

# CIBSE Pipe Sizing Charts 2007 – Excel Spreadsheet Format

## INTRODUCTION

This guidance note provides instruction on the use of the following spreadsheets:

### **CIBSE Pipe Sizing V2.xls** **CIBSE Duct Sizing V2.xls**

These spreadsheets enable engineers to generate pipe and duct sizing tables in compliance with the pressure loss equations and standard fluid data set out in CIBSE Guide C4: Flow of Fluids in Pipes and Ducts 2007. The spreadsheet calculations allow for:

- any choice of pipe or duct materials
- any pipe or duct diameter
- any fluid density/viscosity
- fluid temperatures in the range 5-200°C for water and 0-40°C for air
- water and glycol mixtures

## OPERATING REQUIREMENTS

The spreadsheet is designed for operation using Microsoft Excel 2003 under the Windows XP operating system.

The spreadsheet is best viewed at a screen resolution of 1024 x 768 pixels. To change screen resolution, right click the Windows desktop, select **Properties** then click on the tab **Settings**. Screen resolution is adjusted using the sliding scale indicator.

Apart from the input data cells, all worksheets are password protected to prevent unauthorised tampering with embedded calculations.

## INSTRUCTIONS FOR USE

There are three separate worksheets as indicated by the tab names at the bottom of the screen:

Input Data

Stored Pipe/Duct Data

Pipe/Duct Sizing Tables

Data can be entered in the following sections as required:

### Input Data: SELECTION CRITERIA

The options selected will determine the pipe sizing tables generated. Tables are automatically prepared as soon as the white input boxes are completed.

- **Pipe/duct material:** This is the generic name for the particular pipe or duct material (e.g. steel, copper, plastic etc for pipework, longitudinal seam or spiral wound for ductwork). Click on the white cell to highlight a menu from which options can be selected.
- **Water/air temperature:** This is the mean fluid temperature for the system in operation. Click on the white cell to bring up a menu from which the nearest appropriate value can be selected.

- **% Glycol mix (pipework only):** This is the percentage of ethylene glycol by mass, mixed with the water in the system. Estimated density and viscosity values will be calculated automatically to allow for the specified percentage of ethylene glycol.
- **Volume or mass flow (ductwork only):** For ventilation, flow expressed as m<sup>3</sup>/s will be required whereas for heating or cooling capacities, kg/s may be more helpful. Tables can be expressed in either format.
- **Density & dynamic viscosity:** These cells enable the properties of fluids other than air, water or glycol mixtures to be entered. Entry to these cells is optional, hence the grey colouration. If left blank standard values taken from CIBSE Guide C4 will be used.

### Input data: INDIVIDUAL RESULTS

The spreadsheet allows individual calculation of velocity, pressure loss and velocity pressure for any combination of flow rate and pipe/duct size, and at the previously specified selection criteria. The results achieved are calculated independently of those in the accompanying tables.

For duct sizing, an equivalent diameter calculator is included. This enables calculation of equivalent diameters for rectangular or flat oval ducts. If a duct diameter within 50mm of the calculated equivalent diameter is entered in the following input box, then the estimated pressure loss for the rectangular or flat oval duct will be calculated. Otherwise, the pressure loss cell will report “NO VALUE” until an appropriate diameter is selected.

### Stored Pipe/Duct Data

The spreadsheet uses standard pipe and duct data taken from British and international standards, and as summarised in CIBSE Guide C4. The title boxes form the menu generated when the pipe/duct materials box is selected under Input Data : SELECTION CRITERIA

Pipe sizing tables for alternative pipes or ducts can be generated by filling in the appropriate values in the “ADD YOUR OWN” tables. The following data can be entered:

- **Specification (optional):** The British or international standards with which pipes or ducts comply.
- **Title:** The name by which the pipes or ducts are identified – typically the pipe or duct material itself. The titles entered will be automatically added to the pipe/duct materials menus under SELECTION CRITERIA
- **Pipe/Duct Sizes:** Nominal diameters and their corresponding mean internal diameters must be entered in ascending order for the range of pipes to be considered. Nominal diameters will be used to label the pipe/duct sizing tables; mean internal diameters will be used for calculation purposes.
- **Equivalent roughness:** The equivalent roughness is an indication of the roughness of the internal surface of the pipe/duct in its brand new condition. Typical values for common pipe and duct materials are indicated in CIBSE Guide C4.