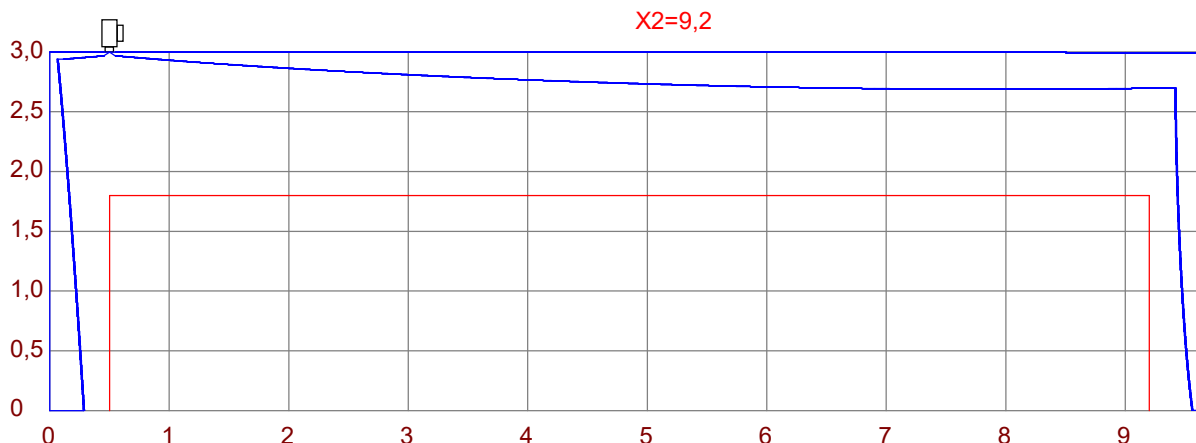# Air distribution design

Project data :

Name of the project : Vrtec Kamnitnik
Customer :
Reference :
Designed by : Zupan
Information : Igralnica P-540m3/h
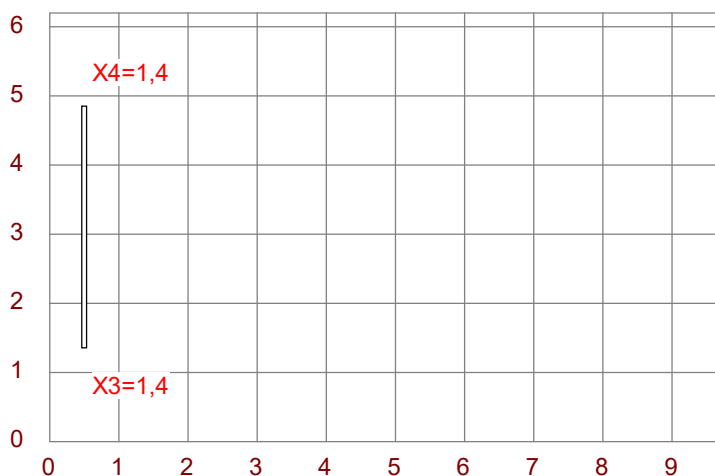
Air diffusion :

X2=9,2

Space :

height = 3,0 m
length = 9,7 m
width = 6,2 m
floor = 60,1 m2
volume = 180,4 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 9,20 m
X3 = 1,35 m
X4 = 1,35 m
nl = 1
nb = 1

Placement of diffusers :

X4=1,4

X3=1,4

Definitions :

Vol [l/sm] : Air flow rate at the diffuser per meter
dl,db [m] : Distance between the diffusers
X1,X2,X3,X4 [m] : Distance between the diffuser and the wall
H1 [m] : Distance between the diffuser and the stand level
H [m] : Installation height of the diffuser
h1 [m] : Vertical throw of the diffuser for heating
h1max [m] : Maximum throw of the diffuser for heating
vH1 [m/s] : Air velocity between the diffusers at the distance H1
vL [m/s] : Air velocity by the wall at the distance L
LwA [dB(A)] : A-weighted sound power level
LpA [dB(A)] : A-weighted sound pressure level in room
dpt [Pa] : Pressure drop at the diffuser

Placement :
dl [m] : Distance along long side of the space
db [m] : Distance along broad side of the space
X1 [m] : Distance from the left wall
X2 [m] : Distance from the right wall
X3 [m] : Distance from the lower wall
X4 [m] : Distance from the upper wall
nl [ ] : Number of diffusers along long side of the space
nb [ ] : Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 2,5 l/s m2 floor
Required supply air flow rate in space : 150 l/s
Air change coefficient : 3,0 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Two sided
length = 3,5 m

Calculation results for cooling :

Diffuser type : LD-13/2
Diffuser air flow rate : Vol = 42,9 l/sm   (154,3 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,44 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,33 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,136   dtL = -1,1 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,101   dtL = -0,8 K
Pressure drop on the diffuser (regulation=100%) : dpt = 5,4 Pa

Sound power level of the diffuser :
Lw63 = 31 dB   Lw125 = 37 dB   Lw250 = 37 dB   Lw500 = 29 dB   Lw1000 = 15 dB
Lw2000 = 6 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 31,1 dB(A)   NR = 28

Sound pressure level in space at 1,8 m :
Lp63 = 28 dB   Lp125 = 33 dB   Lp250 = 34 dB   Lp500 = 25 dB   Lp1000 = 11 dB
Lp2000 = 0 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 27,3 dB(A)   NR = 24
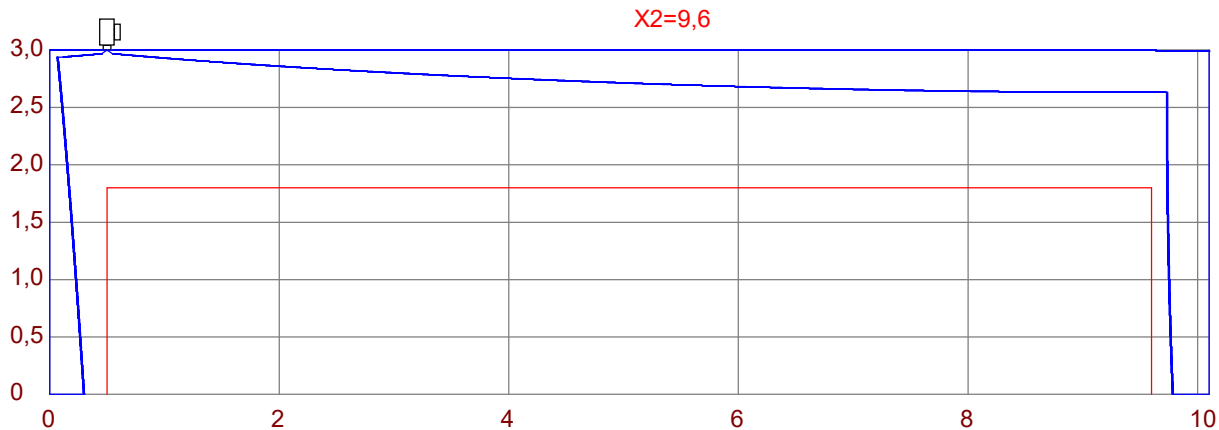
Air distribution design

Lindab®
IMP Klima

Project data :

Name of the project : Vrtec Kamnitnik
Customer :
Reference :
Designed by : Zupan
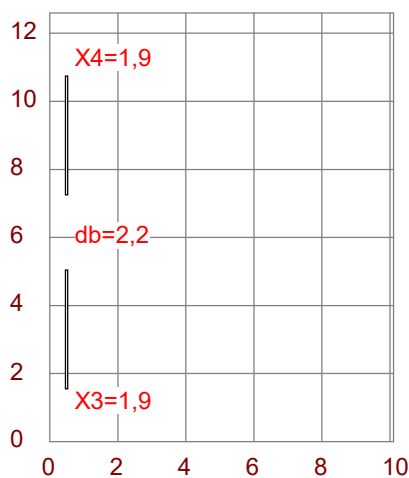Information : Večnamenski prostor P-1176m3/h

Air diffusion :

X2=9,6

Space :

height = 3,0 m
length = 10,1 m
width = 12,6 m
floor = 127,3 m2
volume = 381,8 m3

Placement :

dl = 0,00 m
db = 2,20 m
X1 = 0,50 m
X2 = 9,60 m
X3 = 1,86 m
X4 = 1,86 m
nl = 1
nb = 2

Placement of diffusers :

X4=1,9

db=2,2

X3=1,9

Definitions :

Vol [l/sm] : Air flow rate at the diffuser per meter
dl,db [m] : Distance between the diffusers
X1,X2,X3,X4 [m] : Distance between the diffuser and the wall
H1 [m] : Distance between the diffuser and the stand level
H [m] : Installation height of the diffuser
h1 [m] : Vertical throw of the diffuser for heating
h1max [m] : Maximum throw of the diffuser for heating
vH1 [m/s] : Air velocity between the diffusers at the distance H1
vL [m/s] : Air velocity by the wall at the distance L
LwA [dB(A)] : A-weighted sound power level
LpA [dB(A)] : A-weighted sound pressure level in room
dpt [Pa] : Pressure drop at the diffuser

Placement :

dl [m] : Distance along long side of the space
db [m] : Distance along broad side of the space
X1 [m] : Distance from the left wall
X2 [m] : Distance from the right wall
X3 [m] : Distance from the lower wall
X4 [m] : Distance from the upper wall
nl [ ] : Number of diffusers along long side of the space
nb [ ] : Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
    occupied zone : 0,15 m/s
Required supply air flow rate : 2,6 l/s m2 floor
Required supply air flow rate in space : 326 l/s
Air change coefficient : 3,1 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Two sided
length = 3,5 m

Calculation results for cooling :

Diffuser type : LD-13/2
Diffuser air flow rate : Vol = 46,6 l/sm   (167,7 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,47 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,36 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,136   dtL = -1,1 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,101   dtL = -0,8 K
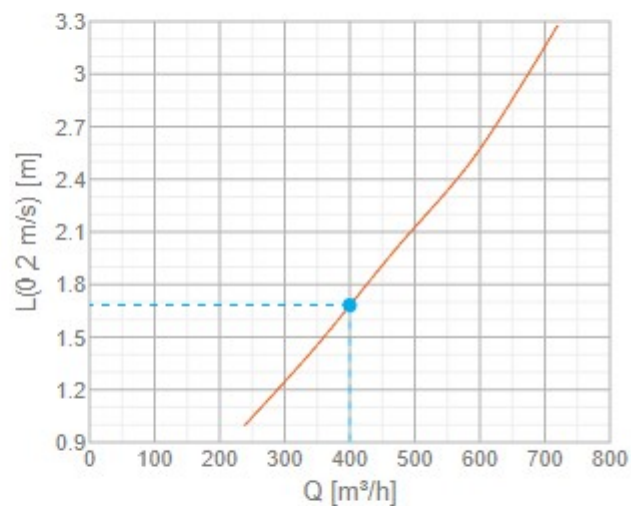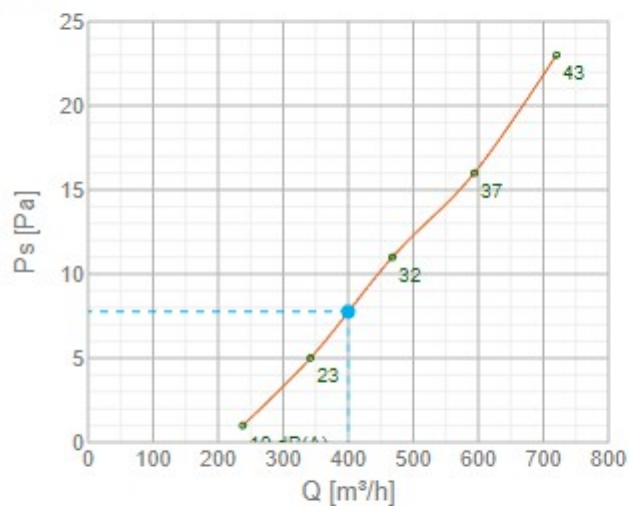Pressure drop on the diffuser (regulation=100%) : dpt = 6,2 Pa

Sound power level of the diffuser :
Lw63 = 33 dB   Lw125 = 38 dB   Lw250 = 39 dB   Lw500 = 31 dB   Lw1000 = 18 dB
Lw2000 = 9 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 33,1 dB(A)   NR = 30

Sound pressure level in space at 1,8 m :
Lp63 = 29 dB   Lp125 = 34 dB   Lp250 = 36 dB   Lp500 = 27 dB   Lp1000 = 14 dB
Lp2000 = 2 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 29,3 dB(A)   NR = 26

Vstopni podatki

Zahtevana delovna točka   Pretok zraka   `400`   `m³/h ▼`

Diagrami

Tehnični podatki

	Zahtevana točka	Delovna točka			
	Pretok zraka [m³/h]	Q [m³/h]	Ps [Pa]	Lp [dB]	L (0,2 m/s) [(0.2 m/s) m]
Uporabnik	400	400	7,76	27,1	1,68

Air distribution design

Lindab® IMP Klima

Project data :

Name of the project : Vrtec Kamnitnik
Customer :
Reference :
Designed by : Zupan
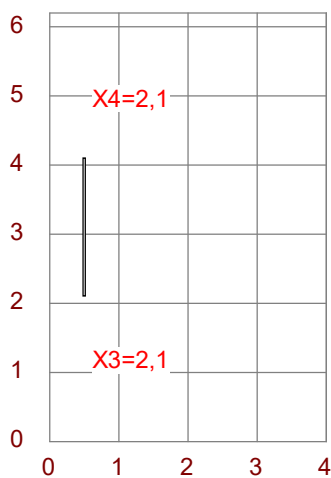Information : Dodatne dejavniosti P-250m3/h

Air diffusion :
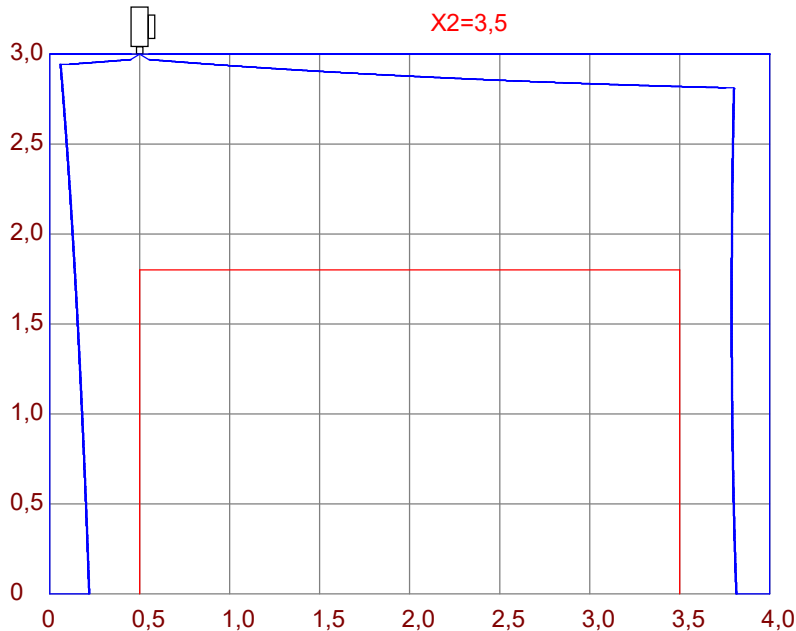
X2=3,5

Space :

height = 3,0 m
length = 4,0 m
width = 6,2 m
floor = 24,8 m2
volume = 74,4 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 3,50 m
X3 = 2,10 m
X4 = 2,10 m
nl = 1
nb = 1

Placement of diffusers :

X4=2,1

X3=2,1

Definitions :

Vol [l/sm] : Air flow rate at the diffuser per meter
dl,db [m] : Distance between the diffusers
X1,X2,X3,X4 [m] : Distance between the diffuser and the wall
H1 [m] : Distance between the diffuser and the stand level
H [m] : Installation height of the diffuser
h1 [m] : Vertical throw of the diffuser for heating
h1max [m] : Maximum throw of the diffuser for heating
vH1 [m/s] : Air velocity between the diffusers at the distance H1
vL [m/s] : Air velocity by the wall at the distance L
LwA [dB(A)] : A-weighted sound power level
LpA [dB(A)] : A-weighted sound pressure level in room
dpt [Pa] : Pressure drop at the diffuser

Placement :
dl [m] : Distance along long side of the space
db [m] : Distance along broad side of the space
X1 [m] : Distance from the left wall
X2 [m] : Distance from the right wall
X3 [m] : Distance from the lower wall
X4 [m] : Distance from the upper wall
nl [ ] : Number of diffusers along long side of the space
nb [ ] : Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
  occupied zone : 0,15 m/s
Required supply air flow rate : 2,8 l/s m2 floor
Required supply air flow rate in space : 70 l/s
Air change coefficient : 3,4 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Alternate sided
length = 2,0 m

Calculation results for cooling :

Diffuser type : LD-13/1
Diffuser air flow rate : Vol = 34,7 l/sm   (125,1 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,33 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,24 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,069   dtL = -0,5 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,050   dtL = -0,4 K
Pressure drop on the diffuser (regulation=100%) : dpt = 17,2 Pa

Sound power level of the diffuser :
Lw63 = 44 dB   Lw125 = 42 dB   Lw250 = 42 dB   Lw500 = 33 dB   Lw1000 = 20 dB
Lw2000 = 14 dB   Lw4000 = 4 dB   Lw8000 = 0 dB   LwA = 35,7 dB(A)   NR = 33

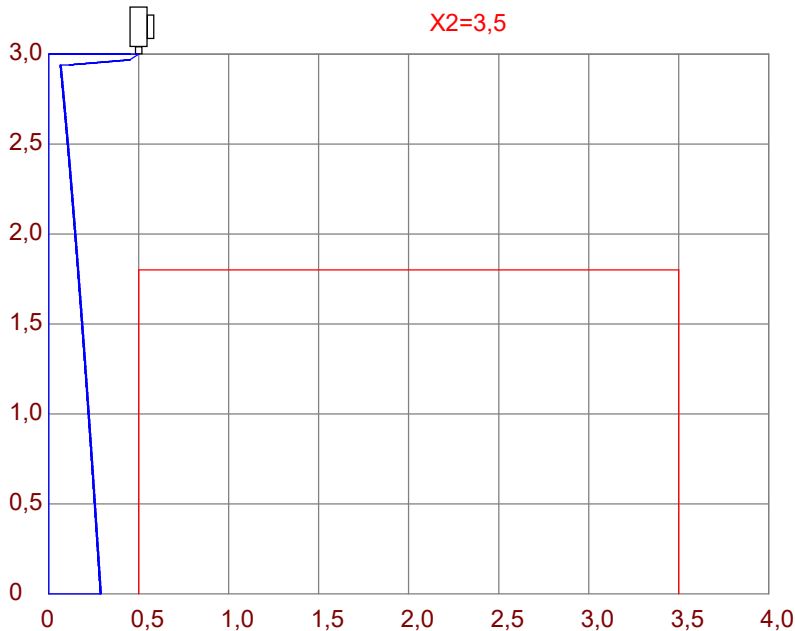Sound pressure level in space at 1,8 m :
Lp63 = 43 dB   Lp125 = 41 dB   Lp250 = 41 dB   Lp500 = 32 dB   Lp1000 = 20 dB
Lp2000 = 13 dB   Lp4000 = 1 dB   Lp8000 = 0 dB   LpA = 34,8 dB(A)   NR = 32

Air distribution design

Project data :

Name of the project : Vrtec Kamnitnik
Customer :
Reference :
Designed by : Zupan
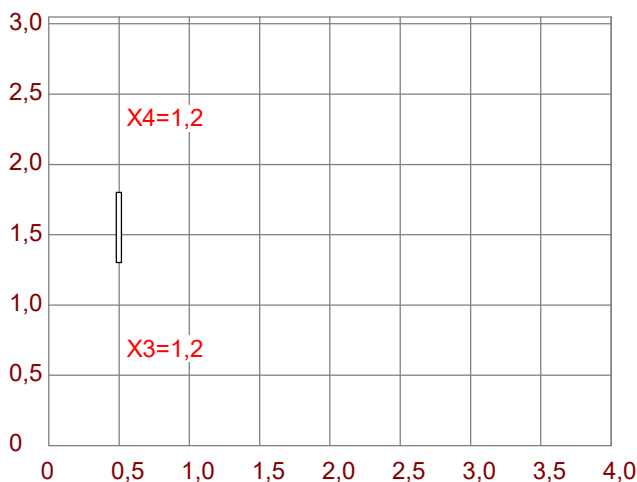Information : Pisarne P-40m3/h

Air diffusion :

X2=3,5

Space :

height = 3,0 m
length = 4,0 m
width = 3,0 m
floor = 12,2 m2
volume = 36,6 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 3,50 m
X3 = 1,25 m
X4 = 1,25 m
nl = 1
nb = 1

Placement of diffusers :

X4=1,2

X3=1,2

Definitions :

Vol [l/sm] :   Air flow rate at the diffuser per meter
dl,db [m] :   Distance between the diffusers
X1,X2,X3,X4 [m] :   Distance between the diffuser and the wall
H1 [m] :   Distance between the diffuser and the stand level
H [m] :   Installation height of the diffuser
h1 [m] :   Vertical throw of the diffuser for heating
h1max [m] :   Maximum throw of the diffuser for heating
vH1 [m/s] :   Air velocity between the diffusers at the distance H1
vL [m/s] :   Air velocity by the wall at the distance L
LwA [dB(A)] :   A-weighted sound power level
LpA [dB(A)] :   A-weighted sound pressure level in room
dpt [Pa] :   Pressure drop at the diffuser

Placement :
dl [m] :   Distance along long side of the space
db [m] :   Distance along broad side of the space
X1 [m] :   Distance from the left wall
X2 [m] :   Distance from the right wall
X3 [m] :   Distance from the lower wall
X4 [m] :   Distance from the upper wall
nl [ ] :   Number of diffusers along long side of the space
nb [ ] :   Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 0,9 l/s m2 floor
Required supply air flow rate in space : 11 l/s
Air change coefficient : 1,1 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - One sided
length = 0,5 m

Calculation results for cooling :

Diffuser type : LD-13/1
Diffuser air flow rate : Vol = 22,0 l/sm   (79,1 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,45 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,34 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,136   dtL = -1,1 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,101   dtL = -0,8 K
Pressure drop on the diffuser (regulation=100%) : dpt = 4,3 Pa

Sound power level of the diffuser :
Lw63 = 24 dB   Lw125 = 18 dB   Lw250 = 18 dB   Lw500 = 7 dB   Lw1000 = 0 dB
Lw2000 = 0 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 12,7 dB(A)   NR = 8
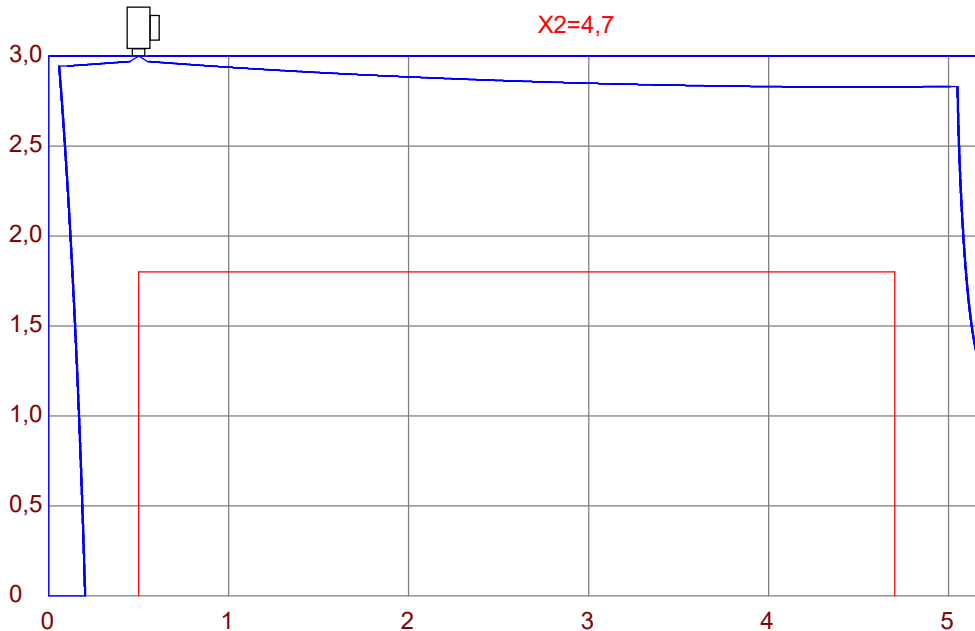
Sound pressure level in space at 1,8 m :
Lp63 = 23 dB   Lp125 = 17 dB   Lp250 = 17 dB   Lp500 = 6 dB   Lp1000 = 0 dB
Lp2000 = 0 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 11,1 dB(A)   NR = 8

Air distribution design

Lindab
IMP Klima

Project data :

Name of the project : Vrtec Kamnitnik
Customer :
Reference :
Designed by : Zupan
Information : Pralnica P-320m3/h
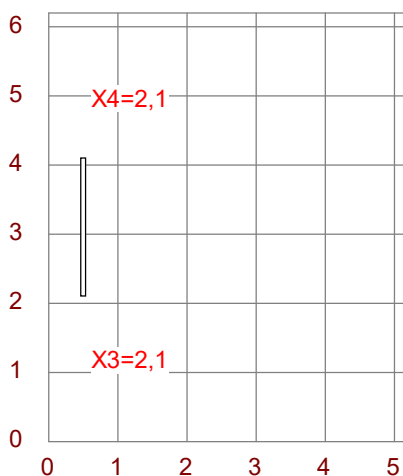
Air diffusion :

X2=4,7

Space :

height = 3,0 m
length = 5,2 m
width = 6,2 m
floor = 32,2 m2
volume = 96,7 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 4,70 m
X3 = 2,10 m
X4 = 2,10 m
nl = 1
nb = 1

Placement of diffusers :

X4=2,1

X3=2,1

Definitions :

Vol [l/sm] :   Air flow rate at the diffuser per meter
dl,db [m] :   Distance between the diffusers
X1,X2,X3,X4 [m] :   Distance between the diffuser and the wall
H1 [m] :   Distance between the diffuser and the stand level
H [m] :   Installation height of the diffuser
h1 [m] :   Vertical throw of the diffuser for heating
h1max [m] :   Maximum throw of the diffuser for heating
vH1 [m/s] :   Air velocity between the diffusers at the distance H1
vL [m/s] :   Air velocity by the wall at the distance L
LwA [dB(A)] :   A-weighted sound power level
LpA [dB(A)] :   A-weighted sound pressure level in room
dpt [Pa] :   Pressure drop at the diffuser

Placement :
dl [m] :   Distance along long side of the space
db [m] :   Distance along broad side of the space
X1 [m] :   Distance from the left wall
X2 [m] :   Distance from the right wall
X3 [m] :   Distance from the lower wall
X4 [m] :   Distance from the upper wall
nl [ ] :   Number of diffusers along long side of the space
nb [ ] :   Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 2,8 l/s m2 floor
Required supply air flow rate in space : 89 l/s
Air change coefficient : 3,3 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Alternate sided
length = 2,0 m

Calculation results for cooling :

Diffuser type : LD-13/2
Diffuser air flow rate : Vol = 44,4 l/sm   (160,0 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,30 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,22 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,096   dtL = -0,8 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,071   dtL = -0,6 K
Pressure drop on the diffuser (regulation=100%) : dpt = 5,7 Pa

Sound power level of the diffuser :
Lw63 = 32 dB   Lw125 = 38 dB   Lw250 = 38 dB   Lw500 = 30 dB   Lw1000 = 16 dB
Lw2000 = 7 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 31,9 dB(A)   NR = 29

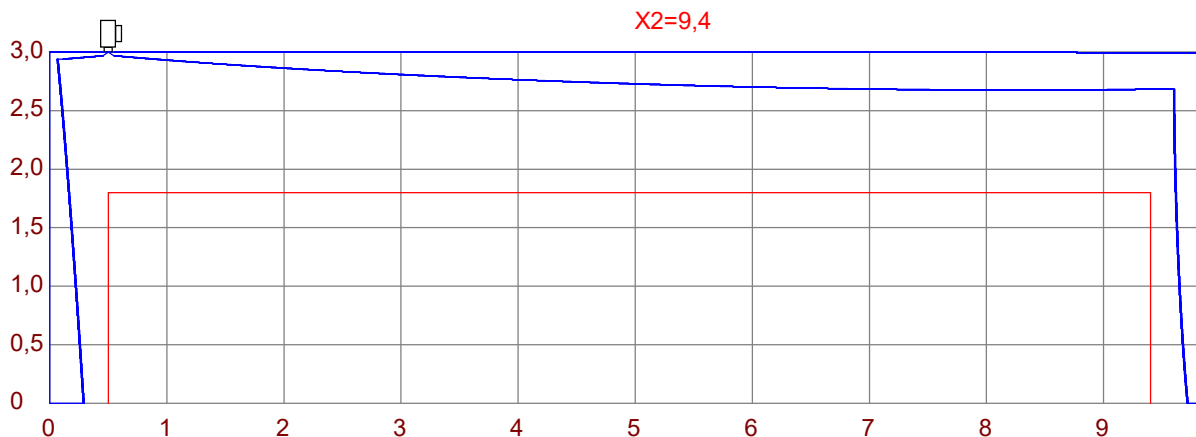Sound pressure level in space at 1,8 m :
Lp63 = 30 dB   Lp125 = 36 dB   Lp250 = 36 dB   Lp500 = 28 dB   Lp1000 = 14 dB
Lp2000 = 6 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 30,1 dB(A)   NR = 27

Air distribution design

Lindab®
IMP Klima

Project data :

Name of the project : Vrtec Kamnitnik
Customer :
Reference :
Designed by : Zupan
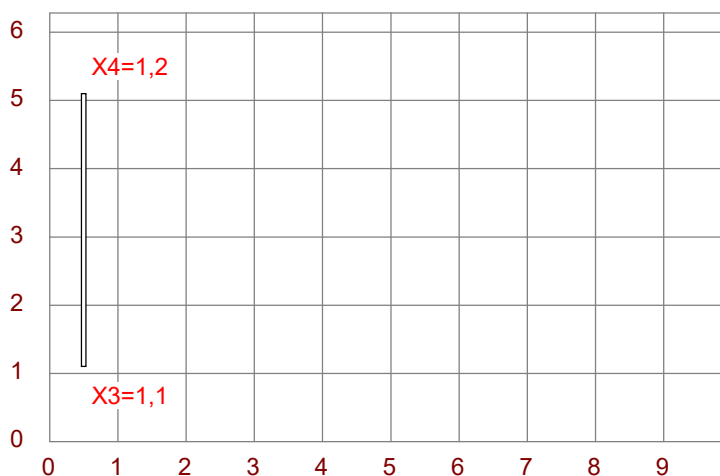Information : Igralnica 1N-630m3/h

Air diffusion :

X2=9,4

Space :

height = 3,0 m
length = 9,9 m
width = 6,3 m
floor = 62,2 m2
volume = 186,7 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 9,40 m
X3 = 1,10 m
X4 = 1,19 m
nl = 1
nb = 1

Placement of diffusers :

X4=1,2

X3=1,1

Definitions :

Vol [l/sm] : Air flow rate at the diffuser per meter
dl,db [m] : Distance between the diffusers
X1,X2,X3,X4 [m] : Distance between the diffuser and the wall
H1 [m] : Distance between the diffuser and the stand level
H [m] : Installation height of the diffuser
h1 [m] : Vertical throw of the diffuser for heating
h1max [m] : Maximum throw of the diffuser for heating
vH1 [m/s] : Air velocity between the diffusers at the distance H1
vL [m/s] : Air velocity by the wall at the distance L
LwA [dB(A)] : A-weighted sound power level
LpA [dB(A)] : A-weighted sound pressure level in room
dpt [Pa] : Pressure drop at the diffuser

Placement :
dl [m] : Distance along long side of the space
db [m] : Distance along broad side of the space
X1 [m] : Distance from the left wall
X2 [m] : Distance from the right wall
X3 [m] : Distance from the lower wall
X4 [m] : Distance from the upper wall
nl [ ] : Number of diffusers along long side of the space
nb [ ] : Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 2,8 l/s m2 floor
Required supply air flow rate in space : 175 l/s
Air change coefficient : 3,4 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Two sided
length = 4,0 m

Calculation results for cooling :

Diffuser type : LD-13/2
Diffuser air flow rate : Vol = 43,8 l/sm (157,5 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,44 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,34 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,136   dtL = -1,1 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,101   dtL = -0,8 K
Pressure drop on the diffuser (regulation=100%) : dpt = 5,6 Pa

Sound power level of the diffuser :
Lw63 = 32 dB   Lw125 = 37 dB   Lw250 = 38 dB   Lw500 = 29 dB   Lw1000 = 15 dB
Lw2000 = 7 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 31,5 dB(A)   NR = 28

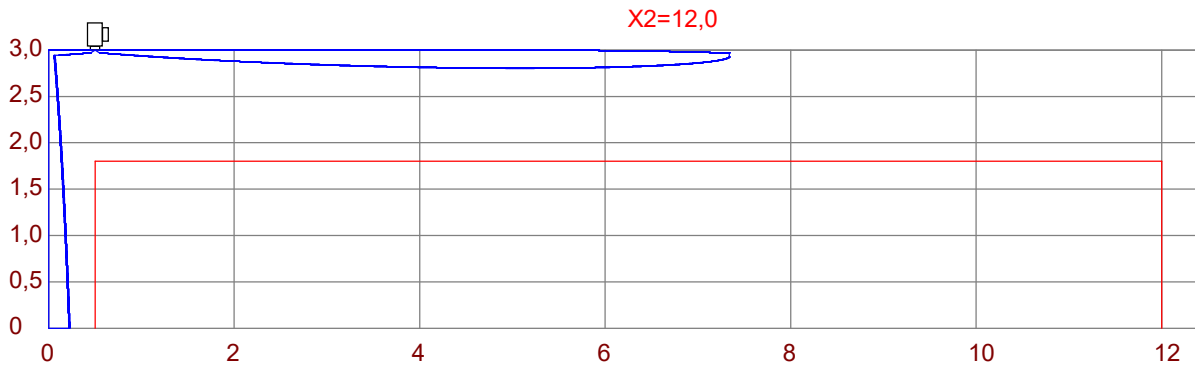Sound pressure level in space at 1,8 m :
Lp63 = 28 dB   Lp125 = 33 dB   Lp250 = 34 dB   Lp500 = 25 dB   Lp1000 = 12 dB
Lp2000 = 1 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 27,6 dB(A)   NR = 24

Air distribution design

Lindab®
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Project data :

Name of the project : kamnitnik
Customer :
Reference :
Designed by : Zupan
Information : Zbornica 840m3/h
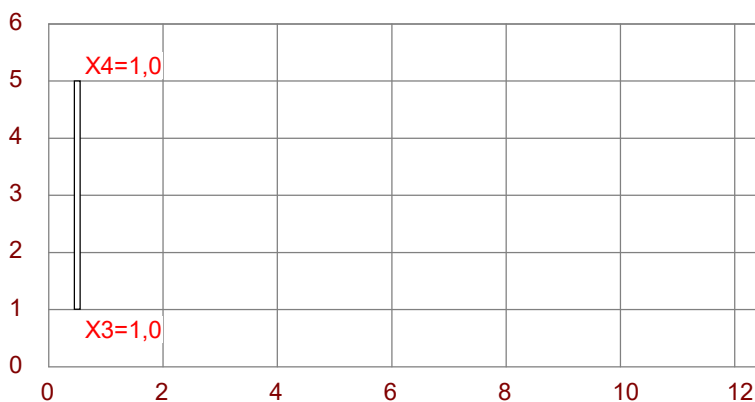
Air diffusion :

X2=12,0

Space :

height = 3,0 m
length = 12,5 m
width = 6,0 m
floor = 75,0 m2
volume = 225,0 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 12,00 m
X3 = 1,00 m
X4 = 1,00 m
nl = 1
nb = 1

Placement of diffusers :

X4=1,0

X3=1,0

Definitions :

Vol [l/sm] :   Air flow rate at the diffuser per meter
dl,db [m] :   Distance between the diffusers
X1,X2,X3,X4 [m] :   Distance between the diffuser and the wall
H1 [m] :   Distance between the diffuser and the stand level
H [m] :   Installation height of the diffuser
h1 [m] :   Vertical throw of the diffuser for heating
h1max [m] :   Maximum throw of the diffuser for heating
vH1 [m/s] :   Air velocity between the diffusers at the distance H1
vL [m/s] :   Air velocity by the wall at the distance L
LwA [dB(A)] :   A-weighted sound power level
LpA [dB(A)] :   A-weighted sound pressure level in room
dpt [Pa] :   Pressure drop at the diffuser

Placement :

dl [m] :   Distance along long side of the space
db [m] :   Distance along broad side of the space
X1 [m] :   Distance from the left wall
X2 [m] :   Distance from the right wall
X3 [m] :   Distance from the lower wall
X4 [m] :   Distance from the upper wall
nl [ ] :   Number of diffusers along long side of the space
nb [ ] :   Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
    occupied zone : 0,15 m/s
Required supply air flow rate : 3,1 l/s m2 floor
Required supply air flow rate in space : 233 l/s
Air change coefficient : 3,7 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Alternate sided
length = 4,0 m

Calculation results for cooling :

Diffuser type : LD-13/3
Diffuser air flow rate : Vol = 58,3 l/sm   (210,0 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,33 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,24 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,121   dtL = -1,0 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,087   dtL = -0,7 K
Pressure drop on the diffuser (regulation=100%) : dpt = 2,4 Pa

Sound power level of the diffuser :
Lw63 = 43 dB   Lw125 = 28 dB   Lw250 = 37 dB   Lw500 = 27 dB   Lw1000 = 13 dB
Lw2000 = 7 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 30,4 dB(A)   NR = 28
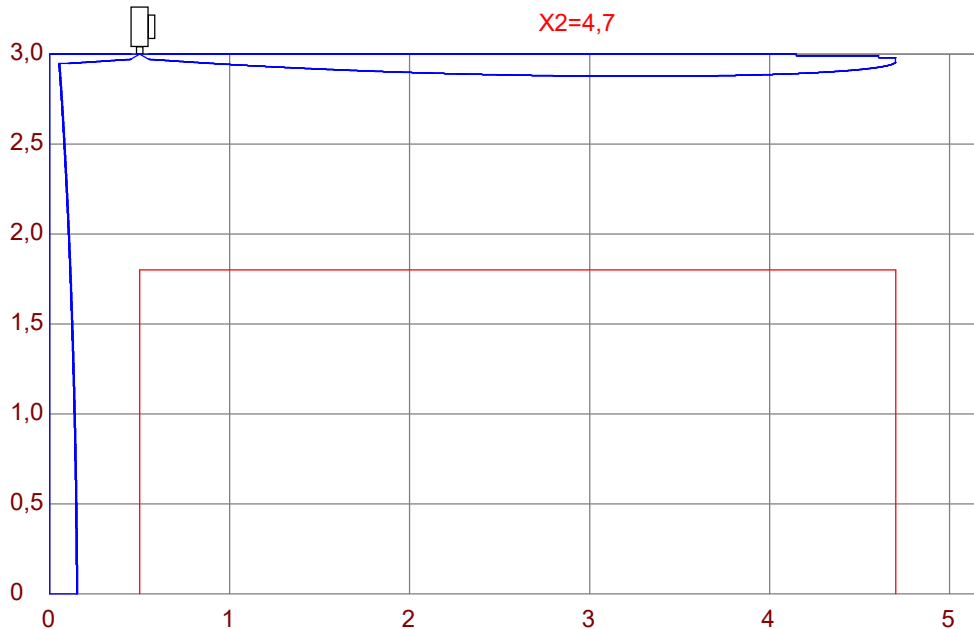
Sound pressure level in space at 1,8 m :
Lp63 = 38 dB   Lp125 = 24 dB   Lp250 = 33 dB   Lp500 = 23 dB   Lp1000 = 9 dB
Lp2000 = 1 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 26,0 dB(A)   NR = 23

Air distribution design

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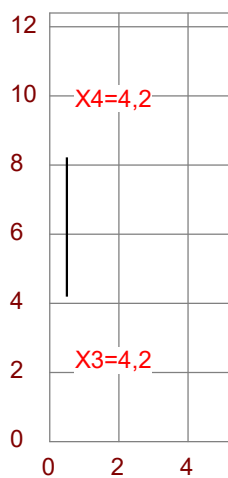## Air diffusion :

X2=4,7

Space :

height = 3,0 m
length = 5,2 m
width = 12,4 m
floor = 64,5 m2
volume = 193,4 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 4,70 m
X3 = 4,20 m
X4 = 4,20 m
nl = 1
nb = 1

Placement of diffusers :

X4=4,2

X3=4,2

Definitions :

Vol [l/sm] :   Air flow rate at the diffuser per meter
dl,db [m] :   Distance between the diffusers
X1,X2,X3,X4 [m] :   Distance between the diffuser and the wall
H1 [m] :   Distance between the diffuser and the stand level
H [m] :   Installation height of the diffuser
h1 [m] :   Vertical throw of the diffuser for heating
h1max [m] :   Maximum throw of the diffuser for heating
vH1 [m/s] :   Air velocity between the diffusers at the distance H1
vL [m/s] :   Air velocity by the wall at the distance L
LwA [dB(A)] :   A-weighted sound power level
LpA [dB(A)] :   A-weighted sound pressure level in room
dpt [Pa] :   Pressure drop at the diffuser

Placement :
dl [m] :   Distance along long side of the space
db [m] :   Distance along broad side of the space
X1 [m] :   Distance from the left wall
X2 [m] :   Distance from the right wall
X3 [m] :   Distance from the lower wall
X4 [m] :   Distance from the upper wall
nl [ ] :   Number of diffusers along long side of the space
nb [ ] :   Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 1,6 l/s m2 floor
Required supply air flow rate in space : 106 l/s
Air change coefficient : 2,0 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Alternate sided
length = 4,0 m

Calculation results for cooling :

Diffuser type : LD-13/1
Diffuser air flow rate : Vol = 26,4 l/sm   (95,0 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,25 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,19 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,069   dtL = -0,5 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,050   dtL = -0,4 K
Pressure drop on the diffuser (regulation=100%) : dpt = 9,8 Pa

Sound power level of the diffuser :
Lw63 = 37 dB   Lw125 = 35 dB   Lw250 = 33 dB   Lw500 = 22 dB   Lw1000 = 7 dB
Lw2000 = 0 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 26,4 dB(A)   NR = 23
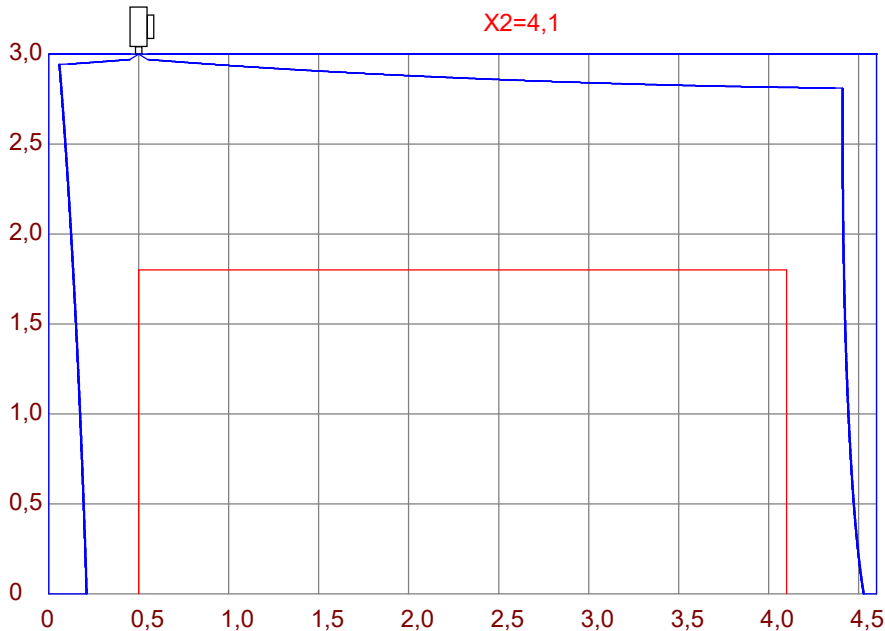
Sound pressure level in space at 1,8 m :
Lp63 = 33 dB   Lp125 = 31 dB   Lp250 = 29 dB   Lp500 = 18 dB   Lp1000 = 2 dB
Lp2000 = 0 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 22,3 dB(A)   NR = 18

Air distribution design

Project data :

Name of the project :
Customer :
Reference :
Designed by : Zupan
Information : Pisarne-N_60m3/h
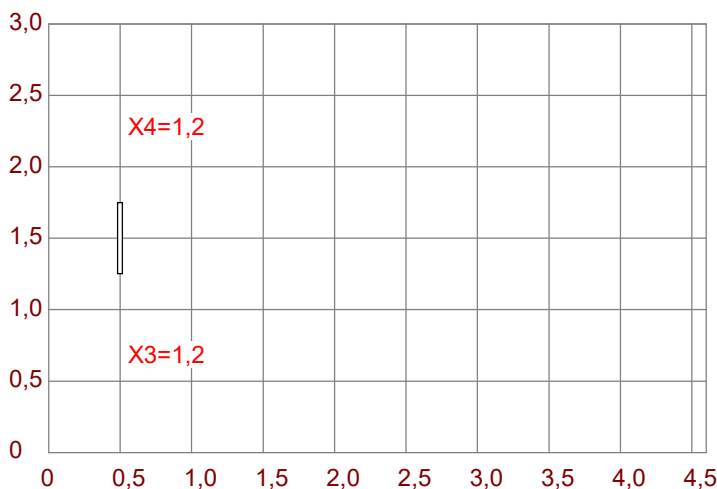
Air diffusion :

X2=4,1

Space :

height = 3,0 m
length = 4,6 m
width = 3,0 m
floor = 13,8 m2
volume = 41,4 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 4,10 m
X3 = 1,25 m
X4 = 1,25 m
nl = 1
nb = 1

Placement of diffusers :

X4=1,2

X3=1,2

Definitions :

Vol [l/sm] :   Air flow rate at the diffuser per meter
dl,db [m] :   Distance between the diffusers
X1,X2,X3,X4 [m] :   Distance between the diffuser and the wall
H1 [m] :   Distance between the diffuser and the stand level
H [m] :   Installation height of the diffuser
h1 [m] :   Vertical throw of the diffuser for heating
h1max [m] :   Maximum throw of the diffuser for heating
vH1 [m/s] :   Air velocity between the diffusers at the distance H1
vL [m/s] :   Air velocity by the wall at the distance L
LwA [dB(A)] :   A-weighted sound power level
LpA [dB(A)] :   A-weighted sound pressure level in room
dpt [Pa] :   Pressure drop at the diffuser

Placement :
dl [m] :   Distance along long side of the space
db [m] :   Distance along broad side of the space
X1 [m] :   Distance from the left wall
X2 [m] :   Distance from the right wall
X3 [m] :   Distance from the lower wall
X4 [m] :   Distance from the upper wall
nl [ ] :   Number of diffusers along long side of the space
nb [ ] :   Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 1,2 l/s m2 floor
Required supply air flow rate in space : 17 l/s
Air change coefficient : 1,4 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Alternate sided
length = 0,5 m

Calculation results for cooling :

Diffuser type : LD-13/1
Diffuser air flow rate : Vol = 33,3 l/sm   (120,0 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,32 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,23 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,069   dtL = -0,5 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,050   dtL = -0,4 K
Pressure drop on the diffuser (regulation=100%) : dpt = 9,0 Pa

Sound power level of the diffuser :
Lw63 = 27 dB   Lw125 = 24 dB   Lw250 = 26 dB   Lw500 = 17 dB   Lw1000 = 1 dB
Lw2000 = 0 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 19,3 dB(A)   NR = 15
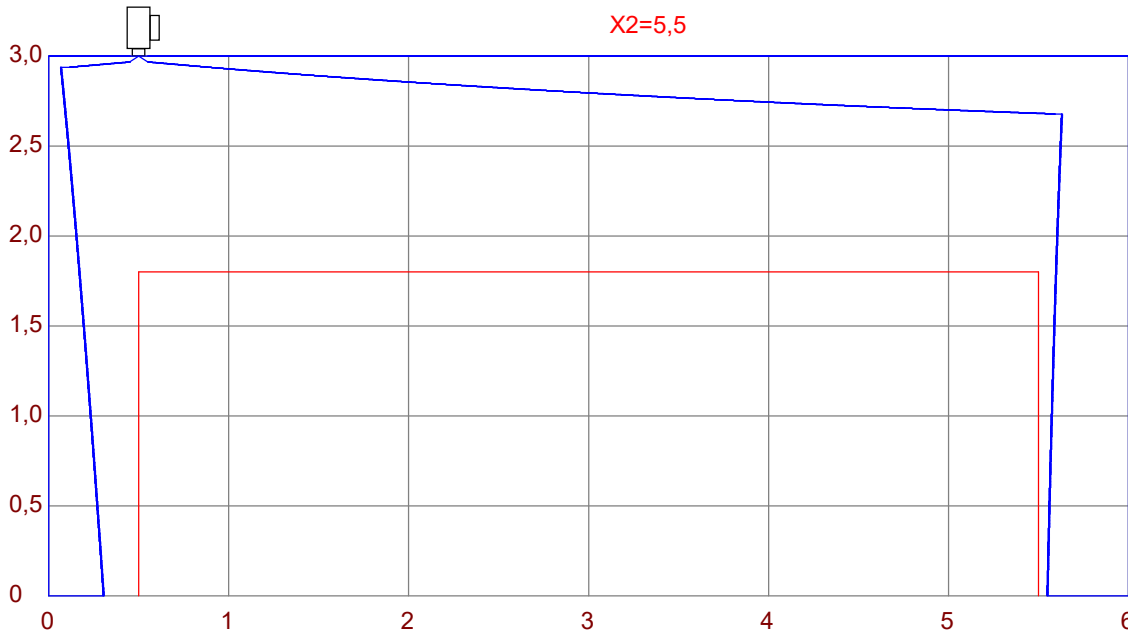
Sound pressure level in space at 1,8 m :
Lp63 = 25 dB   Lp125 = 22 dB   Lp250 = 24 dB   Lp500 = 15 dB   Lp1000 = 0 dB
Lp2000 = 0 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 17,6 dB(A)   NR = 14

Air distribution design

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Project data :

Name of the project :
Customer :
Reference :
Designed by : Zupan
Information : Dodatne-dejavnosti-N_350m3/h
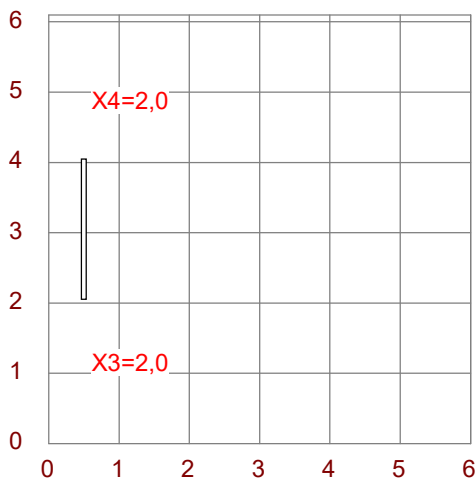
Air diffusion :

X2=5,5

Space :

height = 3,0 m
length = 6,0 m
width = 6,1 m
floor = 36,6 m2
volume = 109,8 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 0,50 m
X2 = 5,50 m
X3 = 2,05 m
X4 = 2,05 m
nl = 1
nb = 1

Placement of diffusers :

X4=2,0

X3=2,0

Definitions :

Vol [l/sm] :   Air flow rate at the diffuser per meter
dl,db [m] :   Distance between the diffusers
X1,X2,X3,X4 [m] :   Distance between the diffuser and the wall
H1 [m] :   Distance between the diffuser and the stand level
H [m] :   Installation height of the diffuser
h1 [m] :   Vertical throw of the diffuser for heating
h1max [m] :   Maximum throw of the diffuser for heating
vH1 [m/s] :   Air velocity between the diffusers at the distance H1
vL [m/s] :   Air velocity by the wall at the distance L
LwA [dB(A)] :   A-weighted sound power level
LpA [dB(A)] :   A-weighted sound pressure level in room
dpt [Pa] :   Pressure drop at the diffuser

Placement :

dl [m] :   Distance along long side of the space
db [m] :   Distance along broad side of the space
X1 [m] :   Distance from the left wall
X2 [m] :   Distance from the right wall
X3 [m] :   Distance from the lower wall
X4 [m] :   Distance from the upper wall
nl [ ] :   Number of diffusers along long side of the space
nb [ ] :   Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 2,7 l/s m2 floor
Required supply air flow rate in space : 99 l/s
Air change coefficient : 3,2 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Two sided
length = 2,0 m

Calculation results for cooling :

Diffuser type : LD-13/2
Diffuser air flow rate : Vol = 49,4 l/sm   (177,9 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=1,7m) : vL = 0,49 m/s
Mean air velocity by the wall at the floor level (L=3,5m) : vL = 0,38 m/s
Temperature quotient at the distance L=X1+H1 (L=1,7m) : dtL/dtz = 0,136   dtL = -1,1 K
Temperature quotient at the distance L=X1+H (L=3,5m) : dtL/dtz = 0,101   dtL = -0,8 K
Pressure drop on the diffuser (regulation=100%) : dpt = 6,9 Pa

Sound power level of the diffuser :
Lw63 = 34 dB   Lw125 = 39 dB   Lw250 = 41 dB   Lw500 = 33 dB   Lw1000 = 20 dB
Lw2000 = 11 dB   Lw4000 = 0 dB   Lw8000 = 0 dB   LwA = 34,7 dB(A)   NR = 32
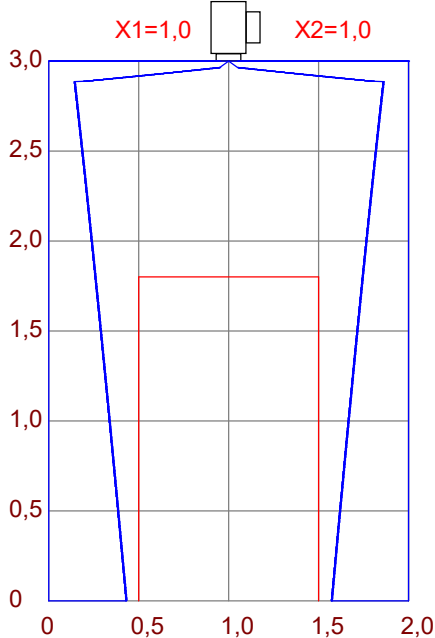
Sound pressure level in space at 1,8 m :
Lp63 = 32 dB   Lp125 = 37 dB   Lp250 = 39 dB   Lp500 = 30 dB   Lp1000 = 18 dB
Lp2000 = 9 dB   Lp4000 = 0 dB   Lp8000 = 0 dB   LpA = 32,4 dB(A)   NR = 29

Air distribution design

Project data :

Name of the project :
Customer :
Reference :
Designed by : Zupan
Information : Hodnik-N_480m3/h

Air diffusion :

X1=1,0   X2=1,0

Placement of diffusers :
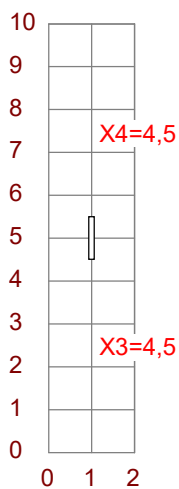

X4=4,5

X3=4,5

Space :

height = 3,0 m
length = 2,0 m
width = 10,0 m
floor = 20,0 m2
volume = 60,0 m3

Placement :

dl = 0,00 m
db = 0,00 m
X1 = 1,00 m
X2 = 1,00 m
X3 = 4,50 m
X4 = 4,50 m
nl = 1
nb = 1

Definitions :

Vol [l/sm] :   Air flow rate at the diffuser per meter
dl,db [m] :   Distance between the diffusers
X1,X2,X3,X4 [m] :   Distance between the diffuser and the wall
H1 [m] :   Distance between the diffuser and the stand level
H [m] :   Installation height of the diffuser
h1 [m] :   Vertical throw of the diffuser for heating
h1max [m] :   Maximum throw of the diffuser for heating
vH1 [m/s] :   Air velocity between the diffusers at the distance H1
vL [m/s] :   Air velocity by the wall at the distance L
LwA [dB(A)] :   A-weighted sound power level
LpA [dB(A)] :   A-weighted sound pressure level in room
dpt [Pa] :   Pressure drop at the diffuser

Placement :
dl [m] :   Distance along long side of the space
db [m] :   Distance along broad side of the space
X1 [m] :   Distance from the left wall
X2 [m] :   Distance from the right wall
X3 [m] :   Distance from the lower wall
X4 [m] :   Distance from the upper wall
nl [ ] :   Number of diffusers along long side of the space
nb [ ] :   Number of diffusers along broad side of the space

Design criteria :

Optimal operative temperature : 26,0 °C
Supply air temperature : 18,0 °C
Temperature difference : -8,0 K
Permissible mean air velocity in
   occupied zone : 0,15 m/s
Required supply air flow rate : 6,7 l/s m2 floor
Required supply air flow rate in space : 134 l/s
Air change coefficient : 8,0 1/h
Sound pressure level : 35 dB(A)
Sound increment : 0 dB
Reverberation time : 1,0 s
Occupied zone : 1,8 m

Diffuser :

Supply : Cooling (Coanda effect) - Two sided
length = 1,0 m

Calculation results for cooling :

Diffuser type : LD-13/4
Diffuser air flow rate : Vol = 134,0 l/sm   (482,4 m3/hm)
Mean air velocity by the wall at the occupied zone level (L=2,2m) : vL = 0,79 m/s
Mean air velocity by the wall at the floor level (L=4,0m) : vL = 0,61 m/s
Temperature quotient at the distance L=X2+H1 (L=2,2m) : dtL/dtz = 0,174   dtL = -1,4 K
Temperature quotient at the distance L=X2+H (L=4,0m) : dtL/dtz = 0,130   dtL = -1,0 K
Pressure drop on the diffuser (regulation=100%) : dpt = 13,8 Pa

Sound power level of the diffuser :
Lw63 = 36 dB   Lw125 = 36 dB   Lw250 = 41 dB   Lw500 = 30 dB   Lw1000 = 23 dB
Lw2000 = 15 dB   Lw4000 = 4 dB   Lw8000 = 0 dB   LwA = 34,1 dB(A)   NR = 32

Sound pressure level in space at 1,8 m :
Lp63 = 33 dB   Lp125 = 33 dB   Lp250 = 38 dB   Lp500 = 27 dB   Lp1000 = 21 dB
Lp2000 = 13 dB   Lp4000 = 1 dB   Lp8000 = 0 dB   LpA = 31,3 dB(A)   NR = 29