```
5240    IF Twb<0 THEN E=.000594
5250    Ps=Pss-Patm*E*(Tdb-Twb)
5260    Rh=Ps/Pws
5270  SUBEND
5280  !
5290  !
5300  !
5310  SUB Radp(Tdiff,Patm,Tdb,Rh,Shf,Wg,Hg,Radp,Message$)
5320  !       Subroutine for determining the apparatus dew-point temperature.
5330  !       PARAMETERS ARE :
5340  !           Tdiff     cooler coil maximum temp differential
5350  !           Shf       sensible heat factor
5360  !           Radp      apparatus dew-point temp
5370  !           T1,T2     bracket variables for Radp
5380  !           T3        average temp of bracket
5390  !           Tg        dry-bulb temp iteration variable
5400  !           Wg        moisture content for temp variable corresponding to
5410  !                     the Shf line
5420  !           Wssg      saturated moisture content for dry-bulb temp Tg
5430  !           U=Wg/Wssg moisture content ratio
5440  !
5450  !       Check for unacceptable relative humidity.
5460    IF Rh<=.1 THEN
5470      BEEP 900,.15
5480      PRINT "Unexpected error found  : rh < 10 % LINE 3200"
5490      STOP
5500    END IF
5510    T=Tdb+273.15
5520    Pss=(10^(30.59051-8.2*LOG(T)/LOG(10)+.0024804*T-3142.31/T))*10
5530    Ps=Rh*Pss
5540    W=(18.016/28.9664)*1.0048*Ps/(Patm-1.0048*Ps)
5550    Z=-.00000662*Tdb^3-.000194*Tdb^2+1.8375*Tdb+2500.83
5560    Hdb=1.005*Tdb+W*Z
5570    Tg=Tdb
5580  !       Set initial temp guess equal to dry-bulb temp.
5590  !       Start search for temp bracket.
5600    REPEAT
5610      T1=Tg
5620  !       Determine moisture contents - saturated and on Shf line. Correct
5630  !       moisture content is when both are equal.
5640      GOSUB 6060
5650      IF U<1 AND (Tdb-Tg)>Tdiff THEN
5660        Radp=Tdb-Tdiff
5670        Message$="NOT"
5680  !     PRINT "Sat line not intersected by sensible ratio line (room or effe
ctive)"
5690  !
5700        T=Radp+273.15
```

```
5710        Pssg=(10^(30.59051-8.2*LOG(T)/LOG(10)+.0024804*T-3142.31/T))*10
5720        Wg=(18.016/28.9664)*1.0048*Pssg/(Patm-1.0048*Pssg)
5730        Z=-.00000662*Radp^3-.000194*Radp^2+1.8375*Radp+2500.83
5740        Hg=1.005*Radp+W*Z
5750        GOTO 6140
5760      END IF
5770    UNTIL U>1
5780  !       Bracket has now been located. Iterate until an acceptable error
5790  !       limit is reached.
5800    T2=Tg
5810    REPEAT
5820      Count=Count+1
5830      T3=(T1+T2)/2
5840      Tg=T3
5850      GOSUB 6070
5860      IF U>1 THEN
5870        T2=T3
5880      ELSE
5890        T1=T3
5900      END IF
5910      Error=ABS(1-U)
5920    UNTIL Error<.0001 OR Count=20
5930  !       Check if coil temp difference exceeds tolerated value. If so then
5940  !       set apparatus dew-point temp equal to the limit.
5950    IF (Tdb-T3)>Tdiff THEN
5960  !   PRINT "Supply air temp differential > specified"
5970      Radp=Tdb-Tdiff
5980      Tg=Radp
5990      GOSUB 6070
6000      Message$="LIMIT"
6010    ELSE
6020      Radp=T3
6030    END IF
6040    GOTO 6140
6050    !
6060    Tg=Tg-10
6070    Hg=Hdb-1.0048*(Tdb-Tg)/Shf
6080    Wg=(Hg-1.0048*Tg)/(2501+1.85*Tg)
6090    T=Tg+273.15
6100    Pssg=(10^(30.59051-8.2*LOG(T)/LOG(10)+.0024804*T-3142.31/T))*10
6110    Wssg=(18.016/28.9664)*1.0048*Pssg/(Patm-1.0048*Pssg)
6120    U=Wg/Wssg
6130    RETURN
6140  SUBEND
6150    !
6160    !
6170  SUB Return(Noplant,Nz,Vec(*),Plant(*),Rh(*),T3(*),L,Tret(*),Rhret(*))
```

```
6180  !       Subroutine to determine the plant average return air temperature
6190  !       and humidity.
6200  !       PARAMETERS ARE :
6210  !           Nz          number of zones
6220  !           T3          zone return air dry-bulb temp
6230  !           Tret        plant return air dry-bulb temperture
6240  !           Rhret       plant return air relative humidity
6250  !
6260    FOR P=1 TO Noplant
6270      Rhret(P)=0
6280      Tret(P)=0
6290      Count=0
6300  !       Add the return relative humidities and temperatures for zones
6310  !       served by each plant.
6320      FOR K=1 TO Nz
6330        IF Vec(P)=Plant(K) THEN
6340          Tret(P)=Tret(P)+T3(L,K)
6350          Rhret(P)=Rhret(P)+Rh(L,K)
6360          Count=Count+1
6370        END IF
6380      NEXT K
6390  !       Calculate the average.
6400      Tret(P)=Tret(P)/Count
6410      Rhret(P)=Rhret(P)/(100*Count)
6420    NEXT P
6430  SUBEND
6440    !
6450    !
6460    !
6470  SUB Prop(Patm,Tdb,Rh,W,Hdb,Svoa)
6480  !       Subroutine for determining the psychrometric states of moisture
6490  !       content (W), entalpy (Hdb) and specific volume (Svoa).
6500    T=Tdb+273.15
6510    Pss=(10^(30.59051-8.2*LOG(T)/LOG(10)+.0024804*T-3142.31/T))*10
6520    Ps=Rh*Pss
6530    W=.62198*1.004*Ps/(Patm-1.004*Ps)
6540    Z=-.00000662*Tdb^3-.000194*Tdb^2+1.8375*Tdb+2500.83
6550    Hdb=1.005*Tdb+W*Z
6560    Svoa=2.87055*T*(1+1.607*W)/Patm
6570  SUBEND
6580    !
6590    !
6600    !
6610  SUB Plant(Noplant,Vec(*),Startp(*),Endp(*),Pdiff(*))
6620  !       Subroutine of requesting plant cooler coil maximum temp
6630  !       differential and starting & ending plant operating hours.
6640  !       PARAMETERS ARE :
```

```
6650  !            Startp    plant starting operating hour
6660  !            Endp      plant ending operating hour
6670  !            Poiff     cooler coil maximum temp differential
6680  !
6690    FOR P=1 TO Noplant
6700      DISP "Enter plant starting hour,plant switching off hour for plant ";V
ec(P);
6710      INPUT Startp(P),Endp(P)
6720      DISP "Enter maximum temp differential for plant ";Vec(P);
6730      INPUT Poiff(P)
6740    NEXT P
6750  SUBEND
6760    !
6770    !
6780    !
6790  SUB Bypass(Noplant,Vec(*),Bypass(*))
6800  !       Subroutine for requesting cooler coil by-pass factors (Bypass).
6810    FOR P=1 TO Noplant
6820      INPUT "By-pass factor",Bypass(P)
6830    NEXT P
6840  SUBEND
6850    !
6860    !
6870    !
6880  SUB Fanduct(Noplant,Vec(*),Fsup(*),Fret(*))
6890  !       Subroutine for requesting supply (Fsup) and return (Fret) fan
6900  !       heat gains.
6910  !       Parameters are :
6920  !             Fsup -  supply fan temperature gain (deg c)
6930  !             Fret -  return fan temperature gain (deg c)
6940  !             Z1   -  estimated supply fan total pressure
6950  !             Z2   -  estimated return fan total pressure
6960    FOR P=1 TO Noplant
6970      IF Vec(P)=0 THEN 7050
6980      DISP "Enter estimated SUPPLY FAN TOTAL pressure (Pa) for plant ";Vec(P
);
6990      INPUT Z1
7000      Fsup(P)=Z1/1046
7010      DISP "Enter estimated RETURN FAN TOTAL pressure (Pa) for plant ";Vec(P
);
7020      INPUT Z2
7030      Fret(P)=Z2/1046
7040    NEXT P
7050  SUBEND
7060    !
7070    !
7080    !
7090  SUB Relhumid(Patm,W,Tdb,Rh)
7100  !       Subroutine for determining relative humidity (Rh).
7110    T=Tdb+273.15
```

```
7120    Pss=(10^(30.59051-8.2*LOG(T)/LOG(10)+.0024804*T-3142.31/T))*10
7130  !       Set initial partial pressure.
7140    Ps=.8*Pss
7150    REPEAT
7160      P=Ps
7170      Ps=W*(Patm-1.004*Ps)/(.62198*1.004)
7180      Error=ABS(P-Ps)/Ps
7190      Rh=Ps/Pss
7200    UNTIL Error<.0001
7210  !       Print message if unrealistic humidity value is found.
7220    IF Rh<=0 OR Rh>1.005 THEN
7230      PRINTER IS 1
7240      BEEP 200,.5
7250      PRINT "FOUND UNEXPECTED ERROR IN SUBROUTINE RELHUMID"
7260      PRINT "RH=";Rh
7270      STOP
7280    END IF
7290  SUBEND
7300    !
7310    !
7320    !
7330  SUB Consvol(Trans(*),Hrm,Tdiff,X,Patm,Vsup,Msup,Rload,Tdbon,Twbon,Tdboff,T
wboff,Hon,Hoff,Tsup,Tret,Adpt,Wadp,Hadp,Won,Woff,Svsup)
7340  !       Subroutine for determining the plant max. refrig. psychrometric st
ates.
7350  !       If heating is required, subroutine ends.
7360  !       PARAMETERS ARE :
7370  !           Rsh       room sensible heat
7380  !           Rlh       room latent heat
7390  !           Tsh       total room sensible load
7400  !           Tlh       total room latent load
7410  !           Gth       grand total load
7420  !           Eshf      effective sensible heat factor
7430  !           Toa       outdoor air dry-bulb temp
7440  !           Hoa       outdoor air entalpy
7450  !           Woa       outdoor air moisture content
7460  !           Moa       outdoor air mass flowrate
7470  !           Trm       zone air temp
7480  !           Wrm       zone moisture content
7490  !           Hrm       zone enthalpy
7500  !           Hret      return air enthalpy
7510  !           Svrm      zone specific volume
7520  !           Svsup     supply room temperture specific volume
7530  !           Rh        zone relative humidity
7540  !           X         cooler coil bypass factor
7550  !           Tret      return air temp
7560  !           Vsup      plant supply volume flowrate (m^3/s)
7570  !           Msup      plant supply mass flowrate
7580  !           Rload     plant refrigeration load
```

```
7590  !            Tdbon     on coil dry-bulb temp
7600  !            Twbon     on coil wet-bulb temp
7610  !            Hon       on coil enthalpy
7620  !            Won       on coil moisture content
7630  !            Tdboff    off coil dry-bulb temp
7640  !            Twboff    off coil wet-bulb temp
7650  !            Woff      off coil moisture content
7660  !            Hoff      off coil entalpy
7670  !            Oash      outdoor sensible heat  (kW)
7680  !            Oalh      outdoor latent heat  (kW)
7690  !            Fssh      supply fan heat gain   (kW)
7700  !            Frsh      return fan heat gain   (kW)
7710  !            Wadp      coil dew point moisture content
7720  !            Hadp      coil dew point enthalpy
7730  !            Patm      atmospheric pressure
7740  !
7750    Trans(1)=Trans(1)/1000
7760    Trans(2)=Trans(2)/1000
7770    Rsh=Trans(1)
7780    Rlh=Trans(2)
7790    Toa=Trans(3)
7800    Hoa=Trans(4)
7810    Woa=Trans(5)
7820    Moa=Trans(6)
7830    Trm=Trans(7)
7840    Wrm=Trans(8)
7850    Svrm=Trans(9)
7860    Rh=Trans(10)
7870    Fsup=Trans(12)
7880    Fret=Trans(13)
7890    Message$=""
7900    Oash=1.0048*(Toa-Trm)*X*Moa
7910    Oalh=Moa*2501*(Woa-Wrm)*X
7920    Fssh=Rsh*Fsup/11
7930    Frsh=Rsh*Fret/11
7940    Tsh=Rsh+Oash+Fssh
7950    Tlh=Rlh+Oalh
7960    Gth=Tsh+Tlh
7970    IF Tsh<=0 OR Gth<=0 THEN 8800
7980    Eshf=Tsh/Gth
7990    !
8000  !   Exit subroutine if heating is required
8010    IF Eshf>=1 OR Eshf<0 THEN 8800
8020    CALL Radp(Tdiff,Patm,Trm,Rh,Eshf,Wsup,Hsup,Tsup,Message$)
8030    IF Message$="NOT" OR Message$="LIMIT" THEN
8040      Rload=0
8050      Tdbon=0
```

```
8060      Twbon=0
8070      Tdboff=0
8080      Twboff=0
8090      Hon=0
8100      Hoff=0
8110      Msup=0
8120      Vsup=0
8130      GOTO 8800
8140    END IF
8150    Adpt=Tsup
8160    Wadp=Wsup
8170    Hadp=Hsup
8180    Msup=Tsh/(1.0048*(Trm-Tsup)*(1-X))
8190    IF Msup<Moa THEN
8200      Msup=Moa
8210      Mret=0
8220    ELSE
8230      Mret=Msup-Moa
8240    END IF
8250    !
8260    !  FIND ON PRELIMINARY ON COIL STATES
8270    Tret=Trm+Fret
8280    Z=-.00000662*Tret^3-.000194*Tret^2+1.8375*Tret+2500.83
8290    Hret=1.005*Tret+Wrm*Z
8300    Hon=(Hret*Mret+Hoa*Moa)/Msup
8310    Tdbon=(Hon-Hret)*(Toa-Tret)/(Hoa-Hret)+Tret
8320    Won=(Hon-Hret)*(Woa-Wrm)/(Hoa-Hret)+Wrm
8330      !
8340    !  FIND AND FIX OFF COIL STATES
8350    Tdboff=Adpt+X*(Tdbon-Adpt)
8360    Woff=Wadp+X*(Won-Wadp)
8370    CALL Relhumid(Patm,Woff,Tdboff,Rhoff)
8380    CALL Wet_bulb(Patm,Tdboff,Rhoff,Twboff)
8390    Z=-.00000662*Tdboff^3-.000194*Tdboff^2+1.8375*Tdboff+2500.83
8400    Hoff=1.005*Tdboff+Woff*Z
8410      !
8420    !  RECALCULATE REMAINING VALUES TO REDUCE ERRORS
8430      !
8440    !  FIND SUPPLY STATES
8450    Wsup=Woff
8460    Tsup=Tdboff+Fsup
8470    T=Tsup+273.15
8480    Z=-.00000662*Tsup^3-.000194*Tsup^2+1.8375*Tsup+2500.83
8490    Hsup=1.005*Tsup+Woff*Z
8500    Svsup=2.87055*T*(1+1.607*Wsup)/Patm
8510      !
8520    !  FIND ROOM STATES
```

```
8530    Trm=Rsh/(1.0048*Msup)+Tsup
8540    T=Trm+273.15
8550    Hrm=(Rsh+Rlh)/Msup+Hsup
8560    Z=-.00000662*Trm^3-.000194*Trm^2+1.8375*Trm+2500.83
8570    Wrm=(Hrm-1.005*Trm)/Z
8580    Svrm=2.87053*T*(1+1.607*Wrm)/Patm
8590    Vsup=Msup*(Svsup+Svrm)/2
8600    CALL Relhumid(Patm,Wrm,Trm,Rh)
8610      !
8620    !  FIND FAN RETURN STATES
8630    Tret=Trm+Fret
8640    T=Tret+273.15
8650    Z=-.00000662*Tret^3-.000194*Tret^2+1.8375*Tret+2500.83
8660    Wret=Wrm
8670    Hret=1.005*Tret+Wret*Z
8680      !
8690    !  FIND ON COIL STATES
8700    Hon=(Hret*Mret+Hoa*Moa)/Msup
8710    Won=(Hon-Hret)*(Woa-Wret)/(Hoa-Hret)+Wret
8720    Tdbon=(Hon-Hret)*(Toa-Tret)/(Hoa-Hret)+Tret
8730    CALL Relhumid(Patm,Won,Tdbon,Rhon)
8740    CALL Wet_bulb(Patm,Tdbon,Rhon,Twbon)
8750      !
8760    !  CALCULATE REFRIGERATION LOAD
8770    Rload=Msup*((Hon-Hoff)-42.11*(Won-Woff))
8780    Trans(7)=Trm
8790    Trans(10)=Rh
8800  SUBEND
8810    !
8820    !
8830    !
8840  SUB Wet_bulb(Patm,Tdb,Rh,Twb)
8850  !       Subroutine for determining the wet-bulb temperature.
8860  !       Check for unrealistic humidities.
8870    IF Rh>1 AND Rh<1.005 THEN
8880      Twb=Tdb
8890      GOTO 9340                    ! SUBEND
8900    END IF
8910  !       Calculate moisture content at dry-bulb temp.
8920    T=Tdb+273.15
8930    Pss=(10^(30.59051-8.2*LOG(T)/LOG(10)+.0024804*T-3142.31/T))*10
8940    Ps=Rh*Pss
8950    W=.62198*1.004*Ps/(Patm-1.004*Ps)
8960    Twb=Tdb
8970  !       Set initial wet-bulb temp and search for a bracket.
8980    Twbb=Tdb-8
8990    REPEAT
```

```
9000      Twbb=Twb
9010      GOSUB 9280
9020    UNTIL T_new<Tdb
9030  !       Bracket has been located. Iterate until an acceptable value is
9040  !       found.
9050    T1=Twb
9060    T2=Twbb
9070    REPEAT
9080      T3=(T1+T2)/2
9090      Twb=T3
9100  !       Relative error is used for Tdb<>0, else absolute error is used.
9110      GOSUB 9290
9120      IF Tdb<>0 THEN
9130        Error=ABS(T_new-Tdb)/Tdb
9140  !   PRINT CHR$(129);"1  ERROR ";Error;CHR$(128)
9150      ELSE
9160        Error=ABS(T_new-Tdb)
9170        PRINT CHR$(129);"2  ERROR ";Error;CHR$(128)
9180      END IF
9190      IF T_new>Tdb THEN
9200        T2=T3
9210      ELSE
9220        T1=T3
9230      END IF
9240    UNTIL Error<.001
9250    Twb=T3
9260    GOTO 9340
9270    !
9280    Twb=Twb-8
9290    T=Twb+273.15
9300    Pws=(10^(30.59051-8.2*LOG(T)/LOG(10)+.0024804*T-3142.31/T))*10
9310    Ws=.62198*1.004*Pws/(Patm-1.004*Pws)
9320    T_new=(2501*(Ws-W)+Twb*(4.186*W-2.381*Ws+1))/(1.805*W+1)
9330    RETURN
9340  SUBEND
9350  !
9360  !
9370  !
9380  SUB Cv_pload(Trans(*),Des_woff,Des_toffwb,Des_cap,Des_toffdb,A,B,Vsup,Patm
,Rload,Tdbon,Twbon,Tdboff,Twboff,Hon,Hoff,Msup,X1,X2,Hload)
9390  !       Subroutine for determining the partial load psychrometric states.
9400  !       PARAMETERS ARE :
9410  !           Rsh       room sensible heat
9420  !           Rlh       room latent heat
9430  !           Tsh       total room sensible load
9440  !           Tlh       total room latent load
9450  !           Gth       grand total load
9460  !           Eshf      effective sensible heat factor
```

```
9470  !           Toa       outdoor air dry-bulb temp
9480  !           Hoa       outdoor air entalpy
9490  !           Woa       outdoor air moisture content
9500  !           Moa       outdoor air mass flowrate
9510  !           Trm       zone air temp
9520  !           Wrm       zone moisture content
9530  !           Hrm       zone enthalpy
9540  !           Hret      return air enthalpy
9550  !           Svrm      zone specific volume
9560  !           Svsup     supply room temperture specific volume
9570  !           Rh        zone relative humidity
9580  !           X         cooler coil bypass factor
9590  !           Tret      return air temp
9600  !           Vsup      plant supply volume flowrate (m^3/s)
9610  !           Msup      plant supply mass flowrate
9620  !           Rload     plant refrigeration load
9630  !           Tdbon     on coil dry-bulb temp
9640  !           Twbon     on coil wet-bulb temp
9650  !           Hon       on coil entalpy
9660  !           Won       on coil moisture content
9670  !           Tdboff    off coil dry-bulb temp
9680  !           Twboff    off coil wet-bulb temp
9690  !           Woff      off coil moisture content
9700  !           Hoff      off coil entalpy
9710  !           Qash      outdoor sensible heat  (kW)
9720  !           Qalh      outdoor latent heat  (kW)
9730  !           Fsup      supply fan temp gain
9740  !           Fret      return fan temp gain
9750  !           Wadp      coil dew point moisture content
9760  !           Hadp      coil dew point enthalpy
9770  !           Patm      atmospheric pressure
9780    Des_tondb=A
9790    Des_svsup=B
9800    Trans(1)=Trans(1)/1000
9810    Trans(2)=Trans(2)/1000
9820    Rsh=Trans(1)
9830    Rlh=Trans(2)
9840    Toa=Trans(3)
9850    Hoa=Trans(4)
9860    Woa=Trans(5)
9870    Moa=Trans(6)
9880    Trm=Trans(7)
9890    Wrm=Trans(8)
9900    Svrm=Trans(9)
9910    Rh=Trans(10)
9920    Des_trm=Trans(11)
9930    Fsup=Trans(12)
```

```
9940    Fret=Trans(13)
9950    Msup=Vsup/Svrm
9960    !
9970  !  FIND WHETHER COOLING OR HEATING CYCLE IS REQUIRED
9980    IF Rsh<0 THEN          ! HEATING CYCLE REQUIRED
9990      REPEAT
10000       Count=Cout+1
10010       Msupw=Msup
10020       Tsupw=Des_trm+ABS(Rsh)/(Msup*1.0048)
10030       T=Tsupw+273.15
10040       Wsupw=Wrm-Rlh/(Msup*2626)
10050       Svsupw=2.87055*T*(1+1.607*Wsupw)/Patm
10060       Msup=Vsup*2/(Svrm+Svsupw)
10070       Error=ABS(Msup-Msupw)/Msup
10080     UNTIL Error<.001 OR Count>10
10090   ELSE                     ! COOLING CYCLE REQUIRED
10100     Tsup=Des_toffdb+Fsup
10110     T=Tsup+273.15
10120     Svsup=2.87055*T*(1+1.607*Des_woff)/Patm
10130     Msup=Vsup*2/(Svsup+Svrm)
10140   END IF
10150   !
10160   Tret=Des_trm+Fret
10170   Z=-.00000662*Tret^3-.000194*Tret^2+1.8375*Tret+2500.83
10180   Hret=1.005*Tret+Wrm*Z
10190   Hon=(Hret*(Msup-Moa)+Hoa*Moa)/Msup
10200   Won=(Hon-Hret)*(Woa-Wrm)/(Hoa-Hret)+Wrm
10210   Tdbon=(Hon-Hret)*(Toa-Tret)/(Hoa-Hret)+Tret
10220   CALL Relhumid(Patm,Won,Tdbon,Rhon)
10230   CALL Wet_bulb(Patm,Tdbon,Rhon,Twbon)
10240   !
10250   ! Check if on coil states will will maintain room dry bulb temp
10260   ! within 1.5 deg C of specified dry bulb temp
10270   Trm_new=Tdbon+Rsh/(Msup*1.0048)+Fsup
10280   IF ABS(Des_trm-Trm_new)<1.0 THEN
10290     Rload=0
10300     Trm=Trm_new
10310     Woff=Won
10320     IF ABS(Won-Wrm)/Wrm>.05 THEN
10330       Hload=Msup*2626*(Wrm-Won)-Rlh
10340       Woff=Hload/(2626*Msup)+Won
10350     END IF
10360     Tdboff=Tdbon+Fsup
10370     Trm=Tdboff+Rsh/(1.0048*Msup)
10380     Wrm=Won+Hload/(2626*Msup)
10390     CALL Relhumid(Patm,Wrm,Trm,Rh)
10400     CALL Relhumid(Patm,Woff,Tdboff,Rhoff)
```

```
10410     CALL Wet_bulb(Patm,Tdboff,Rhoff,Twboff)
10420     GOTO 11050
10430   END IF
10440     !
10450   ! check for heating with no cooling requirement
10460   IF (Des_trm-Trm_new)>0 THEN              ! HEATING CYCLE REQUIRED
10470     IF Tdbon<=Des_toffdb THEN              ! CHECK FOR PREHEAT REQUIREMENT
10480       Preheat=Msup*1.0048*(Des_trm-Tdbon-Fsup)
10490       IF Wrm>Won THEN Hload=Msup*2626*(Wrm-Won)-Rlh
10500       Reheat=ABS(Rsh)
10510     ELSE                 ! NO PREHEAT REQUIRED
10520       Reheat=ABS(Rsh)+Msup*1.0048*(Des_trm-Tdbon-Fsup)
10530     END IF
10540     X1=Reheat
10550     X2=Preheat
10560     Tdboff=Tdbon+Fsup+(X1+X2)/(Msup*1.0048)
10570     Woff=Hload/(Msup*2626)+Won
10580     Z=-.00000662*Tdboff^3-.000194*Tdboff^2+1.8375*Tdboff+2500.83
10590     Hoff=1.005*Tdboff+Des_woff*Z
10600     Trm=Tdboff-ABS(Rsh)/(Msup*1.0048)
10610     Wrm=Woff+Rlh/(2626*Msup)
10620     CALL Relhumid(Patm,Wrm,Trm,Rh)
10630     CALL Relhumid(Patm,Woff,Tdboff,Rhoff)
10640     CALL Wet_bulb(Patm,Tdboff,Rhoff,Twboff)
10650     Rload=0
10660     GOTO 11050
10670   END IF
10680   !
10690   ! check for cooling and dehumidification requirement
10700   IF Rsh>0 THEN              ! COOLING CYCLE EXISTS
10710     Tdboff=Des_toffdb
10720     Twboff=Des_toffwb
10730     Z=-.00000662*Tdboff^3-.000194*Tdboff^2+1.8375*Tdboff+2500.83
10740     Hoff=1.005*Tdboff+Des_woff*Z
10750     Tsup=Des_toffdb+Fsup
10760     T=Tsup+273.15
10770     Z=-.00000662*Tsup^3-.000194*Tsup^2+1.8375*Tsup+2500.83
10780     Hsup=1.005*Tsup+Des_woff*Z
10790     !
10800   ! CHECK FOR REHEAT REQUIREMENT IN COOLING CYCLE
10810     T1=Des_trm-Rsh/(1.0048*Msup)
10820     IF T1>Tsup THEN          ! REHEAT CYCLE REQUIRED
10830       Sh=Msup*(Des_trm-Tsup)
10840       Reheat=Sh-Rsh
10850       X1=Reheat
10860       X2=0
10870       Trm=Tdboff+Fsup+Sh/(Msup*1.0048)
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10880        Wrm=Des_woff+Rlh/(2626*Msup)
10890        CALL Relhumid(Patm,Wrm,Trm,Rh)
10900      ELSE                  ! DESIGN CONDITION EXISTS
10910      ! FIND ROOM STATES
10920        Trm=Rsh/(1.0048*Msup)+Tsup
10930        T=Trm+273.15
10940        Hrm=(Rsh+Rlh)/Msup+Hsup
10950        Z=-.00000662*Trm^3-.000194*Trm^2+1.8375*Trm+2500.83
10960        Wrm=(Hrm-1.005*Trm)/Z
10970        Svrm=2.87055*T*(1+1.607*Wrm)/Patm
10980        CALL Relhumid(Patm,Wrm,Trm,Rh)
10990        X1=0
11000        X2=0
11010      END IF
11020      Hload=0
11030      Rload=Des_cap
11040    END IF
11050    Trans(7)=Trm
11060    Trans(10)=Rh
11070  SUBEND
```

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