```
 <html><head><title>Q1</title>
 <link rel="stylesheet" type="text/css"
 href="/phoenics/d_polis/polstyle.css">
 </head><body><pre><strong>
TALK=T;RUN( 1, 1)

***********************************************************
  Q1 created by VDI menu, Version 2015, Date 29/03/16
CPVNAM=VDI; SPPNAM=FLAIR
***********************************************************
 Echo DISPLAY / USE settings
***********************************************************
IRUNN = 1 ;LIBREF = 0
***********************************************************
 Group 1. Run Title
TEXT(Pollutant-gas dispersion from a building)
***********************************************************
 Echo save-block settings for Group  1
  save1begin
 The case considered is pollutant gas dispersion into the
 atmosphere from a roof-top vent on an isolated building.

 The pollutant gas is discharged vertically upwards at
 50degC from a rectangular vent into an ambient wind field
 at 20degC. The inlet densimetric Froude number is unity,
 and the molecular mass of the gas is the same as ambient
 air. The ratio of the reference wind speed to the exhaust-
 plume velocity is 2.5. The mass fraction of the incoming
 pollutant C1 is set to unity at the discharge plane.

 A WIND object is used to specify a northerly wind whose
 log-law inlet profiles define a neutral atmospheric boundary
 layer with a terrain roughness height of 0.03m, and a wind
 speed of 2.5m/s at the reference height of 10m. The
 turbulence is represented by the Chen-Kim variant of the
 k-e turbulence model.The turbulent Schmidt number for the
 pollutant gas is set equal to 0.7.

 The WIND object automatically applies fully-rough wall
 functions on the ground plane and fixed-pressure conditions
 on the sky, side and outlet boundaries. The sky boundary
 also employs a diffusive boundary condition consistent
 with a uniform wind shearing stress.

 The In-Form facility is used to provide tabular printout to
 a MS Excel file (.csv format) of the absolute velocity and
 pollutant mass fraction for 3 different locations. In-Form
 is also used to create a variable named C1PM, which computes
 and stores for plotting purposes the local pollutant
 concentration in ppm by mass.
  save1end
***********************************************************
 Group 2. Transience
STEADY = T
***********************************************************
 Groups 3, 4, 5  Grid Information
   * Overall number of cells, RSET(M,NX,NY,NZ,tolerance)
```

```
RSET(M,65,45,25)
************************************************************
 Group 6. Body-Fitted coordinates
************************************************************
 Group 7. Variables: STOREd,SOLVEd,NAMEd
   * Non-default variable names
NAME(145)=VABS ;NAME(146)=TEM1
NAME(147)=EPKE ;NAME(148)=DEN1
NAME(149)=EL1 ;NAME(150)=ENUT
   * Solved variables list
SOLVE(P1,U1,V1,W1,C1,TEM1)
   * Stored variables list
STORE(ENUT,EL1,DEN1,EPKE,VABS)
   * Additional solver options
SOLUTN(P1,Y,Y,Y,N,N,Y)
SOLUTN(C1,Y,Y,Y,N,N,Y)
SOLUTN(TEM1,Y,Y,Y,N,N,Y)
TURMOD(KECHEN)

************************************************************
 Echo save-block settings for Group  7
 save7begin
(stored of C1PM is 1.E6*C1 with IMAT<100.)
 save7end
************************************************************
 Group 8. Terms & Devices
NEWRH1 = T
NEWENL = T
************************************************************
 Group 9. Properties
PRESS0 =1.01325E+05 ;TEMP0 =273.
   * Domain material index is   2 signifying:
   * Air using Ideal Gas Law, STP
SETPRPS(1, 2)
DRH1DP = GRND5
DVO1DT =3.33E-03
PRNDTL(C1)=0.7 ;PRNDTL(TEM1)=-0.0263
PRT(KE)=0.75 ;PRT(EP)=1.15
************************************************************
 Group 10.Inter-Phase Transfer Processes
************************************************************
 Group 11.Initialise Var/Porosity Fields
FIINIT(P1)=0. ;FIINIT(U1)=5.
FIINIT(C1)=0. ;FIINIT(TEM1)=20.
  No PATCHes used for this Group


INIADD = F
************************************************************
 Group 12. Convection and diffusion adjustments
  No PATCHes used for this Group
************************************************************
 Group 13. Boundary & Special Sources

PATCH(BUOYANCY, PHASEM, 0, 0, 0, 0, 0, 0, 1, 1)
COVAL(BUOYANCY, U1, FIXFLU, GRND2)
COVAL(BUOYANCY, V1, FIXFLU, GRND2)
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```
 COVAL(BUOYANCY, W1, FIXFLU, GRND2)

 BUOYA =0. ; BUOYB =0.
 BUOYC =-9.81
 BUOYD =1.204938
 EGWF = T
 ************************************************************
  Group 14. Downstream Pressure For PARAB
 ************************************************************
  Group 15. Terminate Sweeps
 LSWEEP = 500
 RESFAC =1.0E-04
 ************************************************************
  Group 16. Terminate Iterations
 LITER(P1)=100 ;LITER(C1)=50
 LITER(TEM1)=50
 ************************************************************
  Group 17. Relaxation
 RELAX(P1 ,LINRLX,1. )
 RELAX(U1 ,FALSDT,5. )
 RELAX(V1 ,FALSDT,5. )
 RELAX(W1 ,FALSDT,5. )
 RELAX(KE ,LINRLX,0.5 )
 RELAX(EP ,LINRLX,0.5 )
 RELAX(C1 ,LINRLX,0.5 )
 RELAX(TEM1,LINRLX,0.5 )
 KELIN = 3
 ************************************************************
  Group 18. Limits
 VARMAX(C1)=1. ;VARMIN(C1)=0.
 VARMAX(TEM1)=3000. ;VARMIN(TEM1)=-204.75
 ************************************************************
  Group 19. EARTH Calls To GROUND Station
 NAMGRD =FLAR
 GENK = T
 PARSOL = F
 IENUTA = 2
 ISG62 = 0
 SPEDAT(SET,OUTPUT,NOFIELD,L,T)
 SPEDAT(SET,GXMONI,PLOTALL,L,T)
 ************************************************************
  Group 20. Preliminary Printout
 ************************************************************
  Group 21. Print-out of Variables
 ************************************************************
  Echo save-block settings for Group 21
  save21begin

integer(npts)
array(xx,real,3)
array(yy,real,3)
array(zz,real,3)

npts=3

xx(1)= 50.
xx(2)= 60.
```

```
xx(3)= 70.

do ii=1,npts
yy(ii)= 50.
zz(ii)=1.75
enddo

do ii=1,npts
(table in output:ii:.csv is
get(VABS{:xx(ii):,:yy(ii):,:zz(ii):},C1{:xx(ii):,:yy(ii):,:zz(ii):})
with head(v:ii:,c:ii:)!sweep)
enddo
  save21end
 ************************************************************
  Group 22. Monitor Print-Out
 IXMON = 49 ;IYMON = 23 ;IZMON = 3
 NPRMON = 100000
 NPRMNT = 1
 TSTSWP = -1
 ************************************************************
  Group 23.Field Print-Out & Plot Control
 NPRINT = 100000
 ISWPRF = 1 ;ISWPRL = 100000
   No PATCHes used for this Group
 ************************************************************
  Group 24. Dumps For Restarts

 GVIEW(P,0.,-1.,0.)
 GVIEW(UP,0.,0.,1.)
 GVIEW(DEPTH,3.0E+04)
 GVIEW(NEARPLANE,0.24)
 GVIEW(VDIS,68.330414)
 GVIEW(CENTRE,47.293518,50.,2.3)

> DOM,    SIZE,         1.200000E+02, 1.000000E+02, 3.000000E+01
> DOM,    MONIT,        5.081386E+01, 5.000000E+01, 1.875000E+00
> DOM,    SCALE,        1.000000E+00, 1.000000E+00, 1.000000E+00
> DOM,    INCREMENT,    1.000000E-02, 1.000000E-02, 1.000000E-02
> GRID,   RSET_X_1,      20,-1.100000E+00,G
> GRID,   RSET_X_2,      -8, 1.200000E+00,G
> GRID,   RSET_X_3,       3, 1.000000E+00
> GRID,   RSET_X_4,      -8, 1.200000E+00,G
> GRID,   RSET_X_5,      26, 1.100000E+00,G
> GRID,   RSET_Y_1,      16,-1.100000E+00,G
> GRID,   RSET_Y_2,      -5, 1.200000E+00,G
> GRID,   RSET_Y_3,       3, 1.000000E+00
> GRID,   RSET_Y_4,      -5, 1.200000E+00,G
> GRID,   RSET_Y_5,      16, 1.100000E+00,G
> GRID,   RSET_Z_1,       8, 1.000000E+00
> GRID,   RSET_Z_2,      17, 1.100000E+00,G
> DOM,    INI_AMB,     YES
> DOM,    INI_BUOY,    YES

> OBJ,    NAME,         BUILDING
> OBJ,    POSITION,     3.000000E+01, 4.500000E+01, 0.000000E+00
> OBJ,    SIZE,         1.000000E+01, 1.000000E+01, 6.000000E+00
> OBJ,    GEOMETRY,     cube14
```

```
> OBJ,    VISIBLE,     NO
> OBJ,    TYPE,        BLOCKAGE
> OBJ,    WIREFRAME,   YES
> OBJ,    MATERIAL,    198,Solid with smooth-wall friction

> OBJ,    NAME,        INL_GAS
> OBJ,    POSITION,    3.500000E+01, 4.950000E+01, 6.000000E+00
> OBJ,    SIZE,        1.000000E+00, 1.000000E+00, 0.000000E+00
> OBJ,    GEOMETRY,    cube3t
> OBJ,    TYPE,        INLET
> OBJ,    WIREFRAME,   YES
> OBJ,    PRESSURE,     P_AMBIENT
> OBJ,    VELOCITY,    0. ,0. ,1.
> OBJ,    TEMPERATURE, 50.
> OBJ,    INLET_C1,    1.
> OBJ,    TURB-INTENS, 5.
> OBJ,    OBJECT-SIDE,  HIGH

> OBJ,    NAME,        IN_WIND
> OBJ,    POSITION,    0.000000E+00, 0.000000E+00, 0.000000E+00
> OBJ,    SIZE,        TO_END,       TO_END,       TO_END
> OBJ,    DOMCLIP,     NO
> OBJ,    GEOMETRY,    windgr
> OBJ,    ROTATION24,  7
> OBJ,    VISIBLE,     NO
> OBJ,    TYPE,        WIND
> OBJ,    WIREFRAME,   YES
> OBJ,    PRESSURE,    1.01325E+05
> OBJ,    COEFFICIENT, 1000.
> OBJ,    VELOCITY,    2.5
> OBJ,    WIND_DIR,    0.
> OBJ,    AXIS_DIR,    90.
> OBJ,    TEMPERATURE, 20.
> OBJ,    PROFILE,      Logarithmic
> OBJ,    REF_HEIGHT,  10.
> OBJ,    RGHNS_HEIGHT,0.03
> OBJ,    UP-DIR,       Z
> OBJ,    SKY,          YES
> OBJ,    GROUND,       YES
> OBJ,    GROUND-TEMP,  ADIABATIC
STOP
  </strong></pre></body></html>
```