fill applies to all lower cells.

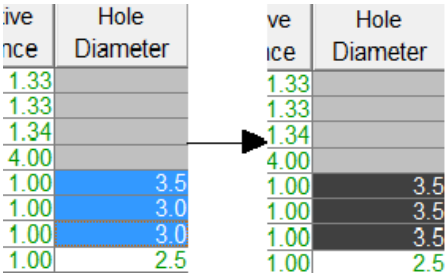


Figure 6-3: Result of applying Fill Down

Copy All is used to copy all cells from the table to the clipboard so that they can be pasted into Excel or Word tables. This copy will copy all columns including those that are currently hidden. It will also copy all rows even the rows that are not in the scrolled range.

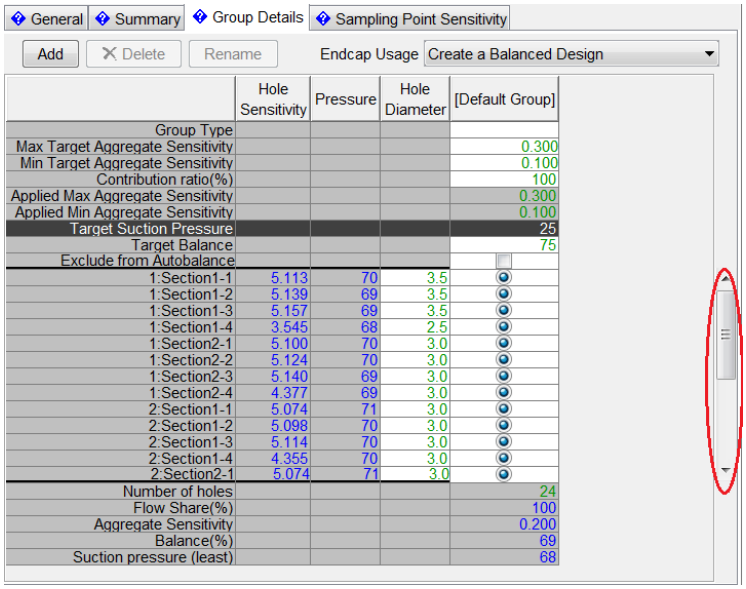


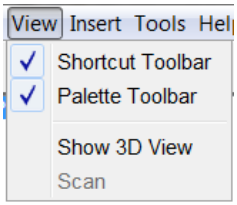
Figure 6-4: Copy All copies all table cells to the clipboard. Even those rows that are outside the scrolled range will be copied to the clipboard

Delete removes the currently selected element.

The **Edit Notes** and **Rename** options allow you to add extra information to different sections. The name of each section and any notes will be printed out on the IDP and will assist the person installing the system.

6.3.3 The View Menu

The view menu allows you to display or hide the Shortcut Toolbar and the Palette Toolbar. Refer to The Toolbars for further information.



Show/Minimise 3D View: selecting this option will either undock the 3D View and move it in its own frame or will close the frame and dock the 3D view in the lower left of the main window. The 3D View allows you to see a 3-D view of the detector and pipework and directly edit elements of the network. Refer to The 3D View section for further information.

Scan : The VLS detector has the ability to test samples from all pipes and then scan each individual pipe once smoke has been detected. If you have chosen to use a VLS you can use this option to test your pipe network with scanning enabled (ticked) or disabled (no tick). We recommend that you use the detector in normal mode (no scan) first, then turn scanning on later. For further information on Scanning detection see the VLS Product Guide.

6.3.4 The Insert Menu

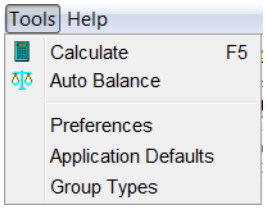
Adding a detector is one of the first functions you will need to perform when designing a new site. If multiple detectors are required for a site you can add further units by selecting this option.

Once you have added a detector you can add pipe runs to suit your site conditions. Selecting **Add Pipe** will start The Pipe Network Choice Screen of the Pipe Wizard. For further information, refer to The Pipe Network Choice Screen of the Pipe Wizard.

For assistance see the VESDA Pipe Network Design Guide and Creating an Effective Design.

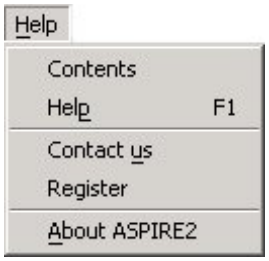
The following menu items refer to fittings that can be inserted into a pipe. These are the same as shown on the Palette toolbar and are enabled when the pipe (or pipe section) is selected on the tree. Refer to the Palette Toolbar for more information.

6.3.5 The Tools Menu



- **Calculate:** Once you have made changes to your pipe network you can recalculate the flows and pressures by selecting this option.
  Note: You only need to run this Flow Calculator when the detector is showing the stale calculation status .
- **Auto Balance:** This is one of the main features of ASPIRE. Once you have built your basic pipe network design for the site you can use this feature to automatically set your hole sizes. It will test a range of hole sizes and endcap sizes and the detector fire threshold then adjust these settings to offer the most effective solution for this pipe network configuration. **Undo** will return to the original hole sizes and fire threshold.
- **Preferences:** Sets the ASPIRE system settings and Project defaults so that future designs are created more efficiently, and more consistently. Refer to The Preferences Dialog for further information.
- **Application defaults:** This allows you to set up default sets for applications that you commonly use. For further information, refer to Configuring Your Applications and Defaults.
- **Group Types:** This allows you to setup settings for standard types of groups.

6.3.6 The Help Menu



- **Contents:** Selecting the contents option will display the table of contents for the online help for ASPIRE.
- **Help:** Displays the first page of the online help system for ASPIRE.
- **Contact us:** This option displays the contact details for support.
- **About ASPIRE:** Displays the version details for the copy of ASPIRE that you are currently running.

6.4 The Toolbars

There are two toolbars available in ASPIRE. To enable or disable the toolbars, select the View Menu and toggle the shortcut or palette toolbar options.

6.4.1 The Shortcut Toolbar

Displays some regularly used features.

- **Create New Project:** This button allows you to create an entirely new pipe network project. If you have not already saved your design, you will be prompted for the location and file name where the design is to be stored.
- **Open Existing Project:** This button allow you to open existing ASPIRE configurations.
- **Save Design:** This button saves your current project configuration. If you have not already saved your design, you will be prompted for the location and file name where the design is to be stored.
- **Generate Installation Data Pack:** This button allows you to get an Installation Data Pack so that the installers get all the details of your current pipe network design.
- **Generate Bill of Materials:** This button allows you to generate a Bill of Materials that lists all components required to build the pipe network for the project or the selected detector.
- **Generate Commissioning Report:** This button allows you to generate a Commissioning Report that contains the forms and information used to commission the system.
- **Undo:** Will undo the last operation. Tere are 8 levels of undo.
- **Redo:** Will reapply the operation that has just been undone.
- **Cut Current Selection:** Copies the currently selected element to the clipboard and then deletes it.
- **Copy Current Selection:** Copies the currently selected element to the clipboard.
- **Paste item into Design:** The element in the clipboard is pasted over the currently selected element so that it replaces the selected element. For detectors the properties are replaced but the pipes and groups are unaffected.
- **Insert Item Before Current Selection:** This button allows you to paste a copied element before the currently selected element. If the clipboard element normally sits beneath the selected element, then the copied element will be added to the end of the selected element's children.
- **Fill Down:** Fill lower cells with top cell value.
- **Delete:** Removes the selected element.
- **Edit Note:** This button allows you to add notes to any element of the pipe network design. These notes will be included in the IDP (Installation Data Pack) which can be given to the installers. Use notes to name and help the installers distinguish between different pipes.
- **Calculate:** Once you have made changes to your pipe network click this button to recalculate all of the ASPIRE figures based on your current parameters.
- **Auto Balance:** If you have entered the details of your proposed design and the calculate function is returning **Amber/Orange** or **Red** results, selecting this button will cause ASPIRE to automatically adjust hole size settings to see if a valid configuration is possible that satisfies the design constraints. Auto Balance will test a variety of hole sizes, endcap sizes and fire thresholds.

6.4.2 The Palette Toolbar

Allows you to insert different components into the pipe network. The components in this toolbar will change to suit different regions.

To insert any element, select the location in the project tree window or 3D view, then click the toolbar component. Adding bends and other joints that redirect airflow disturb the normal air flow inside the pipe network. For information on the impact of using different types of joints please see the VESDA Pipe Network Installation Guide.

- **Add Detector:** This button allows you to add a detector to your site design.
- **Add Pipe:** This button allows you to add extra pipes to a detector in your site design.
- **Add Hole:** This button lets you add a hole to your pipe run.
- **Add Capillary:** This button lets you add a capillary to your pipe network design.
- **Add HASP:** This button lets you add a Heat Activated Sampling Point.
- **Add 45° Elbow:** This button lets you add an elbow to your pipe network design.
- **Add Bend:** This button lets you add a bend to your pipe network design.
- **Add Small Radius Bend:** This button lets you add a small radius bend to your pipe network design.
- **Add T Piece:** This button lets you add a T piece to your pipe network design.
- **Add Reducer:** This button lets you add a pipe reducer to connect different sized pipes.

6.5 Views

The following views are available in ASPIRE. Some views are only available when a specific type of object is selected.

6.5.1 The Project View

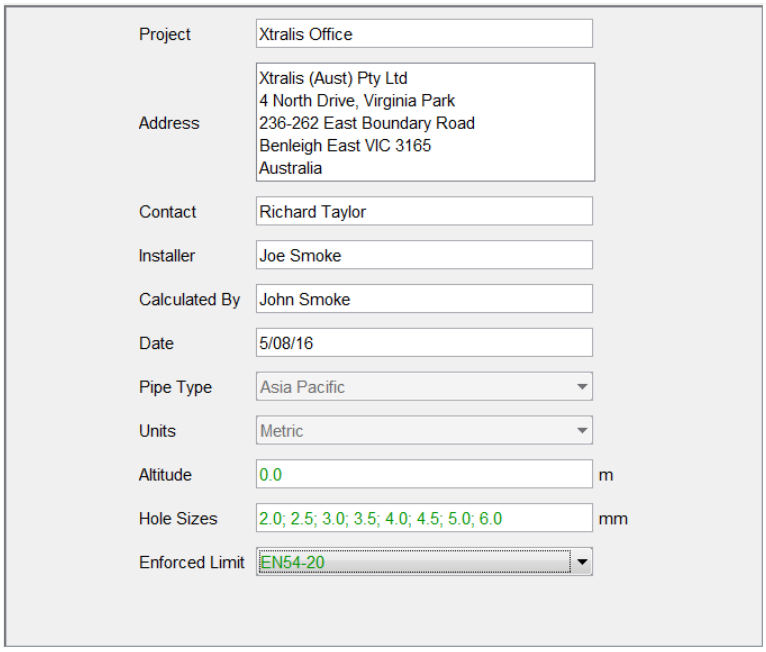


Figure 6-5: Project View

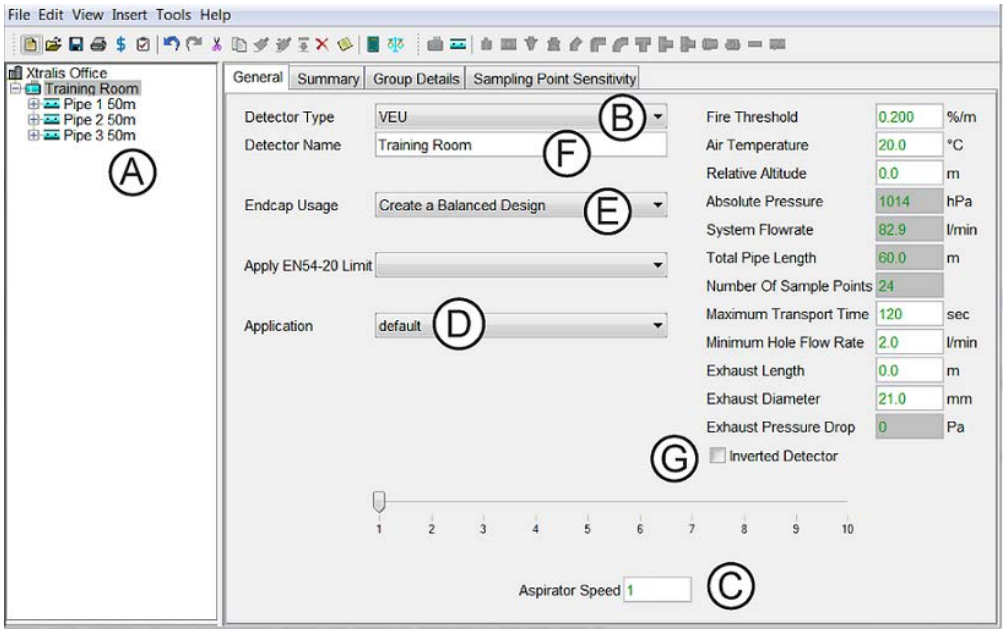
This is the first screen to be displayed when starting a new project. It allows you to record administrative information about the project.

- **Project:** This field stores the name of the project. If you use **File | Save As** to save a copy of this project the name in this field will change to reflect your changes.
- **Address:** The address of the customer site. Enter enough detail for the installer to install the system in the correct location. If there are multiple buildings or levels within buildings then these details should also be recorded to reduce the chance of errors occurring.
- **Contact:** Enter the contact details of the customer who will make the final decisions on the fire systems to be installed.
- **Installer:** Allows you to record who will be installing the system.
- **Calculated By:** Allows you to record your name so that if people look at the project information at a later date and have any questions they will be able to contact you. You can use this field to also record your phone or email address to make it easier for the installers to contact you.
- **Date:** By default this field records the date when the project was first started.
- **Pipe Type:** Defines the pipe fittings that will be used in this pipe network. The regions are America, Europe and Asia/Pacific.
- **Units:** Show if you are currently using US imperial or Metric units of measurements. Refer to The Preferences Dialog for details.
- **Altitude:** The altitude above sea level affects the air pressure in the detector view. Thinner air at higher altitudes will increase the time it takes to get a smoke sample to the detector (transport time).
- **Hole Sizes:** A list of the hole sizes that are being used in this pipe network. Hole sizes can be added to this list but can only be removed from the list if they are not being used.
- **Enforced Limit:** Specifies what sampling point sensitivity standard to apply. The 'Custom' option allows you to specify your own sensitivity and transport time limits.

6.5.2 The Detector View

The Detector view displays all the information about the detector selected in the tree view.

The General Tab of the Detector View



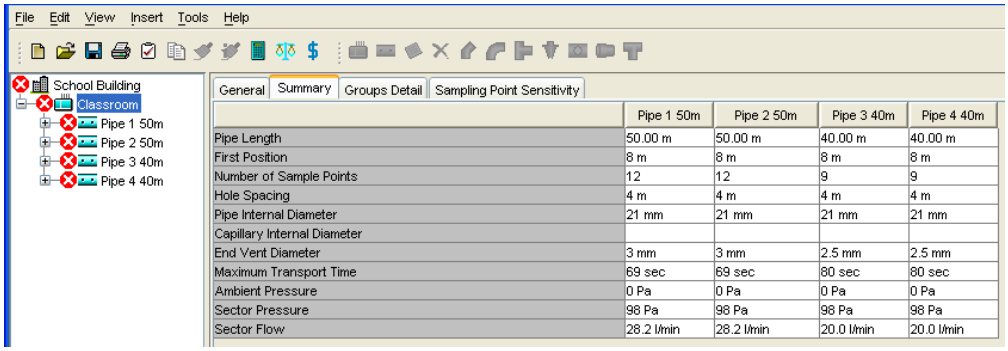
Legend			
A	Detector selected	**B**	List of available detectors
C	Aspirator speed	**D**	Application
E	Endcap usage	**F**	Detector details
G	Inverted detector selection		

Figure 6-6: The General tab of the Detector View

- **Detector Type:** This list allows you to select the type of detector for your customer site. As new detector models become available you will be able to select them from this list. If you are looking for a particular model and it is not listed, please update your copy of ASPIRE to the latest version.
- **Detector Name:** This field displays the name of the detector you have selected. If your customer site requires pipe networks for an office, atrium, and warehouse you can name each different detector to avoid confusion.
- **Aspirator Speed:** Some detector models allow you to adjust the aspirator speed. Increasing the aspirator speed will normally reduce the transport time for smoke samples reaching the detector.
- **Endcap Usage:** Endcap usage determines how you wish to use endcaps.
- **Create a balanced design:** This increases the sensitivity of detection for each hole as more air comes into the pipe network through sample holes rather than the endcap vent. By default 3mm holes are used.
- **Use endcaps to reduce transport time:** This option increases the hole sizes in the endcaps so that the air from the sample holes is transported faster to the detector. By default 4mm holes will be used.
- **Apply EN54-20 Limit:** The EN 54-20 class to apply to this design. If the project has defined a different Approvals standard then this drop down list will show the relevant classifications.
- **Application:** If you find that you are regularly creating a similar type of site from the factory defaults, you should consider creating your own sets of defaults to allow you to design customer sites more consistently and faster. This drop-down list allows you to select to use any sets of defaults that you have created. For information on creating your own personalized set of application defaults for each detector please see The Detector Tab of the Application Defaults Dialog.
- **Fire Threshold:** The amount of smoke required at the detector to activate the fire alarm (Fire 1).
- **Temperature:** The expected average temperature of the air being sampled by the detector. Temperature affects the viscosity and density of air, hotter air travels faster. Enter an estimate of what the expected average temperature will be.

- **Relative Altitude:** The relative offset of this detector from the altitude specified for the project. For a tall building the project may specify the altitude of the city and this relative altitude field may specify the height above ground level of the detector location. This setting has minimal impact on the flow calculations and can generally be ignored. It is used to calculate the Absolute Pressure.
- **Absolute Pressure:** The expected average air pressure at the detector based on the sum of the project altitude and the detector's relative altitude. Air pressure affects the transport time.
- **System Flowrate:** The amount of air collected by the detector per minute. (Not shown for detectors that contain multiple aspirators.)
- **Manifold Pressure:** The amount of suction pressure (in Pa) in the detector manifold.
- **Total Pipe Length:** This is the total length of all pipes connected to the detector. If this number is red you will need to decrease the size of the pipe network for the detector to work effectively. Alternatively, you can select a different Detector Type as another model may be able to support your proposed pipe network.
- **Number of sample points:** All detector types have an upper limit on the number of sample points that can be effectively used. Having too many sample points connected to a detector will reduce the sucking pressure to an unacceptable lower limit that may compromise detection.
- **Maximum Transport Time:** This is the maximum acceptable amount of time for a smoke sample to travel from a sample hole to the detector. If an EN 54-20 class is specified then this field will show the relevant time and will not be editable.
- **Minimum Hole Flow Rate:** This is the minimum acceptable amount of air to be sampled by each hole per minute.
- **Exhaust Length:** The total length of exhaust pipe.
- **Exhaust Diameter:** The diameter of the exhaust pipe.
- **Exhaust Pressure Drop:** Calculated estimate of the pressure drop across the exhaust.
- **Inverted Detector:** For some customer sites, it may be most practical to install the detector in an inverted (upside-down) position. Check this box if the detector will be inverted.

The Pipe Summary Tab of the Detector View



	Pipe 1 50m	Pipe 2 50m	Pipe 3 40m	Pipe 4 40m
Pipe Length	50.00 m	50.00 m	40.00 m	40.00 m
First Position	8 m	8 m	8 m	8 m
Number of Sample Points	12	12	9	9
Hole Spacing	4 m	4 m	4 m	4 m
Pipe Internal Diameter	21 mm	21 mm	21 mm	21 mm
Capillary Internal Diameter				
End Vent Diameter	3 mm	3 mm	2.5 mm	2.5 mm
Maximum Transport Time	69 sec	69 sec	80 sec	80 sec
Ambient Pressure	0 Pa	0 Pa	0 Pa	0 Pa
Sector Pressure	98 Pa	98 Pa	98 Pa	98 Pa
Sector Flow	28.2 l/min	28.2 l/min	20.0 l/min	20.0 l/min

Figure 6-7: The Pipe Summary Tab of the Detector view

The pipe summary tab displays the current pipe configuration. This tab gives a summary of the pipe network connected to the detector. As extra pipes are added you will need to select **Calculate** to update these details. Some figures, such as the distance between holes, may vary. When this occurs the range of distances will be displayed instead of a figure. Select the pipe in the tree view to see the details.

- **Pipe Length:** The total length of pipe connected to the detector.
- **First Position:** The distance from the detector to the first hole.
- **Number of Sample Points:** Total number of sample holes for the pipe.
- **Hole Spacing:** Distance between holes.
- **Pipe Internal Diameter:** The ID (Internal Diameter) of the pipe.
- **Capillary Internal Diameter:** The ID (Internal Diameter) of any capillaries.
- **End Vent Diameter:** The size of the hole in the endcap.
- **Ambient Pressure:** The relative difference in suction pressure between the location of the sample point and the location of the detector exhaust (ignoring height effects). If the detector exhausts air back into the same area it samples, the ambient pressure should be set to zero (0) Pa.
- **Maximum Transport Time:** The maximum calculated transport time for an air sample to travel from a sample point to the detector.

- **Sector Pressure:** The suction pressure for each pipe at the detector.
- **Sector Flow:** The amount of air collected by each pipe.

The Group Details Tab of the Detector View

Warning: Hole Groups should not be used when trying to achieve EN 54-20 compliance. Instead, use the Sampling Point Sensitivity tab.

The **Group Details** tab is used to create groups of sampling holes that work together to simulate a large, more sensitive sampling point. For further information refer to Advanced Design Using Groups.

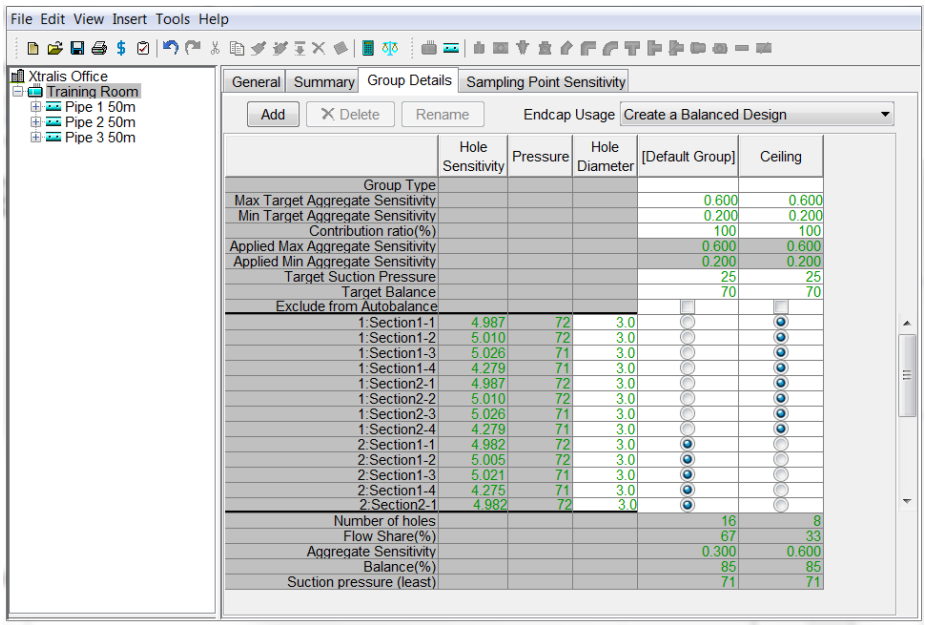


Figure 6-8: The Group Details tab of the Detector view

- **Add:** Allows you to add a new group.
- **Delete:** Allows you to delete a group. Holes assigned to the deleted group are returned to the Default group. (The default group cannot be removed). Undo can be used to bring back a deleted group.
- **Rename:** Allows you to rename a group. (The Default Endcap group may not be renamed).
- **Endcap Usage:** Determines the use of endcap in pipe networks.
- **Create a balanced design:** This increases the sensitivity of detection for each hole as more air comes into the pipe network through sample holes rather than the endcap vent. The endcap is also used to sample the air. By default 3mm holes are used.
- **Use endcaps to reduce transport time:** This option increases the hole sizes in the endcaps so that the air from the sample holes is transported faster to the detector. By default 4mm holes will be used. The endcap is not used to sample air in this mode.
- **Group Type:** Allows the group settings to be set to a standard group type.
- **Max Target Aggregate Sensitivity:** The upper limit of smoke detection for the group of holes.
- **Min Target Aggregate Sensitivity:** The lower limit of smoke detection for the group of holes.
- **Contribution ratio (%):** The proportion of sampling points within the group that would be expected to sense a fire event. For example, in a large room the smoke from a fire event at one end of the room may only reach half of the sample points. In this case the Contribution Ratio would be set to 50%.
- **Applied Max Aggregate Sensitivity:** The upper limit of smoke detection that is applied to this group. It is the Max Target Aggregate Sensitivity * Contribution Ratio.
- **Applied Min Aggregate Sensitivity:** The lower limit of smoke detection that is applied to this group. It is the Min Target Aggregate Sensitivity * Contribution Ratio.
- **Target Suction Pressure:** The lower limit of suction pressure for holes in the group.
- **Target Balance:** The least acceptable balance for the group of holes.
- **Exclude from AutoBalance:** The option allows you to protect your settings from being altered when the AutoBalance function is run.
- **Pipe/Section:** The details for each sample point in the pipe network. Click the radio button for each hole to collect them into groups. Holes can be moved from one group to another by selecting the radio button in the other group.
- **Number of holes:** Count of the number of sample points. (Ignores blocked or open endcaps).

- **Flow Share (%):** The proportion of the detector's flow in this group.
- **Aggregate Sensitivity:** Aspirating Smoke Detectors have a unique feature that allows the detector to collect small samples of smoke from many different sample points and check to see if the total of the smoke exceeds the smoke threshold. If two traditional point detectors (which do not use aspirating smoke detection) are exposed to a small amount of smoke - say one detector receives 48% of its threshold, the other 52%, there is no way they can combine this information. But an aspirated detector can aggregate smoke received through several holes. Aggregate Sensitivity is defined for a **group** of holes. It is the uniform smoke level required at each hole (with clean air at all others outside the group) to produce a fire alarm at the detector. For example, if you are using two pipes to protect a room, and a third pipe to cover a return air grill, you might assign all holes in the first two pipes to the "room" group, and the remainder to "air grille" group. Then you can ask ASPIRE to determine what is the aggregate sensitivity of the room, and also the sensitivity for the air grille.
- **Balance:** The lower limit of balance expected for the group of holes. This value is usually set to 70% or higher because the holes in the group should have similar characteristics. For further information refer to The Flow Balance Needs to Improve.
- **Suction Pressure (least):** The lower limit of suction pressure (in Pa) for the sample hole.
- **Notes:** You can attach notes to groups. This information will be included in the Installation Data Pack which will be printed out and given to the installers, so it is useful to include any details that will assist the engineers to correctly identify and install the detector.
  To add or edit the notes for a group, select the group by clicking on the group header and click on the **Edit Notes** toolbar button. Enter the extra information into the pop up window and select **OK** to save the details.

Sample Point columns.

Any of the following sample point columns can be shown (or hidden) on the Group view by right clicking on the column headers and then clicking on the relevant column name.

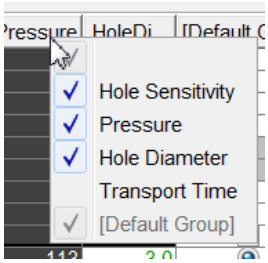
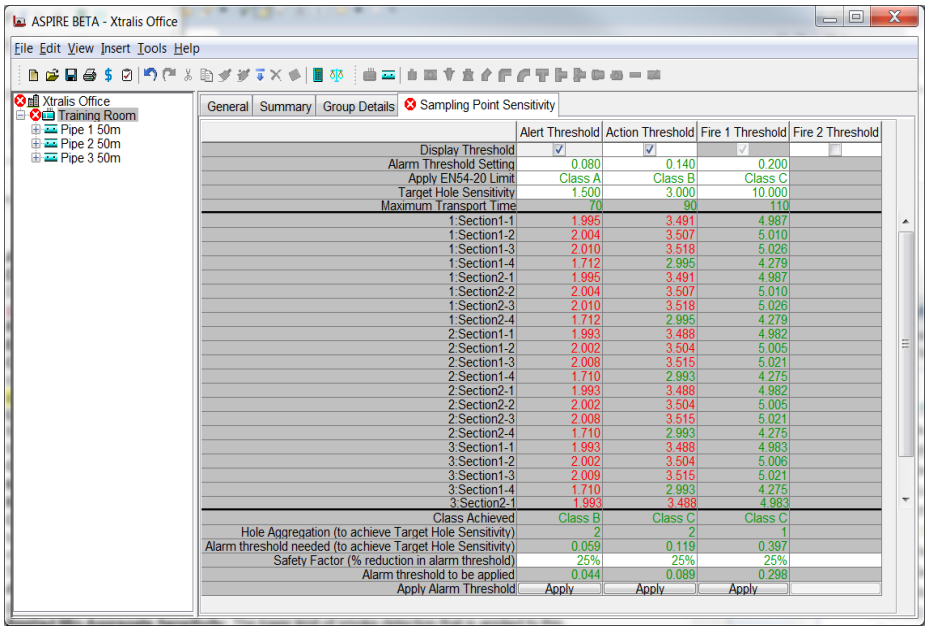


Figure 6-9: Context menu used to show/hide columns

The order of these columns can be changed using a mouse drag.

The Sampling Point Sensitivity Tab of the Detector View



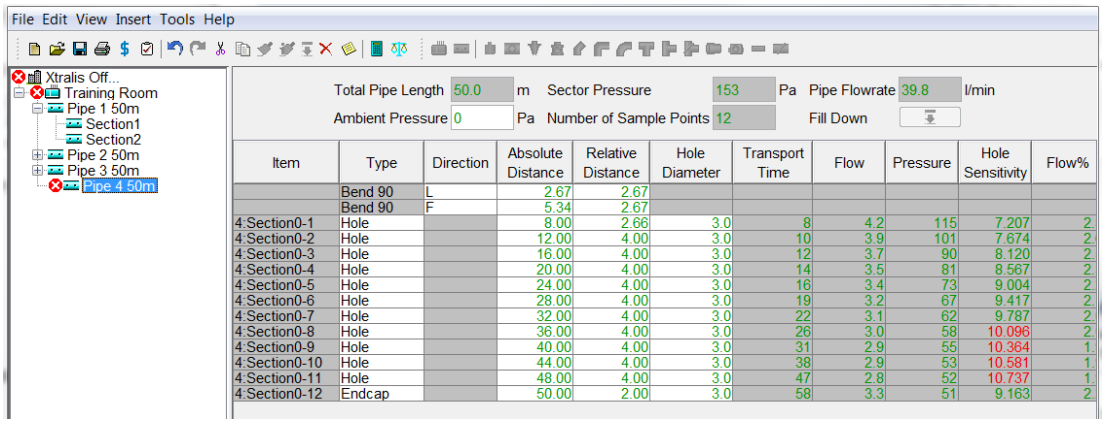
	Alert Threshold	Action Threshold	Fire 1 Threshold	Fire 2 Threshold
Display Threshold	☑	☑	☑	☐
Alarm Threshold Setting	0.080	0.140	0.200	
Apply EN54-20 Limit	Class A	Class B	Class C	
Target Hole Sensitivity	1.500	3.000	10.000	
Maximum Transport Time	70	90	110	
1:Section1-1	1.995	3.491	4.987	
1:Section1-2	2.004	3.507	5.010	
1:Section1-3	2.010	3.518	5.026	
1:Section1-4	1.712	2.995	4.279	
1:Section2-1	1.995	3.491	4.987	
1:Section2-2	2.004	3.507	5.010	
1:Section2-3	2.010	3.518	5.026	
1:Section2-4	1.712	2.995	4.279	
2:Section1-1	1.993	3.488	4.982	
2:Section1-2	2.002	3.504	5.005	
2:Section1-3	2.008	3.515	5.021	
2:Section1-4	1.710	2.993	4.275	
2:Section2-1	1.993	3.488	4.982	
2:Section2-2	2.002	3.504	5.005	
2:Section2-3	2.008	3.515	5.021	
2:Section2-4	1.710	2.993	4.275	
3:Section1-1	1.993	3.488	4.983	
3:Section1-2	2.002	3.504	5.006	
3:Section1-3	2.009	3.515	5.021	
3:Section1-4	1.710	2.993	4.275	
3:Section2-1	1.993	3.488	4.983	
Class Achieved	Class B	Class C	Class C	
Hole Aggregation (to achieve Target Hole Sensitivity)	2	2	1	
Alarm threshold needed (to achieve Target Hole Sensitivity)	0.059	0.119	0.397	
Safety Factor (% reduction in alarm threshold)	25%	25%	25%	
Alarm threshold to be applied	0.044	0.089	0.298	
Apply Alarm Threshold	Apply	Apply	Apply	

Figure 6-10: The Sampling Point Sensitivity tab of the Detector view

- **Display Threshold:** Check the check box to display/hide the threshold. If checked, the threshold will be displayed and printed in the IDP. The checkbox for Fire 1 is not enabled because Fire 1 cannot be deselected.
- **Alarm Threshold Setting:** The smoke level at which the detector will report an alarm.
- **Apply EN 54-20 Target:** The EN 54-20 classification used to set the target hole sensitivity.
  Note: This field will change depending on the Approvals code that is defined for the project.
- **Target Hole Sensitivity:** The maximum allowable smoke level at an individual hole in order to achieve the detector threshold setting. This value is automatically adjusted when you select an EN 54-20 target. The higher the target hole sensitivity, the less sensitive the detector will be.
- **Maximum Transport Time:** Shows the maximum time that is allowed by the EN 54-20 class for smoke to reach the detector sensing element.
- **Hole Aggregation (to achieve Target Sensitivity):** A hole aggregation number greater than 1 indicates that ASPIRE has aggregated holes in order to achieve the target sensitivity. You may accept the design with aggregated holes (ASPIRE will show the pipe section values in red, and red crosses next to the pipes in the tree view) or you may modify your design so that hole aggregation is 1. For more information, refer to Hole Aggregation.
- **EN 54-20 Class Achieved:** This row displays the EN 54-20 Class achieved for each threshold level.
- **Alarm Threshold needed (to achieve Target Sensitivity):** The detector threshold setting that will be triggered if any single hole detects smoke at the Target Sensitivity level.
- **Safety Factor (% reduction in alarm threshold):** The margin to allow when setting the threshold. It is recommended to always use a margin here to allow for slight variations in installation and operating conditions.
- **Alarm threshold to be applied:** The estimated Alarm Threshold reduced by the specified Safety Factor.
- **Apply needed Detector Threshold?:** Adjusts the Detector Threshold setting to the value that will trigger an alarm any single hole if smoke is detected at the Target Sensitivity level.

6.5.3 The Pipe View

Selecting any pipe, or section of pipe, in the project tree will display the details.



Item	Type	Direction	Absolute Distance	Relative Distance	Hole Diameter	Transport Time	Flow	Pressure	Hole Sensitivity	Flow%
	Bend 90	L	2.67	2.67						
	Bend 90	F	5.34	2.67						
4:Section0-1	Hole		8.00	2.66	3.0	8	4.2	115	7.207	2.
4:Section0-2	Hole		12.00	4.00	3.0	10	3.9	101	7.674	2.
4:Section0-3	Hole		16.00	4.00	3.0	12	3.7	90	8.120	2.
4:Section0-4	Hole		20.00	4.00	3.0	14	3.5	81	8.567	2.
4:Section0-5	Hole		24.00	4.00	3.0	16	3.4	73	9.004	2.
4:Section0-6	Hole		28.00	4.00	3.0	19	3.2	67	9.417	2.
4:Section0-7	Hole		32.00	4.00	3.0	22	3.1	62	9.787	2.
4:Section0-8	Hole		36.00	4.00	3.0	26	3.0	58	10.096	2.
4:Section0-9	Hole		40.00	4.00	3.0	31	2.9	55	10.364	1.
4:Section0-10	Hole		44.00	4.00	3.0	38	2.9	53	10.581	1.
4:Section0-11	Hole		48.00	4.00	3.0	47	2.8	52	10.737	1.
4:Section0-12	Endcap		50.00	2.00	3.0	58	3.3	51	9.163	2.

Figure 6-11: Pipe View

This panel displays all the calculated pipe details. Figures displayed in cells shaded gray are your calculated values.

The top of the panel shows pipe properties. The bottom of the panel shows the details for each section.

You can customize the columns that appear on the Pipe View display. Right-click on the heading of any column in the pipe view and click on the name of a column in the drop-down list to show or hide that column.

Summary Information

- **Total Pipe Length:** The total length of all sections of pipe. Total Pipe Length may be altered by clicking on the relevant cell in the Relative Distance column and entering a new value. The Total Pipe Length will be updated to show the new value. The total pipe length ignores sections of pipe with blocked endcaps such as those sections used for cleaning or maintenance checks.
- **Sector Pressure:** The suction expected at the start of the pipe.
- **Pipe Flowrate:** The amount of air expected to be sampled by this pipe (liters per minute).
- **Ambient Pressure:** The difference in pressure between this pipe and the detector exhaust outlet. A positive value indicates that the air pressure for the room sampled by the pipe is higher than the air pressure at the detector exhaust outlet.
- **Number of Sample Points:** The total number of sample points in this pipe.

Detailed Information

- **Item:** The name of each section of pipe.
- **Type:** Type of each item of pipe in the design. You can change holes for capillaries, and Water Traps for Endcaps by clicking on the component that you wish to change and select another component from the drop-down list.
- **Direction:** Indicates the direction that a bend or elbow will take. For further information on the different directions see the pop-ups by placing your mouse pointer over any item in the list.
- **Absolute Distance:** Distance from the start of the pipe (detector).
- **Relative Distance:** Distance relative to the previous item in the list.
- **Hole Diameter:** The diameter of the hole for this sampling point.
- **Capillary Length:** This changes the length of the capillary tube for this capillary. For a drop pipe this is the pipe length in the drop pipe.
- **Transport Time:** The time it will take for an air sample to move from the sample point to the detector. (Calculated by ASPIRE).
- **Pressure:** The suction pressure at the sample point. This should be at least 25 Pa. Cross drafts in the sampling area may require more suction pressure. (Calculated by ASPIRE).
- **Flow:** The amount of airflow from the sample point (L/min). (Calculated by ASPIRE).
- **Flow%:** The percentage of the total air flow that will come from this sample point. (Calculated by ASPIRE).

- **Hole Sensitivity:** The amount of smoke required at this hole with clean air entering all other holes to cause the detector to alarm. Higher numbers indicate less sensitivity. (Calculated by ASPIRE).
- **Pipe Diameter:** ID (Internal Diameter) of sampling pipe.
- **Capillary Diameter:** ID (Internal Diameter) of the capillary. For drop pipes this is the pipe diameter.
- **Intersection Pressure:** The pressure (in Pa) at the point where the capillary intersects the pipe.

6.5.4 The 3D View

Minimizing and Floating

The 3D View may be shown in its own frame by selecting the menu item **View | Show 3D View** or by clicking on the expand button  .

The 3D View can be re-docked by selecting the menu item **View | Minimise 3D View** or by clicking on the Minimize or Close buttons on the top right of the 3D frame.

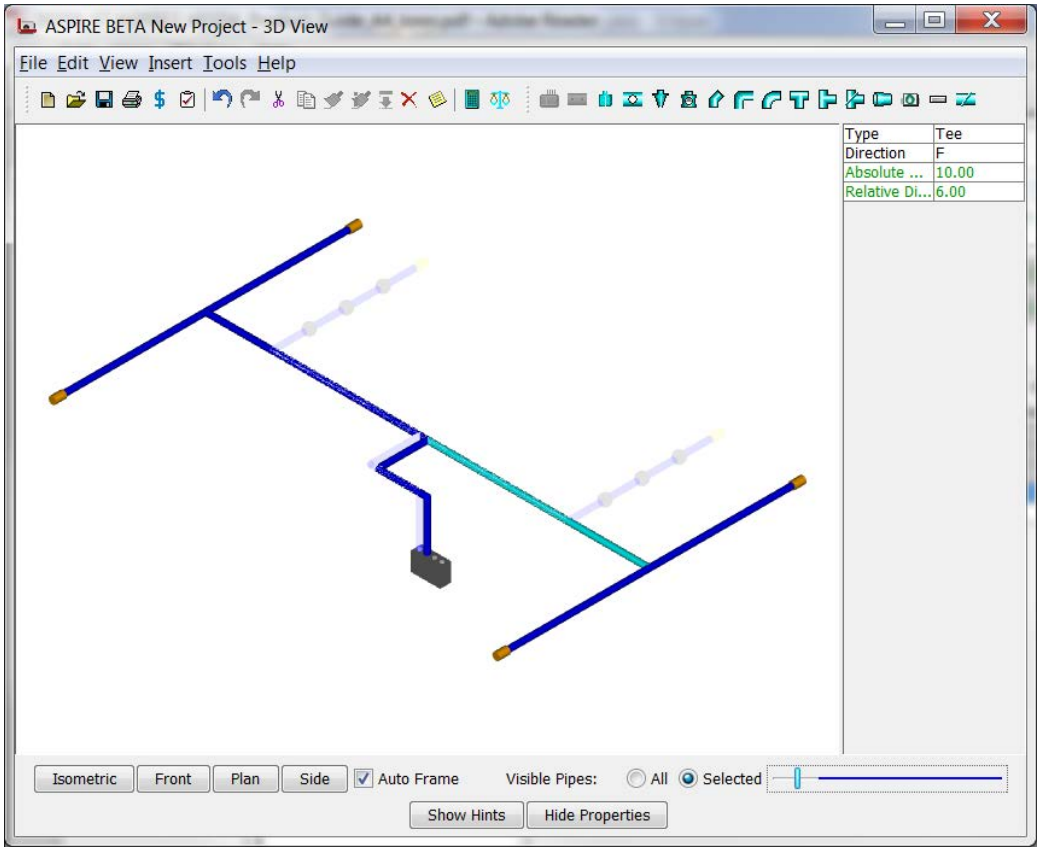


Figure 6-12: 3D View

View

The viewed network may be moved by holding down the left mouse button and dragging it to a new location.

The network may be rotated by holding down the right mouse button and moving the mouse.

The mouse scrollbar is used to zoom in and out on the pipe network view.

There are four standard orientations that can be accessed by clicking a button. They are:

- Isometic: where the viewer is behind, above and to the right of the detector.
- Front: where the viewer is behind the detector looking forward.
- Plan: where the viewer is above the detector looking down.
- Side: where the viewer is to the right of the detector looking to the left.

The Auto Frame checkbox centers the pipe network within the field of view and adjusts the zoom so that the pipe network fits within the viewed window. This checkbox is also available on the docked view.

Visible Pipes

When a detector is selected then it is shown along with all its pipes. When you select a pipe or a section or fitting within a pipe then you can choose to show or hide other pipes. If you choose to show the Selected pipe then other pipes are shown as transparent. The transparency (or opaqueness) of these other pipes is controlled by a slider. The blue bar on the slider indicates the range of transparency where other pipes may be selected by clicking on them. When the slider is below the blue bar the other pipes will appear ghosted and may not be selected.

Edit Functions

The table to the right of the 3D View shows the properties of the currently selected element so that you can edit properties without needing to leave the 3D View.

If you select a bend or tee, or the section immediately before the bend or tee, then you can change the direction using the following keyboard shortcuts where they are relevant.

- U/D Up or down
- F/B Forward or backwards
- L/R Left or right

You can remove elements by selecting them and clicking **Delete** or clicking on the delete toolbar button.

You can Copy and Paste Insert items by selecting an item and copying it to the clipboard using Ctrl-C (or the toolbar Copy button) and Paste Insert using Ctrl-I (or the toolbar Paste Insert button).

You can insert new fittings by selecting the location and clicking on the relevant fitting icon on the Palette toolbar.

Selection

The selection in the 3D view is linked to the tree so that changing the selection in the tree (or the pipe table) changes the selected items on the 3D view. Similarly changing the selection on the 3D view will update the tree and table.

Clicking on a section in the 3D view will select the item at the end of the section. For example, to select a bend you need to click on the section immediately before the bend.

Double clicking on an item will select its containing pipe section. This is defined as all items after the current item and all items before the current item until a branch (or tee) or the detector is encountered.

When the Group Details or Sampling Point Sensitivity tabs are selected on the Detector's detail pane, then selecting items on the 3D view will not update the tree but will select the sample point row in the relevant table. Double clicking on a sample point on the 3D view when the Group Details tab is visible will cause the group containing that sample point to be selected along with all the other sample points in that group. Similarly, selecting a group by clicking in the column heading of the group in the Group Details table will cause the 3D view to select all sample points in that group.

Copies of the views can be included in the IDP (Installation Data Pack) which is given to installers.

The colors used are similar to the pipe view, green is good, red requires further investigation. For further information on the color coding refer to The Colors used in ASPIRE. The 3D view also uses cyan to show the currently selected element.

6.5.5 IDP (Installation Data Pack)

Select **File | Generate IDP** to see the Installation Data Pack for your site.

Once you have finished designing your site, the IDP contains all the site specific information that the installer needs to know to correctly install your design. This information includes project level information, drawings, pipe network specifications, and all the notes you have added to your design.

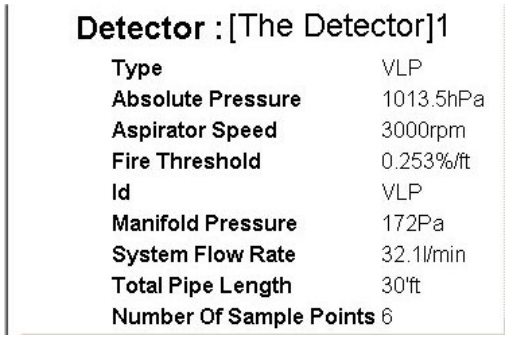
IDP Project

The first section of information is specifically related to the project. This section of the IDP includes the altitude above sea level, the date the IDP was printed, and the units of measure to be used by the project. The list of hole sizes reduced to those actually used in the design lets the installer know what drill bits are required.

IDP Detector

The second section contains information about the type and configuration of each of the detectors that will be used on the site. The detector section also contains a summary of the pipe networks that will be connected to each detector.

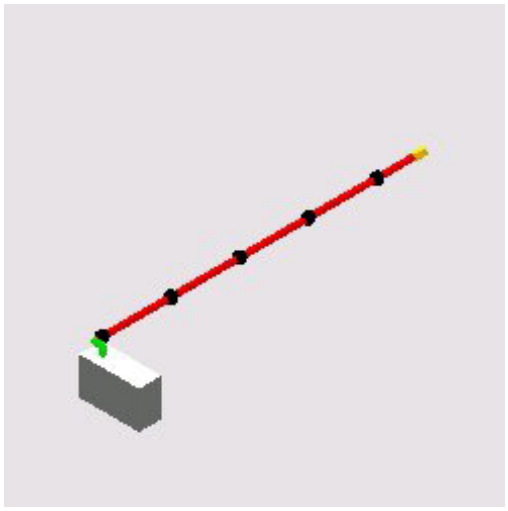
The IDP will include a table showing the multiple threshold sensitivities you have selected.



IDP 3D Diagrams

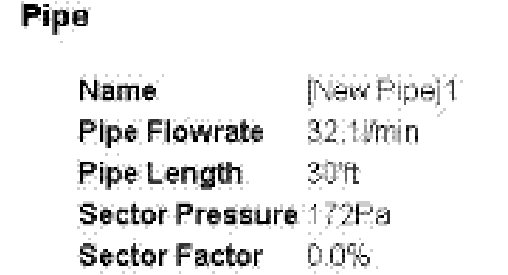
The third section contains 3D schematic diagrams for each pipe leading away from the detector. The inclusion of 3D diagrams is optional (but recommended) in the IDP.

Note: Color coding is used in these diagrams. If there are any red sections of pipe, it indicates that the current configuration will not meet your design criteria and further investigation is required before you can send the IDP to the installer.



IDP Pipe Summary

The next section of the IDP contains a summary of the parameters for each pipe. The figures listed in this section may also be used by the person commissioning the system to determine the expected air pressure in each pipe.



IDP Pipe Section

Finally, the IDP contains a section which gives the installer detailed information on the configurations required for this section of the pipe network.

Details such as the expected pressure for each hole can be used by the person commissioning the system to check that the installed pipe network matches the design created in ASPIRE.

Pipe Section

Diameter 0.875in

	Distance (m)	Rel (m)	Hole Diameter (mm)	Tube Length (m)	Transport Time (sec)	Pressure (Pa)	Flow (l/m)	Flow %	Hole Sensitivity (%/m)	Diameter (mm)	Tube Diameter (mm)
Bend	8"	8"									
Bend	1'4"	8"									
Hole	2'	8"	1/8"	0'	2	168	5.4	16.9	1.5	0.875	0.375
Hole	8'	6'	1/8"	0'	3	164	5.4	16.7	1.5	0.875	0.375
Hole	14'	6'	1/8"	0'	5	161	5.3	16.5	1.5	0.875	0.375
Hole	20'	6'	1/8"	0'	6	158	5.3	16.4	1.5	0.875	0.375
Hole	26'	6'	1/8"	0'	9	156	5.2	16.3	1.6	0.875	0.375
End Cap	30'	4'	1/8"	0'	13	154	5.5	17.2	1.5	0.875	0.375

Figure 6-13: IDP - Pipe Section Information

6.5.6 BOM (Bill of Materials)

A Bill Of Materials can be generated for a single detector or for the entire project. Select a detector or the project, then select **File | Generate BOM** to see a list of all the parts required for each detector in your project.

Bill Of Materials

The first section of this report lists all the project details.

Detector

This section of the report lists all the part numbers required to order the parts for each detector.

Project Totals

This section of the report is a summary of all the parts required for the entire project (if BOM is generated for entire project).

Commissioning Report

Select **File | Commissioning Report** or click on the **Generate Commissioning Report** toolbar button to generate the Commissioning Report.

The Commissioning Report contains all the forms used to commission the system. For details of the forms, refer to the relevant detector guides.

Bill Of Materials

Name **Warehouse**
Address 1 Station Street
Georgeville

Contact Richard tailor
Installer Luke Hoban
Date 15/07/04

Detector : [The Detector]1

	Part Id	Description	Quantity
1	E700-P	pipe per 4 metre length (Crate of 300 lengths only)	5
2	E700-PC	Pipe Clip single point fix	10
3	pipelabel	pipelabel	5
4	E700-J	T Piece	1

Project Totals

	Part Id	Description	Quantity
18	E700-P	pipe per 4 metre length (Crate of 300 lengths only)	13
19	E700-PC	Pipe Clip single point fix	26
20	pipelabel	pipelabel	13
21	E700-J	T Piece	4

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7 The Pipe Wizard

The Pipe Wizard automates the addition of new pipes to a detector. It will lead you through all of the steps required to configure a pipe. To access the pipe wizard select a detector, then select **Insert | Add Pipe**. Once you have completed the creation of a pipe, you can view the details of any pipe by selecting it in the tree view.

The Pipe Wizard knows the maximum allowable parameters for each type of detector. The Pipe Wizard will recommend that you use a more appropriate detector if you attempt to configure a pipe network which is beyond the recommended capabilities for the type of detector you have chosen.

If you must use that type of detector you should review your pipe runs on the floor plan and modify your pipe network to a better design.

7.1 The Pipe Network Choice Screen of the Pipe Wizard

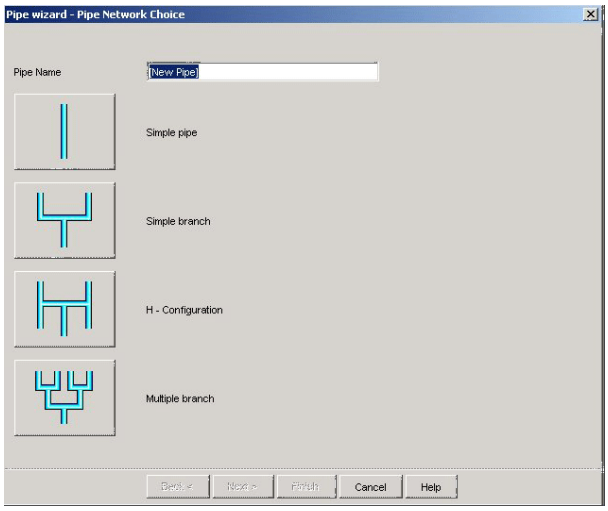


Figure 7-1: Pipe Wizard

Enter a name and select which type of pipe is to be added to the detector.

- **Simple:** Pipes that may have many bends but do not branch into more than one pipe.
- **Simple branch:** Pipes that are used to fill in a section of a room which is not covered by other pipe work.
- **H configuration:** Pipes that are recommended for small, square rooms as they have good balance and uses less pipe than equivalent single pipes.
- **Multiple Branch:** Pipes that are used in large rooms or rooms with odd shapes.

7.2 The Simple Pipe Screen of the Pipe Wizard

To access the Pipe Wizard select a detector, then select **Insert | Add Pipe**.

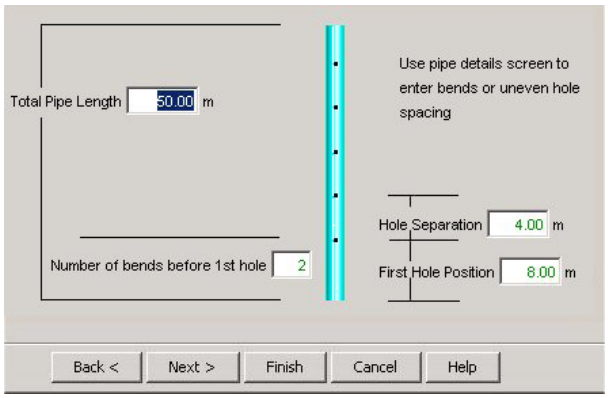


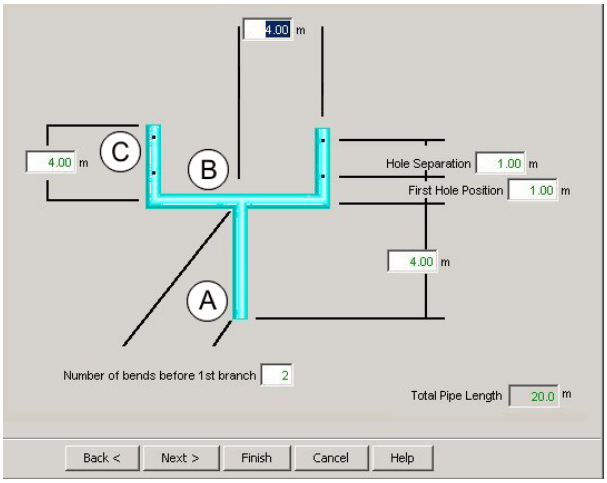
Figure 7-2: Simple Pipe Screen

The default configuration settings can be modified by **Tools | Application defaults | Simple Pipe Wizard**. These settings allow you to configure a pipe which may have bends but does not split into more than one pipe.

- **Total Pipe Length:** Enter the length of the pipe.
- **Number of bends before the first hole:** Enter the number of bends before the pipe network reaches the first sample hole.
- **First Hole Position:** Set the distance to the first sample hole in the pipe.
- **Hole Separation:** Set the distance between sample holes in the pipe. If you are using a variety of different distances between holes, enter the most common distance here and manually edit the distances when the pipe wizard has finished.
- **Number of Holes:** The number of holes that will be generated based on the values you have entered. (Calculated by ASPIRE.)
- **Number of Sample Points:** This adds the endcap hole to the list of holes. (Calculated by ASPIRE.)
- **Back <:** Returns you to the previous screen of the pipe wizard.
- **Next >:** Moves you on to the next screen in the pipe wizard.
- **Finish:** Selecting this button will cause the pipe wizard to automatically accept the default values for any options which you have not already set.

7.3 The Simple Branch Screen of the Pipe Wizard

To access the Pipe Wizard select a detector, then select **Insert | Add Pipe**.



Legend	
A	Section 1
B	Section 2
C	Section 3

Figure 7-3: Simple Branch Wizard Screen

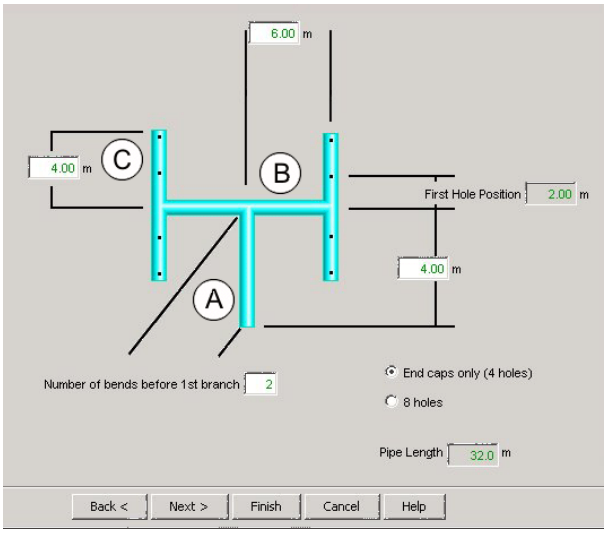
These settings can be modified by **Tools | Application defaults | Simple Branch**.

These settings allow you to configure your branched pipe produced by the wizard.

- **Number of bends before the first branch:** Enter the number of bends before the pipework will start branching.
- **First Hole Position:** Set the distance to the first sample hole in the pipe.
- **Hole Separation:** Set the distance between sample holes in the pipe.
- **Section 1 Length:** Set the length of the first piece of pipe. (A)
- **Section 2 Length:** Set the length of the second pieces of pipe. (B)
- **Section 3 Length:** Set the length of the third pieces of pipe. (C)
- **Total Pipe Length:** The length of all the parts of pipe. (Calculated by ASPIRE.)
- **Total Pipe Length:** The combined length of all sections of pipe based on the values you have entered.
- **Number of Holes:** The number of holes that will be generated based on the values you have entered. (Calculated by ASPIRE.)
- **Number of Sample Points:** This adds the endcap holes to the list of holes. (Calculated by ASPIRE.)
- **Back <:** Returns you to the previous screen of the pipe wizard.
- **Next >:** Moves you on to the next screen in the pipe wizard.
- **Finish:** Selecting this button will cause the wizard to automatically accept the default values for any options which you have not already set.

7.4 The H Configuration Screen of the Pipe Wizard

To access the Pipe Wizard select a detector, then select **Insert | Add Pipe**.



Legend	
A	Section 1
B	Section 2
C	Section 3

Figure 7-4: H Configuration Screen of the Pipe Wizard

This kind of pipe network can provide well balanced sampling for small, square rooms.

These settings can be modified by **Tools | Application defaults | H Configuration**.

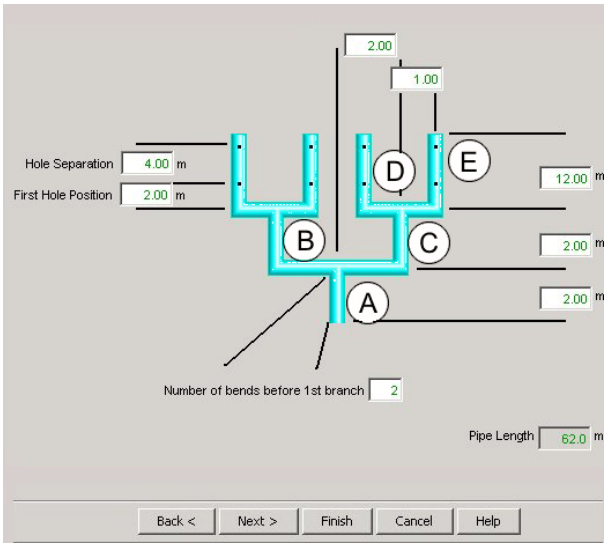
These settings allow you to configure a H branched pipe (also called a small multiple branch).

- **Number of bends before the first branch:** Enter the number of bends before the pipework will start branching.
- **First Hole Position:** Set the distance to the first sample hole in the pipe.
- **Section 1 Length:** Set the length of the first piece of pipe (A).
- **Section 2 Length:** Set the length of the second pieces of pipe (B).
- **Section 3 Length:** Set the length of the third pieces of pipe (C).
- **Endcaps only :** Have 4 sample points, one in each endcap. (Option not available when using endcaps to reduce transport time).
- **8 Holes:** This will normally consist of a hole in each Section 3 pipe, and a second sample hole in the endcap.
- **Total Pipe Length:** The combined length of all section of pipe based on the values you have entered. (Calculated by ASPIRE.)
- **Number of Holes:** The number of holes that will be generated based on the values you have entered. (Calculated by ASPIRE.)
- **Number of Sample Points:** This adds the endcap holes to the list of holes. (Calculated by ASPIRE.)
- **Back <:** Returns you to the previous screen of the pipe wizard.
- **Next >:** Moves you on to the next screen in the pipe wizard.
- **Finish:** Selecting this button will cause the pipe wizard to automatically accept the default values for any options which you have not already set.

To model a 4-hole configuration with the holes in Section C, choose the 8-hole configuration, and set the Endcap hole diameter to 0 units.

7.5 The Multiple Branch Screen of the Pipe Wizard

To access the Pipe Wizard select a detector, then select **Insert | Add Pipe**.



Legend	
A	Section 1
B	Section 2
C	Section 3
D	Section 4
E	Section 5

Figure 7-5: Multiple Branch "Moose Head" Screen

These settings can be modified by **Tools | Application defaults | Multiple Branch**. These settings allows you to configure the defaults when you add a Multiple branched pipe (refer to The Pipe Network Choice Screen of the Pipe Wizard).

These settings allow you to configure a multiple branch pipe (also called a 'moose head' pipe).

- **Number of bends before the first branch:** Enter the number of bends before the pipework will start branching.
- **First Hole Position:** Set the distance to the first sample hole in the pipe.
- **Hole Separation:** Set the distance between sample holes in the pipe.
- **Section 1 Length:** Set the length of the first piece of pipe (A).
- **Section 2 Length:** Set the length of the second pieces of pipe (B).
- **Section 3 Length:** Set the length of the third pieces of pipe (C).
- **Section 4 Length:** Set the length of the fourth pieces of pipe (D).
- **Section 5 Length:** Set the length of the fifth pieces of pipe (E).
- **Total Pipe Length:** The combined length of all sections of pipe based on the values you have entered. (Calculated by ASPIRE.)
- **Number of Holes:** The number of holes that will be generated based on the values you have entered. (Calculated by ASPIRE.)
- **Number of Sample Points:** This adds the endcap holes to the list of holes. (Calculated by ASPIRE.)
- **Back <:** Returns you to the previous screen of the pipe wizard.
- **Next >:** Moves you on to the next screen in the pipe wizard.
- **Finish:** Selecting this button will cause the pipe wizard to automatically accept the default values for any options which you have not already set.

7.6 The Pipe Properties Screen of the Pipe Wizard

If you wish to use a variety of different size hole diameters then enter the most common size in the hole diameter field and once the wizard is finished you will need to manually edit the sizes. To edit the sizes, select the section of pipe in the tree view, click on the appropriate cell in the Hole Diameter column, and edit the size by entering the value, or by choosing a diameter from the drop-down list.

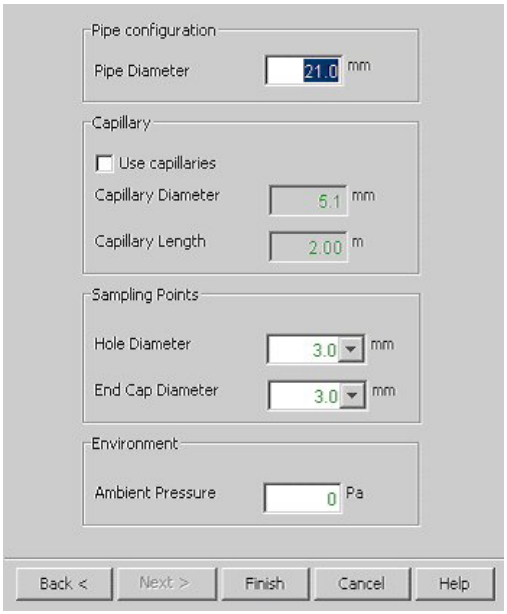


Figure 7-6: Pipe Properties Screen

Pipe Configuration

- **Pipe Diameter :** Enter the ID (Internal Diameter) of the pipe network.

Capillary

- **Use Capillaries :** Check this checkbox if you would like to use capillaries.
- **Capillary Diameter :** If you choose to use capillaries, enter the internal diameter of the capillaries.
- **Capillary Length :** If you choose to use capillaries, enter their length.

Sampling Points

- **Hole Diameter :** The standard size of holes in the pipe network. You can manually change the size of individual holes once the Pipe Wizard has finished.
- **Endcap Diameter :** The standard size of endcap holes in the pipe network. You can manually change the size of individual holes once the Pipe Wizard has finished.

Environment

Ambient air pressure is any difference in air pressure that occurs between the sample holes and the detector's exhaust outlet. If the pipe samples air from an area that has a higher or lower air pressure than the detector it will affect the flow rate, transport time and other variables in your design. Differences in air pressure can be caused by fan forced air being pumped into an area such as a computer room, cabinets that need to be air cooled, and some high security environments.

Generally, if there are no air tight doors in a building this figure should be zero (0). If air tight doors are fitted, ask the building management for access to the air conditioning specifications as it should show any differences in pressure.

In computer rooms or other mechanically ventilated areas, it is possible for individual pipes to be located in areas where the ambient atmospheric pressure is higher (+ve ambient) or lower (-ve ambient) than the pressure that the detector is exhausting to. The ambient pressure differential relevant to each pipe can be entered. It is not usual for pressure differentials to exceed 25 (Pa). At this pressure, doors become difficult either to open or to close, or loose ceiling tiles may lift. An aspirator exhaust pipe may be fitted to relieve pressure or noise and the details of the exhaust, both pipe length and diameter should be entered into the detector settings.

- **Ambient Pressure:** Enter the pressure differential between the pipe network and the detector's exhaust outlet. This will be zero unless there are air-tight areas between the pipe network and detector.
- **Back <:** Returns you to the previous screen of the Pipe Wizard.
- **Finish:** Selecting this button will cause the Pipe Wizard to automatically accept the default values for any Pipe Wizard options which you have not already set.

7.7 The Application Defaults Dialog

If you find that you are regularly creating a similar type of site from the factory defaults, you should consider creating your own set of application specific defaults to allow you to design customer sites faster and more consistently.

To create a new set of application defaults select **Tools | Application Defaults | New…**. You will be prompted to enter a name which must be unique. Then you will see the dialog that lets you specify a set of defaults. Select a tab and edit the defaults. When you have finished editing all the desired defaults on all of the desired tabs, click **Save**.

You have now created a new set of application defaults. These will now be available for all future detectors. To use them in the existing project you will need to save the project and re-open it. On the **General** tab of the Detector View, select your set of application defaults from the **Application** drop-down list and you are ready to start.

7.7.1 The Detector Tab of the Application Defaults Dialog

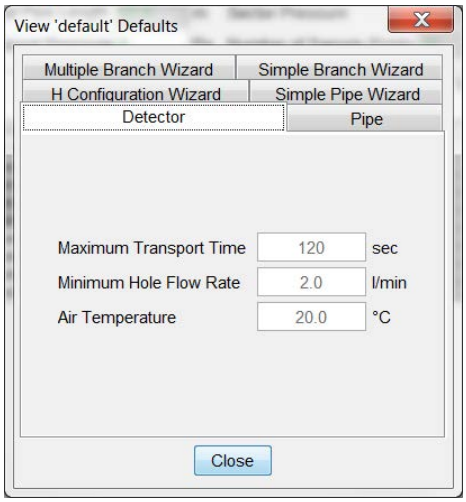


Figure 7-7: The Detector tab of the Application Defaults dialog

- **Maximum Transport Time:** The upper allowable limit of time that it can take to move a smoke sample from a sample hole to the detector.
- **Minimum Hole Flow Rate:** The lower allowable limit of airflow from the pipe network.
- **Temperature:** This is the expected average air temperature where the detector and the pipe network will operate. Temperature affects the density and viscosity of air, the hotter the air the shorter the transport time. As an example, VLP transport time for a single one hundred meter pipe run with 5.0mm hole at end:

Temperature	-20 C	+20 C	+60 C
Transport Time	86 Seconds	81 Seconds	78 Seconds

Note: For information about minimum or maximum operating environments for each detector please see the VESDA Pipe Network Design Guide or refer to the manual for that detector. Transport times are also dependent on hole sizes.

7.7.2 The Pipe Tab of the Application Default Dialog

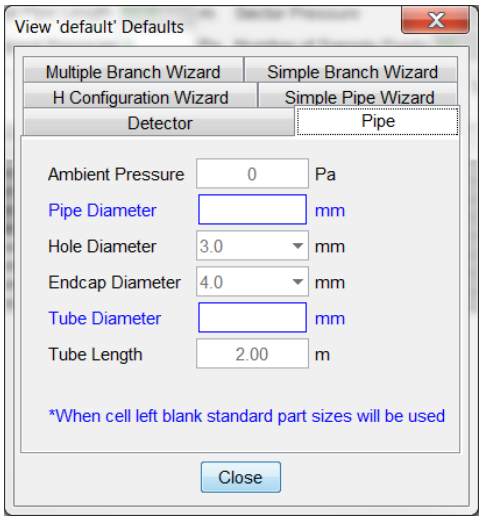


Figure 7-8: The Pipe tab of the Application Defaults dialog

When you run the Pipe Wizard you will be able to change any of the default values entered below.

- **Ambient Pressure:** The default pressure differential between the pipe network and the detector's exhaust outlet. This will be zero unless there are air-tight areas between the pipe network and detector.
- **Pipe Diameter:** The default ID (Internal Diameter) of the pipe. Leave this blank to use the diameter of the standard pipe used in the current region.
- **Hole Diameter:** The size of sample points in the pipe.
- **EndCap Diameter:** The diameter of the vent in the endcap.
- **Tube Diameter:** The diameter of capillary tubes. Leave this blank to use the diameter of the standard capillary tube used in the current region.
- **Tube Length:** The length of capillary.

These are only default sizes, you will be able to change these figures when you run the Pipe Network Wizard, and in the project pipe view.

7.7.3 The Simple Pipe Wizard Tab of the Application Defaults Dialog

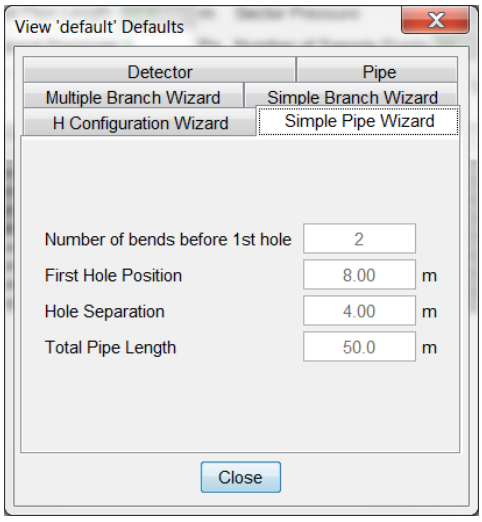


Figure 7-9: The Simple Pipe Wizard tab of the Application Defaults Dialog

This dialog lets you configure the default settings for the simple pipe wizard. For further details refer to The Simple Pipe Screen of the Pipe Wizard.

- **Number of bends before the first hole:** The default number of bends before the first hole in the pipe.
- **First Hole Position:** The distance of the first hole from the start of the pipe network.
- **Hole Separation:** The default distance between holes.
- **Total Pipe Length:** The default distance for unbranched pipes.

7.7.4 The Simple Branch Wizard Tab of the Application Defaults Dialog

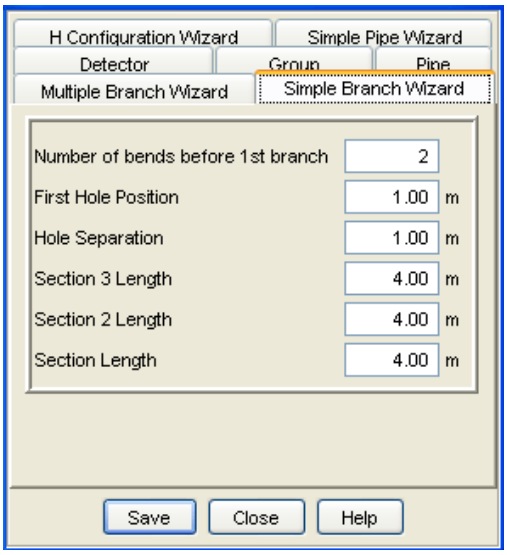


Figure 7-10: The Simple Branch tab of the Application Defaults Dialog

This dialog lets you configure the default settings for the simple branched pipe wizard. For further details refer to The Simple Branch Screen of the Pipe Wizard.

- **Number of bends before the first branch :** The default number of bends before the first branch in the pipe.
- **First Hole Position :** The distance of the first hole from the start of the pipe network.
- **Hole Separation :** The default distance between holes.
- **Section 3 Length :** The length of the third section of pipe.
- **Section 2 Length :** The length of the second section of pipe.
- **Section Length :** The length of the first section of pipe.

7.7.5 The H Configuration Wizard Tab of the Application Defaults Dialog

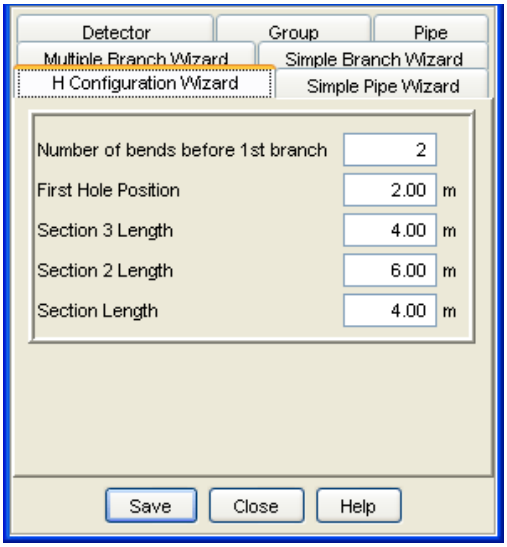


Figure 7-11: The H Configuration tab of the Application Defaults Dialog

This dialog lets you configure the default settings for the H configuration pipe wizard. For further details refer to The H Configuration Screen of the Pipe Wizard.

- **Number of bends before the first branch:** The default number of bends before the first branch in the pipe.
- **First Hole Position:** The distance of the first hole from the start of the pipe network.
- **Section 3 Length:** The length of the third sections of pipe.
- **Section 2 Length:** The length of the second sections of pipe.
- **Section Length:** The length of the first section of pipe.

7.7.6 The Multiple Branch Wizard Tab of the Application Default Dialog

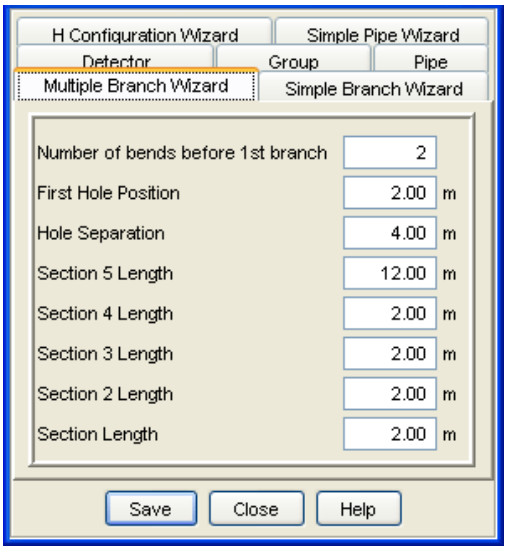


Figure 7-12: The Multiple Branch Configuration tab of the Application Defaults

This dialog lets you configure the default settings for the Multiple Branched pipe wizard. For further details refer to The Multiple Branch Screen of the Pipe Wizard.

- **Number of bends before the first branch:** The default number of bends before the first branch in the pipe
- **First Hole Position:** The distance of the first hole from the start of the pipe network.
- **Hole Separation:** The default distance between holes.
- **Section 5 Length:** The length of the fifth sections of pipe.
- **Section 4 Length:** The length of the forth sections of pipe.
- **Section 3 Length:** The length of the third sections of pipe.
- **Section 2 Length:** The length of the second sections of pipe.
- **Section Length:** The length of the first section of pipe.

7.7.7 The Group Types Dialog

To access this tab, select **Tools | Group Types**.

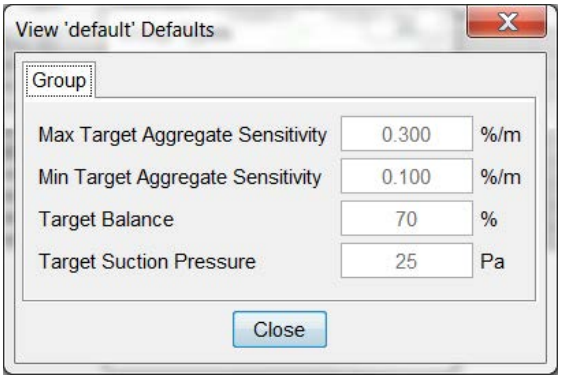


Figure 7-13: The Group Types dialog

The use of groups is an advanced design topic that should only be used if you have received Xtralis-accredited training.

- **Max Target Aggregate Sensitivity:** The upper limit of smoke detection for the group of holes.
- **Min Target Aggregate Sensitivity:** The lower limit of smoke detection for the group of holes.
- **Max Target Balance:** The lower limit of acceptable sample hole balance.
- **Target Suction Pressure:** The lowest level of acceptable suction pressure for any sample point in the group.

7.7.8 The Preferences Dialog

To access this dialog, select **Tools | Preferences**.

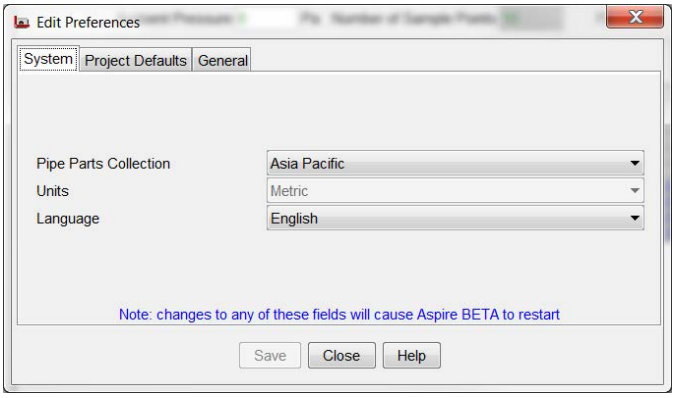


Figure 7-14: Systems Defaults

7.7.9 The System Tab of the Preferences Dialog

Changing any of the settings on this tab will require ASPIRE to be restarted to take effect

This tab allows you to configure:

Pipe Parts Collection (or region)

- Asia Pacific
- Europe
- American

Units

This setting allows you to toggle the interface between Imperial (US) and Metric length and temperature units when using the American region.

Language

You can select the language with which you would like to operate ASPIRE.

7.7.10 The Project Defaults Tab of the Preferences Dialog

This tab allows you to set defaults for future projects.

Enforced Limit

This setting allows you to apply limits from EN 54-20 or UL or use your own limits.

- **Custom:** All limits are to be set by you.
- **EN54-20:** This specifies by hole sensitivity and transport time limits.
- **UL:** Specifies hole sensitivity limits.

Altitude: Specifies the default altitude for future projects.

Hole Sizes: Specifies the default hole sizes for the current units.

Installer: Default name for the installer.

Calculated By: Person carrying out the calculation; usually the designer.

These settings will be applied to all future projects.

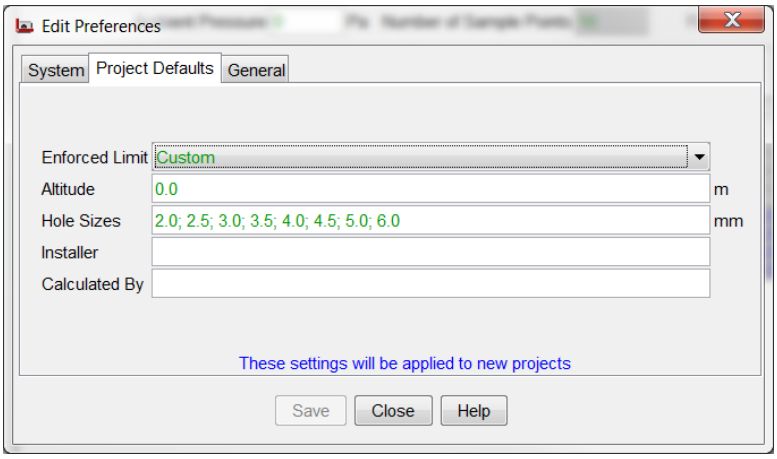


Figure 7-15: The Project Defaults Tab

7.7.11 The General Tab of the Preferences Dialog

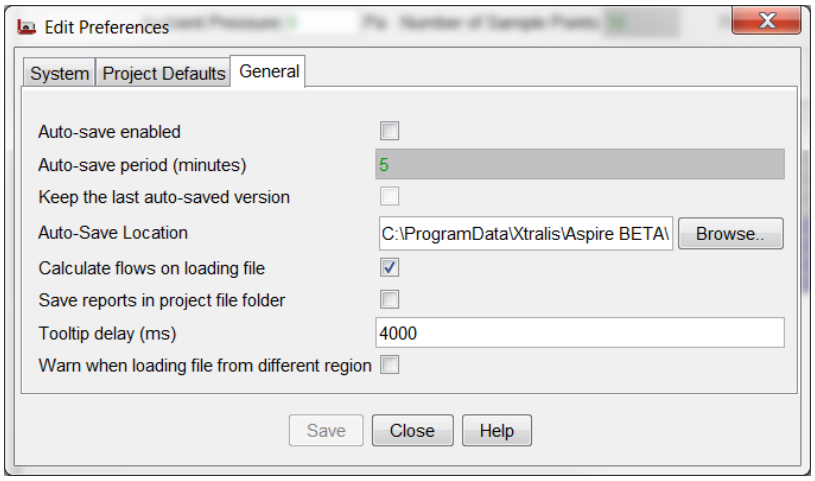


Figure 7-16: Edit Preferences Dialog

This tab contains settings that allow you to customize the ASPIRE user interface.

Auto-save

Auto-save will periodically save your design to the file *aspireAutoSave.asp* so that if ASPIRE crashes you can still retrieve your design work. The design is only saved if it has changed since the last user save.

The following fields control the Auto-save behavior:

- **Auto-save enabled:** Enables/Disables the auto-save function.
- **Auto-save period (minutes):** The interval (in minutes) between auto-save events.
- **Keep the last auto-saved version:** When checked it will force ASPIRE to create a new backup file every time that ASPIRE starts. This avoids ASPIRE clobbering the auto-save file if you restart it straight after a crash but it may also build up a large number of files in your program data area.
- **Auto-Save Location:** The location where the files are saved.

General Settings

Calculate flows on loading file: When a file is loaded flow calculations will be performed for all detectors if this option is checked. This option is enabled by default.

Save reports in project file folder: By default all reports are written as HTML files to the ProgramData folder *C:\ProgramData\Xtralis\Aspire*. When this option is checked HTML files will be written to the same folder as the ASPIRE file and given the same name with a suffix to indicate the type of report. For example, if we were to generate an IDP report for the ASPIRE file *HeadOffice.aspire*, the generated report would be *HeadOffice_IDP.aspire*.

Note: The ProgramData folder is hidden by default on Windows 7. To view and access it go to *Control Panel > Appearance and Personalization > Folder Options > Show hidden files* and folders and click on the radio button *Show hidden files, folders, and drives*.

Tooltip delay (ms): The time that tooltip messages will stay on the screen. This can be extended out to 10000 (ie 10 seconds). The default is 4000ms.

General warnings

When deleting detectors, pipes and doing several other actions you are now given the option to disable the standard warning. If you do that then you will see an entry here that will let you re-enable that warning should you wish to do so.

8 Configuring Your Applications and Defaults

The factory default settings used when you first start the software are designed to meet Xtralis standards. These standards are typically more demanding than many local codes and standards. You will need to check and configure the default values to suit the local codes and standards before designing the customer site.

You will also want to configure the default settings to suit your installer and application requirements. Once these are configured you can be confident that the software will accurately accept designs which meet the specific requirements of your customer site.

Changing the Defaults to Comply with Local Codes and Standards

The default criteria of ASPIRE may not meet the parameters required by your local fire codes and standards. Before you start building pipe network designs for customers you **must** check that the settings will be suitable for the customer environment. Failure to do so may result in ASPIRE 'approving' a design, and producing a bill of materials, which fails to meet local codes and standards.

Refer to The Detector Tab of the Application Defaults Dialog for instructions on how to change the default criteria.

Changing the Defaults to suit your Installer

If your installation crews are limited to using drill pieces of certain sizes then edit the defaults so that ASPIRE will only offer you solutions which comply with these restrictions. Refer to The Preferences Dialog for instructions on how to change the default project settings.

Creating Custom Applications

If you are regularly designing a particular type of building, say a warehouse, you may wish to set up your own set of defaults to suit this environment. To configure a set of application specific defaults, refer to The Application Defaults Dialog.

Copying or Distributing Defaults

Once you have created a set of defaults for a specific environment you can save and send them to other people, to ensure that everyone in your organization is using the same set of defaults.

To distribute your set of defaults, copy the default file you have created in the following directory and distribute it as required.

- C:\ProgramData\Xtralis\Aspire\ApplicationSettings
- C:\ProgramData\Xtralis\Aspire\ApplicationSettings

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9 Example: How to Use ASPIRE

The following section shows an example of setting up and troubleshooting a detector and pipes to obtain an acceptable configuration, and to achieve EN54-20 classification. The example used here is of a VESDA VLP detector with two straight pipes of 50m long, and two straight pipes of 40m long.

The 3D view for the detector with four pipes (below) shows the 3D view of the detector and pipes after clicking the **Calculate** button. The pipes sections are colored green where the values are acceptable, and red where they are unacceptable. The General tab shows that the manifold pressure is too low, and the group details tab shows that the balance is unacceptable.

The aspirator speed was increased to 3600 rpm, and the **Autobalance** button clicked. After Autobalancing, the hole sensitivities are colored green (Figure 9-2), indicating that the values are acceptable.

The Sampling Point Sensitivity tab shows that to achieve EN54-20 Class C, a detector threshold of 0.213 is needed. This value is less sensitive than the current value of 0.200, so the detector is compliant.

When the display threshold checkbox is checked for Action Threshold (Class B), the maximum transport time is reduced to 90 seconds (refer to Achieving EN 54-20 Compliance), and the values for the pipe sections are red (The red figures indicate that the detector has achieved EN54-20 Class C but not Class B). The EN 54-20 Class Achieved box shows that Class C has been achieved.

The **Apply** button was clicked and confirmed, and the **Calculate** button was clicked. The numbers change to green, and there are no red crosses on tree view (After the Detector Threshold needed (to achieve target sensitivity) is applied, the detector has achieved EN54-20 Classes B and C). The detector now complies with EN54-20 Classes B and C.

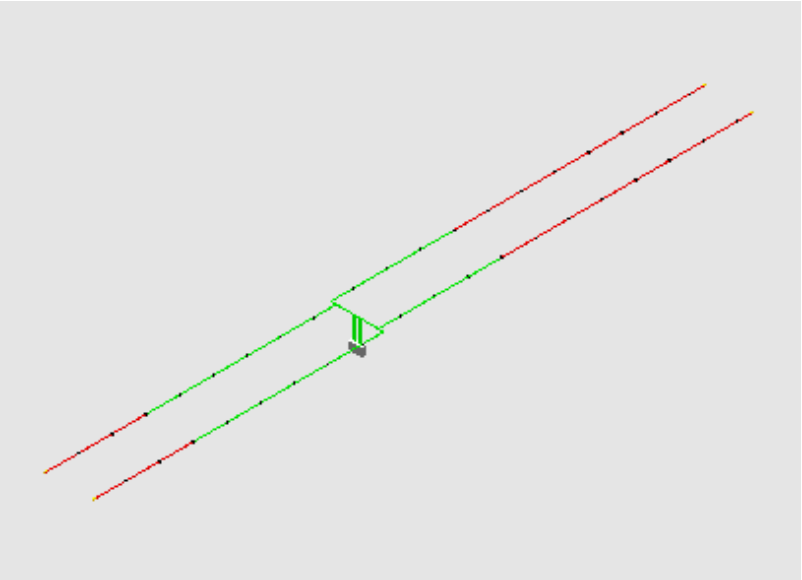

Figure 9-1: The 3D view for the detector with four pipes

Note: Pipe sections shown in red are unacceptable.

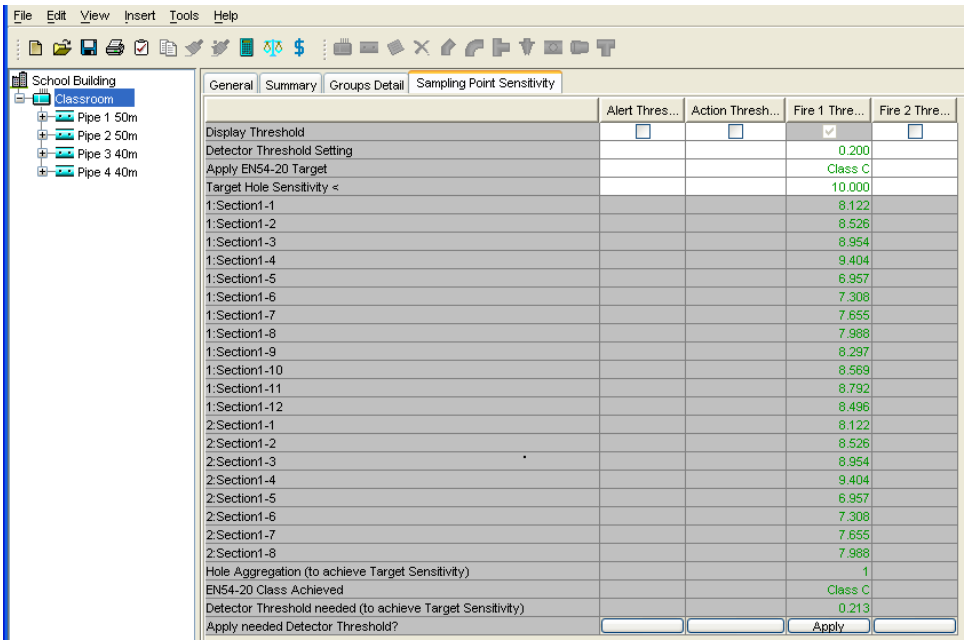

Figure 9-2: The Sampling Point Sensitivity tab shows that the detector has achieved EN54-20 Class C classification

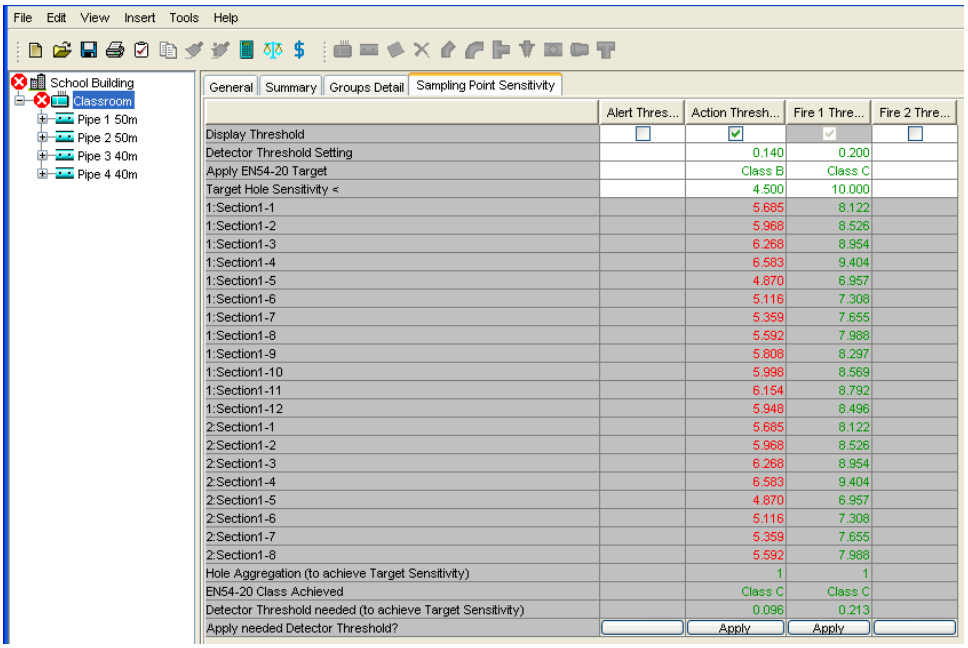

Figure 9-3: The red figures indicate that the detector has achieved EN54-20 Class C but not Class B

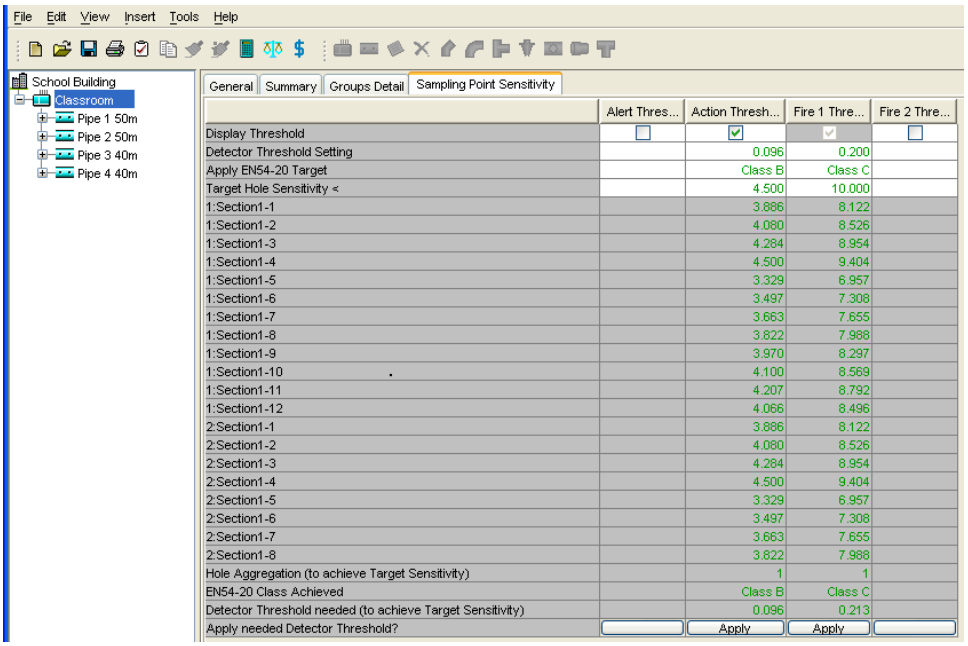

Figure 9-4: After the Detector Threshold needed (to achieve target sensitivity) is applied, the detector has achieved EN54-20 Classes B and C

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10 FAQs

10.1 Pipe Layout

Question: I made a mistake while inputting data into the pipe wizard, how can I correct the design?

Answer: Click on the pipe you have created in the tree view (or 3D view) and edit it manually.

Question: Can an end cap be a capillary drop?

Answer: You can get the same effect by, simply placing a capillary just before the end-cap and then changing the end cap to a 'closed' end cap.

Question: What do I do when the "total pipe length" is red?

Answer: If the "total pipe length" is red in ASPIRE, this means that:

This pipe is longer than Xtralis recommends for this detector based on detailed testing of the detector aspirator.

Some recommended actions to resolve this are:

- Upgrade to a higher performing detector
- Split the pipe into two shorter pipes.
- If you are already using a VEU detector, consider redesigning the system to use additional detectors
- Check the area coverage is within the regulatory limits.

ASPIRE allows you to create designs that exceed Xtralis recommended limits for the VEU, VEP, VLP or VLS detectors. In this case, you must verify that the performance of the pipe network is within acceptable customer and regulatory requirements.

Question: Is it possible for a pipe not to have an end cap in an ASPIRE MODEL?

Answer: There must always be an end cap, but you can represent a closed pipe by using a closed end-cap (with a hole size of 0 mm).

You should never use an end-cap with a very large hole size because then your system will not be able to pick up a break in the pipe network.

Question: Can I model return pipes with ASPIRE?

Answer: ASPIRE now models the pressure drop across the return pipes. You need to enter the total length and diameter of your return pipe on the detector's General tab as the Exhaust length and Exhaust diameter.

Question: In the pipe view, how can I change a hole to a capillary?

Answer: Select the relevant pipe section in the tree, double click on the 'Hole' cell, from the Type column and change it to a capillary.

Question: I can't change pipe assignments without first deleting them. What should I do?

Answer: Presumably the changes that you refer to are adding and removing joins and bends in a pipe. It is possible to both insert new bends, Tees etc and also to remove them as described below.

To insert the bends, Tees or other items:

- Select the pipe segment in the tree.
- Select the insert position (on the table) then click on the item in the palette toolbar. ASPIRE will insert the item mid-way between the selected item and the previous item.
- Check the item distances are correct for the new item and the following item.

To delete an item:

- Select the pipe segment in the tree.
- Select the item to delete in the table.
- Select the Delete toolbar button (the red cross) to delete. The distance of the deleted item would be added to the distance of the next item.
- Check that the item distance for the following item is correct.

Question: How can we change the order of a pipe?

Answer: You can change the order of pipes within a detector using drag and drop on the tree. The drag and drop allows items to be reordered under their parent item but does not allow items to be moved to another parent.

Question: Is it possible to copy pipes and/or detectors within ASPIRE?

Answer: You can copy and paste pipes, as long as the detector has not reached its pipe limit. You can copy /paste pipes and detectors between different instances of ASPIRE as long as both instances are using the same region and units settings.

If you hold the control (Ctrl) key down while dragging the detector it will duplicate the detector where you do the drop.

You can also duplicate a detector by selecting it, copying it to the clipboard (using the copy toolbar button or using Edit->Copy menu or Ctrl-C keyboard shortcut). Then select the project on the tree and paste the detector into the project (by clicking the Paste Insert toolbar button or using Edit->Paste Insert menu or Ctrl-I keyboard shortcut).

You can copy a pipe similarly to the detector by doing drag and drop with the control (Ctrl) key down.

You can also copy a pipe by selecting it, copying it to the clipboard. Then select the destination detector and paste insert. The paste insert function will be disabled when the detector's pipe limit has been reached.

Question: How could I copy one pipe over another?

Answer: Select the original pipe then click on the copy icon. Select the destination pipe then click the paste button. ASPIRE will replace the destination pipe with that from the clipboard when you click OK to proceed.

Question: How do I delete a pipe section or Tees and Branches?

Answer: To delete a pipe section, select it on the tree and then use the Edit > Delete menu. You can also right mouse click and select **Delete** from the context menu. ASPIRE will then delete the pipe section and replace the branch at the head of the section with a bend or elbow.

You can delete a branch or Tee if the secondary inlet only contains one sample point. If the inlet contains more sample points then you will first need to delete one of the pipe sections which will replace the branch with an elbow as described above. You can then delete this elbow by selecting the pipe section in the tree, selecting the elbow in the table and using the Delete toolbar button (the red cross).

Question: A field in the pipe wizard is dedicated to ambient pressure. How do I make sure I enter in the right value for the application?

Answer: If there are no airtight doors in the pipe or detector areas set this value to zero (0). If there is fan forced air or air doors fitted check with building management for the air pressure specified in the air conditioning floor plans.

Question: How do I change units to imperial, the field is greyed out?

Answer: Only when Pipe type = American do you have the option to change between Imperial and Metric units. Bring up the Preferences window using the Tools > Preferences menu and change the Units field to US. Save and restart ASPIRE.

Question: I would like to view all possible hole size choices how can I do this?

Answer: Click on the Project at the root of the tree and the hole sizes are listed in the details pane.

Question: How do I choose my local pipe?

Answer: Contact your local Xtralis office or check your local codes and standards.

10.2 3D View

Question: How do I invert my detector so that it shows up correctly on the 3D view?

Answer: To invert the detector you need to select it on the tree and then on the General tab on the right pane you will find an Inverted Detector checkbox below the group of properties on the right of the tab. Use this to define the detector orientation.

Question: What can I do if I get the message 'System does NOT support 3D graphics'?

Answer: ASPIRE uses JavaFX for its 3D graphics. The hardware requirements are specified http://docs.oracle.com/javafx/2/system_requirements_2-2/jfxpub-system_requirements_2-2.htm

To use the 3D view you need to run on a computer that has this capability.

Question: How could I see what I have just created?

Answer: ASPIRE provides live 3D view updates of detectors so you need to select a detector or an element of a detector for the 3D view to know which detector to show you.

10.3 Flow Calculations

10.3.1 Balance

Question: Why is it important to have a balanced pipe network and how is this achieved?

Answer: A balanced system is one where there is similar flow through each sampling hole so that the entire protected region is being monitored uniformly. We want to avoid networks which have dead regions that are poorly monitored and we also want to avoid false detections by regions with are overly sensitive to smoke. In ASPIRE, the default flow balance is 70% (and this can be adjusted). This means that every sampling hole has at least 70% as much flow as the best sampling hole.

So how do we achieve similar flows through each sampling hole. A simple starting approach may be to make all the holes the same size. However the flow rate through each hole reduces with distance of the hole from the detector. To help achieve a balanced system, try increasing the sampling hole size as the holes get further away from the detector. The Auto-balance tool will help locate a possible combination of hole sizes that meets your balance constraint. If no such solution occurs then you may need to use shorter branched pipes.

Question: Is perfect pipe network balance really necessary since the regulations only stipulate transport time?

Answer: Transport time is certainly important but if a network is not well balanced then it means that there are 'dead' regions that are not being fully monitored and possibly regions that are overly sensitive that may cause false detections. So both balance and transport time are important. You must ensure that the transport time requirement is met and complies with the regulations and also verify that there is a reasonable overall system balance.

Question: Can I change the acceptable thresholds for % balance?

Answer: Balance should be at least 70%. However, you can set your own acceptance level. To alter your defaults see **Tools > Application Defaults > Group > Target balance**.

Question: Can I accept a pipe network design when some of the parameters are shown as red even after optimising the ASPIRE design?

Answer: ASPIRE estimates the pipe network performance. Where parameters will ensure the most reliable performance these are shown in green. Parameters appearing in red indicate that the network falls outside of the recommended range. However, you may still accept a design with red settings if the pipe network design meets your installation and regulatory requirements. Contact your local Xtralis office should you require further assistance.

Question: What causes AutoBalance to fail?

Answer: AutoBalance searches for a solution to your pipe design that has acceptable transport times to all the holes, achieves reasonable flow rates and pressures at each hole and is balanced.

If the network is inherently unbalanced such as one that combines long and short pipes then it may be impossible to satisfy all the constraints and so the only way then to meet approved standards would be to even out the pipe network so that all the pipes are of similar length.

With long pipes it is difficult to meet the required transport times for the holes at the ends of the pipe. The options are generally to increase the fan speed or reduce the pipe length by relocating the detector.

ASPIRE may find a potential solution but still show some hole sensitivity values in red. This indicates that the detector threshold (which drives the Aggregate Sensitivity) is not achievable for these holes. In this case review the threshold levels and consider reducing them.

Question: I don't like the changes that AutoBalance has made to my pipe network and wish to undo them and go back to what I had before I ran AutoBalance. How do I do this?

Answer: The AutoBalance changes can be reversed using **Edit > Undo**.

10.3.2 Calculation Parameters

Question: What is an acceptable transport time?

Answer: Most local codes and standards specify that the transport time cannot be longer than 90 seconds. (Check your local codes for details). Xtralis recommends that the transport time should be around 60 seconds. Remember that there can be additional delays once a fire panel is notified before an alarm is sounded so it is important to keep the detector delay to a minimum.

Question: What can I do if the detector flow rate is too low?

Answer: You can either try to adjust the pipe network to match the detector or match the detector to better match the network.

Where possible try using more pipes of shorter length. Alternatively, try using larger holes, but be aware that this will tend to unbalance your system.

You can enhance the detector by increasing the aspirator speed (applicable only to detectors with adjustable aspirator speed). If that is still insufficient then select a higher performing detector.

Question: What does it mean when the sample hole sensitivity is displayed in red?

Answer: The hole sensitivity is an indication of how high the smoke concentration must be at the hole in order to cause the detector to alarm. When the sample hole sensitivity is shown in red it indicates that the smoke coming through that hole will be diluted too much by other air flows to trigger the detector.

To resolve this issue the Fire threshold setting can be reduced or the Target Hole Sensitivity setting on the Group tab of the Application Defaults can be adjusted.

Question: Why is the hole sensitivity shown as red above 6.092 %obs/ft or 20 %obs/m?

Answer: The maximum target aggregate sensitivity allowed in ASPIRE is 6.092 % obs/ft or 20 % obs/m. This is the least sensitive that a point detector is allowed to be by any regulatory body. Given that sampling points are often discussed as replacements for point detectors, this constraint ensures compliance. If it is necessary for the designer to install a system that does not meet the criteria, the designer must verify that the performance of the pipe network is within acceptable customer and regulatory requirements.

Question: How do I find out what variables mean?

Answer: Most of the variable fields have a tool tip that explains their meaning.

Question: Can I export the calculated data in pipe table data to Excel?

Answer: ASPIRE supports exporting data from any table to Excel. To do this select a row or cell in the table and just press Ctrl-Shift-C (or **Edit > Copy All**) to copy the entire table to the clipboard. Then paste it in Excel.

This will also include hidden columns or rows.

10.4 IDP

Question: I only want to print the pipe data. How do I do it?

Answer: You can select the preferred pipe then select the print IDP function to print the information related to the selected pipe. If the detector is a Scanner then Scan mode data for the pipe will also be printed.

Question: How can I store a reference to the original drawings for my network?

Answer: Use the Notes field on the Project or Detector in the tree.

10.5 Installation

Question: With which operating systems is ASPIRE compatible?

Answer: Microsoft Windows 7 and 10.

Question: Do I need Administrator rights to use ASPIRE software on my PC?

Answer: You only need Administrator rights to install ASPIRE. For older builds (before build 3950) you will also need it to register the software. Once you have done this you can use ASPIRE without being logged in as an Administrator

10.6 Support

Question: Where can I obtain part numbers?

Answer: Contact your local distributor or Xtralis office to request the price list or sales brochure for your product model number.

Question: Are there any specific training courses for maintenance and troubleshooting?

Answer: All Xtralis fire systems should be installed, configured, commissioned and maintained by an Xtralis accredited person.

Question: How do I test the Xtralis fire system after installation?

Answer: Only Xtralis accredited personnel are permitted to install, configure, commission and maintain Xtralis products. The Maintenance section of the System Design Manual contains performance tests for this purpose. Local regulations should be checked for commissioning requirements. Customers may also have predefined requirements. All results should be recorded and signed off by commissioning staff, the end user and a local fire approval inspector. These results should also be kept on record.

Question: Where do I obtain the ASPIRE Product Guide?

Answer: ASPIRE contains a complete online help file.

Question: Where do I obtain ASPIRE?

Answer: It is free for download from www.xtralis.com.

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