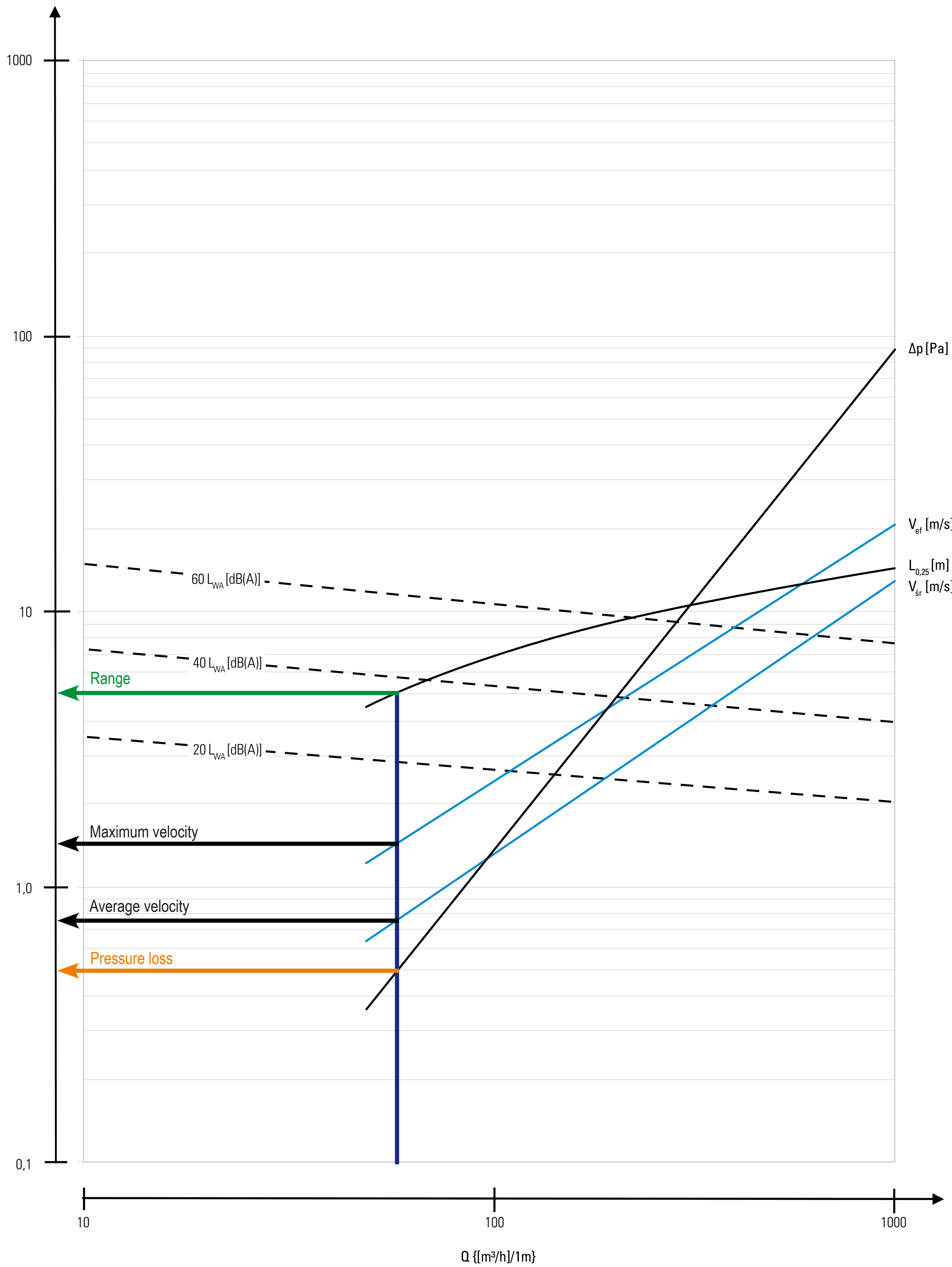
Instructions for the diagram for selection of slotted diffusers NSS



NOTE!
Q – Air outlet for a single 1m long diffuser.
For double or triple diffusers and for diffusers of different lengths see the annotations.

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Annotations:
Characteristics are relevant for a single 1 m long diffuser (unit characteristics)In case of using a longer diffuser, or using two or three units, in order to calculate the demanded air outlet and correctly read the value from the diagram one needs to calculate the following:

$$Q_h \text{ diagram} = \frac{Q_h \text{ demanded}}{D \times N}$$

Where: N = 2 for two diffusers,
N = 3 for three diffusers,
D = diffuser length in meters.

Chart 1. Correction coefficients for other lengths:

L [m]	1	1,5	2	3	4	5	6	8	10
ΔPt [Pa]	x1	x1,05	x1,1				x1,15		
$L_{0,2}$ [m]									
NR [dB]	0	+2	+3	+4	+5	+6	+7	+9	+10

Values of range, pressure loss and velocity read from Q diagram, and corrected according to the above chart represent a complete diffuser. For lower air outlets then in the diagram the curves should be linearly prolonged.

When looking for the outlet covering the demanded range one has to use the following formula:

$$Q_h = Q_h \text{ diagram} \times D \times N$$

Active surface of the diffuser depends on the blade fixing:

$$A_{ef} \text{ max single} = 0{,}022 * L[m]$$

Given values are given for orientation purposes. In special cases characteristics may depend on the room hight where the diffuser is to be fitted (shape and size) and depends on the system to which the diffuser is attached (e.g. depending on the plenum box or damper used in the system).

Annotations for two or three slotted diffusers:

Counter directional fixing of blades is not recommended because of the non-stationary air flow. In special cases the air stream may be vertical despite shifted blades, instead being directed horizontally in opposing directions. Such possibility should be verified during mounting of the diffuser.
When one of the slots is open, the other slot blade is closed, as for achieving horizontal air flow, we will get a skew air stream deviating approx. 20-30° from the perpendicular. That will not provide two air streams – where one is vertical and the other is horizontal. In order to obtain two air streams flowing in different directions it is recommended to use two independent diffusers fitted at least one width from each other.

Example of selection:

Task 1:

4 m high room. Demanded velocity at 1.5 m lower than 0.5 m/s. Planned 3 m long diffuser. Vertical air supply, open blades.

2,5 m distance from the diffuser. At the crossing point of the orange line $L_{0.5}$ and the 2,5 value we find the outlet for 1m long diffuser Q_h diagram = 90{[m³/h]/m}.

For a single diffuser:
Demanded air outlet:
Q_h = 90 x 3 m = 270 m³/h
Pressure loss can be also read from the diagram ΔPt = 1 Pa
(for Q_h diagram = 90 {[m³/h]/m}.
Maximum velocity equals 1,1 m/s and the average is 1,02 m/s.
Air stream range $L_{0,2}$ = 6,5 m.

For two diffusers:
Q_h = 90 x 3 x 2 = 540 m³/h
ΔPt total = 1 Pa
Maximum velocity and range $L_{0,2}$ as with a single diffuser

For two diffusers:
Q_h = 90 x 3 x 3 = 810 m³/h
ΔPt total = 1 Pa
Maximum velocity and range $L_{0,2}$ as with a single diffuser.

Task 2:

Demanded air outlet 200 m³/h. Horizontal air supply. 1.5 m long diffuser. Looking for the range and pressure loss.

Single diffuser:
Q_h diagram = 200/1,5 = 133,3 {[m³/h]/m}
ΔPt total = 13 Pa

$L_{0,5}$ = 7,5 m
$L_{0,2}$ = 9,5 m
V_{max} = 4,2 m/s
V_{du} = 1,6 m/s

Double diffuser:
Q_h diagram = 200/(1,5 x 2) = 66,6 {[m³/h]/m}
ΔPt total = 3 Pa

$L_{0,5}$ = 1,4 m
$L_{0,2}$ = 5 m
V_{max} = 2,3 m/s
V_{du} = 0,8 m/s

Triple diffuser:
Q_h diagram = 200/(1,5 x 3) = 44,4 {[m³/h]/m}
ΔPt total = 1,33 Pa

$L_{0,5}$ = 0,3 m
$L_{0,2}$ = 3,5 m
V_{max} = 1,4 m/s
V_{du} = 0,5 m/s