StackCalc

Help and Operating Instructions

Overview

The programme is designed to allow the user to input Discharge Units for individual stacks and branches.
The user can add as many floors as necessary to the stack and the programme will automatically
keep a running total of the Discharge units. The resulting Discharge Units total can be input into the
Drain flows tab to give a connecting foul drain size. The Discharge Unit values are based on industry
standard figures for sanitaryware as described in BSEN 12056.

The user can add as many stacks as necessary for any building by the use of a macro, which generates
a summary of each stack on the stack summary sheet.
If a user needs to reduce the number of floors on a stack, floors can be removed using a further macro.

By using the 'branch flows' tab the user can calculate the appropriate sizes of any branches that do not fall
within the standard rules set out in BSEN 12056.

The programme is set up for a UK branch system, however other versions of this programme
can be provided by Plumbcalc for use in other European countries.

By using the 'testing tab' the user can establish the number and type of fixtures that need to be operated
simultaneously to conform with the British Standard testing requirements for any stack.

By using the 'Drain flows' tab the user can calculate the appropriate size of the branch drain that connects
the stack to the first manhole on the external drainage system. Where the building has multiple stacks the
programme automatically updates the drain flow data as each stack is created.

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Worksheet tabs

The programme contains a number of worksheet tabs, these are named 'Help', 'Cover sheet' and 'Stack No' Branch System 3, Testing and Branch flows.

'Help' tab - 'Help' tab contains the Help and Operating instructions for the programme.

'Cover Sheet' tab - The 'Cover Sheet' tab contains the cover sheet template for the programme print out.

'Stack summary' tab - The 'Stack summary' sheet contains the stack summary data. Once a stack has been created a macro is used to transfer the relevant data to the summary sheet. The stack summary sheet can contain as many stacks as necessary for any size of building.

'Stack No.' tab - The 'Stack No.' sheet tab contains the stack part of the programme. This is the stack is created and the attached fixtures are added at each level of the stack. As many stacks as needed can be created in this part of the programme.

'Branch System 3' tab - The 'Branch System 3' sheet tab should be used for UK sanitary branch This part of the programme allows the user to establish the branch size for all the types of fixture that are likely to be connected to the branch. Where a branch falls outside all the normal parameters the 'Branch flows' tab can be used to design a self cleansing branch with a suitable pipe size.

'Testing' tab - The 'Testing' sheet tab should be used to establish how many appliances of type should be operated simultaneously to test the stack that has been designed using the 'Stack_No' tab.

'Branch flows' tab - The 'Branch flows' tab should be used to check the required branch material, gradient, size etc.

'Drain flows' tab - The 'Drain flows' tab should be used to check the required drain material, gradient, size etc. connecting the base of the stack to the first manhole. The programme can also be used to size a horizontal branch drain located in a basement or a service duct.

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Inputting data   **Only place data in boxes marked in green**

Cover sheet tab -   This sheet can be used as a template for a project report.

Stack No. tab -   This sheet should be filled by the user as described below.

Project -   The user should input the name of the project in the box adjacent to the
'Project' indicator.

Location -   The user should input the location of the stack in the box adjacent to the
'Location' indicator.

Building type -   The user should select the 'Building Type' from the drop down list.

Usage of appliances -   The programme automatically indicates the usage of appliances.

K Factor -   The programme automatically indicates the 'K' factor.

Stack type -   The user should select the 'Stack Type' from the drop down list. The two
are 'standard' and 'stub' stacks. 'Standard' stacks are multi-level stacks and 'stub' stacks serve only a single
floor.

Ventilation type -   The user should select the 'Ventilation Type' from the drop down list. The
user should select 'primary' if a single soil and ventilation pipe is proposed. The user should select
'secondary' if a combination of soil stack and separate ventilation stack is proposed.

System Type -   The programme is set up to use 'system type 3', which is the system used in
UK.

Branch entry type -   The user should select the entry type from the drop down list. Sharp entry
should be used for boss connected branches. Swept entry type should be used where a branch to stack
fitting is used.

Minimum stack size -   The programme will automatically generate the minimum stack size. Where
more WC's is connected to the stack the minimum stack diameter permitted is 100mm.

Secondary vent size -   The programme will automatically generate the secondary vent size. Where no
secondary ventilation is proposed the secondary vent size will be shown as 'N/A' - not applicable.

Minimum AAV size -   The programme will automatically generate the minimum automtatic air vent
Where secondary ventilation is proposed the AAV size will be shown as 'N/A'.

Notes -   The programme will automatically generate notes where they are applicable.

Stack No. -   The user should input the stack number in the box below the column heading
marked 'Stack No.'

Level No. -   The user should input the level number in the box below the column heading
marked 'Level No'.

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Fixture - The list of fixtures is provided by the programme and includes all the fixtures normally found in the UK.

Number - The user should input the number of fixtures connected to the stack on the relevant floor level.

Discharge Unit Input - The discharge unit figure for each fixture is given by the programme and the values are industry standard figures.

Total Discharge Units - The total discharge units for each type of fixture is given by the programme and the total number of discharge units for each floor level is provided by the programme.
The grand total of discharge units for the whole stack is automatically provided by the programme.

Creating an additional level

To create an additional floor level press "Control+C" this activates a macro which will add a new set of fixtures below the existing set. To add a further level press "Control+C" again. **Always create additional floor levels before creating additional stacks. The user can only create additional floor levels on the stack that was the last to be created.**

Removing a level

To remove a floor level press "Control+D" this activates a macro which will remove the last level. To remove a further floor level press "Control+D" again. The programme will not permit the removal of the first level

Creating an additional stack

Once a stack has been created using the 'Stack_No' tab it can be transferred to the 'Stack_summary' tab. To transfer the stack data to the summary sheet the user should press "Control+S" this activates a macro which will copy the necessary data to the summary sheet. Once the data has been copied to the summary sheet a new stack can be created in the 'Stack_No' tab. These actions can be repeated as many times as necessary to create as many stacks as are required for the building.

Removing a stack

To remove a stack press "Control+R" this activates a macro which will remove the last Stack from the 'Stack_summary' worksheet. Further stacks can be removed by pressing "Control+R" again. The programme will allow the user to remove all the stacks from the 'Stack_summary' worksheet but will not permit the user to remove any headings from the 'Stack_summary' worksheet.

Branch System 3 - tab The user should fill the data in this tab as described below.

Project - The user should input the name of the project in the box adjacent to the 'Project' indicator.

Location - The user should input the location of the stack in the box adjacent to the 'Location' indicator.

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Building type -　　　　The user should select the 'Building Type' from the drop down list.

Usage of appliances -　　The programme automatically indicates the usage of appliances.

K Factor -　　　　　　The programme automatically indicates the 'K' factor.

Branch type -　　　　The branch type shall be selected from the drop down list and shall be either 'ventilated' or 'unventilated'.

Appliance being served - The appliance type shall be selected from the drop down list. The range of appliance types offered will depend on whether the branch type selected is ventilated or unventilated. The user can select from a number of basins and bidets and the type selected will depend on the branch conditions proposed. The user should select the appliance number that matches the branch conditions proposed. The branch conditions are stated in the details that follow and the notes.

Appliance trap depth -　The programme automatically indicates the minimum appliance trap depth user has selected the appliance type.

Branch diameter -　　The programme automatically indicates the minimum branch diameter once has selected the appliance type.

Minimum AAV size -　The programme automatically indicates the minimum automatic air vent size the user has selected the appliance type. The programme will show 'N/A' (not applicable) if an unventilated branch type is selected.

Maximum branch length The programme automatically indicates the maximum branch length. This vary depending upon the type of appliance selected and whether the branch is ventilated or unventilated.

Pipe gradient -　　　The programme automatically indicates the required pipe gradient. This figure vary depending upon the type of appliance selected and whether the branch is ventilated or unventilated.

Max. number of bends -　The programme automatically indicates the maximum number of bends. This will vary depending upon the type of appliance selected and whether the branch is ventilated or

Notes -　　　　　　The programme automatically indicates any required notes.

Proposed pipe material - The user should select the 'Proposed pipe material' from the drop down list.

Proposed pipe diameter - The user should select the 'Proposed pipe diameter' from the drop down list. list of diameters offered to the user will depend on the pipe material selected.

Spacing of vertical pipe supports -　The programme automatically displays the maximum vertical the pipe supports. The spacing displayed will depend on the pipe material and pipe diameter.

Spacing of horizontal pipe supports The programme automatically displays the maximum horizontal of the pipe supports. The spacing displayed will depend on the pipe material and pipe diameter.

Testing tab -　　　　The user should fill the data in this tab as described below.

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Project -   The user should input the name of the project in the box adjacent to the 'Project' indicator.

Location -   The user should input the location of the stack in the box adjacent to the 'Location' indicator.

Type of building use -   The user should select the 'type of building use' from the drop down list. The list contains three use types 'domestic' for domestic situations and small offices where appliance use is infrequent, 'commercial and public' is used for larger buildings such as hospitals, schools, restaurants and hotels where appliance use is more frequent. 'Congested' is used for buildings such as shopping malls, theatres, concert halls and sports events locations where use is very frequent or contains relatively short

Number of appliances -   The user should select the 'number of appliances' of each type connected to stack from the number ranges indicated in the drop down list. The number ranges are dependant on the type of building use selected.

The number of appliances to be flushed simultaneously - The programme automatically displays the number of each type of appliance that should be flushed simultaneously. These figures are based upon the type of building use and the number of appliances of each type connected to the stack.

Branch flows tab -   The user should fill the data in this tab as described below.

Project -   The user should input the name of the project in the box adjacent to the 'Project' indicator.

Location -   The user should input the location of the stack in the box adjacent to the 'Location' indicator.

Pipe material -   The pipe material for each branch can be selected from a drop down menu. Where the pipe material is unknown a pipe should be selected such that when the pipe condition is selected a roughness coefficient of 1.5 is generated in the Ks value column.

Pipe condition -   The pipe condition for each branch can be selected from a drop down menu. When the pipe material and pipe condition have been selected the roughness coefficient will be generated automatically. The available pipe conditions vary automatically depending on the type of pipe selected.

Ks value -   The programme automatically indicates the appropriate Ks value. The Ks (roughness coefficient) is dependant on the pipe material and pipe condition selected

Branch length -   The user should input the length of the branch in metres

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Gradient - The gradient is user input as a percentage. The programme automatically generates an 'Imperial' type gradient in a 1 in ? format. If the gradient input creates a velocity that is too (below 0.75 metres per second) a warning message will pop-up when the user moves along the row. Similarly if the gradient is too slack and the depth of flow becomes more than 0.5 a warning message will pop-up as the user moves along the row.

Fall - The fall is generated automatically by the programme and is the difference in invert levels between the upstream and downstream manholes on the branch.

Probable delivery - The probable delivery is automatically generated by the programme. The delivery is created from the various flow inputs described below.

Pipe diameter - The pipe diameter is user input from a drop down menu for each branch. The diameters available for selection in the menu are based on the pipe material that was previously selected.

Full bore capacity - The full bore capacity is automatically generated by the programme.

Proportional discharge - The proportional discharge is automatically generated by the programme. Should the proportional discharge exceed 1.0 meaning the pipe is over full the text in the proportional discharge cell will automatically change to red.

Full bore velocity - The full bore velocity is automatically generated by the programme.

Proportional depth - The proportional depth is automatically generated by the programme. If the proportional depth increases to above 0.5 a warning message will automatically pop-up and the text in the cell will automatically change to red.

Design flow velocity - The design flow velocity is automatically generated by the programme. If the velocity drops below 0.65 metres per second a warning message will pop up and the text in the cell will automatically change to red.

Type of use - The programme automatically selects the type of use, which is copied from the choice made in the Branch System 3 tab. There are three categories 'intermittent', 'frequent' and 'congested'. Intermittent is used for domestic and office situations. Frequent is used for hospitals, schools, restaurants, hotels etc. Congested is used for public toilets, shopping malls, airports changing rooms and

Use Factor - The programme automatically selects the use factor. The factor is dependant the type of use selected.

Grand total D/U - The programme automatically displays the grand total of discharge units. This is copied from the grand total calculated in the branch system 3 tab.

Total flow - The programme automatically calculates the total flow in litres per second.

Total fall - The programme automatically calculates the total fall.

Drain flows tab - The user should fill the data in this tab as described below.

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Project -   The user should input the name of the project in the box adjacent to the
'Project' indicator.

Location -   The user should input the location of the stack in the box adjacent to the
'Location' indicator.

Pipe material -   The pipe material for each branch drain can be selected from a drop down menu
Where the pipe material is unknown a pipe should be selected such that when the pipe condition is
selected a roughness coefficient of 1.5 is generated in the Ks value column.

Pipe condition -   The pipe condition for each branch drain can be selected from a drop down
When the pipe material and pipe condition have been selected the roughness coefficient will be generated
automatically. The available pipe conditions vary automatically depending on the type of pipe selected.

Ks value -   The programme automatically indicates the appropriate Ks value. The Ks
(roughness coefficient) is dependant on the pipe material and pipe condition selected

Branch length -   The user should input the length of the branch drain in metres

Gradient -   The gradient is user input as a percentage. The programme automatically
generates an 'Imperial' type gradient in a 1 in ? format. If the gradient input creates a velocity that is too
(below 0.75 metres per second) a warning message will pop-up when the user moves along the row.
Similarly if the gradient is too slack and the depth of flow becomes more than 0.5 a warning message will
pop-up as the user moves along the row.

Fall -   The fall is generated automatically by the programme and is the difference in
invert levels between the upstream and downstream manholes on the branch.

Probable delivery -   The probable delivery is automatically generated by the programme. The
delivery is created from the various flow inputs described below.

Pipe diameter -   The pipe diameter is user input from a drop down menu for each branch drain.
pipe diameters available for selection in the menu are based on the pipe material that was previously

Full bore capacity -   The full bore capacity is automatically generated by the programme.

Proportional discharge - The proportional discharge is automatically generated by the programme.
Should the proportional discharge exceed 1.0 meaning the pipe is over full the text in the proportional
discharge cell will automatically change to red.

Full bore velocity -   The full bore velocity is automatically generated by the programme.

Proportional depth -   The proportional depth is automatically generated by the programme. If the
proportional depth increases to above 0.5 a warning message will automatically pop-up and the text in the
cell will automatically change to red.

Design flow velocity -   The design flow velocity is automatically generated by the programme. If the
velocity drops below 0.75 metres per second a warning message will pop up and the text in the cell will
automatically change to red.

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Type of use - The programme automatically selects the type of use, which is copied from the choice made in the Branch System 3 tab. There are three categories 'intermittent', 'frequent' and 'congested'. Intermittent is used for domestic and office situations. Frequent is used for hospitals, schools, restaurants, hotels etc. Congested is used for public toilets, shopping malls, airports changing rooms and

Use Factor - The programme automatically selects the use factor. The factor is dependant the type of use selected.

Grand total D/U - The programme automatically displays the grand total of discharge units. This is copied from the grand total calculated in the Stack No. tab.

Total flow - The programme automatically calculates the total flow in litres per second.

Total fall - The programme automatically calculates the total fall.