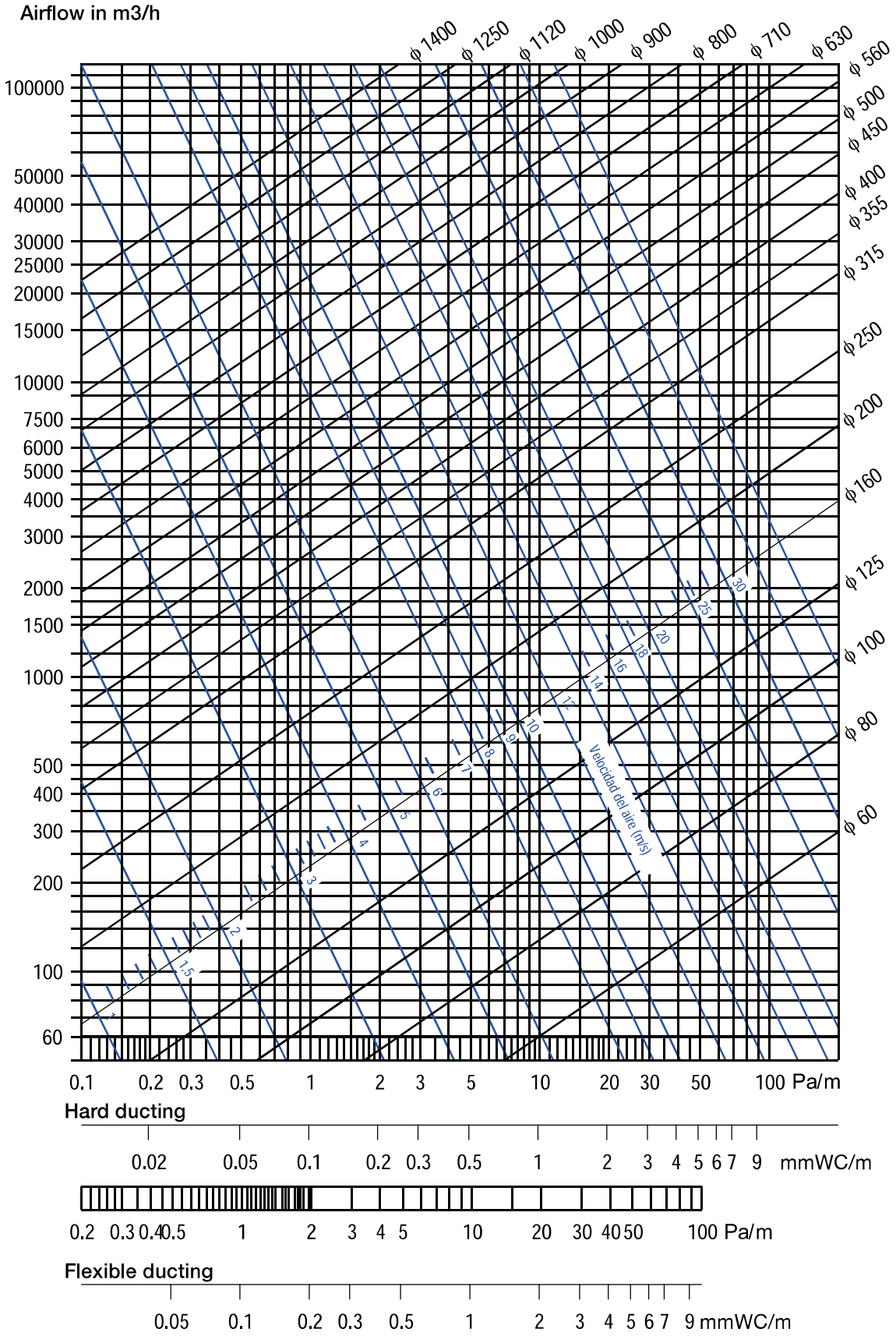
RECTILINEAR CIRCULAR DUCTING
PRESSURE DROPS



Air circulation through ducting: pressure drops

In order to ventilate an enclosure or a machine, whether by air impulsion or extraction, it is very common to have to connect the fan or extractor via ducting or a pipe, which will have a particular length, section and shape.

The air passage through the ducting absorbs energy from the fan due to the friction against the walls, the changes in direction or the obstacles found in its way. The profitability of an installation requires this part of the energy consumed to be minimised.

As a fan's consumption is directly proportional to the total pressure **(TP)** at which it works, it is clear that if the piping is not designed with care this can lead to a much greater energy consumption than necessary.

Pressure drops

This is the pressure required to overcome the air passage along the ducting. It determines the fan's energy consumption. It depends on the length, section and layout of the ducting, the hydraulic diameter, the air speed and density, the friction coefficient, and the roughness of the walls.

Straight Sections

The practical way of doing this is to use nomograms developed based on all the necessary technical gear which are valid for ducting with the regular roughness in commonly used materials.

The nomogram in the figure on the previous page shows one of these for circular sections and a friction coefficient = 0'02 (galvanised iron sheet).

Rectangular ducting

If the section of the ducting is not circular, which is often the case in ventilation installations, where the rectangular or square shapes are common, it is necessary to first determine the equivalent circular section, that is, the section that presents the same load loss as the rectangular section considered.

The equivalent diameter can be determined in a practical way using the following graph.

EQUIVALENT DIAMETER OF RECTANGULAR DUCTING WITH THE SAME LOAD LOSS

Rectangular ducting side (cm)