Thermal Solver Error Message List

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Overview

The thermal solver displays user information, warning, and error messages in the Solution Monitor at run time and in the log files. User messages indicate problems with the input file. Warning and information messages appear at various places in the output. Fatal messages cause the program to terminate. These messages appear at the end of the output.

The messages in the following table can be found in the *<simulation/model name>-<solution/analysis name>.log* and *<simulation/model name>-<solution/analysis name>_verbose.log* files.

Information messages	1000 - 1999	2000 - 2999	3000 - 3999
Warning messages	4000 - 4999	5000 - 5999	6000 - 6999
Fatal messages	7000 - 7999	8000 - 8999	9000 - 9999

The 10000 - 13999 messages in the Other messages section are general information messages stored in the *<simulation/model name>-<solution/analysis name>_report.log* file.

The 14000 - 14499 fatal and 14500 - 14999 warning messages in the Other messages section are generated by the multiphysics executable and stored in the *<simulation/model name>-<solution/analysis name>.mplg* file.

The 15000 - 15499 fatal and 15500 - 15551 warning messages in the Other messages section are generated by the mapping executable and stored in the *<simulation/model name>-<solution/analysis name>.log* file.

Information messages

2736 1001
'Elements',I10,' through',I10,' are circular elements,',/,
'Axis is along nodes',I10,' and',I10
1002
'Largest TMG table no. generated from ANSYS input=',I8
1003
'Axisymmetric element generation report'
1004
'The symmetry is local'
1005
'The symmetry is global'
1006
'Axisymmetric elements were merged to profile elements'
1007
'Axisymmetric view factors were requested with merge'
1008
'Axisymmetric elements are defined as circular elements'
1009
'Name assignment report',/,
'Name First Element Last Element Increment'
1011
'Variable assignment report',//,
'Name Value',/
1012
A31,1P,E11.4
1013
/,'End of variable assignment report'
1014
1X,A
1015
A
1016
'Invalid Model Translation option (Card 2a, N=4)'
1017
'Elements',I10,' thru',I10,' have been generated',
' in increments of',I10,' and',I10
1018
'Field 4 of REPEAT Card is blank, set to 0'
1019
'Repeat Card is ignored as previous Card ',
'is TABTYPE, TABDATA, or PRINT'
1020
' No eclipse occurs during this orbit'
1021
/,' Sun and planet angles are calculated for ',I8,' orbital positions'
1022

```
'    Eclipse starts at time',1PE15.6,3X,'Angle from periapsis= ',0P,F9.3,/,
'    Eclipse ends   at time',1PE15.6,3X,'Angle from periapsis= ',0P,F9.3
1023
'    Eclipse duration= ',F15.5
1024
 'Elements',I10,' through',I10,' of the model were not deactivated'
1025
 'Elements',I10,' through',I10,' of the model were deactivated'
1026
 'Conductive conductances ',
 ' to elements',I10,' through',I10,' are deleted'
1027
 'Radiative conductances connected',
 ' to elements',I10,' through',I10,' are deleted'
1028
 'The heat loads',
 ' to elements',I10,' through',I10,' are deleted'
1029
 'The capacitances',
 ' of elements',I10,' through',I10,' are deleted'
1030
 'Axisymmetric elements ',I10,' to ',I10,/,'(Increment=',
 I4,') are generated from profile element',I10
1031
 'A total of',I10,' profile elements are redefined',
 ' to be axisymmetric elements'
1032
 'All profile elements are defined to be axisymmetric elements'
1033
 /,'    A total of',I10,' additional axisymmetric elements are generated',/
1034
 A7,' element',I10,' created at node',I10
1035
'    Space elements',4I10,' created and merged to ',/,I12
1036
'    Space elements',3I10,' were created and merged to ',/,I12
1037
'    Orbital calculation times are: '
1038
 'X rot.=',F8.3,' Y rot.=',F8.3,' Z rot.=',F8.3,
 ' Time= ',1P,E15.6
1039
'    T=',1P,E11.4,' Theta=',0P,F6.1,' Sun: Thetas=',
 F6.1,' Phis=',F6.1,/,'    Planet: Thetae=',F6.1,' Phie=',F6.1
1040
'    Perigee occurs above north pole'
1041
'    Perigee occurs above south pole'
```

```
1042
 '    Local time at perigee is:',I3,' HR',I3,' MIN',/
1043
 'The emissivity of elements',I10,' through',I10,' is changed to',F9.3
1044
 'Solar surface property of elements',I10,
 ' through',I10,' changed to',F10.3
1045
 'Conduction parameter of elements',I10,
 ' through',I10,' changed to',1P,E13.4
1046
 'Capacitance parameter of elements',I10,
 ' through',I10,' changed to',1P,E12.4
1048
 '    Initial ',A,' obtained from file ',/,5X,A
1049
 'Elements',I10,1X,A7,' and',I10,1X,A7,' are a transparency pair'
1050
 'Elements of group ',A,' are circular elements,',/,
 'Axis is along nodes',I10,' and',I10
1051
 'Options for run:',/,'Module selection parameter=',I24,
 /,'File translation control parameter=',
 I16,/,'Subdivision parameter=',I29,
 /,1P,'Radiative Coupling Threshold=',E22.5,
 /,'First conductance # for SINDA output=',I14
1052
   'Residual view factor control value=',I16,
 /,'Stefan-Boltzmann constant=        ',1P,E16.5
1053
 'GRADNT=',F10.3,
 /,'Absolute temperature offset=',F23.3,
 /,'Printout interval=',F13.3,
 /,'DT=',F14.3
1054
 'TST=',F13.3,/,'TF=',F14.3
1055
 'Transient Damping Parameter=',F11.2
1056
 '    Input data is in NASTRAN format'
1058
 ''
1059
 ''
1061
 ''
1062
 ''
```

```
1064
 ''
1065
 ''
1066
 ''
1067
 ''
1068
 ''
1069
 ''
1070
 ''
1071
 ''
1072
 ''
1073
 ''
1074
 'View factor symmetry calculations are performed',
 ' with element merging'
1075
 'View factor symmetry calculations are performed',
 ' with no element merging'
1076
 'Cpu time=',F9.1,'     End of run'
 ' Cpu time=',F9.1,'     End of run'
1077
 'Conductive conductances and capacitances will be calculated with CG ',
 'method'
1078
 '   File ',A,' has been converted into binary format.',/
1079
 /,
 '   Note: Files VUFF and MODLF are in binary format. They may be converted',/,
 '   to ASCII format with the ''tmg as'' command.',/
1080
 'Parameter Card: ',A
1081
 'PARAM HYDPR Card IGNORED FOR TRANSIENT RUN'
1082
 'Pressure sink definitions obtained from file PRESSF'
1083
 'New Cartesian coordinate system is created'
1084
 'New cylindrical coordinate system is created'
```

```
1085
 'New spherical coordinate system is created'
1086
 'New origin is at',1P,3E11.4
1087
 '    New X axis is   ',3E11.4
1088
 '    New Y axis is   ',3E11.4
1089
 '    New Z axis is   ',3E11.4
1090
 /,'    Number of nodes              ',I10
1091
 '    Number of geometric elements    ',I10
1092
 '    Number of 1-D/duct fluid elements',I10
1093
 'Solution is transient with Exponential Forward Integration'
1094
 'Solution is transient with Forward Integration'
1095
 'Solution is transient with Forward-Backward Integration'
1096
 'Solution is transient with fixed Alpha'
1097
 'Solution is transient with optimized Alpha'
1098
  'Absolute temperature offset=',F23.3,
 /,'Results output interval=',1P,E27.3
1099
 'Integration time step= ',1P,E28.3
1100
 'Integration time step= ',1P,E22.3,'*RCmin'
1101
 'Load time=',1P,E41.3,/,'Iteration limit=',I35
1102
 'Time averaged loads will be used',/,'Iteration limit=',I35
1103
 'Start Time=',1P,E40.7,/,'Final Time=',E40.7
1104
 'Transient Damping Parameter=',1P,E23.3
1105
 'Solution is steady state with ',/,
 'temperature convergence criterion      <',1P,E10.3
1106
 'Steady state iteration damping parameter=',1P,E10.3
1107
 /,'    Coincident node check activated, number of merged nodes=',I10,/
```

```
 1108
  /,'    No. of machines available for parallel run of ',A10, ' is ',I3.3,/,
    '    Details about these machines are following:',/
 1109
  '    The master machine ',I3.3,': ',A32
 1110
  '       slave machine ',I3.3,': ',A32
 1111
  /,'    Note:',/,
    '    To run HEMIVIEW in parallel on UNIX/Linux, each machine ',/,
    '    must have a graphic card and it must have an active local',/,
    '    login session running. In addition, the access control to',/,
    '    the X server on the remote machines must be disabled, ',/,
    '    by its local user using the command: xhost +',/
 1112
  /,'    Checking availability of all machines to run ',A10,/,
    '    in parallel.  This may take up to a few minutes...',/
 1113
  /,'    ...done checking machines.',/
 1114
  /,'    No. of processors used for parallel run of ',A10, ' is ',I3.3
 1115
  'Rotational Periodic elements ',I10,' to ',I10,/,'(Increment=',
  I4,') are generated from profile element',I10
 1116
  'A total of',I10,' profile elements are redefined',
  ' to be Rotational Periodic elements'
 1117
  'All profile elements are defined to be rotational periodic elements'
 1118
  /,'    A total of',I10,' additional rotational periodic elements',
  ' are generated',/
 1119
  'Solution is transient with fixed alpha - fully implicit'
 1120
  '    New method is used to treat enclosure radiations ',/,
  '    applied to plane stress edge or axisymmetric elements.',/
 1203
  '    In the free convection coupling referencing',
  ' characteristic element',I10,',',/
  '    angle with the vertical is ',
  I8,' degrees, the vertical correlation used.'
 1204
  '    In the free convection coupling referencing',
  ' characteristic element',I10,',',/
  '    angle with horizontal is',
  I8,' degrees, the horizontal correlation used.'
 1205
```

```
 'Circular element',I10,1X,A7,' was subdivided into elements',/,(10I10)
1206
 ' Cpu time=',F9.1,1X,A10,' Module'
 'Cpu time=',F9.1,1X,A10,1X,'Module'
1207
 '    Number of shadowing surfaces =',I10,' created from',I10,' elements'
1209
 '    has only',I3,' elements'
1210
  '    Number of specular reflections processed         ',I10,
 /,'    Number of self reflections on curved surfaces     ',I10,
 /,'    Number of ray/curved surface intersect failures    ',I10
1211
  '    Calculating view factors for articulation time ',1P,E15.6
1212
 'Quad element',I10,1X,A7,' was subdivided into 2 triangles:',2I10
1213
 /,'   Cpu time=',F14.1,' processing orbital request for time',1P,E15.6,/
1214
 /,'   Cpu time=',F14.1
1215
 '    Processing radiation request',I4,',',
 1P1E10.3,' items are to be computed.',/
1216
 '    At Cpu time=',F9.1,' seconds the calculation is ',I3,'% complete.'
1217
 '    ...done.'
1218
 /,'    View factor and orbital view factor calculation summary:',//
 5X,'No. of rays launched toward specular/transparent elements:',I13,/,
  5X,'No. of view factors calculated with no elemental subdivision:',I10
 (5X,'No. of view factors calculated with elemental subdivision',I3,
 ':',I10)
1219
 /,
 '    Note: anti-aliasing is in effect for solar view factor calculations.'/,
 '    When solar view factors are calculated for transparent and specular',/,
 '    surfaces, then the normal elemental subdivision parameter is'/,
 '    multiplied by',I10,/
1220
 '_#I VUFAC 1     Processing orbital request ',I6,'$'
1221
 '_#I VUFAC 3     ...done.$'
1222
 '_#I VUFAC 4     Processing all orbital requests$'
1223
 /,'    Processing orbital request ',I6,/
1224
```

```
 '_#I VUFAC 2       ',I3,'% done$'
 1225
 /,'   Cpu time=',F11.1,' processing orbital request for time',1P,E19.11,/
 1226
 '    Note: anti-aliasing is in effect for collimated radiative'/,
 '    sources. The specified elemental subdivision parameter is'/,
 '    multiplied by',I10,/
 1227
 '    ...done.'
 1228
 '    Processing radiation request',I4,', MC method casts rays from'
 ,I10,' elements',/
1229
 /,1X,'PARTICLE TRACKING SUMMARY',/,1X,'-------------------------',/,
 1X,'Number of particles ',I5,/,
 1X,'Dose Statistics [Time*Power/Length^2]',/,
 1X,'Mean Dose = ',E14.6,' Standard Deviation = ',E14.6,/,
 1X,'Min. Dose = ',E14.6,'        Max. Dose = ',E14.6,//,
 1X,'Residence Time Statistics [Time]',/,
 1X,'Mean Time = ',E14.6,' Standard Deviation = ',E14.6,/,
 1X,'Min. Time = ',E14.6,'        Max. Time = ',E14.6,//,
 1X,'Path Length Statistics [Length]',/,
 1X,'Mean Path = ',E14.6,' Standard Deviation = ',E14.6,/,
 1X,'Min. Path = ',E14.6,'        Max. Path = ',E14.6,/
 1230
 /,'    Calculating V.F. with spinning effect at time = ',1E12.4,'...'
 1231
 '    Processing radiation request',I4,' (',I4,'),',
 1P1E10.3,' items are to be computed.',/
 1232
 '_#I VUFAC 1     Processing orbital request ',I6,' (',I6,')$'
 1233
 '    Processing radiation request',I4,' (',I4,'), MC method casts rays from'
 ,I10,' elements',/
 1234
 /,
 '    Spinning Time Step: ',I10,/,
 '    ============================',/,
 '    '
 1235
/,'  Total elapsed time in VUFAC is             ',F12.3,' seconds',/,
   '  Total time in VF main computations section:   ',F12.3,' sec',/,
   '  Total time in input processing (readsd3):     ',F12.3,' sec',/,
   '  Total time in broadcasting data to slaves:    ',F12.3,' sec',/,
   '  Total time in waiting for slaves:          ',F12.3,' sec',/,
   '  Total time in output file writing:         ',F12.3,' sec',/,
   '  Total time in receiving data from slaves:     ',F12.3,' sec',/,
   '  Total time in thermal coupling calculations:  ',F12.3,' sec',/,
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```
  '  Total time in conv1 (alone):              ',F12.3,' sec',/,
  '  Total time in specular view factor processing:',F12.3,' sec',/,
  '  Total time in view factor merging:         ',F12.3,' sec',/,
  '  Total time in immduct:                     ',F12.3,' sec',/,
  '  Total time in building octree (FEM):       ',F12.3,' sec',/,
  '  Total time in comput duct calculation (FEM):  ',F12.3,' sec',/,
  '  Total time in reading element (readsd3):     ',F12.3,' sec',/,
  '  Total time in putpi (readsd3):             ',F12.3,' sec',/,
  '  Total time in reading init (readsd3):       ',F12.3,' sec',/,
  '  Total time in main loop (readsd3):         ',F12.3,' sec',/,
  '  Total time in BLOCK:                       ',F12.3,' sec',/
1236
 /,'    Max and average times per workload chunk on each process are:',/
1237
 '    Max of ',E10.3, ' and average of ',E10.3,' sec on proc ',I4
1238
 '    **  A complete element list appears in file groups.unv with group:',/,
 '    **  ',A,/
1239
 ' ',/,
 '    Note: When Finite Element Method is used, the option',/,
 '    "Only Connect Overlapping Elements" is automatically activated',/,
 '    for all thermal couplings of type perfect contact.',/
1300
 /,'    Creating solar spectrum gray body view factor matrix'
1301
 /,'    Creating IR spectrum gray body view factor matrix'
1302
 /,'    Creating radiative couplings...',/
1303
 /,'    Enclosure no.',I5,' contains',I10,' elements'
1304
 '    The residual view ',
 'factors are to the elements themselves.'
1305
 '    KSP =',I10,' The residual view factors are to element',I10
1306
 '    View factor adjustment is performed...'
1307
 '    Oppenheim method used, new elements',
    ' created with an increment of',I10
1308
 'Surface element',I10,' created for element',I10
1309
 /,'    Max view factor sum =',F7.3,' for element',I10,
 ' ',A,/,'    Min view factor sum =',F7.3,' for element',I10,
 ' ',A,/,'    Please see [Solution_name]_report.log file for complete report.'
1310
```

```
 ' '
1311
 'Element no.',I10,' Sum =',F11.7,' Residual VF =',F11.7,' ',A7
1312
 '    Enclosure does not see space: ',/,
 '    Residual view factors are to elements themselves.',/
1313
 ''
1314
 'After iteration',I3,' maximum Vfsum deviation =',1P,E11.4,' at element',I10
1315
 '    Processing articulation time ',1P,E15.6
1316
 /,'    A complete element list of enclosure',I4,
 ' appears in file groups.unv ',/,'    with the group name:',/,'    ',A,/
1317
 /,'    A complete list of the front facing elements of enclosure',I4,/,
 '    appears in file groups.unv with the group name:',/,'    ',A
1318
 /,'    A complete list of the reverse facing elements of enclosure',I4,/,
 '    appears in file groups.unv with the group name:',/,'    ',A
1319
 /,5X,'Multispectral run for band',I3,', lambda range:',1P,E9.2,
 '->',E9.2,' microns',/
1320
 /,5X,'No radiative couplings created.'
1400
 /,'    Calculating IR spectrum and Earth IR heat loads.',/
1401
 /,'    Calculating diffuse solar spectrum and albedo heat loads.',/
1402
 /,'    Calculating collimated solar heat loads.',/
1403
 '    Processing heat loads for articulation time ',1P,E15.6
1404
 /,'    For some elements ',A,' fluxes were calculated where black',/,
 '    body view factors do not exist. Only the direct absorbed value was',/,
 '    calculated, the reflected component of magnitude ',1PE11.4,/,
 '    was ignored. You may request that the reflected flux be absorbed',/
 '    by the elements by including GPARAM 6 40 1 in Card 9 in INPF, or',/,
 '    toggling on the ABR option in the Advanced Solver Options form.',/
1405
 /,
 '    The following',I10,' elements are affected by this error. The',/,
 '    full list is written on file groups.unv with group name:',/,
 5X,A,/,5X,9I10,/
1406
 '    No radiative heat loads calculated.'
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1407
 '    Calculating heat loads for source:',/,5X,A
1500
 '    The first element',I10,' in SINDA deck is arithmetic',
 ' node,',/,'    a capacitance of 1E-10 is assigned to it.'
1501
  'The area of element',I10,1X,'on input file (INPF) is zero.'
1600
 'NASTRAN CHBDY element',I10,1X,'transformed into four node element'
1800
 '    Element',I10,1X,A7,' was merged into element',I10,1X,A7
1801
 /,'No element renumbering or merging was performed.'
1802
 'Substructuring criterion: RCmin  =',1P,E11.4
1803
 'Substructuring criterion:  Cmin  =',1P,E11.4
1804
 'Substructuring criterion: Gsumn  =',1P,E11.4
1805
 'Element',I10,' cannot be eliminated',
 ' - it has a temperature boundary condition.'
1806
 'Element',I10,' cannot be eliminated,',
 ' it has radiation defined.'
1807
 'Element',I10,' cannot be eliminated,',
 ' it is part of a fluid network.'
1808
 'Element',I10,' cannot be eliminated,',
 ' referenced by a convective or series ',/,'coupling.'
1809
 'Element',I10,' cannot be eliminated,',
 ' it is part of a fluid network.'
1810
 'Element',I10,' cannot be eliminated,',
 ' referenced by an interpolation table. '
1811
 'Element',I10,' cannot be eliminated,',
 ' it is referenced by a thermostat. '
1812
 'Element',I10,' cannot be eliminated,',
 ' it is a MCV fluid element. '
1813
 'Element',I10,' cannot be eliminated,',
 ' it has phase change defined. '
1814
 'Element',I10,' cannot be eliminated,',
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 ' attached to a numbered conductance. '
1815
 '    Summary of thinning operation:'
 '    Number of conductive conductances reduced from',I10,' to ',I10
 '    Number of radiative conductances reduced from',I10,' to ',I10
 '    Total number of conductances reduced from',I12,' to ',I10
1816
 '    No. of elements merged: ',I10,
 '    For details please see [Solution_name]_report.log file.'
1900
 /,'    Total system heat input ',1P,E11.4,' since time',E14.7
1901
 '    Heat absorbed by ',A7,1P,E11.4,' since time',E14.7,
 ' Tavg=',1P,E9.2
1902
 /,
  'Iter    Tmax     At   Tmin     At   TDmax     At  T(TDmax) ',
 '   Time',/
 /,
 ' Iter    Tmax     At   Tmin     At   TDmax     At  T(TDmax) ',
 '   Time',/
1903
 I5,0P,F9.2,I8,F8.2,I8,1P,E9.2,I8,0P,F9.2,1X,1P,E15.7
 I5,0P,F9.2,I8,F8.2,I8,1P,E9.2,I8,0P,F9.2,1X,1P,E15.7
1904
 /,'    Summary for fluid elements',/
1905
  1P,
    '    Ambient pressure (absolute)       =',E10.3,
 /,'    Ambient density                =',E10.3,
 /,'    Ambient temperature             =',E10.3,
 /,'    Average density                =',E10.3
1906
  1P,
    '    Average viscosity              =',E10.3,
 /,'    Maximum Reynolds number          =',E10.3,' at element',I10,1X,A7,
 /,'    Minimum Reynolds number          =',E10.3,' at element',I10,1X,A7,
 /,'    Average Reynolds number          =',E10.3
1907
  1P,
    '    Maximum static pressure          =',E10.3,' at element',I10,1X,A7,
 /,'    Minimum static pressure          =',E10.3,' at element',I10,1X,A7,
 /,'    Maximum dynamic pressure         =',E10.3,' at element',I10,1X,A7
1908
  1P,
    '    Maximum total pressure           =',E10.3,' at element',I10,1X,A7,
 /,'    Minimum total pressure           =',E10.3,' at element',I10,1X,A7,
 /,'    PDmax                       =',E10.3
```

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 1P,
 /,'    Total mass flow into sinks        =',E10.3,
 /,'    Total mass flow from sinks        =',E10.3,
 /,'    Deviation from mass balance       =',E10.3
1909
 /,'    Summary for thermal elements:',/
1910
 '    Maximum heat balance deviation occurs',11X,'at element',I10,1X,A7
1911
 1P,'    Heat flow into sinks            =',E10.3,
 /,'    Heat flow from non-fluid sinks    =',E10.3,
 /,'    Heat load into elements           =',E10.3,
 /,'    Heat flow from fluid sinks        =',E10.3,
 /,'    Deviation from heat balance       =',E10.3,//
1912
 'Gsum/C/DeltaT > 1 for MCV element',I10,' approx. exponential ',
 'formulation used.'
1913
 'Element',I10,1X,A7,' has no hydraulic diameter defined, calculated from area.'
1914
 1P,/,'    Time=',E15.6,1X,'timestep=',E9.2,' RCmin=',E7.1,' at ',
 I8,1X,A7,/
1916
 /,'RC products for non-merged elements at the beginning of the run',/
1917
 /,'The following describe the pressure network of the hydraulic elements',/
1918
 1P,'Element',I10,1X,'Gsum=',E10.3,1X,'Cap=',E10.3,' RC=',E10.3,1X,A7,A10
1919
 1P,
 /,'    RCmin          =',E11.4,' at element',I10,
 /,'    RCmean         =',E11.4,
 /,'    RCmax          =',E11.4,' at element',I10,
 /,'    Total capacitance =',E11.4
1920
 1P,'    At time =',E15.6,1X,'timestep =',E11.4,' is > than RCmin =',
 E11.4
1921
 /,'    Time =',1P,E15.6
 /,' Time =',1P,E15.6
1924
 '    Incomplete convergence at element',I10,' TDmax=',1P,E8.1,
 ' Time=',E13.6
1925
 /,'    Model Summary:',//,'    Number of elements              =',I10
1926
 '    Number of hydraulic elements       =',I10
1927
```

```
'    Total number of conductances        =',I10
1928
'    Number of linear conductances       =',I10
1929
'    Number of radiative conductances    =',I10
1930
'    Number of 1-way fluid conductances  =',I10
1931
'    Number of follower conductances     =',I10
1932
'    Number of flow resistances          =',I10
1933
'    Number of convective conductances   =',I10
1934
/,'    Starting run number ',I8
1935
 1P,'Recommended radiation linearization parameter  =',E10.3
1936
'Element elimination process was independent of radiation ',/,
'linearization parameter.'
1937
 1P,'    Total heat content (Sum C(i)*T(i))  =',1P,E10.3
1938
'    Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Average temperature',17X,  '=',F10.3
1939
 1P,
'    Minimum dynamic pressure',12X,  '=',1P,E10.3,' at element',I10,1X,A7,/,
'    Maximum Mach No.       ',12X,  '=',1P,E10.3,' at element',I10,1X,A7
1940
 1P,/,
'    Time=',E15.6,1X,'timestep=',E8.2,' RCmin=',E8.2,' at  ',I10,1X,A7,//,0P,
'    Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Average temperature',17X,  '=',F10.3
 1P,/,'    Time=',E15.6,1X,'timestep=',E8.2,
' RCmin=',E8.2,' at  ',I10,1X,A7,//,0P,
'    Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Average temperature',17X,  '=',F10.3
1941
 1P,/,'    No. of iterations = ',I6,
'  TDmax =',E10.3,'  at element',I10,//,0P,
'    Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Average temperature',17X,  '=',F10.3
 1P,/,'    No. of iterations = ',I10,
```

```
'  TDmax =',E10.3,' at element',I10,//,0P,
'    Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
'    Average temperature',17X,  '=',F10.3
1942
 'ILU iteration ',I4,1P,' Residual=',5E10.2
 ' ILU iteration ',I4,1P,' Residual=',5E10.2
1943
 1P,' ENVIRONMENTAL VARIABLE PARAMSX SET, PARAMS(',I5,')=',E15.7
1944
  1P,'    Heat flow into sinks            =',E10.3,/,
    '    Heat flow from non-fluid sinks     =',E10.3,/,
    '    Heat load into elements          =',E10.3,/,
    '    Heat load into sinks            =',E10.3,/,
    '    Heat flow from fluid sinks        =',E10.3,/,
    '    Deviation from heat balance       =',E10.3,//
1945
 'Hyd iter',I4,' PDmax=',1P,E8.1,' Pmax=',E8.1,' Pmin=',E8.1,' Massdif=',E8.1
 ' Hyd iter',I4,' PDmax=',1P,E8.1,' Pmax=',E8.1,' Pmin=',E8.1,' Massdif=',E8.1
1946
 '    Number of boundary elements         =',I10
 /,'    Number of boundary elements         =',I10
1947
 '    Total electrical power dissipation =',1P,E11.3
 ' Total electrical power dissipation =',1P,E11.3
1948
 'Clipping at hyd. res.',I10,' Value=',1P,E10.3,' Bet. elements',2I10
 ' Clipping at hyd. res.',I10,' Value=',1P,E10.3,' Bet. elements',2I10
1949
 '    Analyzer paused'
1950
 '    Analyzer restarted'
1951
 1X,/,'    Conjugate-gradient solver converged.'
 1X,/,' Conjugate-gradient solver converged.'
1952
 /,'    Heat flow into temperature BC''s:',4X,'=',1P,E10.3,/,
  '    Heat flow from temperature BC''s:',4X,'=',E10.3,/,
  '    Total heat load into elements:',6X,'=',E10.3,//,
  '    Total Heat Imbalance:',15X,'=',E10.3,/,
  '    Percent Heat Imbalance:',13X,'=',E10.3,' %',/
1953
 /,
 '    Maximum Temperature:',16X,'=',1P,E10.3,/,
 '    Minimum Temperature:',16X,'=',1P,E10.3,/,
 '    Average Temperature:',16X,'=',1P,E10.3
1954
 /,'    Number of electrical elements=    ',I10,/,
```

```
   '    Number of electrical conductances=',I10,/
 1955
  '    .... List too long to display.',/,
  '    **  Number of fluid elements not connected to solids:',I10,/,
  '    **  See full list in file groups.unv.',/
 1957
  /,'    Writing submodel file at time',1P,E15.6,' onto file ',A,/
1958
  /,'    Note: During the analysis process a number of elements have been',
  /,'    created whose labels you may not recognize. To find out more about',
  /,'    these elements and the elements they are associated with, please',
  /,'    see [Solution_name]_report.log file for the phrase ''TMG element''',/
 1959
  '    Temperature of element',I10,' is',1P,E15.6,' at time    ',E15.7
1960
  /,
  '    At time',1P,E15.6,' after',I5,' cycles of length',E15.6,/,
  '    periodic convergence has been achieved with a maximum ',/,
  '    temperature difference of',E11.4,' at element',I10
1961
  /,
  '    At time',1P,E15.6,' after',I5,' cycles of length',E15.6,/,
  '    periodic convergence has not been achieved, the maximum ',/,
  '    temperature difference is',E11.4,' at element',I10
1962
  '    Note: The model has ablative materials. The elements of the',/,
  '    ablation front are written at each time step on file',/,
  '    groups.unv, with the group name starting with the phrase',/,
  '    ABLATION_FRONT_AT_TIME='
1963
  /,' Heat Flow Load Summary Into Different Sink Entities:',/,
  '      Sink Entity                ',
 'Temperature    Heat   Energy absorbed',/
 '                              ',
 '         Flow+Load   since start ',/
1964
  1X,A40,1X,1P,E10.3,2E12.3
1965
  '    Note: Element',I10,' is one of the layers of element',I13
1966
  '    Heater sizing calculations: Heat loads will be determined by',I4,/,
  '    perturbation calculations plus 1 unperturbed one (at nominal heat',/,
  '    loads). One more calculation will then be performed at the',/,
  '    determined heat loads. If needed (for nonlinear problems) such',/,
  '    sets of calculations will be repeated until convergence of the',/,
  '    termostat temperatures to the specified targets.',/
1967
  /,'    Temperature results of heater perturbation ',I3,/
```

```
1968
 '    Thermostat',I4,' Temperature =',1P,E11.4
1969
 /,'    The following power requirements were computed for the thermostats',/
  '    as percentages of their heater/cooler nominal power ratings:',/
1970
 '    Thermostat',I4,' Heat load:',1P,E12.4,' percent of nominal'
1971
 /,'    Temperature results using the final heat loads:',/
1972
 A
1973
 /,'    Temperature results using nominal heat loads:',/
 1974
 1P,/,'    Time=',G15.6,1X,'Integration timestep=',G15.6
 1975
 1P,/,
 '    Time=',G19.12,1X,'Integration timestep=',G13.6,/,0P,
 '    Cpu time in ANALYZER module=',G11.4,//,
 '    Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 '    Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 '    Average temperature',17X,  '=',F10.3
 1P,/,'    Time=',G19.12,1X,'Integration timestep=',G13.6,/,0P,
 '    Cpu time in ANALYZER module=',G11.4,//,
 '    Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 '    Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 '    Average temperature',17X,  '=',F10.3,/,
 1976
 1P,/,
 '    Heater sizing calculations: File heatermatrix.dat is used',/,
 '    to determine the heat loads.',/
1977
 /,
 '    Temperature results of heater perturbation ',I3,
 ' iteration ',I3,':',/
1978
 /,
 '    Temperature results of nominal heat loads iteration ',I3,/
1979
 /,
 '    Temperature results using determined heat loads iteration ',I3,/
1980
 /,
 '    The problem is nonlinear: iterations on the heater factors ',/,
 '    will be performed to determine the correct values. The ',/,
 '    heater factors just determined become the new nominal values.',/
1981
 /,
```

```
 '    Beginning iteration ',I3,' to determine heater factors. The',/,
 '    heater factors just determined become the new nominal values.',/
1982
 /,'   Total elapsed time in ANALYZER is ',F9.1,' seconds, including',/,
 '   ',F9.1,' seconds (',F5.1'%) in parallel-processing capable sections.',/
1983
 /,
 '    The next run will calculate temperatures at those power ',/,
 '    ratings to assess convergence (proximity) of the thermostat',/
 '    temperatures to their specified targets.',/
1984
 'ILU iteration ',I4,1P,' DTmax=',E10.2,' at ',I9
 ' ILU iteration ',I4,1P,' DTmax=',E10.2,' at ',I9
1985
 /,
 '    Found ',I4,' film cooling entities, affecting ',I10,' elements.',/
1986
 5x,A
1987
 /,
 '    The BICGSTAB method failed at iteration',I7,/,
 '    ',A,' Breakdown.',/
1988
 ' QSPECTRA band',I3,' QDmax=',1P,E8.1,' at',I10,' Qmin=',E9.2,' Qmax=',E9.2
1989
 ' QRADSOLVE QDmax=',1P,E8.1,' at',I10,' Qmin=',E9.2,' Qmax=',E9.2
1990
 ' During this run fluid properties will be evaluated with ',/,
 ' Total Absolute temperatures when available. ',/
1991
 ' During this run fluid properties will be evaluated with ',/,
 ' Relative Total temperatures when available. ',/
1992
 ' During this run axial velocities are not available for ',/,
 ' all fluid elements in the model. ',/
1993
 '    Number of perfect contact conductances=',I10
1994
 /,
 '    Temperature prediction TDmax = ',E10.2,' at void ID ',I5,' element ',I9
1995
 /,
 '    Energy balance convergence not reached'
1997
 'ILU iteration ',I4,1P,' Residual energy imbalance=',E10.2,' tol=',E10.2
 ' ILU iteration ',I4,1P,' Residual energy imbalance=',E10.2,' tol=',E10.2
1998
 '    Number of FEM nodes              =',I10,/,
```

```
'    Number of FEM elements            =',I10,/,
'    Number of FEM faces               =',I10
1999
  1P,'    Heat flow into FEM elements       =',E10.3,/,
     '    Heat flow from FEM elements       =',E10.3
2100
 /,
 '    ================================',/,
 '    Articulation Time Step: ',I10,/,
 '    ================================',/,
 '    '
2200
 '    Obtaining license for ',A20,' module'
2201
 '    This installation will expire in',I3,' days. ',/,
 '    Contact your account representative.'
 '    This installation will expire in',I3,' days. ',/,
 '    Contact your account representative.'
2202
 '    Allocating',I10,' memory locations for array',I6,' of type ',A,/,
 '    ',I10,' bytes already allocated'
2701
 'Nodes',I11,' thru',I10,' have been generated'
2702
 'Element',I10,' created as reverse side of element',I10,' no merging will occur'
2703
 'Elements relabeled',4(I10,'->',I10)
2704
 'Nodes relabeled',4(I10,'->',I10)
2705
 '    Local time at perigee is:',1P,E15.6
2706
 /,'    Element',I10,' is flagpole or hinge connected to element',I10,','/,
 '    Element',I10,' was created at their juncture and merged to element',I10
2707
 /,'Element ',I10,' is flagpole/hinge door connected to element',I10,/,
 'Elements',2I10,' at their juncture were merged.'
2708
 /,'    No. of back-to-back elements converted to reverse side elements is'
 ,I10,
 /,'    The reverse side elements were assigned zero thickness. For further',
 /,'    details please look on file [Solution_name]_report.log.',/
2709
 /,'    Number of flagpole or hinge-door connected elements corrected is',I10,
 /,'    For further details please see file [Solution_name]_report.log.',/
2710
 'Elements of group ',A7,' were not deactivated'
2711
```

```
 'Elements of group ',A7,' were deactivated'
2712
 /,'    Diurnal heating request',I8,/

2713
 '    This diurnal heating period is during the daytime'
 'This diurnal heating period is during the daytime'
2714
 '    Sun and planet angles are calculated for ',I6,
 ' diurnal heating positions.',/
 'Sun and planet angles are calculated for ',I6,
 ' diurnal heating positions.',/
2715
 /,'    Night starts at time= ',1P,1E15.6,3X,/
  '    Night ends   at time= ',1E15.6,3X
 /,'Night starts at time= ',1P,1E15.6,3X,/
  'Night ends   at time= ',1E15.6,3X
2716
 '    Night duration      = ',1P,1E12.5
 'Night duration      = ',1P,1E12.5
2717
 '    Incident direct flux at time ',1P,1E15.6,' is ',1E12.5
 'Incident direct flux at time ',1P,1E15.6,' is ',1E12.5
2718
 '    The following calculation points occur during the night:',/
 /,'The following calculation points occur during the night:',/
2719
 '    At time = ',1P,1E15.6
 'At time = ',1P,1E15.6
2720
 /,15X,'Group name association with a long group name',/,/,
 'Name    Long group name',/
2721
 A7,1X,A
2722
 A
2723
 '    Incident direct flux ',2A
 'Incident direct flux ',2A
2724
 /,
 '    A Fortran user-written subroutine has been detected. The',/,
 '    Analyzer module will pass the T, TIME, and DT variables to',/,
 '    the subroutine in single precision. To have these variables',/,
 '    passed with double precision, please include the line',//,
 '    DOUBLE PRECISION T(*),TIME,DT',//,
 '    among your specification statements.',/
2725
```

```
 /,
 '    A Fortran user-written subroutine has been detected. The',/,
 '    Analyzer module will pass the T, TIME, and DT variables to',/,
 '    the subroutine in double precision. ',/
2726
 '    A Lahey Fortran user-written subroutine has been detected. The',/,
 '    Analyzer module will pass the T, TIME, and DT variables to',/,
 '    the subroutine in single precision. ',/
2727
      /,
 '    Note: Elements with physical property',I10,' have been defined',/,
 '    to be non-homogeneous multilayer elements. However, not all',/,
 '    of these elements have the same material properties, in ',/,
 '    particular elements',I10,' and',I10,' have material properties',/,
 '    ',I10,' and',I10,' respectively. This is not a problem, just',/,
 '    information.',/
2728
      /,
 '    Note: AMBIENT',I10,' element with zero total and static pressure',/,
 '    boundary conditions created at node',I10
2729
      /,'            Diurnal Heating Request Calculations',/
2730
 1X,/,
 '    Some axisymmetric element(s) had their surface',/,
 '    normal reversed in order to follow the convention that if',/,
 '    a 2-noded axisymmetric element is surface coated on an',/,
 '    axisymmetric solid, its front side must point out of the solid.',/,
 '    Should you wish it to radiate into the solid, please define',/,
 '    the reverse side accordingly. A complete element list appears',/,
 '    in file groups.unv with groups names starting with:',/,
 '    ',A
2731
 '_#I DATACH 1',10(1X,I1),'$'
2732
      /,
 '    Note: In solution step input for step ',A,/,
 '    ',A,' is greater than the time interval between this step',/,
 '    and the previous one. The interval will be used as ',A,'.',/
2733
      /,
 '    Note: In solution step input for step ',A,/,
 '    the minimum timestep is greater than the maximum timestep.',/,
 '    The maximum timestep will be used as the minimum timestep.',/
2734
      /,
 '    Note: Stream ',I8,' with the name ',A,/,
 '    is defined on unsupported topology including multiple',/,
```

```
'    not connected surfaces.',/
2735
     /,
'    For a complete list of solution steps modifications, please ',/,
'    see the verbose log file ',A,/


3001
'    Writing Temperature data on Elements to tmgtempe.unv...'
3002
'    Writing Temperature data on Nodes to tmgtempn.unv...'
3003
'    Writing Heat Flow Density data on Elements to tmghtfe.unv...'
3004
'    Writing Heat Flow Density data on Nodes to tmghtfn.unv...'
3005
'    Writing Temperature Gradient data on Elements to tmggrade.unv...'
3006
'    Writing Temperature Gradient data on Nodes to tmggradn.unv...'
3007
'    Writing Heat Imbalance data on Elements to tmghbal.unv...'
3008
'    Writing Velocity data on Elements to tmgvele.unv...'
3009
'    Writing Velocity data on Nodes to tmgveln.unv...'
3010
'    Writing Reynolds Number data on Elements to tmgrene.unv...'
3011
'    Writing Reynolds Number data on Nodes to tmgrenn.unv...'
3012
'    Writing Total Pressure data on Elements to tmgprese.unv...'
3013
'    Writing Total Pressure data on Nodes to tmgpresn.unv...'
3014
'    Writing Mass Flow data on Elements to tmgmasse.unv...'
3015
'    Writing Mass Flow data on Nodes to tmgmassn.unv...'
3016
'    Writing Convection Coefficient data on Elements to tmghtc.unv...'
3017
'    Writing View Factor Sum data on Elements to tmgvfsum.unv...'
3018
'    Writing Orbital View Factor data on Elements to tmgorbvf.unv...'
3019
'    Writing Absorbed Orbital Flux data on Elements to tmgabsf.unv...'
3020
'    Writing Incident Orbital Flux data on Elements to tmgincf.unv...'
3021
```

```
 '    Writing Reflected Orbital Flux data on Elements to tmgreff.unv...'
3022
 '    Writing Total Orbital Flux data on Elements to tmgtotf.unv...'
3023
 '    Writing Connectivity Model to tmgconn.unv...'
3024
 '    Writing Displacement data on Nodes to tmgdisp.unv...'
3025
 /,'   Processing group reporting entities...'
3026
 '   ...done.',/
3027
 '    Writing Reporter data to ',A50
3028
 '    Writing Phase Change Quality data on Elements to tmgquale.unv...'
3029
 '    Writing max & min temperature data on Elements to tmgtmaxe.unv...'
3030
 '    Writing Radiance data on Elements to tmgrade.unv...'
3031
 '    Writing Apparent Temperature data on Elements to tmgappte.unv...'
3032
 '    Writing Fluence data on Elements to tmgfluence.unv...'
3033
 '    Writing Solid Element Radiation flux data on elements to ',
 'tmgsolflux.unv...'
3034
 '    Writing RC Product data on Elements to tmgrcprod.unv...'
3035
 '    Writing Radiative exchange data on Elements to tmgradf.unv...'
3036
 '    Writing duct fluid density data on Elements to tmgdense.unv...'
3037
 '    Writing duct fluid density data on Nodes to tmgdensn.unv...'
3038
 '    No thermal results to recover.'
3039
 '    Writing transverse gradient data on Elements to tmgtrvtgre.unv...'
3040
 '    Writing transverse gradient data on Nodes to tmgtrvtgrn.unv...'
3041
 5x,A
3042
 '    Writing Environmental View Factor data on Elements to tmgvfenv.unv...'
3043
 '    Writing Temperature Error Estimates on Elements to tmgerrmaxe.unv...'
3044
 '    Writing Temperature Error Estimates on Nodes to tmgerrmaxn.unv...'
```

```
3045
 '    Writing Swirl velocities on Elements tmgswirlvele.unv...'
3046
 '    Writing Convective heat flux data on Elements to tmgconvflux.unv...'
3047
 '    Writing Convective heat flux data on Nodes to tmgconvflux.unv...'
3048
 '    Writing wall velocities to tmgwallvel.unv...'
3049
 '    Writing Corrected Convection Coeff on Elements to tmgcrhtc.unv...'
3050
 '    Writing Corrected Convection Coeff on Nodes to tmgcrhtc.unv...'
3051
 '    Writing Corrected Convective Area on Elements to tmgconvarea.unv...'
3052
 '    Writing Corrected Convective Area on Nodes to tmgconvarea.unv...'
3053
 '    Writing Convective Thickness on Elements to tmgconvthick.unv...'
3054
 '    Writing Convective Thickness on Nodes to tmgconvthick.unv...'
3055
 '    Writing Convective Area Factor on Elements to tmgconvfactor.unv...'
3056
 '    Writing Convective Area Factor on Nodes to tmgconvfactor.unv...'
3057
 '    Writing Temperature on Protective Layers to tmgprotempe.unv...'
3058
 '    Writing Heat load from ducts on 3D Elements to tmgheatduct.unv...'
3059
 '    Writing Immersed ducts HTC on Elements to tmghtcduct.unv...'
3060
 '    Writing Immersed ducts Solid Temperature on Elements to tmgsoltempcduct.unv...'
3061
 '    Writing Stream Flow Direction on Elements to tmgflowdir.unv...'
3062
 '    Writing Mass Flow Direction data on Elements to tmgmassdire.unv...'
3063
 '    Writing Immersed ducts Convective Heat Flux on Elements to tmghtfduct.unv...

3097
 /,' Creating intermediate results file:',/,
 ' "',A,'" for Time=',1PE19.12,/,
3098
 '  '
3099
 /,' Creating intermediate results file:',/,
 ' "',A,'"',/,
3101
```

```
 /,'  Starting TMG Analysis...'
3102
 /,'  Performing data checking...'
3103
 /,'  Calculating geometrical parameters...'
3104
 /,'  Calculating conductive conductances and capacitances...'
3105
 /,'  Calculating thermal couplings and geometric radiative parameters...'
3106
 /,'  Calculating radiative couplings and/or gray body matrices...'
3107
 /,'  Calculating radiative heat loads...'
3108
 /,'  Performing element merging and elimination...'
3109
 /,'  Performing Analyzer data preprocessing...'
3110
 /,'  Calculating temperatures...'
3111
 /,'  Performing result postprocessing...'/
3112
 /,'  Performing thermal model validation...'
3113
 /,'  Performing model parametrization analysis...'
3114
 /,'  Performing model reformatting for other solvers...'
3115
 /,'  ...done.',/
3116
 /,'  Performing temperature interpolation...'
3117
 /,'  Performing calculations for laser simulation...'
3118
 /,'  Performing fast view factor calculations...'
3119
 '_#I MPI 1$'
3120
 '_#I ALL 1$'
3121
 '    ** ERROR 3121 **',/,
 '    ** Stream with ID ',I6,' and name:',/,
 '    ** ',A,/,
 '    ** is defined with Relative Temperature Reference Frame option.',/,
 '    ** With this option, it is invalid for Side A and Side B to be',/,
 '    ** defined on components with different rotational speeds. ',/,
3122
 '    Writing Mass Flow Junction Imbalance to tmgmfjuncimbalance.unv...'
```

```
3123
'    ** The stream with ID ',I6,' and name: ',/,
'    ** ',A,' is defined with ',/,
'    ** the automatically determine mass flow option',/,
'    ** but it is not connected to any other streams.',/,
'    ** Therefore, its mass flow cannot be computed.',/
3124
'    ** A set of ',I4,'  connected streams ',/,
'    ** with IDs',/,(8X,6I10)
3125
'    ** and names',
3126
'    ** are defined with the automatically determine mass flow option',/,
'    ** but they are not connected to any streams',/,
'    ** that have a defined mass flow.',/,
'    ** Therefore, their mass flow cannot be computed.',/
3127
'    ** The stream with ID ',I6,' and name: ',/,
'    ** ',A,' is defined with ',/,
'    ** the automatically determine inlet temperature option and',/,
'    ** the automatically determine reverse inlet temperature option',/,
'    ** but it is not connected to any other stream.',/,
'    ** Therefore, neither its inlet temperature ',/,
'    ** nor its reverse inlet temperature can be computed.',/
3128
'    ** ',A,
3129
'    ** The stream with ID ',I6,' and name: ',/,
'    ** ',A,' is defined with a specified mass flow but',/,
'    ** the automatically determine reverse mass flow option',/,
'    ** is also defined. This case is not supported by the solver.',/
3130
'    ** The stream with ID ',I6,' and name: ',/,
'    ** ',A,' is defined with ',/,
'    ** the automatically determine inlet temperature option but',/,
'    ** neither its inlet is connected to any other stream',/,
'    ** nor flow reversal is specified.',/,
'    ** Therefore, its inlet temperature cannot be computed.',/
3131
'    ** This was caused by a user-specified junction with ID ',I6,/,
'    ** and name ',A,/
3132
 /,'    Stream with ID ',I6,' and name ',A,' is a circular stream.',/
3133
'    ** ',1X,A11,2X,I6,6X,A
3134
 /,'  Performing view factor calculations on GPU...'
3135
```

```
 '    Writing thermal connections to tmgthermalconnections.unv...'
3136
 '    Writing coupled area ratio to tmgcoupledarearatio.unv...'
3137
 ' '
3138
 '    Writing duct static pressure data on Elements to tmgstatprese.unv'
3139
 '    Writing duct static pressure data on Nodes to tmgstatpresn.unv'

3140
 '    Writing protective layer temperatures to tmgfemprotempnod.unv'

3141
 /,'    PARAM FEM is activating the Finite Element Method.'
3400
 /,'   Creating radiative SOURCE cards for laser signal and pump.'
3401
 /,'   Calculating initial heat loads from laser pump.'
3402
 /,'   Interfacing to structural analysis.'
3403
 /,'   Calculating index of refraction.'
3404
 /,'   Calculating laser signal strength and path lengths of rays.'
3405
 /,'   Iteration ',I3,' Total signal power    ',1P,E10.4,
   ' Residual ',E10.4
3406
 /,'   Total pump power:     ',1P,E10.4,/,
   '   Total heating:        ',1P,E10.4,/,
   '   Exiting signal power:  ',1P,E10.4,/
3407
 /,'   Exit beam convergence for outer LASER iteration ',I3,':',/,
   '   Position residual:               ',1P,E10.4,/,
   '   Direction residual:              ',E10.4,/,
   '   Exiting signal power residual:      ',E10.4,/
   '   Path length residual:            ',E10.4,/
3408
 /,'  User-subroutine laserser1.f for LASER module was detected. ',/,
   '  This routine will be compiled and linked into the LASER ',/,
   '  module for this analysis',/
3409
 /,'  No user-subroutine for the LASER module was detected. ',/,
   '  A default physics model will be used which may not  ',/,
   '  be representative of the physics of this analysis.  ',/
3410
 /,'   LASER Module Iteration Control: ',/,
```

```
   '  Maximum number of Outer Iterations:           ',I3,/,
   '  Convergence criterion for position residual:    ',E10.4,/,
   '  Convergence criterion for direction residual:   ',E10.4,/,
   '  Convergence criterion for signal power residual: ',E10.4,/,
   '  Convergence criterion for path length residual:  ',E10.4,/,
   '  Maximum number of inner iterations for signal power: ',I3,/,
   '  Convergence criteria for inner power iterations:    ',E10.4,/
3411
 /,' For calculation of impermeability, the following elements ',/,
   ' have no material orientation vector and are considered to ',/,
   ' be isotropic: '
3412
 /,' For calculation of impermeability, the following elements ',/,
   ' have material orientation vectors defined and are considered',/,
   ' anisotropic: '
3413
 1X,6I9
3414
 /,'  Total fluorescent power= ',E13.4,/,
   '       absorbed into group TOPABFL = ',E13.4,/,
   '       absorbed into group BOTABFL = ',E13.4,/,
   '       lost = ',E13.4
3500
 /,'  ...Radiation request No. ',I4,' is finished. ',/,
   '    Number of view factors written to VUFF =',I9,/
3501
 '    Number of view factors written to VUFF =',I9,/,
 '    ...done.'
3502
 '_#I HEMIVIEW 2 ',I4,'$'
3503
 /,'    Processing radiation request ',I4
3504
 '    Process ',I4, ' performed ',F6.2,' percent of the total calculations.'
3505
 /,'    Summary of workload partition in the parallel run:',/
3600
 '    .... Table too long to display. ',/,
 '   Only the first',I5,' table entries are shown.',/
3601
 1X,/,
 '    Conjugate-Gradient solver successfully converged after',I5,
 ' iterations.',/,
 '    Residual=',1P,E11.3,', target residual=',E11.3,
 ', matrix fill=',I5,'.',/
3602
 1X,/,
 '    After',I5,' iterations the Conjugate-Gradient solver',
```

```
 ' did not converge.',/,
 '    Residual=',1P,E11.3,', target residual=',E11.3,
 ', matrix fill=',I5,'.',/,
 '    The solution is restarting with matrix fill=',I5,
 ', iteration limit=',I5,'.'/
3603
 /,'   Info: Next coupling time has been modified from ',G10.5,
  ' to ',G10.5,' due to time adaptivity.',/
3604
 1X,/,
 '    Reshaping the matrix and reseting the fill value to improve',/,
 '    the convergence...',/
3605
 '    The responsible element with ID',I10,' is',A,/
 '    The maximum enthalpy is contributed by heatflow from element',I10,/,
 '    connected by conductance RR(',I10,')=',E10.3,' of type',I10,'.',/,
 '    ',A,/
3606
 '    The responsible row ',I10,' in the matrix correspond to a FEM',/,
 '    solution point which has the external ID of ',I10,/
3607
 '    The responsible row ',I10,' in the matrix correspond to the FEM',/,
 '    non-geometric element of the thermal void BC with ID:',I10,/
3608
 '    The responsible row ',I10,' in the matrix correspond to a FEM',/,
 '    Robin boundary condition.'/
3609
 '    ** .. success',/,
3610
 '    The maximum temperature change parameter of convergence criterion',/,
 '    has been updated from Solution Control to ',E11.4,/
3611
 '    The Conjugate gradient solver Convergence Criterion',/,
 '    has been updated from Solution Control to ',E11.4,/
3612
 /,'    **** DESIGN CYCLE ',I4,' ****',
 '    The objective function for the current correlation step is',E11.4,/
3613
 /,'    **** DESIGN CYCLE ',I4,' ****',
 '    The average temperature for target locations is',F10.3,/
3614
 /,'    **** DESIGN CYCLE ',I4,' ****',
 '    For design Variable ', A,' with a step length of',E11.4,/,
 '    The gradient value is',E11.4,' and the value of',/,
 '    the design variable is',E11.4,/
3615
 /,'    **** DESIGN CYCLE ',I4,' ****',
 '    New design cycle ',/
```

```
3616
 /,'    **** DESIGN CYCLE ',I4,' ****',
 '    The value of design variable ', A,'  is ',E11.4,/
3617
 /,'           **********  NLOpt version  2.6.2 **********',/
 '     THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND,'/,
 '     EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES'/,
 '     OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND'/,
 '     NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT'/,
 '     HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY,'/,
 '     WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING'/,
 '     FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE'/,
 '     USE OR OTHER DEALINGS IN THE SOFTWARE.'/,
 '           ****************************************',/
3618
 'ILU iteration ',I4,1P,' Residual=',5E10.2,/
3619
 'ILU iteration ',I4,1P,' DTmax=',E10.2,' at ',I9,/
3620
 'ILU iteration ',I4,1P,' Residual energy imbalance=',E10.2,' tol=',E10.2,/
3621
 '    Total electrical power dissipation =',1P,E11.3,/
3622
 /,
 '    Temperature prediction TDmax = ',E10.2,' at void ID ',I5,' element ',I9,/
3623
 /,
 '    Energy balance convergence not reached',/
3624
 I5,0P,F9.2,I8,F8.2,I8,1P,E9.2,I8,0P,F9.2,1X,1P,E15.7,/
3625
 /,
  'Iter    Tmax    At   Tmin    At  TDmax     At  T(TDmax) ',
 '   Time',/
3626
 /,
 '    Energy balance convergence not reached',/
3627
 'Hyd iter',I4,' PDmax=',1P,E8.1,' Pmax=',E8.1,' Pmin=',E8.1,' Massdif=',E8.1,/
3628
 'Clipping at hyd. res.',I10,' Value=',1P,E10.3,' Bet. elements',2I10,/
3629
 /,
 '    The BICGSTAB method failed at iteration',I7,/,
 '    ',A,' Breakdown.',/
3630
 '    The responsible element with ID',I10,' is',A,/
 '    The maximum enthalpy is contributed by heatflow from element',I10,/,
```

```
'    connected by conductance RR(',I10,')=',E10.3,' of type',I10,'.',/,
'    ',A,/
3631
'    The responsible row ',I10,' in the matrix correspond to a FEM',/,
'    solution point which has the external ID of ',I10,/
3632
'    The responsible row ',I10,' in the matrix correspond to the FEM',/,
'    non-geometric element of the thermal void BC with ID:',I10,/
3633
'    The responsible row ',I10,' in the matrix correspond to a FEM',/,
'    Robin boundary condition.'/

3634
/, '    Thermal Correlation Summary: ',/,
'    ------------------------------------------------'
3635
'    Final objective function          ',E11.4,/,
'    Number of design cycles            ',I8,/,
'    ------------------------------------------------'/,
'    DESIGN VARIABLE NAME              VALUE      '/,
'    ------------------------------------------------',

3636
 '    ',A,E11.4,
3637
'    ------------------------------------------------'/

3638
'    Thermal correlation convergence criterion is time varying. '/,
'    The objective function cannot be computed as cumulative '/,
'    in time, as requested. Instead, the convergence will be'/,
'    checked at every correlation time. '/
3639
'    Final objective function at        '
3640
/,'    Number of design cycles            ',I8,/,
'    ------------------------------------------------'/,
'    DESIGN VARIABLE NAME              VALUE      '/,
'    ------------------------------------------------',
3641
'      t = ',E11.4,'              ',E11.4,

3642

'    **  ERROR 3642 **',/,
'    **  There are inconsistencies in parallel run domain decomposition',/,
'    **  setup on domain ',i6,'. The code for inconsistency type is ',i2,'.'/
```

```
3643
 '    Note: The integrated parallel GMRES solver (SMS) is used as',/,
 '    the linear solver for this simulation.',/,
 '    L2 is used as the convergence norm with a convergence criterion',/,
 '    value specified in the xml input file / UI of ',E7.1,'.',/,
 '    The preconditioner matrix fill value is set to ',I3,'.'/
3644
 /,'    State-space matrix files were extracted at time',G15.6,/,
 '    Matrices and load were linearized between time ',G15.6,/,
 '    and time ',G15.6,/

3700
 '    Domain decomposition using ',A,' with ',I0,' CPUs...',/
3701
 '    ...done.'
3702
 '    Writing Paraview output for DOMDEC: CPU = ',I0,/
3703
 '    DOMDEC: Transferring tmg49 files to the main directory',/
3704
 '    DOMDEC: Elapsed time in gathering tmg49 files ',F7.4,' sec',/
3705
 '    DOMDEC: Transferring solve result files to the main directory',/
3706
 '    DOMDEC: Transferring heat flux data to the main MODLF file',/
3707
 '    DOMDEC: Transferring VF sum data to the main tmggeom.dat file',/
3708
 '    DOMDEC: Transferring VF sum data to the main tmgrslt.dat file',/
3709
 '    DOMDEC: Elapsed time in gathering solve results files ',F7.4,' sec',/
3710
 /,'    DOMDEC: Multi-host configuration found.',/
3711
 '    DOMDEC: Copying ',A,' to cpu-specific folders.',/
3712
 '    DOMDEC: Copying ',A,' to master cpus of each host.',/
3750
 '    A translation of the source model, based on MAP1 points,',/,
 '    will be applied in order to align the models.',/
3751
 '    The 2D solid options of the source and target',/,
 '    models are different. A rotation will be applied',/,
 '    in order to align the models.',/
3752
 '    The source model does not have a 2D solid option.',/,
 '    However, it has an active global cyclic CSYS, which',/
 '    will be used to align the models.',/
```

```
3754
 8X,I10
3755
 '    The source and target will be aligned using ',/,
 '    the Source Model Mapping simulation object.',/
3756
 '    The source and target will be aligned using ',/,
 '    the 2D solid options.',/
3757
 '    A translation of the source model, based on Source Model Mapping ',/,
 '    simulation object, will be applied in order to align the models.',/
```

Warning messages

```
4001
'    ** Axisymmetric elements are not defined as circular elements',/,
'    ** because the faceting value is less than 8.',/
4002
'    ** Card 10 not recognized as user subroutine:',
/,'    ** First line of Card 10 does not start in column 7 ',
/,'    ** with the word SUBROUTINE or FUNCTION.',/
4003
'    ** Iteration limit > 100000, changed to 100000',/
4004
'    ** Iteration damping parameter = ',1P,E11.4,
/,'    ** it must have a value between 0 and 1.',/
4005
'    ** Results printout interval ',
'> 100000, changed to 100000.',/
4006
'    ** Improper transient damping parameter = ',1P,E11.4,
/,'    ** it must have a value between 0 and 1.',/
4007
'    ** ',
'Axisymmetric element',I10,' has more then 4 nodes, it is ignored.',/
4008
'    ** Reverse side element',I10,' is defined as axisymmetric, ',
'it is ignored.',/
4009
'    ** Surface normal of axisymmetric element ',I10,/,
'    ** points into solid element          ',I10,/
4010
'    ** Error on file VUFF in line',/,A80
4011
'    ** Density for ANSYS MAT Card',I8,
' must be temperature independent.',/
4012
'    ** Error reading ANSYS material property Cards.',/
4013
'    ** Node',I10,' has an improper label.',/
4014
'    ** Node ',I10,1X,'is renumbered to',I10,/
4015
'    ** Node',I10,' does not exist.',/
4016
'    ** Element',I10,' was not found.',/
4017
'    ** AREA Card 6E references both',
' a profile element and a table.',/
4018
```

```
'    ** On Card 6 VFMERGE Card generation',
' element',I10,' is unacceptable.',/
4019
'    ** ON Card 6 SYMNODES Card generation',
' element',I10,' is unacceptable.',/
4020
'    ** Element merging or elimination element generation',I10,/,
  '    ** is unacceptable.',/
4021
'    ** Element label',I10,' is a duplicate.',/
4022
'    ** TMG input file error.',
 /,'    ** More than 1 axisymmetry definition, and one ',
 'or more of them is global. ',
 /,'    ** The last global definition is assumed correct.',/
4023
'    ** Error in field ',A8,/
4024
'    ** Axisymmetric faceting value < 8,',
 ' changed to 8.',/
4025
'    ** Radial heat flow element',I10,
 ' has angle > 120 degrees,',/'    ** the conductances may be improper.',/
4026
'    ** TMG input file error.',/,
'    ** Undefined variable in axisymmetry definition',
 ', value set to 8.',/
4027
'    ** Character field of DESCRIP Card',/,
'    ',A,/,
'    ** exceeds 40 characters, only the first 40 characters are used. ',/
4028
'    ** Radiative heat source has zero ',
 'power value specified.',/
4029
'    ** TMG input file error.',
 /,'    ** Obsolete format ORTHO Card found. Use MAT Card instead.',
 /,'    ** With ORTHO Card element center method must be used.',/
4030
'    ** The ray tracing results will be inaccurate',/,
'    ** if the view factor requests are for partial enclosures. It is',/,
'    ** recommended you use the all radiation option with ray tracing.',/
4031
'    ** All materials have zero thermal',
 ' conductivity.',/
4032
'    ** For material ',I6,' transmissivity ',
 '+ absorptivity should be <_ 1.0.',/
```

```
4033
 '    ** For material ',I6,' specularity ',
 '+ absorptivity should be <_ 1.0.',/
4034
 '    ** Node ',I10,' has 1-node fluid elements',I10,', and',I10,/,
 '    ** associated with it, more than 1 may cause problems.',/
4035
 '    ** View factors are requested for an axisymmetric model,',/,
 '    ** at least one of the requests must be for all radiation.',/
4036
 '    ** Since space element is defined it is recommended that',/,
 '    ** residual view factors are set to space.',/
4037
 '    ** KSP=10000, possible error. The code for Proportional Adjustment ',/,
 '    ** is KSP=3000000 in this release.',/
4038
 '    ** CG conduction method was specified, radiative conductances',/,
 '    ** will be calculated with Oppenheim''s Method.',/
4039
 '    ** Table-dependent emissivities are present, for accurate results',/,
 '    ** use Oppenheim''s Method.',/
4040
 '    ** Interface element',I10,' has non-zero thermal conductivity. If',/,
 '    ** the connected elements have temperature-dependent thermal ',/,
 '    ** conductivities then inaccurate conductances will be calculated.',/
4041
 '    ** The ray trace option is used, transparent properties are',/,
 '    ** present, and orbital heat fluxes are requested. Inaccurate ',/,
 '    ** results will be obtained, try the Explicit Earth option.',/
4042
    '    ** The specified temperature for sink element',I10,/,
    '    ** is below absolute zero.',/
4043
 '    ** Weighted view factor adjustment not supported with'
 ,/'    ** articulation. Changed to self-view factors option.',/
4044
 '    ** ',A,' references reverse elements of group ',A7,/,
 '    ** that do not exist. The nonexistent elements are in the group',/,
 '    ** ',A27,' on file groups.unv',/
4045
 '    ** For shell with physical property number',I6,' the number of ',/,
 '    ** layers defined is ',I6,',. The maximum allowable value is',I5,'.',/,
 '    ** The number of layers was reset to ',I5,'.',/
4046
 '    ** For material property number',I6,' emissivity= ',1PE11.4,' and',/,
 '    ** transmissivity or specularity=',1PE11.4,'. View factors with ray',/,
 '    ** tracing are requested in the model. The sum of the two values is',/,
 '    ** > 1, incorrect results will be obtained.',/
```

```
4047
 '    ** On physical property number',I6,' the thickness is zero while',/,
 '    ** the number of layers is',I6,'. This is not correct, the number of',/,
 '    ** layers is reset to 1.',/
4048
 '    ** Some nodes are at a distance > 1.E6 from the origin. Elements',/,
 '    ** connected to them will be considered SPACE elements.',/
4049
 '    ** The reverse sides of the element group ', A7,' may not exist.',/,
 '    ** The radiation request for these reverse sides may be ignored.',/
4050
 '    ** Some elements of the model are not axisymmetric. No view factors',/,
 '    ** will be calculated to them.',/
4051
 '    ** RESTART does not update natively defined BCs. If they have ',/,
 '    ** been changed, it may be necessary to perform a new analysis.',/
4052
 '    ** Restart is being performed with specular/transparent model. If',/,
 '    ** you are re-using previously calculated view factors, ensure the ',/,
 '    ** specular/transparent element surface properties have not changed.',/
4053
 '    ** For material',I8,' a table-dependent specific heat is defined.',/,
 '    ** The value interpolated from the table will override the ',/,
 '    ** specified specific heat above the phase change temperature.',/
4054
 '    ** The solid element subdivision flag is set and solid elements',/,
 '    ** have temperature-dependent orthotropic material properties.',/,
 '    ** This is not permitted, the solid element subdivision flag is',/,
 '    ** deactivated.',/
4055
 '    ** The element radiation patching option is activated, and there',/,
 '    ** are some elements with emissivities of 1.0. No radiation patches',/,
 '    ** will be created for them. If you do wish to create patches',/,
 '    ** for them, please change their emissivities to < 1.0, e.g. 0.99.',/,
 '    ** The complete list of elements is written on file groups.unv with',/,
 '    ** the group name: ',A,/
4056
 '    ** An All Radiation request is present with ray tracing, and the',/,
 '    ** model is axisymmetric. Incorrect results will be obtained.',/,
 '    ** Ray tracing may not be performed on axisymmetric models.',/
 4057
 '    ** Some radiation requests are present but no emissivities are',/,
 '    ** defined. They will not be executed.',/
 4058
 '    ** Specular and/or transmissive elements are present in the',/,
 '    ** model, but there are no view factor requests with the',/,
 '    ** Ray Trace option specified. These elements will be ',/,
 '    ** treated as fully diffuse and opaque.',/
```

```
4059
'    ** For material ',I6,' emissivity should be <_ 1.0.',/
4060
'    ** Temperatures from a previous run have been specified as',/,
'    ** initial temperatures, and the Redistribute Capacitances',/,
'    ** option is activated. Since this is not a restart, boundary',/,
'    ** element labeling may not be consistent. Therefore, initial',/,
'    ** temperatures of boundary elements will be approximate.',/
4061
'    ** Heat load vs temperature interpolation relationship has',/,
'    ** been detected. This may result in convergence problems.',/,
'    ** Suggestion: lower damping parameter.',/
4062
'    ** Heat map requests cannot be combined with PARAM REDUCE,',/,
'    ** group to group heat flow, or group to group view factor',/,
'    ** requests. Heat map requests will be ignored.',/
4063
'    ** An ESATAN or SINDA file is requested, the default',/,
'    ** option of redistributing capacitances is ON, and solid',/,
'    ** elements are present in the model. This is not',/,
'    ** compatible with ESATAN or SINDA, therefore no ESATAN',/,
'    ** or SINDA deck will be created. To correct this, please',/,
'    ** turn on the Do Not Redistribute Capacitances flag.',/
4064
'    ** The Analyzer is being run, a SINDA or ESATAN model is',/,
'    ** requested, there are solid elements in the model, and',/,
'    ** the default capacitance redistribution option is ON.',/,
'    ** This combination is not permitted, since the TMG model',/,
'    ** is not compatible with the ESATAN or SINDA models, which',/,
'    ** require that the capacitances of solid elements not be',/,
'    ** redistributed to the boundary elements. The ESATAN/SINDA',/,
'    ** model will not be created. To create the ESATAN/SINDA',/,
'    ** model, please turn on the Do Not Redistribute Capacitances',/,
'    ** flag.',/
4065
'    ** A negative element number of',I10,' was specified on an',/,
'    ** XCOND Card specifying conductances, it was changed to',/,
'    ** a positive value.',/,
4066
'    ** A negative conductance value of',1PE11.3,' was specified',/,
'    ** on an XCOND Card between elements',I10,' and',I10,/
4067
'    ** Single ',A5,' spectrum option is ON. The number of bands for',/,
'    ** spectrum subdivision specified in PARAM SPECTRA Card is reduced.',/
4068
'    ** The following',I10,' element(s) have potential reverse side',/,
'    ** conflicts. Either a capacitance, or a heat load,',/,
'    ** or a conductance, or a temperature boundary condition was',/,
```

```
'    ** defined on their reverse side. A complete element list appears',/,
'    ** in file groups.unv with the group name:',/,
'    ** ',A,/,(8X,9I10)
 4069
'    ** The following',I10,' multilayer elements have conflicting',/,
'    ** surface normal orientations. This can create improper view',/,
'    ** factors. Adjacent multilayer elements sharing common nodes',/,
'    ** should have consistent surface normal orientations. Please',/,
'    ** re-orient the elements. A complete element list appears ',/,
'    ** in file groups.unv with the group name:',/,
'    ** ',A,/,(8X,9I10)
4070
'    ** ',A,' references the reverse sides of elements of group ',/,
'    ** ',A,/,
'    ** These elements either do not exist or are the reverse',/,
'    ** sides of nonhomogeneous multilayer shell elements. These',/
'    ** elements are listed in the group',/,
'    ** ',A27,' on file groups.unv',/
 4071
'    ** Axisymmetry is defined about more than one axis of',/,
'    ** revolution.',/
4072
'    ** For material',I8,' a table-dependent density is defined.',/,
'    ** Time or temperature dependent density is not supported for',/,
'    ** solid materials.',/
4073
'    ** Some elements of the model are not Rotational Periodic. ',/,
'    ** No view factors will be calculated to them.',/
4074
'    ** Some elements of the model have a property of Rotational ',/,
'    ** Periodic conduction and have also radiative properties. ',/,
'    ** Only conduction will be used for them.',/
4075
'    ** A temperature-dependent table for Cp has been created  ',/,
'    ** during the solve, using Cp (below), Cp (above), latent heat,',/,
'    ** and phase change temperature and range',/
4076
'    ** A heat load for the void ',I8,' would be overwritten with',/,
'    ** the expression indicated via generic entity ',I8,/
4077
'    ** Thermo coupling request specified in line ',I8,' of INPF:',/,
'    ** ',A,/,
'    ** contains primary and/or secondary selections with no elements.',/,
'    ** This request will be ignored.',/
4078
'    ** The selection of thermal stream:',/,
'    ** ',A,/,
'    ** is a shared edge between axisymmetric solid elements.',/
```

```
4079
 '    ** The selection of thermal void:',/,
 '    ** ',A,/,
 '    ** is a shared edge between axisymmetric solid elements.',/
4080
 '    ** The selection of thermal convecting zone:',/,
 '    ** ',A,/,
 '    ** is a shared edge between axisymmetric solid elements.',/
4081
 '    ** The selection of convection to environment BC:',/,
 '    ** ',A,/,
 '    ** is a shared edge between axisymmetric solid elements.',/
4082
 '    ** The selection of thermal stream:',/,
 '    ** ',A,/,
 '    ** has an edge with 0 thickness.',/
4083
 '    ** The selection of thermal void:',/,
 '    ** ',A,/,
 '    ** has an edge with 0 thickness.',/
4084
 '    ** The selection of thermal convecting zone:',/,
 '    ** ',A,/,
 '    ** has an edge with 0 thickness.',/
4085
 '    ** The selection of convection to environment BC:',/,
 '    ** ',A,/,
 '    ** has an edge with 0 thickness.',/
 4086
 '    ** Two-sided stream ',I8,' with the name ',A,/,
 '    ** is not valid due to sides A and B having opposite directions.',/
 4087
 '    ** Monte-Carlo is used with axisymmetric elements, however',/,
 '    ** the option "Calculate View Factors only" is not activated.',/,
 '    ** This option is required for proper handling of Monte-Carlo ',/,
 '    ** radiation requests. The solver will activate this automatically.',/
 4088
 '    ** Monte-Carlo is used with plane stress elements, however',/,
 '    ** the option "Calculate View Factors only" is not activated.',/,
 '    ** This option is required for proper handling of Monte-Carlo ',/,
 '    ** radiation requests. The solver will activate this automatically.',/
 4089
 '    ** The selection of thermal stream:',/,
 '    ** ',A,/,
 '    ** may not have a convective area.',/,
 '    ** Please check thickness definition of adjacent meshes.',/
 4090
 '    ** The selection of thermal void:',/,
```

```
'    ** ',A,/,
'    ** may not have a convective area.',/,
'    ** Please check thickness definition of adjacent meshes.',/
4091
'    ** The selection of thermal convecting zone:',/,
'    ** ',A,/,
'    ** may not have a convective area.',/,
'    ** Please check thickness definition of adjacent meshes.',/
4092
'    ** The selection of convection to environment BC:',/,
'    ** ',A,/,
'    ** may not have a convective area.',/,
'    ** Please check thickness definition of adjacent meshes.',/
4093
'    ** Note: Stream ',I8,' with the name ',A,/,
'    ** might be defined on complicated topology including loops',/,
'    ** and other surfaces. Please check the final form of the ',/,
'    ** stream in the post-processing. If needed subdivide your ',/,
'    ** stream selection into separate simpler ones.',/
4094
'    ** For material ',I8,' a temperature-dependent density is defined.',/,
'    ** Temperature dependent density is not supported for solid ',/,
'    ** materials. The density is substituted with the constant value of ',/,
'    ** ',G10.4,' which is interpolated based on the provided temperature',/,
'    ** of ',G11.5,'.',/
4095
'    ** The number of axisymmetric segments for some axisymmetric ',/,
'    ** collectors is higher than the maximum supported: 90.',/,
'    ** Default value of 90 will be used for those collectors.',/
4096
'    ** The selection of enclosure radiation BC:',/,
'    ** ',A,/,
'    ** contains a shared edge between axisymmetric solid elements.',/
4097
'    ** For protective layer ',I8,' with the name ',A,/,
'    ** the ratio between protective layer total thickness ',/,
'    ** and adjacent mesh size exceeds 1/2. ',/,
'    ** This might lead to the creation of invalid  ',/,
'    ** protective layer elements.',/
4100
'    ** Two nodes of element',I10,
' are coincident.',/
4101
'    ** Conductance between elements',I10,1X,A7,/,
'    ** and',I10,1X,A7,' is approximate.',/
4102
'    ** Internal approximations made ',
'within element',I10,1X,A7,/
```

```
4103
'    **  Area of element',I10,1X,A7,
' is negative.',/
4104
'    **  Width of element',I10,1X,A7,
' is equal to zero.',/
4105
'    **  Flow in element',I10,1X,
'not in plane of the element.',/
4106
'    **  Sum of flows into element',I10,
' is not zero.',/
4107
'    **  Some nodes are used both as midside nodes of parabolic elements',/,
'    **  as well as vertex nodes of linear and/or parabolic elements. ',/,
'    **  The elements sharing these nodes may not conduct to each other.',/,
'    **  A list of these nodes follows: ',/,(8I10,/)
4200
'    **  An edge of radial heat flow element',I10,
' is too long.',/,'    **  Inaccurate view ',
'factors may result, try to subdivide the element.',/
4201
'    **  TMG input file error.',/,
'    **  On Card 6E,  field N1F < field N1S, ',
'no conductances generated.',/
4202
'    **  Element ',I10,' has an improper emissivity value, ',/,
'    **  no radiative couplings were created.',/
4203
'    **  Specular element',I10,1X,A7,/,
'    **  should not be used with the fixed solar input option.',/
4204
'    **  Transparent element',I10,1X,A7,/,
'    **  should not be used with the fixed solar input option.',/
4205
'    **  The distance between elements',I10,1X,A7,' and',I10,1X,A7,/,
'    **  is too small.',/
4206
'    **  Element',I10,
' has improper emissivity, no rad. couplings created.',/
4207
'    **  Thermal coupling failed for ',A7,' option.',/,
'    **  No eligible secondary elements found between groups ',A7,
' and ',A7,/
4208
'    **  Read error on file ',A6,1X,
'record is ignored.',/,A3,A65,/
4209
```

```
'    **  The H/R ratio for an orbit is < 1, ',/,
'    **  The resulting subterranean orbit ignored.',/
4210
'    **  Either element',I10,' or',
 I10,' is present on VUFF but not on Card 6h.',/
4212
'    **  The following input file (INPF) line has an error in it.'
 ,/,A80,/
4213
'    **  Element',I10,' in view factor merging definition ',/,
'    **  is not active for radiation.',/
4214
'    **  Incorrect specular reflectivity',
 ' or transmissivity for element ',I10,/
4215
'    **  Unrecognized element',I10,' in ',
 'radiation request, request is ignored.',/
4216
'    **  Too many specular view factors',
 ' for radiative heating request.',/
4217
'    **  In element',I10,' either 2 nodes are ',
 'coincident or 3 nodes are ',/,'    **  in a straight line.',/
4218
'    **  Model contains no eligible radiation ',
 'elements.',/
4219
'    **  The orientation of free convecting element ',I10,' and its ',/,
'    **  characteristic element ',I10,' differ substantially (',A7,')',/
4220
'    **  Radiative thermal couplings should not',
 ' be used with Oppenheim option',/,
'    **  if the connected elements have table-dependent emissivities.',/
4221
'    **  Specular reflectivity or transmissivity',
 ' may not be assigned to beams, ',/,
'    **  as is for element ',I10,/
4222
'    **  There is an improper length-proportional thermal coupling request',/,
'    **  for shell element',I10,', the element should be a beam.',/
4223
'    **  Thermal coupling request failed because no secondary elements',/
'    **  were found in primary group ',A7,' for ',I10,' elements.',/,
'    **  Associated with entity: ',A,/,
'    **  Element list:',6I10,' ...'
4224
'    **  Thermal coupling request failed because improper emissivity',/
'    **  was defined in primary group ',A7,' for ',I10,' elements.',/,
```

```
'    ** Associated with entity: ',A,/,
'    ** Element list:',6I10,' ...'
4225
'    ** These specular elements of group ',A7,' should not be used with',/,
'    ** fixed solar option for ',I10,' elements.',/,
'    ** Associated with entity: ',A,/,
'    ** Element list:',6I10,' ...'
4226
'    ** These transparent elements of group ',A7,' should not be used ',/,
'    ** with fixed solar option for ',I10,' elements.',/,
'    ** Associated with entity: ',A,/,
'    ** Element list:',6I10,' ...'
4229
'    ** The orientations of the following free-convecting elements',/,
'    ** differ substantially from the orientations of their ',/,
'    ** characteristic elements.',/,
'    ** Associated with entity: ',A,/,
'    ** Element list:',6I10,' ...'
4230
'    ** Radiative thermal boundary condition application failed',/,
'    ** because improper emissivity was defined for elements in ',/,
'    ** group ',A7,' for ',I10,' elements.',/,
'    ** Associated with entity: ',A,/,
'    ** Element list:',6I10,' ...'
4231
'    ** You are attempting to redefine the solar or IR extinction',/,
'    ** coefficient property of element',I10,' with a MATCHANGE Card.',/,
'    ** However, this cannot be done because the property was',/,
'    ** originally defined with a zero value. Please redefine the',/,
'    ** original property on the MAT Card with a non-zero value.',/
4232
'    ** A large number of calls has been made to the pseudo-random',/,
'    ** number generator.  The Monte Carlo results may not be ',/,
'    ** properly converged.',/
4233
'    ** During ray tracing',I9,' rays hit the inactive sides of',I10,/,
'    ** elements and were discarded. The following is a partial list.',/,
'    ** A complete element list appears in file groups.unv with the',/,
'    ** group name ',A,/,(8X,9I10)
4234
'    ** Array ',I4,' specifies a bidirectional reflectance ',/,
'    ** distribution function. The independent variables are ',/,
'    ** incorrectly specified.  The first independent variable ',/,
'    ** should be ANG_INC, and the second should be ANG_REF.  The',/,
'    ** BRDF will be ignored.'
4235
'    ** Array ',I4,' specifies a bidirectional reflectance ',/,
'    ** distribution function. Both incident and reflected angles ',/,
```

```
'    ** must be specified from 0 to 90 degrees.  The BRDF will be ',/,
'    ** ignored.'
4236
'    ** An error has been detected in the shadowing surface reduction ',/,
'    ** algorithm.  The algorithm has been deactivated.  This will not ',/,
'    ** affect results, but may impact performance.  Please contact ',/,
'    ** TMG support. '
4237
'    ** Incomplete BRDF table.  BRDF values should be entered for ',/,
'    ** 90 deg. > THETA > 0 deg., and 360 deg. > PHI > 0 deg. '
4238
'    ** Incomplete BRDF table.  BRDF table should be fully ',/,
'    ** populated. '
4239
'    ** All elements are potentially illuminated when using Monte ',/,
'    ** Carlo ray tracing to calculate radiative heating requests.',/
4240
'    ** With Monte Carlo ray tracing, all view factor and radiative',/,
'    ** heating requests are treated as shadowing requests. ',/
4241
'    ** An All Radiation (VFSALL) request was encountered.',/,
'    ** However, solid elements with uncoated surfaces are also',/,
'    ** present in the model. Note that no view factors will be',/,
'    ** calculated to uncoated solid elements. If you wish, you',/,
'    ** may automatically surface coat all solid elements with',/,
'    ** the ACO (PARAM AUTOCOAT) option in the Advanced Solver ',/,
'    ** Parameters Menu.',/
4242
'    ** The bidirectional reflectance distribution function (BRDF)',/,
'    ** defined in array number ',I4,' is associated with multiple',/,
'    ** materials.  A unique BRDF function should be defined for each',/,
'    ** material.  Otherwise, the emission distribution from the BRDF',/,
'    ** -associated materials will not be computed correctly.'
4243
'    ** With Monte Carlo ray tracing, Group-to-Group view factor',/,
'    ** requests are treated as Enclosure requests. ',/
4244
'    ** With the Monte Carlo ray tracing algorithm, ',I10,' rays have ',/,
'    ** been requested from one of the elements.  This exceeds the ',/,
'    ** limit of ',I10,'.  The limit will be imposed:  to increase the',/,
'    ** limit, use the MONTE CARLO RAY LIMIT option in the advanced ',/,
'    ** options form.',/
4245
'    ** Array ',I4,' specifies a direction dependent E/Absorptivity ',/,
'    ** distribution function. The incident angle must be specified  ',/,
'    ** from 0 to 90 degrees. Otherwise, the results may not be good.'
4246
'    ** Array ',I4,' specifies a direction dependent E/Absorptivity ',/,
```

```
'    ** distribution function. The independent variables are ',/,
'    ** incorrectly specified.  The first independent variable ',/,
'    ** should be ANG_INC, and the second should be DIR_INC.  The',/,
'    ** array will be ignored.'
4247
'    ** Ray-tracing using octree is not supported yet when parabolic',/,
'    ** elements are present. Ray-tracing will be performed without ',/
'    ** octree. ',/
4248
'    ** The thermal coupling involving the primary selection :',/,
'    ** ',A/,
'    ** and  the secondary selection : ',/,
'    ** ',A/,
'    ** is specified with the revolved secondary region option. ',/,
'    ** The selected primary and secondary regions are not ',/,
'    ** rotationally periodic about the specified axis. ',/
4249
'    ** Spinning elements could possibly collide with unspun elements',/
4250
'    ** Extinction coefficient ignored for view factor requests',/
4251
'    ** Free correlations are present in a model with ',/,
'    ** Articulation/Spinning. Free Correlations evaluation will only',/,
'    ** use geometrical information from first articulation time.',/
4252
'    ** Enclosure radiation with axisymmetric elements and ',/,
'    ** Ray-tracing method are used. ',/,
'    ** Parabolic elements will be treated as linear for Radiation.',/
4253
'    ** One or more immersed duct BCs',/,
'    ** do not intersect any solid elements. ',/
4254
'    ** Thermal coupling failed for ',A64,'.',/,
'    ** No eligible secondary elements found between groups ',A7,
' and ',A7,/
4310
'    ** No view factors present for radiative',
' conductance calculations.',/
4311
'    ** Error in ARR subroutine in GRAYB module.',/
4312
'    ** Some Oppenheim elements were relabeled.',/
4313
'    ** The view factor sum of some elements is >',1PE10.3,
', better results may',
/,'    ** be obtained by recalculating them with a higher subdivision',
' parameter.',/
4314
```

```
'    **  The view factor sum of some elements',
' is < ',1PE11.3,/,'    **  Incomplete enclosures may exist in the model.',/
4315
'    **  Radiative couplings are generated',
' with Gebhardt''s while using the CG',/,
'    **  element method. If convergence problems result, try Oppenheim''s',
' method.',/
4316
'    **  The view factor sum error of the following',I10,' element(s) ',/,
'    **  exceeds',I3,'%. The total number elements with non-zero',/,
'    **  view factor sums is',I10,'. Incomplete enclosures may ',/
'    **  exist in the model. A complete  element list can be',/,
'    **  found in file groups.unv under the group name:',/,
'    **  ',A,/,(8X,9I10)
4317
'    **  The original emissivity of a material used in initial run ',/,
'    **  was changed for a restart. Verify that the emissivity is ',/,
'    **  only changed for a material with no transmissivity and/or ',/,
'    **  specularity.',/
4400
'    **  No view factors exist, no radiative',
' heating calculations performed.',/
4401
'    **  No solar gray body view ',
'factor matrix exists for radiative heating.',/
4402
'    ** ',
'No IR gray body view factor matrix exists for ',
'radiative heating.',/
4403
'    **  Emissivity and solar absorptivity not identical for element',I10,
 /,'    **  radiative couplings are not modified for specular effects.',/
4404
'    **  No solar view factors exist for solar heating.',/
4405
'    **  No Earth view factors for orbital heating or IR heat flux ',/
'    **  view factors exist.',/
4406
'    ** ',
' No albedo factors or solar spectrum heat flux view factors exist.',/
4407
'    **  No radiative heat loads computed.',/
4408
'    **  Ambient Earth IR flux = 0, no Earth IR heat loads computed.',/
4409
'    **  Ambient solar flux = 0, no orbital heat loads computed.',/
4410
'    **  Iterative heat flux calculation method did not converge,',
```

```
 /,'    **  residual fraction of incident energy that was evenly',
 /,'    **  redistributed was ',1P,E11.3,/
4411
 '    **  The heat flux view factors do not sum to 1, and because of ',
 /,'    **  this the total radiated energy is off by approximately ',
 1P,E8.1,'%',
 /,'    **  You can scale the heat flux view factors with the SHF option',
 /,'    **  on the Advanced Solver Options form.',/
 4412
 '    **  The heat flux view factors do not sum to 1, and because of ',
 /,'    **  this the total radiated energy is off by approximately ',G8.1,'%',
 /,'    **  This energy was compensated for by scaling the heat flux ',
 /,'    **  view factors.',/
 4413
 '    **  For some of the transparent elements the reverse sides',
 /,'    **  have no view factors calculated. Thus, the diffusely',
 /,'    **  reflected radiation on these elements has nowhere to go',
 /,'    **  and is discarded. The magnitude of this radiation is',1P,E12.5,/
4414
 '    **  The following',I10,' transparent element(s) have no view ',/,
 '    **  factors calculated on their reverse sides. A complete ',/,
 '    **  element list appears in file groups.unv with the group ',/,
 '    **  name ',A,/,(8X,9I10)
4415
 '    **  No Earth view factors for orbital heating exist.',/
4416
 '    **  No albedo factors exist.',/
4417
 '    **  The following',I10,' elements appear in multiple ',/,
 '    **  radiative source requests. A complete element list appears',/,
 '    **  in file groups.unv with the group name ',A,/,(8X,9I10)
4418
 '    **  This is a multispectral run. An iterative method',/,
 '    **  will be used to redistribute heat fluxes.',/
4500
 '    **  Temperature of sink element',I10,/,
 '    **  is not defined for time=',1P,E15.6,/
4501
 '    **  Element no',I10,1X,
 'has more than 4 nodes, ignored in NASTRAN output.',/
4502
 '    **  CG element method is used with',
 ' SINDA output format.',/,
 '    **  Erroneous conductive conductances will result.',/
4503
 '    **  File FMODLF was erroneously specified',
 ' as output file for',/,'    **  SINDA 85 format. No output is created.',/
4600
```

```
'    **  NASTRAN CELAS2 Card',1X,A8,1X,
 'is not acceptable.',/
4601
'    **  NASTRAN Card',/,
 A80,/,'    **  Does not have proper immediately following ',
 'continuation Card.',/
4602
'    **  Error in element ',I10,/
4603
'    **  NASTRAN MAT4 or PROPERTY Card missing ',
 'for element',I10,/
4604
'    **  NASTRAN CHBDY Card',1X,A8,1X,
 'not recognized.',/
4605
'    **  NASTRAN continuation Card not found for Card',
 /,A80,/
4606
'    **  Error in NASTRAN field',A10,/
4607
'    **  NASTRAN Node no',I10,' > 9999, it is ignored',/
4608
'    **  Number of NASTRAN CORD1 Cards exceeds',I10,/
4609
'    **  Number of NASTRAN CORD2 Cards exceeds',I10,/
4610
'    **  Error in node no',I9,1X,
 'in element no',I9,/
4611
'    **  NASTRAN Coordinate system',I10,1X,
 'is a duplicate.',/
4612
'    **  No coordinate system',I10,1X,
 'for node',I10,/
4613
'    **  Node',I10,
 ' has untransformable coordinate system.',/
4614
'    **  No continuation Card for CORD2',
 1X,A8,/
4800
'    **  Area of element',I10,1X,A7,1X,
 'is not present on file VUFF.',/
4801
'    **  ',
 'Radiation linearization temperature = 0.',/,
'    **  For automatic element merging, a value of 1 is used.',/
4802
```

```
'    ** ',
 'Stefan Boltzmann constant = 0.',/,
'    **  For automatic element merging, a value of 1 is used.',/
4803
'    **  Possible loss of precision, time value',1P,E13.6,/,
'    **  converted to',E11.4,/
4804
'    **  On XCAP Card field 3 =',1P,E11.4,
 ' is smaller than field 2 =',I10,/
4805
'    ** ',
 'Radiation linearization temperature = 0.',/,
'    **  For element elimination, a value of 1 is used.',/
4806
'    ** ',
 'Stefan Boltzmann constant = 0.',/,
'    **  For element elimination, a value of 1 is used.',/
4807
'    **  Error on file MODLCF in line'
 ,/,A80
4808
'    **  No sink temperature on file TEMPF for element',I10,/,
'    **  at time =',1P,E15.6,/
4809
'    ** ',
 'Radiation linearization temperature = 0.',/,
'    **  For conductance thinning, a value of 1 used.',/
4810
'    ** ',
 'Stefan Boltzmann constant = 0.',/,
'    **  For element elimination, a value of 1 used.',/
4811
'    **  Improper value for ',
 'radiation linearization temperature, ',/,
'    **  matrix thinning is not performed.',/
4812
    '    **  Read error during thinning operation.',/
4813
'    **  Element',I10,
 ' is a boundary element, cannot be eliminated.',/
4814
'    **  Element merging is being performed with',
 /,  '    **  the element CG method, convergence problems may result.',/
4815
'    **  Elements',I10,' and ',I10,' are merged and have table-dependent',/,
'    **  material properties which do not reference the same table.',/
4816
'    **  These elements have different temperature-dependent ',/,
```

```
'    ** thermal conductivities but are joined by conductances ',/,
'    ** directly. Errors may result. Please place an element ',/,
'    ** between them or use the element CG method.',/,
(10I10)
4817
'    ** These elements have temperature-dependent thermal conductivities ',/,
'    ** and are joined by XCOND Cards. Errors may result. Suggest you ',/,
'    ** use the element CG method.',/,(8X,9I10)
4818
'    ** Capacitance was not distributed to following elements because ',/,
'    ** they are solids. Use the volume option instead of the area ',/,
'    ** option for these elements.',/,(8X,9I10)
4819
'    ** On a total heat load request there is a mixture of shell ',/,
'    ** and solid elements. The heat load redistribution will be',/,
'    ** inaccurate.',/
4820
'    ** A conductive coupling exists at',/,
'    ** the interface between two plane stress elements with ',/,
'    ** different numbers of instances.',/,
'    ** Any convective BC applied on the interface will use',/,
'    ** the difference of thicknesses as the convecting area',/,
'    ** unless otherwise specified in the BC UI dialog.',/,
'    ** The associated element numbers can be found ',/,
'    ** in the [Solution_name]_report.log file',/,
'    ** in the group name Interface Elements.',/
4821
'    ** A convective coupling exists at the interface between',/,
'    ** two elements with no convective area.',/,
'    ** The associated boundary conditions and element numbers can be',/,
'    ** found in the [Solution_name]_report.log file in the group names.',/,
'    ** Boundary Conditions With 0 Convection and ',/,
'    ** Elements With 0 Convection.',/
4900
'    ** Writing Analyz matrix into tmggeom.dat',/
4901
'    ** Possible divergence in Chebyshev ',
'accelerator.',/
4902
'    ** There are no temperature boundary conditions in the model.',/
4903
'    ** Interpolation truncated for',
' table number ',I5,' at iteration',I8,/,'    ** X = ',
1P,E12.4,',  Number of table entries',I8,/,'      Y     ',2X,
'     X      ',/,(E14.4,2X,E14.4)
4904
'    ** Truncation of ',A1,
' vs time table has been performed at iteration',I8,/
```

```
 ,'    ** X =',
 1P,E12.4,',  Number of table entries',I8,/,'        Y     ',2X,
 '     X       ',/,3X,(E14.4,2X,E14.4)
4905
 '    ** In USER1 subroutine fan, internal element',
 I8,' is not a FANPUMP.',/
4906
 '    ** There are no boundary ',
 'conditions in the flow model.',/
4907
 '    ** Element',I10,1X,A7,' has no path',
 ' to a temperature sink.',/
4908
 '    ** Fluid element',I10,1X,A7,
 ' has no path to a pressure BC.',/
4909
 '    ** Navier Stokes 1D solver could not converge in ',I0,' iterations.',/,
 '    ** Max Residual value   = ', ES16.5,/,
 '    ** Convergence criteria = ', ES16.5,/
 '    ** This can be improved by increasing the iteration limit for the',/,
 '    ** duct flow solver.',/
4910
 '    ** Format in user written subroutine',
 ' FORMOUT is neither TEMPF nor I-DEAS.',/
4911
 '    ** File name ',A12,' has > 12 ',
 'characters in user written subroutine',/,
 '    ** FORMOUT, cannot process.',/
4912
 '    ** Incorrect specific data type',I5,
 ' specified for user called subroutine ',/,'    ** FORMOUT, 0 used.',/
4913
 '    ** More than 100 file names',
 ' specified in user-called subroutine FORMOUT.',/
4914
 '    ** Free convection conductance',I10,
 ' between elements',I10,1X,A7,/,'    ** and',I10,1X,A7,' is not active.',/
4915
 '    ** Reynolds number of fluid element ',I10,
 ' >',1P,E10.3,/,
 '    ** Mass flow balance and flow resistances may be incorrect.',/
4916
 '    ** Reynolds number of fluid element ',I10,
 ' <',1P,E10.3,/,
 '    ** Mass flow balance and flow resistances may be incorrect.',/
4917
 '    ** Temperature of element',I10,
 ' was not calculated, ',/,
```

```
'    ** it is needed for the temperature of node',I10,/
4918
'    ** Temperature of element',I10,
' is below absolute zero.',/
4919
'    ** Element',I10,
' is not a fluid flow element.',/
4920
'    ** Element',I10,1X,A7,
' has improper hydraulic diameter defined,',/,
'    ** it was recalculated from its area.',/
4921
'    ** Element',I10,1X,A7,
' has no hydraulic diameter defined',/,
'    ** calculated from area.',/
4923
'    ** At thermal iteration ',I10,' fluid model did not converge',/,
'    ** after',I8,' hydraulic iterations. PDmax=',1P,E8.1,/,
'    ** Pmax=',E8.1,' Pmin=',E8.1,/
4924
'    ** Error in READPROP subroutine, reading ',
'from file VUFF the line',A80,/
4925
'    ** Element',I10,' has ambiguous ',
'propagation of flow sections.',/
4926
'    ** Incorrect table number',I5,
' referenced in subroutine TINT.',/
4927
'    ** In function TMGINT the argument exceeds the limits of the ',1P,/,
'    ** specified independent variable in the array',/,
'       Argument =',E11.3,/,'       Array    =',6E11.3,(/,14X,6E11.3),/
4928
'    ** Element',I10,
' should be defined on file INPF for NASTRAN format',/,
'    ** temperature output.',/
4929
'    ** Follower conductance',
' should not redefine temperature of a sink element.',/
4930
'    ** Ambiguous',
' flow section propagation through branch point',I8,/,
'    ** Define flow sections explicitly.',/
4931
'    ** The thermal solver reached the maximum steady-state ',/,
'    ** iteration limit without satisfying the convergence targets.',/
4932
'    ** Space element ',I10,' temperature fixed at ',
```

```
 1P,E11.4,/
4933
 '    **  Deviation from heat balance > 10% of heat',
 ' flow into sinks.',/
4934
 '    **  Flow direction in fluid element ',I10,
 ' is opposite element direction.',/,
 '    **  Boundary layer effects on forced convective conductances ',
 'are incorrect.',/,'    **  Reverse fluid element directions',
 ' in that branch and rerun the model.',/
4935
 '    **  Flow direction in fluid element ',I10,
 ' is opposite element direction.',/,
 '    **  Boundary layer effects on forced convective conductances ',
 'are incorrect.',/,
 '    **  Reverse fluid element direction and rerun the model.',/
4936
 '    **  Choked flow occurs for the following',I10,' elements.',/,
 '    **  Results may be incorrect. A complete list of elements appears',/,
 '    **  in file groups.unv with the group name: ',A,/,(8X,9I10),/
4937
 '    **  Element',I10,1X,A7,' at the end of',
 ' long chain is not pressure sink.',/,'    **  Convergence problems may',
 ' result.',/
4938
 '    **  At iteration ',I5,' fluid model did not '
 ,'converge after',I5,' iterations',/,'    **  PDmax=',1P,E11.3,
 ' Pmax=',E11.3,' Pmin=',E11.3,/,
 '    **  Clipping is performed on hydraulic resistance',I8,/
4939
 '    **  Table-dependent density specified for',
 ' element',I10,', it should be',/,'    **  specified as liquid.',/
4940
     '    **  Element CG method is used without',
 ' conjugate-gradient solver,',
   /,'    **  convergence problems may result.',/
4941
 '    **  The following elements have no paths to',
 ' temperature boundary condition.',/,(8X,9I10)
4943
 '    **  The following',I10,' elements have no paths to',
 ' fluid elements or ',/,
 '    **  temperature boundary conditions.',/,(8X,9I10)
4944
 '    **  The thermal CG solver did not converge after',I8,' iterations',/,
 '    **  The solution is automatically restarting. No user intervention',/,
 '    **  is required. Matrix fill value=',I4,' Residual=',1P,E11.3,/
4945
```

```
'    **  The following elements have improper',
' shapes:',/,(9X,I10)
4946
'    **  Interpolation is truncated for',
' table number',I5,' at time',1P,E15.6,/,
'    **  X = ',
 E12.4,',  Number of table entries',I6,/,'         Y     ',2X,
'     X      ',/,(3X,E14.4,2X,E14.4)
4947
'    **  Truncation of ',A1,
' vs time table has been performed at time',1P,E15.6,
 /,'    **  X =',E12.4,',  Number of table entries',I8,/,
'        Y     ',2X,
'     X      ',/,3X,(E14.4,2X,E14.4)
4948
'    **  Memory allocation failed with ILU value of',I8,/
'    **  Trying again with ILU value of',I8,/
4949
'    **  Compressibility effects were ignored because',/,
'    **  only a single thermal iteration was performed.',/
4950
'    **  The PARAM FASTRANSIENT option has',
' introduced nontrivial approximations',/,'    **  to radiative conductance',I9,
' connecting elements',I10,' and',/,'    **  ',I10,' Other conductances and',
' results accuracy may also be affected. ',/
4951
'    **  PARAM QUARTIC Option is present with series radiative conductances.',
 /,'    **  The effect of the series radiative conductances is ignored.',/
4952
'    **  Conjugate-gradient solver did not converge in',I5,
' iterations.',/,
'    **  Solution automatically restarting with matrix fill value ',
 I5,/,
'    **  Information: Residual=',1P,E11.3,' Target =',E11.3,
' Matrix fill=',I4,/,
'    **  No user intervention required.',/
4953
'    **  The following elements'' conductances were modified to make the ',/,
'    **  solution more robust. If possible, modify these elements to make',/,
'    **  them less distorted.',/,(8X,9I10)
4954
'    **  Conjugate-gradient solver',
' did not converge in',I4,' iterations.',/,5X,'**  Solution automatically',
' restarting with an iteration limit of ',I3,/,5X,'**  Information: Residual='
 ,1P,E11.3,' Target =',E11.3,' Matrix fill=',I4,/,5X,
'**  No user intervention required.',/
4955
'    **  No capacitances exist for transient run',/
```

```
4957
'    **  The Reynolds number is out of the recommended range in the ',
'correlation',/,'    **  for the head loss coefficient in a curved duct.',
'  Re=',1P,E11.3,'.',/,'    **  The recommended range is 2.E4 < Re < 4.E5.',/
4958
'    **  The Dean number is out of the recommended range in the ',
'correlation',/,'    **  for the head loss coefficient in a curved duct.',
'  De=',1P,E11.3,'.',/,'    **  The recommended range is 50 < De < 5000. ',/
4959
'    **  The radius of curvature of the curved duct element ',I5,/,
'    **  is too small.  Please check the geometry. ',/
4960
'    **  The orientation of one of the following hydraulic elements is',/,
'    **  not consistent with the rest in its branch. This was',/,
'    **  internally corrected. To be safe, please check the geometry.',/,
(8X,7I10)
4961
'    **  ',I10,' conductances out of a total of',I10,' were modified to',/,
'    **  make the solution more robust. A list of modified elements was',/,
'    **  written on files [Solution_name]_report.log and groups.unv with',/,
'    **  group name ',A,/
4962
'    **  The thermal CG solver did not converge. Solution is restarting ',/,
'    **  with the BICGSTAB(2) algorithm.',
' No user intervention is required.',/
4963
'    **  Maximum allowable temperature was',
' exceeded, clipping was performed.',/,
'    **  This may cause heat balance deviation.',/
4964
'    **  The following fluid elements do not',
' convect to any solids.',/,'    **  A complete element list appears',
' in file groups.unv with the',/,'    **  group name ',A,'.',/,(8X,6I10)
4965
    '    **  Internal error:  the hydraulic element',I10,
    ' is improperly defined.',/
4966
'    **  The following',I10,' elements have no paths to a temperature ',/,
'    **  boundary condition. These elements will be ignored.',/,
'    **  Total heat load on these not-connected elements ',/,
'    **  is',1P,E11.4,' A complete element list appears in file ',/,
'    **  groups.unv with the group name ',A,/,(8X,9I10)
4967
'    **  The following elements have no paths to fluid elements or',/,
'    **  temperature boundary conditions. These elements will be ',/,
'    **  ignored in temperature calculations. For the duration of',/,
'    **  the run, they will be assigned a negative capacitance',/,
'    **  value. The total heat load on these elements is',1P,E11.4,/,
```

```
'    ** A complete element list appears in file groups.unv with ',/,
'    ** the group name ',A,/,(8X,9I10)
4968
'    ** At time=',1P,E15.6,' the maximum temperature change of',E11.4,/,
'    ** at element',I10,' exceeds twice the maximum allowable value',/,
'    ** of ',E11.4,/
4969
'    ** The most upstream and the most downstream ends of',/,
'    ** the chain of 1-way conductances must be sink elements. ',/,
'    ** Therefore, an upstream element of a 1-way conductance',/,
'    ** must be either a sink element or the downstream element',/,
'    ** of another 1-way conductance. A downstream element of ',/,
'    ** a 1-way conductance must be either a sink element or',/,
'    ** the upstream element of another 1-way conductance.',/,
'    ** The following elements are improperly connected with ',/,
'    ** 1-way conductances.',/,
'    ** ',6I10
4970
'    ** Electrical elements are present without proper electrical boundary',
/,'    ** conditions. No electrical power dissipation is computed.',/
4971
'    ** Hydraulic element',I10,' is in a closed loop with no pressure',/,
'    ** boundary conditions. A zero gauge pressure boundary condition',/,
'    ** was assigned to it.',/
4972
'    ** Incorrect series thermal coupling specified between ',/,
'    ** elements',I10,' and ',I10,'. Possible cause: elements do not',/,
'    ** share a common boundary.',/
4973
'    ** Sum of 1-way conductances at the following elements and',/,
'    ** possibly others do not sum to zero. Energy imbalance may',/,
'    ** result.',/,
'    ** ',6I10,' ...'
4974
'    ** There is a very large number of radiative conductances',/,
'    ** in the model. This may result in slow convergence or even ',/,
'    ** memory exhaustion. You can reduce the number of radiative',/,
'    ** conductances with the Card 9 PARAM PATCH option. You can ',/,
'    ** activate this option from the Radiation Control / Advanced',/,
'    ** Parameters sub-form.',/
4975
'    ** ',I10,' elements have Reynolds Numbers either',/,
'    ** below',1P,E11.4,' or above',E11.4,' A list of these elements',/,
'    ** was written on files [Solution_name]_report.log and groups.unv',/,
'    ** with group name ',A,/
4977
'    ** For ablative element',I10,' with material ID',I10,' a second ',/,
'    ** material ID',I10,' is specified after ablation has taken place.',/,
```

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'    ** Unfortunately, the second material has a table-dependent',/,
'    ** ',A,' whereas the original one has a constant one.',/,
'    ** This is not allowed. Please make sure that the ',A,' is',/,
'    ** either constant or table-dependent on both materials.',/
4978
'    ** For element ',I10,' a change of material is specified from',/,
'    ** material ID',I10,' to material ID',I10,' Unfortunately the',/,
'    ** second material does not exist.',/
4979
'    ** You are calling the interpolation subroutine TINT from',/,
'    ** a user-written subroutine. You are using double precision',/,
'    ** time and temperatures. Please ensure that the independent',/,
'    ** variable X in the CALL TINT(X,Y,N) statement is not a',/,
'    ** double precision variable, the TINT routine accepts only',/,
'    ** single precision variables.',/
4980
'    ** The following',I10,' elements have no paths to a voltage ',/,
'    ** boundary condition. A complete element list appears in ',/,
'    ** file groups.unv with the group name ',A,/,(8X,9I10)
4981
'    ** You are calling the interpolation routine ARRAYINTERP from',/,
'    ** a user-written subroutine. You are using double precision',/,
'    ** time and temperatures. Please ensure that the independent',/,
'    ** variables X,Y,Z in the CALL statement are single ',/,
'    ** precision variables.',/
4982
'    ** Your model has absolute temperature units (R or K),',/,
'    ** it has radiative conductances, and at least one of the',/,
'    ** initial temperatures is not specified or is at absolute',/,
'    ** zero. This is physically unrealistic and may result',/,
'    ** in convergence problems. If this happens, please try',/,
'    ** specifying non-zero initial temperatures.',/
4983
'    ** Your model has absolute temperature units (R or K),',/,
'    ** it has radiative conductances, and at least one sink',/,
'    ** temperature is at absolute zero. This is physically ',/,
'    ** unrealistic and may result in convergence problems. ',/,
'    ** If this happens, please change the sink temperatures ',/,
'    ** to be above absolute zero.',/
4984
'    ** The following',I10,' elements have no paths to a temperature',/,
'    ** boundary condition. The total heat load on these elements',/,
'    ** is',1P,E11.4,' Convergence problems may result.',/,
'    ** A complete element list appears in file groups.unv with',/,
'    ** the group name ',A,/,(8X,9I10)
4985
'    ** The following elements have no paths to fluid elements',/,
'    ** or temperature boundary conditions. The total heat load on',/,
```

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'    ** these elements is',1P,E12.4,' Convergence problems may result.',/,
'    ** A complete element list appears in file groups.unv with',/,
'    ** the group name ',A,/,(8X,9I10)
4986
'    ** The computed heater/cooler power requirement for thermostat ',I4,/,
'    ** at',1P,E12.4,' percent of its nominal power rating is outside',/,
'    ** the expected range of 0 to 100 percent.',/
4987
'    ** The computed heater/cooler power requirement for thermostat ',I4,/,
'    ** at',1P,E11.4,' percent of its nominal power rating is outside',/,
'    ** the expected range of 0 to 100 percent',/,
'    ** and will be limited to ',I3,' percent. The desired temperature '/,
'    ** target may not be reached for this thermostat.',/
4988
'    ** No heater/cooler power rating available for thermostat ',I4,/,
'    ** That thermostat is disabled and the corresponding desired',/,
'    ** target temperature will be ignored.  ',/
4990
'    ** Stream network mass flow imbalance of ',1P,E11.4,/,
'    ** at element ',I10,' is larger than one percent of'/,
'    ** that element mass flow of '1P,E11.4,'.'/,
4991
'    ** Ablated layer ',I10,' of a non-uniform element ',I10,/,
'    ** is not connected  to any unablated elements.'/,
4992
'    ** Total Temperature: Non-zero swirl ratio defined on boundary '/,
'    ** conditions (BCs) with no corresponding rotation defined. '/,
'    ** Swirl velocity is treated as zero for these BCs. '/,
4993
'    ** Total Temperature: Relative Temperature Reference frame is',/,
'    ** used for stream (or ducts) with ID ',I6,' and name:',/,
'    ** ',A,/,
'    ** but fluid elements convect to walls at different',/,
'    ** rotational speeds. Relative calculation frame is INVALID. ',/,
4994
'    ** Total Temperature: Swirl variables are defined on walls which do ',/,
'    ** not convect to fluid (Duct or Stream) elements. '/,
4995
'    ** Target temperatures or differences in temperatures were not',/,
'    ** reached during the run. ',/
4996
'    ** Multiple gravity loads are present.',/,
'    ** Only the first one will be retained.',/
4997
'    ** The named point ', "'",A,"'",/,
'    ** used in the function call does not exist.',/,
'    ** Return the default value for the function.',/
4998
```

```
'    ** The closest element to the named point ', "'",A,"'",/,
'    ** was not found during the octree search.',/,
'    ** Return the default value for the function ',"'",A,"'.",/,
'    ** All further same warnings with this function and named point',/,
'    ** are disabled.',/,

4999
'    ** The closest element',I10,' to the named point ',"'",A,"'",/,
'    ** does not have connections to hydraulic elements.',/,
'    ** Return the default value for the function',"'",A,"'.",/,
'    ** All further same warnings with this function and named point',/,
'    ** are disabled.',/,

5000
'    ** Area or volume of element',I10,
' not defined, zero assumed.',/
5001
'    ** Entries in table',I6,
' were reordered into ascending order.',/
5002
'    ** Element',I10,' has more than 4 nodes, unsuitable for nodal ',/,
'    ** result output.',/
5003
'    ** At time ',1P,E15.6,
' heat inputs are considered constant.',/
5004
'    ** Element referenced on follower ',
'conductance',I10,' is not defined.',/
5005
'    ** Stefan-Boltzmann constant = 0, no radiative',
' couplings created.',/
5006
'    ** Absolute temperature units are used, it may',
' cause convergence problems.',/
5007
'    ** Starting time of transient run =',
 1P,E15.6,' is not equal to any of',/,
'    ** the printout intervals',
' specified on the initial temperature file.',/,
'    ** The temperatures at the closest printout interval, at ',/,
'    ** time =',E15.6,' will be used as the starting temperatures.',/
5100
'    ** Solid element',I10,1X,A7,' has warped face - conductances ',/,
'    ** are approximate.',/
5101
'    ** Solid element ',I10,1X,A7,
' does not have a unique element center,',/,
'    ** some of its conductances are approximate.',/
```

```
5102
 '    ** Radial heat flow',
 ' for lumped mass element',I10,' is ignored.',/
5103
 '    ** Radial heat flow',
 ' for beam element',I10,' is ignored.',/
5104
 '    ** Element',I10,' has improper shape.',/
5105
 '    ** Element ',I10,
 ' is warped, warpage angle is',E10.3,' degrees.',/
5106
 '    ** Element center of ',I10,1X,A7,
 ' does not fall inside the element.',/
5107
 '    ** The model appears to be a restart ',
 ' but the articulation or orbital time',/,
 '    ** steps do not align with the previous run.',/
5108
 '    ** The following',I10,
 ' elements are warped:',/,'    ** ',10I10,' ...'
5109
 '    ** Multiple spin requests have been specified with different',/,
 '    ** numbers of calculation positions.',I8,' positions will be',/,
 '    ** used for all requests.',/

5110
 '    ** Mixed-order hexahedron or wedge elements have been detected',/,
 '    ** in the model. Those element types are not supported by the',/,
 '    ** thermal solver. A linear version of those elements will be',/,
 '    ** used instead.',/
5200
 '    ** Read error on file ',A,
 ' record is ignored.',/,A80,/
5201
 '    ** Element',I10,' has an improper area defined.',/,
 '    ** Incorrect view factor adjustments may be made.',/
5202
 '    ** File ',A,/,
 '    ** cannot be opened for some reason in routine opencp.',/
5203
 '    ** File ',A,/,
 '    ** cannot be opened for some reason in routine opencp,',/,
 '    ** possibly because it is currently being accessed.',/
5204
 '    ** File ',A,/,
 '    ** cannot be deleted for some reason in routine opencp,',/,
 '    ** possibly because it is currently being accessed.',/
```

```
5205
 '   ** File ',A,/,
 '   ** cannot be opened in routine opencp, possibly because ',/,
 '   ** it is currently being accessed by another application.',/
5206
 '   ** User plugin ',A,/,
 '   ** for expression functions registration could not be loaded.',/
5207
 '   ** User plugin ',A,/,
 '   ** for expression functions registration could not be initialized.',/
5208
 '   ** Non-existent entity ID referenced as argument in function ',/,
 '   ** ',A,/,
 '   ** for expression ID ',I6,':',/,
 '   ** ',A,/,
 '   ** for BC or element selection group name:',/,
 '   ** ',A,/
5209
 '   ** The coordinate value ',E12.6,' is outside of range of the ',/,
 '   ** table ',I10,'. This table will use the "Constant" option ',/,
 '   ** for "Values Outside Table" in NX.',/,
5210
 '   ** The coordinate values ',E12.6,' , ',E12.6,' are outside ',/,
 '   ** Delaunay triangulation for the table ',I10,'. ',/,
 '   ** This table will use the "Constant" option for "Values Outside ',/,
 '   ** Table" in NX.',/,
5211
 '   ** The coordinate values ',E12.6,' , ',E12.6,' , ',E12.6,' are ',/,
 '   ** outside Delaunay triangulation for the table ',I10,'. ',/,
 '   ** This table will use the "Constant" option for "Values Outside ',/,
 '   ** Table" in NX.',/,
5212
 '   ** The Delaunay triangulation used for the table ',I10,' has ',/,
 '   ** less than ',I10,' points. Switching to the Nearest Neighbor ',/,
 '   ** interpolation.',/,
5213
 '   ** The number of spatial dimensions for the table ',I10,' is one. ',/,
 '   ** For Delaunay interpolation method, at least two spatial ',/,
 '   ** dimensions must be provided. Switching to the Linear ',/,
 '   ** interpolation. Results may differ from NX/Simcenter ',/,
 '   ** interpolation results.',/,
5214
 '   ** The number of spatial dimensions for the table ',I10,' is one. ',/,
 '   ** For Delaunay interpolation method, at least two spatial ',/,
 '   ** dimensions must be provided. Switching to the Linear ',/,
 '   ** interpolation. Results may differ from NX/Simcenter ',/,
 '   ** interpolation results. The preferred method of data input is ',/,
 '   ** to use table of fields.',/,
```

```
5215
 '    ** The table ',I10,' used for Renka interpolation should have ',/,
 '    ** at least two spatial dimensions. Switching to the Linear ',/,
 '    ** interpolation. Results may differ from NX/Simcenter ',/,
 '    ** interpolation results.',/,
5216
 '    ** The table ',I10,' used for Renka interpolation should have ',/,
 '    ** at least two spatial dimensions. Switching to the Linear ',/,
 '    ** interpolation. Results may differ from NX/Simcenter ',/,
 '    ** interpolation results. The preferred method of data input is ',/,
 '    ** to use table of fields.',/,
5217
 '    ** The Renka interpolation method used for the table ',I10,' has ',/,
 '    ** less than ',I10,' points. Switching to the Nearest Neighbor ',/,
 '    ** interpolation.',/,
5218
 '    ** The "Inverse Distance Weights Interpolation Method" ',/,
 '    ** specified for the table ',I10,' cannot find any nearest node. ',/,
 '    ** Please check table parameters such as radius, tolerance, ',/,
 '    ** numbers of nearest neighbor points.',/,
5219
 '    ** Unexpected run time condition ',A,/,
 '    ** encountered in place ',A,/
5220
 '    ** Stream with ID ',I6,' and name ',A,/,
 '    ** is a multi-body edge stream. To avoid visualization',/,
 '    ** artifacts, split this stream.',/
5221
 '    ** The inlet of a stream with ID ',I6,' and name ',/,
 '    ** ', A,' is connected to its outlet ',A,'.',/
5222
 '    ** Stream with ID ',I6,' and name ',A,/,
 '    ** is a ',A,' auto connected circular stream.',/,
 '    ** This is not supported.',/
5223
 '    ** A stream with ID ',I6,' and name ',A,/,
 '    ** is an auto ',A,' and connected to a non-auto',/,
 '    ** circular stream with ID ', I6,' and name ',A,/,
 '    ** This is not supported.',/
5224
 '    ** The following stream(s) with automatically determined mass flow',/,
 '    ** create(s) an underdefined cluster configuration, which includes'/,
 '    ** ',I3,' auto-connected stream(s),',I3,' stream(s) with defined',/,
 '    ** mass flow and',I3,' mass flow junction(s). This configuration',/,
 '    ** creates a system of',I3,' equation(s) and',I3,' unkown(s):',/,
 '    **   MASS FLOW   STREAM ID   STREAM NAME',/,
 '    ** ------------------------------------------------------------'
5225
```

```
'    **  The following stream(s) with automatically determined mass flow',/,
'    **  create(s) an overdefined cluster configuration, which includes',/,
'    **  ',I3,' auto-connected stream(s),',I3,' stream(s) with defined',/,
'    **  mass flow and',I3,' mass flow junction(s). This configuration',/,
'    **  creates a system of',I3,' equation(s) and',I3,' unkown(s):',/,
'    **   MASS FLOW   STREAM ID   STREAM NAME',/,
'    **  ------------------------------------------------------------'
 5226
'    **  There are streams that are farther to a junction than ',/,
'    **  the shortest stream of that junction. For a list of these ',/,
'    **  streams please see the [Solution_name]_report.log file.',/
5227
'    ** The outlet node for stream with ID', I6, ' and name ', A,/,
'    ** could not be found.',/
5228
'    ** The inlet node for side ', A,' of stream with ID', I6, ' and name ', A,/,
'    ** could not be found.',/
5229
'    ** Uknown stream side: ', A,' for stream id ',I6,/,
'    ** and name ', A,/
5230
'    **  The Akima interpolation method used for table',I10,' requires ',/,
'    **  a minimum of 3 entries. Switching to Linear interpolation',/,
'    **  method.',/,
5231
'    **  The Akima interpolation method used for table',I10,' requires ',/,
'    **  a minimum of 3 entries. Switching to Nearest Neighbor interpolation ',/,
'    **  method.',/,
5300
'    **  The first record on file TEMPF is not a',
' time record.',/
 5701
'    **  There are missing element options for element',I10,/
 5702
'    **  Missing element geometry for element',I10,/
 5703
'    **  Conductance number',I10,
' not found for element',I10,/
 5704
'    **  Unable to perform preconditioning on',
' element',I10,/
 5705
'    **  Invalid conductance formulation type,',
' using default type.',/
 5706
'    **  No conductive path because of flagpole-type connection between',/,
'    **  the following elements. This typically happens when a beam is',/,
'    **  connected at one end only to a shell element or along one edge',/,
```

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'    **  to a solid element.',/,
('    **  ',9I10)
5707

'    **  No conductive path because of door hinge-type connection between',/,
'    **  the following elements. This typically happens when a shell ',/,
'    **  is not connected along all its edges to a solid element.',/,
('    **  ',9I10)
5708
 12X,8I10,/
5709
'    **  The RE parameter for element',I10,' is null.',/
5710
'    **  The sum of the CG to local boundary',
' conductances for element',I10,/,
'    **  is null.',/
5711
'    **  Cannot calculate conductances for element',I10,/
5712
'    **  Element type not valid for element',I10,/
5713
'    **  The following elements have the same nodes:',/
5714
'    **  The area of element ',I10,' is zero.',/
5715
'    **  The volume of element ',I10,' is zero.',/
5716
'    **  Error inverting formulation matrix for',
' element ',I10,/
5717
'    **  Unable to perform global conditioning for ',
'boundary element', I10,/
5718
'    **  Unable to find conductance data for ',
'internal element', I10,/
5719
'    **  Unable to find material table for ',
'internal element', I10,/
5720
'    **  Number of elements connected to a ',
'boundary element exceeds limits.',/
5721
'    **  Unable to perform global conditioning',
' for internal element', I10,/
5722
'    **  Number of boundary element conductances',
' exceeds limits.',/
5723
```

```
'    ** Unable to find conductance data for',
' boundary element', I10,/
5724
'    ** Number of conductances for one ',
' boundary element exceeds limits.',/
5725
'    ** Unable to perform global conditioning.',/
5726
'    ** Number of element conductances exceeds limits.',/
5727
'    ** External element label', I10,
' in group list not found.',/
5728
'    ** Invalid preconditioning type.',/
5729
'    ** Invalid global conditioning type.',/
5730
'    ** Interface element',I10,/,
'    ** is not on the boundary of any other element.',/
5731
'    ** Element ',I10,' will be selected as boundary.',/
5732
'    ** Boundary element label',I10,' has',
' been created, continuing at label 1.',/
5733
'    ** The following',I10,' elements have no conductive paths ',/,
'    ** between them because of a flagpole-type connection.',/,
'    ** This typically happens when a beam is connected ',/,
'    ** at one end only to a shell or solid element, or at both',/,
'    ** ends to the edge of a solid element. A complete element',/,
'    ** list appears on file groups.unv with the group name:',/,
'      ',A,/,(8X,9I10)
5734
'    ** The following',I10,' elements have no conductive paths ',/,
'    ** between them because of hinge-type connections.',/,
'    ** This typically happens when a shell is connected ',/,
'    ** along a single edge to a solid element. A complete ',/,
'    ** element list appears on file groups.unv with the group ',/,
'    ** name:',/,
'      ',A,/,(8X,9I10)
5735
'    ** Interface in middle of geometry. ',/,
'    ** Splitting of geometry will be skipped.',/
5736
'    ** Interface not duplicated if fluid elements are Present ',/
5901
'    ** Unable to access universal file.',/
5902
```

```
'    **  Unable to write to universal file.',/
5903
'    **  Unable to access file TEMPF or GTEMPF.',/
5904
'    **  Unable to access file VUFF.',/
5905
'    **  Unable to access file MODLF or MODLCF.',/
5910
'    **  Unable to recover boundary element',
' temperature for element', I10,/
5911
'    **  Unable to recover boundary element',
' heat flux for element', I10,/
5915
'    **  Unable to calculate data for',
' node ', I10,/
5920
'    **  Temperature calculations may be ',
'incorrect due to the above errors.',/
5921
'    **  Heat flux calculations may be incorrect due to the above errors.',/
5922
'    **  Temperature gradient calculations ',
'may be incorrect due to above errors.',/
5930
'    **  Unable to calculate temperature for',
' element', I10,/
5931
'    **  Unable to calculate temperature for',
' node', I10,/
5932
'    **  Unable to calculate heat flux for ',
'element', I10,/
5933
'    **  Unable to calculate temperature ',
'gradient for element', I10,/
5934
'    **  Unable to calculate temperature ',
'gradient for node', I10,/
5935
'    **  Unable to calculate heat balance',
' for element', I10,/
5936
'    **  Unable to calculate velocity for',
' element', I10,/
5937
'    **  Unable to calculate velocity for node',
 I10,/
```

```
5938
'    ** Unable to calculate Reynolds ',
'number for element', I10,/
5939
'    ** Unable to calculate Reynolds ',
'number for node', I10,/
5940
'    ** Unable to calculate pressure for',
' element', I10,/
5941
'    ** Unable to calculate pressure for',
' node', I10,/
5942
'    ** Unable to calculate heat transfer',
' coefficient for element', I10,/
5943
'    ** Interpolation falls outside limits of',
' table, using lower or upper bound',/
5944
'    ** Unable to create connectivity model',
' grid for element', I10,/
5945
'    ** Unable to create connectivity model',
' for element', I10,/
5946
'    ** Unable to calculate mass flow for',
' element', I10,/
5947
     '    ** Unable to calculate mass flow for node',I10,/
5948
'    ** Unable to write view factor sum for',
' element', I10,/
5950
'    ** Heat flux calculations not supported',
' with the element center method.',/
5951
'    ** Temperature gradient calculations',
' are not supported with the element ',/,'    ** center method.',/
5952
'    ** The number of time steps limit is exceeded',
' for orbital heat flux output',/
5953
'    ** Number of time steps limit is exceeded',
' for orbital view factor output.',/
5954
'    ** Least-squares interpolation did not converge. ',/,
'    ** Nodal values may be inaccurate.',/
5955
```

```
'    ** A total of ',I4,' elements',' and boundary elements is attached',/,
'    ** to node',I10,'. A maximum of ',I4,' may be processed. The ',/,
'    ** interpolated quantities at this node may be inaccurate.',/
5956
'    ** Unable to calculate fluid network',
' results for node',I10,/
5957
'    ** Unable to calculate fluid network',
' results for element',I10,/
5958
'    ** Node temperature gradients are not',
' calculated for this release.',/
5959
'    ** Node heat fluxes are not',
' calculated for this release',/
5960
'    ** Heat fluxes are not calculated',
' for orthotropic elements',/
5961
'    ** Unable to access file tmgrslt.dat',/,
   '    ** Some requested results may not be available.'/
5962
 '    ** Run failed or completed with some errors.',/,
 '    ** Some requested results may be inaccurate or unavailable.'/
5963
 '    ** ShipIR output is requested for time ',/,
'    ** ',1P,E10.3, ', that does not correspond',/,
'    ** to a TMG printout time. Specify a time',/,
'    ** value that matches a printout time.'/
5964
'    ** The following',I10,' pairs of elements have the same nodes.',/,
'    ** A complete list appears in file groups.unv with the name:',/,
 9X,A,/,(8X,4(I10,I10,','))
5965
'    ** There was a change of number of nodes for convection coefficients',/,
'    ** results. Results might be inaccurate.',/,
6000
'    ** Adjusting radiative conductances proportionally',
' (KSP=1000000) is an ',/,
'    ** obsolete option. Please use weighted distribution (KSP=3000000).',/
6001
'    ** Binary file compatibility between platforms option could',/,
'    ** not be exercised because file ',A12,' already exists in',/,
'    ** an incompatible format',/
6002
'    ** Number of machines available for the parallel run of ',/,
'    ** ',A10,' is ', I3.3, ' which is less than ',I3.3, ', ',/,
'    ** the number of machines listed in the given machine file.',/,
```

```
 '   ** Note that only those machines that are available',/,
 '   ** will be used in the parallel run.',/
6003
 '   ** PARAM DOMDEC/RADDOMDEC option for domain decomposition of',/,
 '   ** radiative model solves is currently not supported for',/,
 '   ** coupled solves, laser analysis, spinning, articulation,',/,
 '   ** or with user1 subroutines. The run will proceed ',/,
 '   ** with PARAM DOMDEC/RADDOMDEC setting ignored.',/
6004
 '   ** PARAMS to run in parallel are specified for coupled ',/,
 '   ** thermal-flow runs. Those params will be ignored. For',/,
 '   ** coupled thermal-flow runs the parameters will be taken',/,
 '   ** from "Parallel Configuration File.xml".',/,
6005
 '   ** One of the parallel parameters was specified ',/,
 '   ** in "Parallel Configuration File.xml" for thermal',/,
 '   ** only run. Params from the file will take precedence',/,
 '   ** over any parallel params specified in INPF.',/,
6006
 '   ** One of the parallel parameters was specified in INPF',/,
 '   ** for thermal only runs but "Parallel Configuration',/,
 '   ** File.xml" wasn''t provided. Run will be performed in ',/,
 '   ** serial.',/,
6007
 '   ** Parallel thermal solver option is not supported',/,
 '   ** for thermal-flow coupled runs with the serial flow solver',/,
 '   ** or when PARAM UPDATEOPTICAL is present.',/,
 '   ** The thermal solve will be performed in serial.',/,
6008
 '   ** Parallel thermal solver option is not supported',/,
 '   ** in coupled thermal-flow simulations.',/,
 '   ** The thermal solve will be performed in serial.',/,
6009
 '   ** Parallel thermal solver option is not supported',/,
 '   ** when PARAM REDUCE is present.',/,
 '   ** The thermal solve will be performed in serial.',/,
6010
 '   ** Warning: Negative number of rays in GPARAM 0 66 N.',/,
 '   ** Default value of 15000 rays per element is used.',/
6011
 '   ** Warning: Parallel Configuration file not present',/,
 '   ** or View Factors GPU option is not activated',/,
 '   ** when NUM_GPU_RAYS_PROTO is used.',/,
 '   ** Using default graphic card.',/
6012
 '   ** Warning: SMS linear solver is specified',/,
 '   ** but is not supported for a serial thermal solve.',/,
 '   ** Default linear solver will be used instead.',/
```

```
6101
'    ** Node label', I10, ' not found for',
' temperature restraint ',/,
'    ** boundary condition.',/
6102
'    ** Element label', I10, ' not found for',
' heat flux boundary condition.',/
6103
'    ** Element label', I10, ' not found for',
' convection boundary condition.',/
6104
'    ** Element label', I10, ' not found for',
' radiation boundary condition.',/
6105
'    ** Element label', I10, ' not found for',
' heat generation boundary condition.',/
6106
'    ** Interpolation table number', I8,
' not found for',/,'    ** temperature restraint boundary condition.',/
6107
'    ** Interpolation table number', I8,
' not found for',/,'    ** heat flux boundary condition.',/
6108
'    ** Interpolation table number', I8,
' not found for',/,'    ** convection boundary condition.',/
6109
'    ** Interpolation table number', I8,
' not found for',/,'    ** radiation boundary condition.',/
6110
'    ** Interpolation table number', I8,
' not found for',/,'    ** heat generation boundary condition.',/
6111
'    ** Invalid interpolation table number', I8,
' specified for',/,'    ** temperature restraint boundary condition.',/
6112
'    ** Invalid interpolation table number', I8,
' specified for',/,'    ** heat flux boundary condition.',/
6113
'    ** Invalid interpolation table number', I8,
' specified for',/,'    ** convection boundary condition.',/
6114
'    ** Invalid interpolation table number', I8,
' specified for',/,'    ** radiation boundary condition.',/
6115
'    ** Invalid interpolation table number', I8,
' specified for',/,'    ** heat generation boundary condition.',/
6116
'    ** Nodal temperature restraint',
```

```
 ' superseded by',/,'    **  temperature boundary condition on element', I10,/
6117
 '    **  Node label', I10, ' not found for',
 /,'    **  heat source boundary condition.',/
6118
 '    **  Interpolation table number', I8,
 ' not found for',/,'    **  heat source boundary condition.',/
6119
 '    **  Invalid interpolation table number', I8,
 ' specified for',/,'    **  heat source boundary condition.',/
6120
 '    **  Heat source boundary condition on',/,
 '    **  free node label', I10, ' is ignored.',/
6121
 '    **  Nodal temperature restraint type for',
 /,'    **  node label', I10, ' is not supported.',/
6122
 '    **  No axisymmetric profile element found.',/
6123
 '    **  No MAT Card 1 found, results may be incorrect.',/
6124
 '    **  TMG model file tmgmodel.dat is being used',
 /,'    **  Restart analysis cannot be performed.',/
6125
 '    **  A restart run is being performed, but either file ',/,
 '    **  tmggeom.dat or MODLF is missing and should be present.',/
6126
 '    **  Transparent or specular surfaces are present and radiative heat',/,
 '    **  flux calculations are requested with Gebhardt''s Method. Results ',/,
 '    **  are likely to be in error. Use Oppenheim''s Method instead.',/
6127
 '    **  IR spectrum transparencies are present. View factor calculations',/,
 '    **  should be performed with the ray-tracing option. ',/
6128
 '    **  The following',I10,' elements have boundary conditions or thermal',/,
 '    **  couplings defined on faces or edges that are not free.',/,
 '    **  A complete list appears in file groups.unv with the ',/,
 '    **  group name ',A,/,(8X,9I10),'.',/
6129
 '    **  The following',I10,' elements have radiative thermal couplings',/,
 '    **  or radiative boundary conditions specified, on a free',/,
 '    **  face, but they do not have an emissivity specified.',/,
 '    **  A complete list appears in file groups.unv with the ',/,
 '    **  group name ',A,/,(8X,9I10),'.',/
6130
 '    **  The following',I10,' orthotropic elements have KXX/KZZ or',/,
 '    **  KYY/KZZ ratios greater than ',1P,E11.4,/,
 '    **  A complete element list appears in file ',/,
```

```
'   ** groups.unv with the group name ',A,/,(8X,9I10)
6131
'   ** Angle dependent emissivity is defined in the model. ',/,
'   ** The Monte Carlo HTFRAD calculation method must be activated ',/,
'   ** for such properties to be correctly accounted for.  ',/,
'   ** Check your radiation request simulation objects. ',/
6132
'   ** Angle dependent absorptivity is defined in the model. The',/,
'   ** Monte Carlo HTFRAD calculation method must be activated for',/,
'   ** such properties to be correctly accounted for.  Check your',/,
'   ** solar, orbit and radiative heating simulation objects. ',/
6133
'   ** You are performing a restart from a previous set of',/,
'   ** temperatures, and you have multilayer shells present.',/,
'   ** It is possible that some of the layers have been relabeled',/,
'   ** and your initial temperatures are thus invalid. You can',/,
'   ** avoid this by ensuring that in your restart only the',/,
'   ** the temperature or heat load boundary conditions have',/,
'   ** changed.',/
6134
'   ** Some elements'' nodes have -ve ',A1,' coordinates. For ',/,
'   ** radiation analysis these elements are expanded',/,
'   ** into 3D by rotating them about the ',A1,' axis. The normals',/,
'   ** of the expanded elements will point in the opposite ',/,
'   ** direction from identical elements in the +',A1,' half-plane,',/,
'   ** because normals are calculated by taking the cross ',/,
'   ** product of the ',A1,' axis with the first edge direction.',/
6135
'   ** Oppenheim''s Method is used and series radiative ',/,
'   ** conductances are specified. This may not work. A',/,
'   ** series radiative conductance is only effective if',/,
'   ** another radiative conductance also exists between',/,
'   ** the specified elements. If it does not, it will be',/,
'   ** ignored.',/
6136
'   ** The following',I10,' nodes are connected to both hydraulic',/,
'   ** and non-hydraulic elements. This is not permitted.',/,
'   ** A complete list appears in file groups.unv with',/,
'   ** the group name ',A,/,(8X,9I10)
6137
'   ** The following',I10,' radiative source elements in radiative',/,
'   ** source requests have improper radiative surface properties',/,
'   ** defined. A complete list appears in file groups.unv with',/,
'   ** the group name ',A,/,(8X,9I10)
6138
'   ** The following',I10,' receiving elements in radiative',/,
'   ** source requests have improper radiative surface properties',/,
'   ** defined. A complete list appears in file groups.unv with',/,
```

```
 '    ** the group name ',A,/,(8X,9I10)
6139
 '    ** Request results set ',A,' is not yet supported',/,
 '    ** with new post-processing. This result set will not be',/,
 '    ** written to the results file. To see all results the model must ',/,
 '    ** be run with the advanced option FE POST-PROCESSING LIBRARY ',/,
 '    ** set to RSLTPOST (0)',/
 6140
 '    ** Some elements had different transmissivities on their front and ',/,
 '    ** reverse side optical properties.  The front transmissivity is ',/,
 '    ** considered for both sides.  Advanced parameter GPARAM 1 178 1 ',/,
 '    ** overrides this setting.',/
 6141
 '    ** The projected point of the surface CG in the overall surface ',/,
 '    ** normal direction falls outside the closest central element.  ',/,
 '    ** Projection point is taken as the center of the central element.',/
6142
 '    ** The specified inlet element ',I8,' for the stream',I8,/,
 '    ** is not an inlet. It is not possible to start stream from',/,
 '    ** the element indicated. The direction of the stream is chosen',/,
 '    ** arbitrarily. Choose proper inlet element from which',/,
 '    ** the stream starts.',/
6143
 '    ** The AREA card from INPF line ',I8,' contains convection ',/,
 '    ** coupling with the negative coefficient or the table in ',/,
 '    ** field 7. There is a possibility of wrong results. ',/
6144
 '    ** The selection of following boundary conditions are overlapping: ',/,
 '    ** ',A,/,
 '    ** ',A,/
6145
 '    ** There is a conflict between a global rotation load',/,
 '    ** and other rotation loads in the model.',/
 '    ** ',A,/
6146
 '    ** Several radiative thermal rotational periodicity requests',/,
 '    ** without specified solid body present in the model. The',/,
 '    ** minimum number of',I3,' instances will be used for all',/,
 '    ** of these requests.',/

6147
 '    ** Advanced option FE POST-PROCESSING LIBRARY is set to ',/,
 '    ** FE POST (1) but it is only supported with the Finite Element Method.',/,
 '    ** RSLTPOST (0) option will be used.',/
6148
 '    ** Some elements, such as 0D lump mass, 1D beams, 2D shells with ',/,
 '    ** zero thickness, are not supported with new post-processing.',/,
 '    ** Results on those elements and related nodes might not be ',/,
```

```
     '    ** outputted. To see all results, the model must be run ',/,
     '    ** with the advanced option FE POST-PROCESSING LIBRARY ',/,
     '    ** set to RSLTPOST (0) ',/
    6149
     '    ** Request results set ',A,' is not yet supported',/,
     '    ** with the Finite Element Method in the Thermal Solver.',/,
     '    ** This result set will not be written to the results file.',/,
     '    ** To see all results the model must be run with the',/,
     '    ** Element CG Method.',/

    6200
     '    ** The closest element',I10,' to the named point ',
     """",A,"""",/,
     '    ** is a hydraulic element. Return the default value',/,
     '    ** for the function.',/

     6201
     '    ** At time=',1P,G15.6,' the maximum temperature change of',E11.4,/,
     '    ** at element',I10,' exceeds more than twice the maximum',/,
     '    ** allowable value of',E11.4,'. It is not possible to reduce',/,
     '    ** time integration step as minimum timestep',G11.4,' is',/,
     '    ** already reached.',/

     6202
     '    ** At time=',1P,G15.6,' the maximum error estimate of',E11.4,/,
     '    ** at element',I10,' exceeds more than twice the maximum',/,
     '    ** allowable value of',E11.4,'. It is not possible to reduce',/,
     '    ** time integration step as minimum timestep',G11.4,' is',/,
     '    ** already reached.',/

     6203
     '    ** At time=',1P,G15.6,' the maximum error estimate of',E11.4,/,
     '    ** at element',I10,' exceeds more than twice the maximum',/,
     '    ** allowable value of',E11.4,'. It is not possible to reduce',/,
     '    ** time integration step as twice minimum timestep',G11.4,/,
     '    ** was used for the start of the ramp.',/
     6204
     '    ** The minimum time step (specified in CARD 2B) ',E11.4,/,
     '    ** does not coincide with the minimum time step (specified',/,
     '    ** in PARAM AUTODELTAT) ',E11.4,'. Minimum time step ',/,
     '    ** is set to the time step specified with PARAM AUTODELTAT.',/,
     6205
     '    ** The error estimates were all set to 0 because some of the ',/,
     '    ** calculated temperatures exceed the maximum allowable ',/,
     '    ** value.',/
     6206
     '    ** The temperature ',E11.4,' K of the void ID',I8,' is extreme. ',/,
     '    ** This void won',"'",'t be taken into the account for convergence.',/,
```

```
 '    ** Overall results might be incorrect.',/
 6207
 '    ** There are inconsistencies in parallel run domain decomposition',/,
 '    ** setup on domain ',i6,'. The code for inconsistency type is ',i2,'.'/
 6208
 '    ** BOTTOM or BOTH is specified for the HTCFREE or HTCFORCE plugin,',/,
 '    ** and the plugin is used in a Thermal Convecting Zone,',/,
 '    ** Thermal Stream, or Thermal Void load ',/,
 '    ** where the selection contains layered shells .',/
 6209
 '    ** Increasing matrix fill value will increase memory consumption and',/,
 '    ** CPU time. It is possible this could be averted by improving the',/,
 '    ** mesh or improving the model definition.',/,
 '    ** Note: Element ',I8,' has the largest residual.',/
 6210
 '    ** Unable to find underlying fluid element while resolving',/,
 '    ** backed variable "u" for expression ',I8,/
 6211
 '    ** Groups ',A,' and ',A,' have close average temperatures',/,
 '    ** of ',E11.4,' and ',E11.4,', respectively. This may lead',/,
 '    ** to a high conductance in the reduced model. Make sure',/,
 '    ** you select representative groups for your model reduction.',/,
 6212
 '    ** Element Add-Remove Simulation Object ',A,' ',/,
 '    ** has ',A,' Delta Time larger than the remaining time in ',/,
 '    ** the solution step. The solver will take the delta time as ',/,
 '    ** the remaining time to the next solution step. ',/,
 6213
 '    ** Error estimates were requested for ',/,
 '    ** unsupported element type(s).These elements ',/,
 '    ** will have a zero value error estimate reported on.',/,
 6214
 '    ** UGII_USER_PLUGIN_DIR environment variable is present.',/,
 '    ** Trying to load the following plugin: ',/,
 '    ** ',A,/,
 6215
 '    ** The function ',A,' cannot be evaluated because',/,
 '    ** no outlet element was found in ',A,/
 '    ** Duct Label ID ',A,' selection.'/
 6216
 '    ** Duct with mass flow is defined but duct diameter is needed. ',/,
 '    ** HTC will be set to zero.',/
 6217
 '    ** Inconsistent rotational loads while using PWR function: ',/,
 '    ** the stream ',I10, ' has ',A,/,
 '    ** while the void ',I10,' has ',A,/
 6218
```

```
'    ** Gradient normalization is not supported for fixed step length. ',/,
'    ** Normalization has been deactivated. '

 6219
'    ** Intermediate results are not available when',/,
'    ** periodic convergence is enabled. ',/

6400
'    ** The following elements have been flagged as non-shadowing.',/,
'    ** However, all elements in a hemicube view factor request are ',/
'    ** automatically checked for shadowing.',//,(5X,9I10)
6401
    '    ** Hemicube method cannot be used with ray tracing.',/
6402
'    ** Hemicube method cannot be used with axisymmetric elements.',/
6403
'    ** Hemicube method cannot be used with articulation. ',/
6404
'    ** Error criterion will be ignored for view factor calculation with',/,
'    ** hemicube method.',/
6405
'    ** Inactive faces seen by other elements are found in ', I5,/,
'    ** radiation request(s). Affected elements are contained in',/,
'    ** group(s) InactiveRevSide_# in file groups.unv.',/
6406
'    ** Hemiview window had been completely or partially obscured.',/,
'    ** View factor calculation result may not be reliable.',/
6500
'    ** Maximum number of iterations reached without fulfilling',/,
'    ** convergence criteria on signal ray power iteration.',/
6501
'    ** Maximum number of iterations reached without fulfilling',/,
'    ** convergence criteria on outer iterations.',/
6502
'    ** LASERIN input file, line ',/,
'    ** ',A70,/,
'    ** is not recognized.',/
6503
'    ** For the ',I5,'the signal ray, the X-axis in the ray coordinate',/,
'    ** system is not perpendicular to the ray direction (which is the',/,
'    ** Z-axis).',/
6504
'    ** For the ',I5,'th signal ray, the X-axis in the ray coordinate',/,
'    ** system is incorrectly defined.',/
6505
'    ** The wavelength of the signal beam is not defined.  Use',/,
'    ** GPARAM 4 274 <Wavelength>.',/
6506
```

```
'   ** Axis of revolution is not the same for all ROTPER cards',/
6507
'   ** The last time entry in the table ',A,' for free',/,
'   ** molecular request ',I10,' goes beyond the orbit period.',/
6508
'   ** Gray body view factors cannot be evaluated',/
6509
'   ** Negative mass flow of ',E10.3,' for stream ',I8,/,
'   ** at time ',G15.6,' is encountered, while no flow reversal',/,
'   ** is defined for the stream.',/
6510
'   ** Total Temperature: Non-zero relative temperature difference is',/,
'   ** defined as swirl input on a boundary condition (BC) with zero',/,
'   ** wall rotation velocity. Swirl velocity is treated as zero for',/,
'   ** any instance under these circumstances.',/

6511
'   ** Negative mass flow of ',E10.3,' for stream ',I8,/,
'   ** at time ',G15.6,' is encountered, while no flow reversal',/,
'   ** is defined for the stream. Since the mass flow is less than',/,
'   ** the ',E10.3,' threshold value, the absolute value of the',/,
'   ** mass flow will be used instead.',/
6512
'   ** The following circular dependency between boundary conditions is',/,
'   ** detected. This type of interdependency will increase the run',/,
'   ** time. If the circular setup for the boundaries was unintentional,',/,
'   ** it is recommended to revise the model boundary conditions.',/,
'   ** ',A70,/,A80,/,A80,/
6513
'   ** The following boundary condition has dependency on itself:',/,
'   ** ',A30,/,
'   ** This self-dependency will increase the run time. If this setup',/,
'   ** for the boundary was unintentional, it is recommended to revise',/,
'   ** the model boundary condition.',/
6514
'   ** The Heat Transfer Coefficient defined for one of the Regions of',/,
'   ** the Thermal Void ',A,' is too sensitive to the void temperature.',/,
'   ** This behavior combined with implicit treatment of heat transfer',/,
'   ** coefficients may adversely effect convergence.',/
6515
'   ** For the Fluid Duct selection in Total Temperature Effects',/,
'   ** type of Duct Flow Boundary Conditions simulation object',/,
'   ** with ID ',I6,', the solver is unable to find any convective',/,
'   ** coupling from the fluid ducts to the wall. Therefore, the',/,
'   ** rotational effects are ignored. Either the Convecting Region',/,
'   ** in the Total Temperature Effects needs to be defined or a',/,
'   ** Convective Coupling needs to be applied.',/
```

```
6516
'    ** During matrix extraction, nonlinear terms were found while',/,
'    ** averaging matrices between two time steps. Linearized matrices',/,
'    ** may not represent faithfully the full system behaviour.',/
6517
'    ** The correlation time ',E11.4,' has been ignored since',/,
'    ** it is out of the simulation transient time interval.',/

6600
'    ** Only 1 domain is identified in the partitioning!',/
6601
'    ** The complete decomposition of radiation to environment request',/,
'    ** may cause incorrect view factor report between regions. Thus,',/,
'    ** radiation request will not be decomposed. As a result, a higher',/,
'    ** memory may be consumed.',/

6602
'    ** There are inconsistencies in parallel run domain decomposition',/,
'    ** setup on domain ',i6,'. The code for inconsistency type is ',i2,'.'/

6700
'    ** The following ',I0,' element(s) are not supported in',/,
'    ** receiver group',/,(8X,9I10)
6701
'    ** The following ',I0,' element(s) are not supported in',/,
'    ** emitter group',/,(8X,9I10)
6702
'    ** VfrtGpu cannot be used with axisymmetric elements.',/
6703
'    ** VfrtGpu cannot be used with articulation. ',/
```

Fatal messages

```
7000
 '    **  Run aborted due to errors.',/
 7001
 '    **  Total number of elements',I10,
 ' exceeds TMG limit of ',I10,/
 7002
 '    **  FILE27 is not present.',/
 7003
 '    **  Recursive name definition, ',A7,
 ' defined from ',A7,/
 7004
 '    **  The name definition ',A7,1X,A7,
 ' could not be resolved.',/
 7005
 '    **  Premature end of file during scan of',
 ' Card 9.',/
 7006
 '    **  Error in TMG input file INPF',
 ' in the above line.',/
 7007
 '    **  Solid element ',I10,' has a volume of ',
  1P,E11.3,/,'    **  CG cannot be calculated.',/
 7008
 '    **  Error in TMG input file near line no',I8,/
 7009
 '    **  Error in TMG input file INPF:',/,
 '    **  Incorrect number of delimiters',
  I5,' occurring in lines',/,5X,(10I5)
 7010
 '    **  Element label ',I10,' exceeds ',
 ' TMG limit of',I10,/
 7011
 '    **  Cannot collect small radiative couplings',
 ' if residual view factors',/,
 '    **  are not connected to a specified element.',/
 7012
 '    **  Error in TMG input file INPF:',/,
 '    **  Error in Program Control Card. ',/
 7013
 '    **  Error in TMG input file INPF:',/,
 '    **  Error in Analyzer Control Card.',/
 7014
 '    **  Cannot perform transient solution',
 ' with time averaged heat loads.',/
 7015
 '    **  Error in TMG input file INPF:',/,
```

```
'    ** Card 3 must be comments only.',/
7016
'    ** Error in TMG input file INPF:',/,
'    ** Error in Program Control or Analyzer Control Card.',/
7017
'    ** Duplicate node in element',I10,/
7018
'    ** Node',I10,1X,'in element',I10,
' is not defined.',/
7019
'    ** Error on INP2F for NASTRAN input.',/
7020
'    ** Node',I10,' specified in',
' radial heat flow entity does not exist.',/
7021
'    ** Nodes specified in',
' radial heat flow entity are coincident.',/
7022
'    ** Error in TMG input file INPF:',/,
'    ** Error in Card ',I1,' line',I10,/
7023
'    ** Nodes of axisymmetric element',
' are too close to the axis.',/
7024
'    ** Number of nodes to be generated',I10,/,
'    ** in expanding axisymmetric model exceeds limits.',/
7025
'    ** Number of elements to be generated',/,
'    ** in expanding axisymmetric model exceeds limits.',/
7026
'    ** Axisymmetric element',I10,
' is incorrectly defined.',/
7027
'    ** Error in TMG input file INPF:',/,
'    ** error in field',I5,' of following line',I8,/
7028
'    ** Excessive data on temperature ',
'recovery file, recovery cannot be ',/,
'    ** performed.',/
7029
'    ** More than',I10,' nodes - ',
'renumbering failed.',/
7030
'    ** More than',I10,' elements - ',
'renumbering failed.',/
7031
'    ** Cannot invert a singular matrix.',/
7032
```

```
'    **  Error in TMG input file INPF:',/,
'    **  No MAT Card',I6,' found, referenced by element',I10,/
7033
'    **  Error in TMG input file INPF:',/,
'    **  Improper PROP Card type specified for element',I10,/
7034
'    **  Error in TMG input file INPF:',/,
'    **  No PROP Card',I5,' found, referenced by element',I10,/
7035
'    **  Error in TMG input file INPF:',/,
'    **  No FANPUMP table specified on PROP Card',I6,/
7036
'    **  More than ',I9,' data items on',
' file ',I3,' - merging is not possible.',/
7037
'    **  Improper use of group name ',A10,
' - wildcards are not allowed.',/
7038
'    **  Error in TMG input file INPF:',/,
'    **  Group names are not valid for following Card in field=',I3,/
7039
'    **  Element group ',A7,' is not defined.',/
7040
'    **  Error in TMG input file INPF:',/,
'    **  Improper number of variables on XCIRC Card.',/
7041
'    **  Error in TMG input file INPF:',/,
'    **  No TABTYPE Card found for referenced table',I6,/
7042
'    **  Error in TMG input file INPF:',/,
'    **  Referenced table no',I6,' not found.',/
7043
'    **  Variable type for',
' table',I6,' should be conductance.',/
7044
'    **  Fluid element',I10,' is selected for',
' element merging - not permitted.',/
7045
'    **  Flow section element creation failed,',
/,'    **  Could not find an unused element label. ',/
7046
'    **  No ambient element was defined.',/
7047
'    **  Ambient conditions are not defined',/
7048
'    **  Ambient fluid material is not defined',/
7049
'    **  Convection coupling requested to ',
```

```
 'non-fluid elements.',/
7050
 '    ** Element ',I10,
 ' defined in two separate radial heat flow entities.',/
7051
 '    ** Error in TMG input file INPF:',/,
 '    ** Element ',I10,' defined on two separate ORTHO Cards.',/
7052
 '    ** Orthotropic element ',I10,
 ' is selected in a radial heat flow entity.',/
7053
 '    ** On Card no',I8,' referenced node',I10,
 ' does not yet exist.',/
7054
 '    ** Element center for solid element ',I10,/,
 '    ** can not be determined, probably improper shape.',/
7055
 '    ** Space element label',I10,' is too large.',/
7056
 '    ** Error generating space elements.',/
7057
 '    ** For a full orbit, the',
 ' time at start position must be zero.',/
7058
 '    ** Error in TMG input file INPF:',/,
 '    ** Improper orientation parameter is specified on an Orbit Card.',/
7059
 '    ** Error in TMG input file INPF in line',I8,/
7060
 '    ** Improper albedo value',
 ' in orbit definition.',/
7061
 '    ** Improper calculation frequency',
 ' in orbit definition.',/
7062
 '    ** Improper eccentricity value',
 ' in orbit definition.',/
7063
 '    ** Improper semi-major axis ratio',
 ' in orbit definition.',/
7064
 '    ** Improper orbit period',
 ' in orbit definition.',/
7065
 '    ** For a full orbit, the',
 ' time at start position must be zero.',/
7066
 '    ** Error in TMG input file INPF:',/,
```

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'    ** Improper rotation code in orbit definition.',/
7067
'    ** More than',I9,' connections: model is too large to solve.',/,
'    ** Suggestion: use element CG method to calculate conductances.',/
7068
'    ** Improper geometry in element',I10,/
7069
'    ** NN parameter of AXISYMM Card',I5,
' < 3.',/
7070
'    ** Axis nodes are not specified for',
' AXISYMM Card',I5,/
7071
'    ** Axis nodes of AXISYMM Card',I5,
' are too close to each other.',/
7072
'    ** Axis nodes of AXISYMM Card',I5,
' do not exist.',/
7073
'    ** Node',I10,1X,'referenced in element',
I10, ' is not defined.',/
7074
'    ** Duplicate node in element',I10,/
7075
'    ** More than',I9,' conductances',/
7076
'    ** More than',I9,' heat loads.',/
7077
'    ** More than',I9,' capacitances.',/
7078
'    ** More than',I9,' items in sub RECOMB2.',/
7079
'    ** Reverse side of element',I10,
' must have the same transmissivity.',/
7080
'    ** Reverse side label of element',
I10,' is too large.',/
7081
'    ** Error in TMG input file INPF:',/,
'    ** There is a mixing of global and local axisymmetry',
' definitions.',/
7082
'    ** Error in TMG input file INPF:',/,
'    ** Improper node number ',I10,' on axisymmetry definition Card.',/
7083
'    ** Error in TMG input file INPF:',/,
'    ** Improper node label ',I10,
' on axisymmetry definition Card.',/
```

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7084
'    **  Error in TMG input file INPF:',/,
'    **  There is a mixing of global and',
' local axisymmetry definitions.',/
7085
'    **  Improper filename specified for',
' initial ',A,/,'    **  boundary condition.',/
7086
'    **  No data was found on',
' initial ',A,' file ',/,'    **  ',A,/
7087
'    **  Error opening initial temperature',
' file ',A8,/
7088
'    **  Transmissive element',I10,' does not have',
' its reverse side defined.',/
7089
'    **  Error in TMG input file INPF:',/,
'    **  Error in orthotropic property for element',I10,/
7090
'    **  Nodes defining of coordinate system',
 I6,' are collinear.',/
7091
'    **  Error in TMG input file INPF:',/,
'    **  Element',I10,1X,'referenced in line',I8,' does not exist.',/
7092
'    **  Space enclosure may not be used if',/,
'    **  an axisymmetric facet value of 1 is defined.',/
7093
'    **  Error in TMG input file INPF:',/,
'    **  No corresponding MAT Card for MAT2 Card id',I6,/
7094
'    **  Group to group radiation requests are not allowed in ',/,
'    **  axisymmetric models.',/
7097
'    **  Exponent for free convective conductance',
' is too large.',/
7099
'    **  Error in TMG input file INPF:',/,
'    **  Group name must be specified on PRINT ABSHEAT Card.',/
7100
'    **  If MCV elements are present, Card 2b',
' GRADNT should be -2 or -3.',/
7101
'    **  Error in TMG input file INPF:',/,
'    **  Physical properties of element',
 I10,' should be defined on PROP Card.',/
7102
```

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'    **  Planar elements with more than 4 nodes',
' are not allowed.',/
7103
'    **  Error in TMG input file INPF:',/,
'    **  No table number specified for a FANPUMP element.',/
7104
'    **  Because of axisymmetry this is ',
'not allowed.',/
7106
'    **  Number of nodes greater than',I10,/
7107
'    **  Number of elements greater than',I10,/
7108
'    **  Error in TMG input file INPF:',/,
'    **  Too many elements on Card 6 VFMERGE Card.',/
7109
'    **  Error in TMG input file INPF:',/,
'    **  Improper element',I10,
' on a view factor merge definition.',/
7110
'    **  Error in TMG input file INPF:',/,
'    **  Improperly placed symmetric elements continuation Card.',/
7111
'    **  Improper element no',I10,' on ',
'symmetric element definition.',/
7112
'    **  Error in TMG input file INPF:',/,
'    **  MATVEC Card for element',I10,' has no corresponding',
' MAT Card.',/
7113
'    **  Error in TMG input file INPF:',/,
'    **  Element',I10,' has two material orientation vectors.',/
I1
7114
'    **  Error in TMG input file INPF:',/,
'    **  Orthotropic element',I10,' has no material orientation vector.',/
7115
'    **   Error in STRNO subroutine on string.',/,A
'    **   Error in STRNO subroutine on string.',/,A
7116
'    **  Error in TMG input file INPF:',/,
'    **  TABTYPE Card may not have QNODE as independent variable.',/
7117
'    **  Error in TMG input file INPF:',/,
'    **  Reverse side definition of group name ',A7,
' has element increment=0.',/
7118
'    **  Cannot mix sun oriented and',
```

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 ' planet oriented orbits in same run.',/
 7119
 '    ** Fluid material ',I6,' has zero viscosity.',/
 7120
 '    ** Quartic solver cannot be used with',
 ' CG element method.',/
 7121
 '    ** Error in TMG input file INPF:',/,
 '    ** Fluid element ',I10,' has improper material ',I6,/
 7122
 '    ** Error in creating reverse side for element',I10,' with increment',/,
 '    ** ',I10,'. Element label conflict found.',/
 7123
 '    ** Reverse side element with label',I10,' is created, maximum',/,
 '    ** element label for axisymmetric models is 10000.',/
 7124
 '    ** Element group ',A7,' contains no elements.',/
 7125
 '    ** Element group ',A7,' has improper group name.',/
 7126
 '    ** Error reading pressure BC data from file PRESSF.',/
7127
 '    ** Runtime Option to Reuse Previous Model (M=256 restart) cannot be',/,
 '    ** used for models which include Variable Heat Flux data (INTERP',/,
 '    ** with AREA code). You must use the option to Reuse Previous',/,
 '    ** Model, Update Boundary Conditions (M=0 restart) instead.',/
 7128
 '    ** Runtime Option to Reuse Previous Model (M=256 restart) cannot be',/,
 '    ** used for models which include Time Varying Total Heat Load data ',/,
 '    ** (INTERP with TOTAL code). You must use the option Reuse Previous ',/,
 '    ** Model, Update Boundary Conditions (M=0 restart) instead.',/
 7129
 '    ** Runtime Option to Reuse Previous Model (M=256 restart) cannot be',/,
 '    ** used for models which include Variable Heat Flux data (INTERP',/,
 '    ** with VOLUME code). You must use the option to Reuse Previous ',/,
 '    ** Model, Update Boundary Conditions (M=0 restart) instead.',/
 7130
 '    ** Runtime Option to Reuse Previous Model (M=256 restart) cannot be',/,
 '    ** used since element',I10,' is associated with variable data (',
 'INTERP',/,'    ** Card). You must use the option to Reuse Previous ',
 'Model, Update Boundary',/,'    ** Conditions (M=0 restart) instead.',/
 7131
 '    ** Transparent elements are not supported with articulation/spin.',/
 7132
 '    ** Weighted view factor adjustment is not supported with',
 ' articulation',/
 7133
 '    ** Ray tracing is not supported with articulation/spin.',/
```

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7134
'   ** Circular elements are not supported with axisymmetric elements.',/
7135
'   ** Interface element',I10,' has non-zero thermal conductivity.',/,
'   ** Recommend you change to element center method or set thermal',/,
'   ** conductivity to zero.',/
7136
'   ** Element',I10,' has table-dependent surface properties defined',/,
'   ** while its reverse side does not.',/
7137
'   ** Element reverse side request with zero increment exists while',/,
'   ** largest element number is ',I10,/
7138
'   ** Conduction module must be re-run for restarts',/,
'   ** when using IDEAS boundary conditions',/
7139
'   ** Table-dependent solar flux value is not allowed, the solar flux',/,
'   ** is in conflict with solar flux defined on Orbit Cards.',/
7140
'   ** Elements with property number',I8,' have both transmissivity',/,
'   ** specularity defined. This is not permitted.',/
7141
'   ** The reverse sides of the elements in group ', A7,' do not exist.',/,
'   ** The radiation request for these reverse side elements is invalid.',/
7142
'   ** The number of spin positions must be greater than or equal to 2.',/
7143
'   ** The normal (',F8.5,',',F8.5,',',F8.5,') of the selection for',/
'   ** radial stream ',I10,' is perpendicular to the Z axis of ',/
'   ** the local cylindrical coordinate system for streams. Check',/
'   ** the cylindrical coordinate system setup.',/
7144
'   ** No stream elements are created for radial stream ',I10,/
'   ** Check your local cylindrical coordinate system setup. ',/
7145
'   ** The search for inlet node on element',I8,' for stream',I3,' has',/,
'   ** failed. Specify the inlet node by adding one of the folowing',/,
'   ** cards:',/,
'   ** TSTREAM ',I3,' NDINLET',I8,'  or  TSTREAM',I3,' NDINLET',I8,/
7146
'   ** The order of elements for selection for the stream',I8,/,
'   ** does not start with the inlet element indicated',I8,/,
'   ** Choose a proper inlet element from which the stream',/,
'   ** starts or make a proper path selection for the stream.',/
7147
'   ** Conflicts between different BC selections are encountered.',/
7148
'   ** One or more streams are defined on unsupported topology',/,
```

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'    ** including multiple not connected surfaces. Please specify',/,
'    ** selection for the streams on one surface. More information',/,
'    ** is available in the above notes.',/
7149
'    ** One or more two-sided streams are not valid due to',/,
'    ** sides A and B having opposite directions.',/,
'    ** Please see the above WARNINGS for more information.',/
7151
'    ** The radiative source power file:',/,
'    ** ',A132,/,
'    ** cannot be opened. Radiative heating is thus undefined.',/
7152
'    ** Radiative source power cannot be computed from block:',/,
'    ** ',A80,/,
'    ** Check the source file and make sure the block is available and',/,
'    ** the heating source is properly defined.',/
7153
'    ** Duct fan/pump BCs are only supported for ducts with mass flow by',/,
'    ** the Navier Stokes 1D solver. Use duct inlet/outlet BC instead.',/,
'    ** For a list of invalid elements for fan/pump BCs,',/,
'    ** see the [Solution_name]_report.log file.',/
7154
'    ** Duct opening BCs are not supported by the Navier Stokes 1D',/,
'    ** solver. Use duct total pressure or duct inlet/outlet of type',/,
'    ** total pressure instead. For a list of invalid elements for',/,
'    ** duct opening BCs, see the [Solution_name]_report.log file.',/
7155
 A80,/,'    ** Error in TMG input file INPF:',/,
'    ** The above Card',I1,' line no.',I6,' has an error in it.',/
7156
'    ** Restart analysis is not supported when',
' using model file tmgmodel.dat.',/, '    ** Model file is used with',
' parabolic shell and axisymmetric shell elements',/,'    ** or',
' articulation.',/
7157
'    ** Articulation time values cannot be modified in a restart run',/
7158
'    ** One of the generated space elements starting with space element',/,
'    ** number',I10,' conflicts with an existing element number. Use ',/,
'    ** another starting space element number.',/
7159
'    ** The following',I10,' elements have reverse sides and have their',/,
'    ** emissivities modified by an interpolation relationship.',/,
'    ** This is not permitted. If you wish to specify a table-dependent',/,
'    ** emissivity for these elements, it must be specified in the',/,
'    ** material definition. A complete element list appears in ',/,
'    ** file groups.unv with the group name ',A,/,(8X,9I10),/
7160
```

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'    ** Enclosure radiation BCs are applied on shared axisymmetric edges.',/
'    ** This is not allowed.',/

7161
'    ** Error in radiative heating BC.',/,
'    ** Monte-Carlo cannot be used with a table dependent power source.',/,
'    ** Define a constant source or choose another computation method.',/
7162
'    ** Node',I10,' is a duplicate.',/
7163
'    ** For protective layer ',I8,' with the name ',A,/,
'    ** the selected surface presents inconsistent normal ',/,
'    ** directions (such in the vicinity of the node ',I8,'). ',/,
'    ** This inconsistency prevents creation of protective  ',/,
'    ** layer elements with proper geometry.',/
7170
'    ** Error reading file INP2F.',/
7171
'    ** Number of elements to be created for',/,
'    ** Applying boundary conditions exceeds limits.',/
7172
'    ** Internal element label', I10,
' is not found.',/
7173
'    ** Internal node label', I10,
' is not found.',/
7174
'    ** The number of heat flux boundary',
' conditions exceeds limits.',/
7175
'    ** The number of convection boundary',
' conditions exceeds the limits.',/
7176
'    ** The number of radiation boundary',
' conditions exceeds the limits.',/
7181
'    ** Parent joint',I8,' not found for joint',
I8,/
7182
'    ** Vector number',I8,' not found for joint',
I8,/
7183
'    ** Duct inlet/outlet BCs are not supported by the',/,
'    ** Generalized Bernoulli 1D solver. Use other BCs',/,
'    ** that are supported instead, i.e. duct fan/pump,',/,
'    ** duct total pressure, duct static pressure, or duct opening. For',/,
'    ** a list of failing BCs, see the [Solution_name]_report.log file.',/
7193
```

```
'    **  Error in TMG input file INPF:',/,
'    **  Line generated by a Card with a name',
' in it has an error.',/
7194
'    **  Error in TMG input file INPF:',/,
'    **  First character in Card 7 Card starts',
' with the letter C.',/
7195
'    **  Error in TMG input file INPF:',/,
'    **  First character in Card 8 Card starts',
' with the letter C.',/
7196
'    **  Error in TMG input file INPF:',/,
'    **  Too many group names in line.',/
7197
'    **  Orthotropic materials cannot be specified',
' in an axisymmetric model.',/
7198
'    **  Enclosure view factor requests are not',
' allowed in an axisymmetric model',/
7199
'    **  Maximum element number',I10,' is too large.',/,
'    **  Cannot create cubic space elements.',/
7200
'    **  A face of solid element'
,i5,' is connected to',/,
'    **  multiple planar elements: ',I10,' and ',I10/
7201
'    **  A face of solid element'
,i5,' is connected to',/,
'    **  multiple solid elements: ',I10,' and ',I10/
7202
'    **  More than',I10,' elements in conduction module.',/
7203
'    **  Duplicate lumped mass elements on node',I10,/
7204
'    **  More than one fluid flow element branches',
' into node',I10,/
7205
'    **  Error in TMG input file INPF:',/,
'    **  Orthotropic material nodes',2I10,' are improper.',/
7206
'    **  Error in TMG input file INPF:',/,
'    **  Orthotropic material defined with',/,
'    **  nodes',2I10,' has improper directions.',/
7207
'    **  Error in TMG input file INPF:',/,
'    **  Orthotropic material defined with',/,
```

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'    ** nodes',2I10,' has improper directions.',/
7208
'    ** Error - sum of flows into node',I10,
 ' is not zero.',/
7209
'    ** Error in TMG input file INPF:',/,
'    ** Anisotropic conductivity not defined correctly',/
7210
'    ** Parabolic shell coating is applied on a non-parabolic element or ',/,
'    ** vice versa at element ',I10,'. This type of coating is not',/,
'    ** supported with the Finite Element Method.',/,
'    ** Please remesh and rerun your simulation.',/
7211
'    ** For protective layer ',I8,' with the name ',A,/,
'    ** the protective element created for element' ,I10,1X,/,
'    ** has a thickness value of ',E16.8,1X,/,
'    ** Please make sure a positive thickness is applied.',/
7212
'    ** For protective layer ',I8,' with the name ',A,/,
'    ** the protective node created for node' ,I10,1X,/,
'    ** has a thickness value of ',E16.8,1X,/,
'    ** Please make sure a positive thickness is applied.',/
7213
'    ** The following elements have zero thickness. ',/,
'    ** This case is not supported by the solver.',/,
'    ** ',/,(8X,8I10)

7214
'    ** Report simulation objects are not supported',/,
'    ** with Finite Element Method and Parallel run.',/

7300
'    ** Element ',I10,1X,
 'is a duplicate on a symmetric element definition Card',/
7301
'    ** Element',I10,1X,
  'is not defined on any symmetric element definition Card',/
7302
'    ** Ambient conditions are not defined for free',
 ' convection.',/
7303
'    ** Free convection with parallel plate',
 ' correlation is defined for',/
'    ** element',I10,1X,A7,' which is not a planar shell.',/
7304
'    ** More than',I9,
 ' elements for view factor module, exceeds its limits.',/
7305
```

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'    **  Element label',I10,' is too large.',/
7306
'    **  Earth albedo factors may not be ',
'calculated for axisymmetric elements.',/
7307
'    **  Solar view factors may not be ',
'calculated for axisymmetric elements.',/
7308
'    **  Earth view factors may not be ',
'calculated for symmetric elements.',/
7309
'    **  View factors may not be ',
'calculated',/,'    **  for symmetric elements with the ray trace option.',/
7310
'    **  Radiative heating may not be ',
'calculated for symmetric elements.',/
7311
'    **  Radiating element',I10,
' not defined in symmetric element definition.',/,
'    **  Possible cause - it was defined as a non-axisymmetric element.',/
7312
'    **  On Card',/,5X,A3,2I8,5E11.4,/,
'    **  On file VUFF neither element I nor element J appears as an ',/,
'    **  N1 profile element on Card 6h.',/
7313
'    **  Improper characteristic element ',I10,
' specified for free convection.',/
7314
     '    **  A radiation request is present that is not supported together',
   /,'    **  with articulation.  Only "All" and "Enclosure" requests are ',
   /,'    **  supported with articulating elements.  ',/
7315
'    **  Missing "All Elements" solar heating or orbit definition',
 /,'    **  with articulation.',/
7316
'    **  Articulation and spinning are not supported ',
'in same run.',/
7317
'    **  Total number of spin definitions',I8,
' exceeds TMG limit of ',I8,/
7318
'    **  Internal TMG error 7318,',
' error with ray tracing for element',I10,/
7319
'    ** ',I10,' articulating elements',
' are out of enclosure: ',I8,/
7320
'    **  Articulation joints are not present in any enclosures and ',/,
```

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'    **  there is no VFSALL/VFNALL radiation request.',/
7321
'    **  Articulation in VFS1ALL/VFN1ALL radiation requests ',/,
'    **  has been found. This is not supported.',/
7322
'    **  Articulation elements are found in the element list of ',/,
'    **  a VFS12/VFN12 radiation request. This is not supported.',/
7323
'    **  For element ',I10,', the total diffuse reflectivity in the ',/,
'    **  ',A6,' spectrum that is derived from the BRDF given by ',/,
'    **  array ',I5,' yields inconsistent radiative properties.'
7324
'    **  To use the ray tracing visualizer, the thermal model must ',/,
'    **  be run with the advanced option ENABLE RAY TRACING ',
'VISUALIZER',/,'    ** turned on.'
7325
'    **  Multilayer elements are used with Join thermal couplings.',/,
'    **  This is not permitted, it is suggested you try to couple',/,
'    **  them with large thermal couplings.',/,
'    **  Associated with entity: ',A,/,
'    **  Element list:',6I10,' ...'
7326
'    ** Particle tracking and flux calculation cannot be performed in ',/,
'    ** the same run. ',
7327
'    **  Thermal couplings to stream elements must have stream elements',/,
'    **  in secondary selection.',/,
'    **  Associated with entity: ',A,/,
'    **  Element list:',6I10,' ...'
7328
'    **  Unable to allocate array ',I4,' on slave machine',I4,/
'    **  when broadcasting master-slave shared data to slaves.',/
'    **  Try a lower number of processors per host machine.',/
7400
'    **  The number of elements in an enclosure',
' exceeds the limit of ',I10,/
'    **  Use Oppenheim method instead.',/
7401
'    **  The number of view factors exceeds ',
'the limit of ',I8,/
7402
'    **  Gray body matrix cannot be determined:',/
'    **  Element ',I10,' in enclosure has an improper surface property.',/
7403
'    **  Error during LU decomposition.',/
7404
'    **  Element label',I10,' is > ',I10,' residual view factor handling',/,
'    **  is improper.',/
```

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7405
'    ** Element ',I10,' is improperly defined.',/
7406
'    ** Maximum element label ',I10,
     ' exceeded.',/
7407
'    ** Not enough memory to store data.',/,
'    ** Please set advanced parameter: GPUINMEMORYFILE=1.',/
7500
'    ** More than 10000 time cases in model.',/
7501
'    ** Gray body matrix has more than',I9,' terms.',/
7502
'    ** Transparent surfaces are present and radiative heat flux',/,
'    ** calculations are requested with the Gebhardt''s Method. ',/,
'    ** Use the Oppenheim Method.',/
7503
'    ** The following',I10,' elements appear in multiple ',/,
'    ** radiative source requests. A complete element list appears',/,
'    ** in file groups.unv with the group name ',A,/,(8X,9I10)
7504
'    ** Not enough memory to store data.',/,
'    ** Please set advanced parameter: GPUINMEMORYFILE=1.',/
7600
'    ** More than'
,I9,' convective conductances.',/
7601
'    ** Element',2I10,
' not defined on Card 5, error in NASTRAN output.',/
7602
'    ** More than',I9,
' heat loads in model.',/
7603
'    ** More than',I10,1X,
'elements with temperature BCs in reduced model.',/
7604
'    ** More than',I9,1X,
'heat loads in reduced model.',/
7605
'    ** Error on line',/,A80,/
7606
'    ** Material Table',I9,
' not found while translating NEVADA deck.',/
7607
'    ** TMG Beam Element',I10,
' has zero length.',/
7608
'    ** TMG Element',I10,
```

```
 ' is poorly defined, cannot generate NEVADA ',/,
 '    **  coordinate system.',/
7609
 '    **  Material property',A16,' for material table',I8,/,
 '    **  cannot be found.',/
7651
 '    **  Error ',A,/
     '    **  FATAL **',/,'    **  Error ',A,/
7652
 '    **  Unable to get TMG version number',
 ' from version file.',/,'    **  Check TMG installation.',/
7700
 '    **  Error in CR1.',/
7701
 '    **  More than',I10,1X,'elements.',/
7702
 '    **  Error on TAPE13 on line no',I5,/
7800
 '    **  Insufficient memory in MEREL module =',I8,/,
 '    **  Please check if an excessive number of additional XCOND',/,
 '    **  conductances were defined.',/
7801
 '    **  Number of conductances exceeds ',I10,/
 '    **  Series conductance between elements',I10,1X,'and',I10,1X,
 'not processed.',/
7802
 '    **  Error in reading file in subroutine SER2.',/
7803
 '    **  Error on temperature file TEMPF.',/
7804
 '    **  More than',I8,1X,
 'time values.',/
7805
 '    **  A boundary condition or load has been defined on ',/,
 '    **  the interface between two plane stress elements or',/,
 '    **  two Cyclic Symmetry simulation objects with ',/,
 '    **  different numbers of instances.',/,
 '    **  It is not defined how to compute the coupling ',/,
 '    **  area in this situation.',/,
 '    **  The associated element numbers are',I10,1X,'and',I10,1X,'.',/
7900
 '    **  More than',I8,1X,
 'table references.',/
7901
 '    **  Error in TMG input file INPF:',/,
 '    **  Dependent variable on table',I6,
 ' for FANPUMP element',I10,' must be',/,
 '    **  DeltaPT, Volume, Mass Flow, OR Velocity.',/
```

```
7902
'    **  For time=',1P,E15.6,
' all time-dependent tables are periodic.',/,
'    **  For periodic tables initial time value must be 0,',
' not',E15.6,'.',/
7903
'    **  For time =',1P,E15.6,
' time-dependent table',I5,' is periodic.',/,
'    **  For periodic tables initial time value must be 0,',
' not',E15.6,'.',/
7904
'    **  Value of conductance between elements',2I10,/,
'    **  modified by table interpolation from table',I6,' is < 0.',/
7905
'    **  Element',
I10,' has flow section improperly defined.',/
7906
'    **  Flow section for fluid element',I10,1X,
' not defined.',/
7907
'    **  Flow resistance',I8,
' between ',I10,' and',I10,' is infinite.',/
7908
'    **  Flow resistance ',I8,
' between elements',I10,' and',I10,' is zero.',/
7909
'    **  Rad. conductance',I10,
' between elements',I10,' and',I10,' is zero.',/
7910
'    **  Radiative conductance',I10,
' between ',I10,' and',I10,' cannot',/,
'    **  be evaluated, temperature',I10,' =',1P,E11.4,/,
'    **  temperature',I10,' =',E11.4,/
7911
'    **  Improper direction for fluid elements',2I10,/
7912
'    **  Conductance value ',I10,
' between ',I10,' and',I10,' is zero.',/
7913
'    **  Conductance',I10,
' between elements',I10,' and',I10,' is infinite.',/
7914
'    **  Nonconsecutive table number',I5,/,
'    **  Possible TABDATA Cards with no corresponding',
' TABTYPE Cards are present.'/
7915
'    **  Number of tables exceeds ',I5,/
7916
```

```
'    **  More than',I8,' entries in a table.',/
7917
'    **  More than',I9,1X,'conductances.',/
7918
'    **  Convective couplings created without',
' fluid elements.',/
7919
'    **  Undefined or improper flow section',
' for fluid element ',I10,/
'    **  You must define a flow section at all points in the network',/
'    **  except at the free ends, which are assigned ambient conditions.',/
7920
'    **  Fluid properties are not defined for element',I10,1X,A7,/,
'    **  at node ',I10,'. You must ensure that fluid properties are ',/,
'    **  defined at the inlet to the network. If you are using a pressure',/,
'    **  boundary condition, assign fluid properties to the rigid link ',/,
'    **  flow section element.',/
7921
'    **  Undefined or improper flow section',
' for fluid element ',I10,1X,A7,/,'    **  at node ',I10,/
'    **  You must define a flow section at all points in the network',/
'    **  except free ends, which are assigned ambient conditions.',/
7922
'    **  Linear conductance',I10,' between',
I10,' and',I10,/,'    **  has improper value of',1P,E11.4,/
7923
'    **  Radiative conductance',I10,' between',
I10,' and',I10,/,'    **  has improper value of',1P,E11.4,/
7924
'    **  1-way conductance',I10,' between',
I10,' and',I10,/,'    **  has improper value of',1P,E11.4,/
7925
'    **  More than ',I10,' fluid elements ',
'or conductances.',/
7926
'    **  More than ',I8,' character string descriptors.',/
7927
'    **  No upstream element found for fluid',
' element',I10,/
7928
'    **  One of the capacitances of phase ',
'change element',I10,1X,'is zero.',/
7929
'    **  Error in TMG input file INPF:',/,
'    **  More than ',I8,' VARIABLE Cards.',/
7930
'    **  Element',I10,' type not defined on ',
'geometry file.',/
```

```
7931
'    ** Insufficient storage for ILU accelerator',
' needs',I8,' locations.',/
7932
'    ** Improper matrix for ILU accelerator.',/
7933
'    ** ILU accelerator faces breakdown.',/
7934
'    ** Too many conductances for ILU accelerator.',/
7935
'    ** Insufficient work length vector =',I8,
' specified in FASTSOLVE',/,'    **  as PAR(6). Should be at least ',I8,/
7936
'    ** Conjugate-gradient solver iterative breakdown,',/,
'    ** please check boundary conditions.',/
7937
'    ** No temperature constraints specified for steady state run.',/,
'    ** Please change your ',A,' to transient.',/
7938
'    ** Improper electrical boundary conditions defined.',/
7939
'    ** Error in routine CRSMADD while creating matrix.',/
7940
'    ** Error while creating electrical resistance matrix.',/
7941
'    ** Electrical element',I10,' with material ',
'property',I6,' should have',/,
'    ** table-dependent thermal conductivity defined.',/
7942
'    ** Error reading ',A12,/
7943
'    ** Error encountered with a conductance connected to element',I10,/,
'    ** Preconditioning matrix could not be constructed.',/,
7944
'    ** Unable to allocate array ',A,' from FGETMEM.',/
'    ** Probably insufficient swap space or inappropriate limits set.',/
7945
'    ** Unable to allocate array ',I4,' in routine fgetmem2. Trying to',/
'    ** allocate ',F12.0,' bytes,',I12,' bytes have already been',/
'    ** allocated. Probable cause is insufficient swap space.',/
7946
'    ** Memory allocation failed with default LFIL value of',I6,/,
'    ** Try a lower value with Card 9 PARAM ILU Card.',/
7947
'    ** Cannot find the flow time-step table data. Check the name',/,
'    ** of the time-step profile in the transient BC file.',/
7948
'    ** Cannot find the thermal time-step table data. Check the name',/,
```

```
'    ** of the time-step profile in the transient BC file.',/
7949
'    ** Error in interpolation routine when creating time step table.',/
7950
'    ** Negative emissivities specified in table',I8,/
7951
'    ** Unable to allocate sufficient memory to solve the model with a',/,
'    ** matrix fill value of',I4,'. Trying to allocate ',F12.0,' bytes,',/,
'    **',I12,' have already been allocated. Possible cause: insufficient',/,
'    ** swap space. Suggestion: if you find the residual value',/
'    ** acceptable, increase the convergence criterion to something',/
'    ** above this value.',/
7952
'    ** Hydraulic element',I10,' is connected to element',I10,/,
'    ** with a follower conductance. This is not permitted. You',/,
'    ** can achieve the same result by specifying both elements',/,
'    ** to be sinks, and making one follow the temperature of ',/,
'    ** the other with a temperature vs temperature table.',/
7953
'    ** User DLL schema is active but tmgopen_user or tmgopen shared ',/,
'    ** object could not be found, it could be related to USER1.f compile',/
'    ** or link errors.',/
7954
'    ** Improper material properties defined either for element',I10,/,
'    ** or for the AMBIENT element. Either the density, or the',/,
'    ** viscosity, or the specific heat, or the thermal conductivity',/,
'    ** is zero.',/
7955
'    ** Unable to access file heatermatrix.dat',/
7956
'    ** A Real Time TMG API routine is called and the Real Time TMG',/,
'    ** feature is not activated. You may activate this feature by',/,
'    ** including GPARAM 12 1378 1 in the input file.',/
7957
'    ** Encountered a hydraulic connection between a stream network ',/,
'    ** element ',I10,' and a non-stream hydraulic element ',I10,'.',/
7958
'    ** There are no active heater controllers but the option to',/,
'    ** determine equivalent heat loads to maintain thermostat set',/,
'    ** points has been selected.',/
7959
'    ** Multiple independent variables not allowed for expression ID ',
I6,':',/,
'    ** ',A,/
7960
'    ** Fluid temperature is referenced for element ',I10,/,
'    ** for expression ID ',I10,' but there are no hydraulic elements',/,
'    ** associated with that element.'/
```

```
7961
'    ** Invalid BC index ID ',I10,' referenced in expression function ',
 A5,'.'/
7962
'    ** Empty element selection encountered when processing',/,
'    ** BC index ID ',I10,' referenced in expression function ',
 A5,'.'/
7963
'    ** Out-of-domain or undefined element ',I10,' on domain ',I6,/,
'    ** for BC index ID ',I6,' referenced in expression function ',
 A5,'.'/
7964
'    ** One of expressions references non-existing additional',/,
'    ** fluid material ',I6,' in material list ',I6,'.'/
7965
'    ** The named point ', """,A,""",/,
'    ** used in the function ',""",A,""",' does not exist.',/,
'    ** Please check the named points names.',/
7966
'    ** Function ',A,' references ',/,
'    ** invalid void region ID ',I10,' for thermal ',/,
'    ** void load ',I10,'.',/
7967
'    ** Function ',A,' references ',/,
'    ** invalid thermal void load',I10,'.',/,
7968
'    ** The curve ', """,A,""",/,
'    ** used in the function RLD does not exist.',/,
'    ** Please check the curve names.',/
7969
'    ** The curve ', """,A,""",/,
'    ** used in the function RLD references the point ',I10,/,
'    ** that does not exist in INPF.',/
7970
'    ** Inconsistent rotational loads while using PWR function: ',/,
'    ** the stream ',I10, ' has ',A,/,
'    ** while the void ',I10,' has ',A,/
7971
'    ** ',A,' is missing or not properly provided.',/
7972
'    ** Number of data in the table of index of refractioin ',/,
'    ** has to be equal to the number of data in the table of ',/,
'    ** extinction coefficient.',/
7973
'    ** There are problems with ',A,' optical properties.',/,
'    ** Please check the input tables.',/
7974
'    ** Run termination is requested from expressions user plugin.',/
```

```
7975
'    ** The table for film thickness dependent ',A,' is missing.',/
7976
'    ** Evaluated Area or multiplication factor is negative or zero.',/
7977
'    ** There are problems with map arrays.',/
7979
'    ** ',A,' BC ',A,' ',/,
'    ** with ID number of ',I8,' has a negative HTC value.',/,
'    ** Please verify that the HTC value over the duration of the ',/,
'    ** simulation is greater than or equal to zero.',/
7980
'    ** The capacitance of thermal void with NAME: ',A2048,/,
'    ** and with USER ID: ',I10,/,
'    ** is negative.',/,
7981
'    ** The process of pairing wall rotational properties to the',/,
'    ** corresponding flow node has failed for the following stream:',/,
'    ** ',A,/
7982
'    ** 'A,' cannot be evaluated because',/,
'    ** it has dependency on itself.',/
7983
'    ** The function ',A,' cannot be evaluated because',/,
'    ** Duct Label ',A,' has not been defined in the model.',/
7984
'    ** A set of ',I4,' connected streams are defined with ',/,
'    ** the automatically determine inlet temperature/reverse inlet ',/,
'    ** temperature option. However, at this stage, there are no ',/,
'    ** incoming streams into the junction. Therefore, the temperature ',/,
'    ** of the junction cannot be computed. The junction includes',/,
'    ** streams with IDs:',/,(8X,9I10)
7985
'    ** The stream with ID ',I6,' is defined with ',/,
'    ** the automatically determine reverse mass flow option.',/,
'    ** During the reverse condition, the mass flow was calculated',/,
'    ** to be in the nominal direction. The calculated direction of ',/,
'    ** the flow contradicts the model setup.',/
7986
'    ** The flow time-step table is empthy. Check the ',/,
'    ** the time-step profile in the transient BC file.',/
7987
'    ** Thermal correlation cannot run without ',/,
'    ** a design variable in the model.',/

7988
'    ** DESIGN VARIABLE ',A,' is not defined ',/
7989
```

```
'    **  Thermal Coupling - ',A,/,
'    **  The element with the global index = ',I,/,
'    **  is not a supported type with Finite Element Method.',/,
'    **  Select the Element CG Method in order to run this simulation.',/,
7990
'    **  Two different Rotation loads has been defined for element ',I,/,
'    **  Rotation load 1 ID:',I,/,
'    **  Rotation load 2 ID:',I,/,
'    **  Please remove one of the loads.',/
7991
'    **  Thermal correlation cannot run without ',/,
'    **  a correlation target in the model.',/
7992
'    **  Interpolation of ',A,' for the ',A,' BC ',A,' ',/,
'    **  with ID number ',I8,' has failed.',/,
'    **  Please check the property definition. ',/

8000
'    **  Insufficient data on file MODLCF.',/
8001
'    **  Time value on file MODLCF < -99990).',/
8002
'    **  HTF AND SINK Cards are',
' improperly ordered on file MODLCF. ',/
8003
'    **  Error in TMG input file INPF:',/,
'    **  Element label ',I10,' on Card 9 too large.',/
8004
'    **  Error in TMG input file INPF:',/,
'    **  Only group names are allowed',
' on INTERP Cards with the TDTHCON option.',/
8005
'    **  Error in TMG input file INPF:',/,
'    **  Element',I10,1X,
'On Card 9 INTERP Card does not exist.',/
8006
'    **  Error in TMG input file INPF:',/,
'    **  Table no',I6,1X,' does not exist.',/
8007
'    **  No conductance found between elements',
I10,1X,'and',I10,/
8008
'    **  Start time is less than the lowest Start',
' Position time',/,'    **  defined in any Orbital Heating entity and',
' the lowest',/,'    **  time value defined in any time-varying Heat Load',
' or Heat Flux entity.',/
```

```
'    **  Start time < minimum time',
' defined in ',/,'    **  radiation request or',
' time dependent heat load.',/
8009
'    **  Start time > maximum time',
' defined in radiation request',/,'    ** ',
' or time dependent heat load.',/
8010
'    **  Table number ',I8,' is a duplicate.',/
8011
'    **  Missing interpolation table variable type',
' definition',/,'    **  for table number',I8,/
8012
'    **  Missing interpolation table data',
' for table number',I8,/
8100
'    **  Solid element',I10,
' has coincident nodes.',/
8101
'    **  Solid element',I10,' has collinear nodes.',/
8102
'    **  Solid element',I10,' has ',I2,
' nodes associated to it.'/
'    **  TMG supports only solid elements with 4,6 or 8 nodes.',/
8103
'    **  Error in TMG input file INPF:',/,
'    **  Orthotropic material defined with nodes',2I10,/,
'    **  has improper nodes.',/
8104
'    **  Error in TMG input file INPF:',/,
'    **  Orthotropic material defined with nodes',
 2I10,/,'    **  has improper directions.',/
8105
'    **  Error in solid element',I10,'. Either orthotropic properties',/
'    **  are improperly defined, or, more probably, material angles are',/,
'    **  either not defined or are improperly defined.'/
8110
'    **  Interpolation table number',I8,
' not found for joint',I8,/
8111
'    **  Invalid interpolation table type',
' for joint',I8,/
8112
'    **  Reverse side of transparent element',
 I10,' is not defined.',/
8113
'    **  Reverse sides are not defined for',I10,
```

```
 ' transparent elements:',/,'    **  ',10I10,' ...'
 8114
 '    **  Multiple spin requests have been',
 ' specified with different spin axes.',/
 '    **  All spin requests in one model must have the same spin axis.',/,

8115
 '    **  The model only consists of elements which are not yet ' ,/
 '    **  supported by the finite element method such as 0D lump ',/,
 '    **  mass, 1D beams, 2D shells with zero thickness. ',/,
 '    **  In such a configuration, a parallel run cannot be operated.',/,
 '    **  Please revisit the solution configuration in order to ',/,
 '    **  perform the thermal solve in serial ',/
 8200
 ' TMG Security Error 2011 TMG License Has Expired',
 ' or Security Violation.',/
 '    **  TMG Error 2011 - TMG license has expired or'
 ,' security violation.',/
 8201
 ' TMG User Count Exceeded for',A12,' Module'
 '    **  TMG user count exceeded for ',A12,
 ' module.',/
 8202
 ' TMG Security Error 2016- ',I4
 '    **  TMG security error 2016- ',I4,/
 8203
 ' TMG Security Error 2015 - Usercount Error',I4
 '    **  TMG security error 2015 - usercount',
 ' error',I4,/
 8204
 '    **  Referenced node',I10,
 ' does not exist.',/
 8205
 ' Error writing on file MSGF.',/
 8206
 ' TMG Security Error 2031 Your TMG Installation has Expired'
 '    **  TMG security error 2031 your TMG ',
 'installation has expired.',/
 8207
 '    **  TMG security error 2006 - contact TMG support'
 ' TMG security error 2006 - contact TMG support.',/
 8208
 ' TMG Security Error 2018 Corrupt Client Database'
 '    **  TMG security error 2018 ',
 'corrupt client database.',/
 8209
 ' TMG security error 2013-',I2,' could not read',
 ' TMG security files'
```

```
'    **  TMG security error 2013-',I2,
' could not read TMG security files.',/
8210
' TMG security error 2013-',I2,' could not decode',
' TMG security files'
'    **  TMG security error 2013-',I2,
' could not decode TMG security files.',/
8211
'    **  TMG security error 2017 ',
'invalid client database.',/
' TMG security error 2017 invalid client database.',/
8212
' TMG security error 2020 unregistered client'
'    **  TMG security error 2020 - unregistered client.',/
8213
'    **  Absolute value of free convection exponent',1P,E11.4,
' is > 5.0.',/
8214
' TMG Security Error 2019 No Current License'
'    **  TMG security error  2019 ',
'no current license. ',/
8215
' TMG Security Error 2020 Contact TMG Support'
'    **  TMG security error 2020',
' contact TMG support.',/
8216
' TMG Security Error 2012 Contact TMG Support'
'    **  TMG security error 2012 contact TMG support.',/
8217
'    **  Error in ',A8, ' module ',/
8218
'    **  Error in readcont subroutine.',/
8219
'    **  Incorrect data type',I5,' in GETPUT.',/
8220
'    **  Incorrect element no',I10,' in GETPUT.',/
8221
'    **  GETPUT entered recursively, ielem=',
I10,' itype=',I5,/
8222
'    **  Unable to allocate array',I6,' from FGETMEM2.',/
8223
'    **  Error in PUT routine, IARR=',I8,' IEL=',I10,
' IEL2=',I10,/
8224
'    **  File ',A,' is being opened with the improper unit number',
I3,' should be ',I3,/
8225
```

```
 '    ** Articulation parameters, or an orbit, diurnal heating, or ',
 'solar',/,
 '    ** heating request must be defined with an articulation request. '/
8226
 '    ** Meshing of the earth failed, possibly due to a low H/R ',
 'value. Try using',/,
 '    ** GPARAM 4 116 1 which activates an alternate earth ',
 'meshing technique.',/
8227
 '    ** Interpolation fails for element ID ',I8,' from table ',I8,/
8228
 '    ** Failed to parse the following string for expression ID ',I6,':',/,
 '    ** ',A,/,
 '    ** for BC or element selection group name:',/,
 '    ** ',A,/
8229
 '    ** Unrecognized field or variable name ',A,/,
 '    ** encountered for expression ID ',I6,':',/,
 '    ** ',A,/,
 '    ** for BC or element selection group name:',/,
 '    ** ',A,/
 8230
 '    ** Expression evaluation failure for expression ID ',
 I6,':',/,
 '    ** ',A,/,
 '    ** for BC or element selection group name:',/,
 '    ** ',A,/,
 '    ** occurring at time = ',E19.12,/,
8231
 '    ** Array number ',I6,/,
 '    ** is outside of the permitted range [2001-2500]',/
 8232
 '    ** Non-existent entity IDs referenced as function arguments',/
 '    ** in expressions',/
 8233
 '    ** No available array number is found in the range ',/
 '    ** between ',I6,' and ',I6,/
 8234
 '    ** Failed to copy file ',A,/
 '    ** to ',A,/
 '    ** with error code ',I3,/
 8235
 '    ** The table ',I10,' has an option LOG_LINEAR. ',/,
 '    ** However, the independent variable (argument) ',E12.6,' ',/,
 '    ** is negative that is not a valid value ',/,
 '    ** for the log function.',/,
 8236
 '    ** The table ',I10,' has an option LINEAR_LOG. ',/,
```

```
'    ** However, the dependent variable (function) ',E12.6,' ',/,
'    ** is negative that is not a valid value ',/,
'    ** for the log function.',/,
 8237
'    ** The table ',I10,' has an option LOG_LOG. ',/,
'    ** However, the independent variable (argument) ',E12.6,' ',/,
'    ** is negative that is not a valid value ',/,
'    ** for the log function.',/,
 8238
'    ** The table ',I10,' has an option LOG_LOG. ',/,
'    ** However, the dependent variable (function) ',E12.6,' ',/,
'    ** is negative that is not a valid value ',/,
'    ** for the log function.',/,
 8239
'    ** The number of spatial dimensions for the table ',I10,' is one. ',/,
'    ** For Delaunay interpolation method, at least two spatial ',/,
'    ** dimensions must be provided.',/,
 8240
'    ** There are no values specified for the table ',I10,'. Please ',/,
'    ** specify at least one value.',/,
 8241
'    ** The specified number ',E12.6,' for the fraction of all points ',/,
'    ** for the table ',I10,' is too low. Please specify a larger ',/,
'    ** number.',/,
 8242
'    ** The number of spatial variables ',I10,' is incorrect for the ',/,
'    ** table ',I10,'. Please check and correct this table.',/,
 8243
'    ** There are more than one non-spatial variables specified for ',/,
'    ** the table ',I10,'. Please specify no more than one ',/,
'    ** non-spatial variable.',/,
 8244
'    ** There are fatal errors in the autoconnected stream topology.',/,
'    ** Please see the above messages for more information.',/

 8245
'    ** There are fatal errors in the parallel run domain decomposition.',/,
'    ** Please see the above messages for more information.',/

 8801
'    ** M=256 obsolete restart option - please use M=0 option instead.',/
 8802
'    ** Error in TMG input file INPF:',/,
'    ** Missing title Card.',/
 8803
'    ** File CHKPNT is present, analysis cannot proceed. Please',/,
'    ** delete or rename this file.',/
 8804
```

```
'    ** File INPF not present in run directory, analysis cannot proceed.',/
8805
'    ** No machines are available to run ',A10,' in parallel.',/,
'    ** Run command mpdboot; or mpd on the master machine and',/,
'    ** mpd -h hostname -p port_number on the slave machines',/,
'    ** to set up the machine chain.',/
8806
'    ** A machine file is given but no machines in the file',/,
'    ** are available to run ',A10,' in parallel. Double check',/,
'    ** the machines in the file and make sure that smpd/mpd',/,
'    ** processes are running and chained to the master machine',/,
'    ** if on unix/linux. The machine file name is ',/,
'    ** ',A256,/
8807
'    ** A machine file is given but the file is not accessible.',/,
'    ** Thus no machines are available to run ', A10,/,
'    ** in parallel. The specified machine file name is: ',/,
'    ** ',A256,/
8808
'    ** TMG tries to filter the machines from the given machine',/,
'    ** file and writes to a temporary machine file in the run',/,
'    ** directory to run ',A10,' in parallel.  However, the',/,
'    ** output file cannot be opened to write the machines in ',/,
'    ** the run directory. The temporary output file name is: ',/,
'    ** ',A132,/,
'    ** The given input machine file name is: ',/,
'    ** ',A256,/
8809
'    ** When attempting to run ', A10,' in parallel, MPI was'/,
'    ** unable to connect to the master machine without prompting'/,
'    ** for user login credentials. Please use mpiexec -register'/,
'    ** or equivalent command on the master machine and on all other '/,
'    ** machines in your machine file. Then reattempt the run.'/,
'    ** The master machine is the machine where this',/,
'    ** TMG run was launched and TMG files are stored.',/,
'    ** The master machine name in this TMG run is: ',/,
'    ** ',A80,/,
'    ** The specified machine file name is: ',/,
'    ** ',A256,/
8810
'    ** No machine file can be found!',/,
'    ** To run ',A10,' in parallel on this platform, a machine file ',/,
'    ** must be specified in which participating machines are ',/,
'    ** listed.  If this file is not given in INPF, ',/,
'    ** TMG tries to open a default machine file in the',/,
'    ** following order:',/,
'    ** 1) mayampi.hosts in the local run directory;',/,
'    ** 2) $SDRC_TMG/if/tmgmpi.hosts.',/,
```

```
'    ** Neither of above exists.',/
8811
'    ** A Fortran user-written subroutine was found, and the',/,
'    ** PARAM USERDLL option was also specified. This combination',/,
'    ** requires double precision. Please ensure that the',/,
'    ** specification:',//,
'       DOUBLE PRECISION T(*),TIME,DT',//,
'    ** is present in your user-written subroutine.',/
8813
'    ** PARAM ANADOMDEC/DOMDEC/RADDOMDEC option is on but neither',/,
'    ** mayampi.hosts nor tmgdomdec.setup file is provided',/,
'    ** in the run/solution directory.',/
'    ** Please run the parallel machine validation tool to',/,
'    ** have file mayampi.hosts written automatically.',/
8814
'    ** Error retrieving data from table ',I10,/,
'    ** Either the table has no entries or has invalid',/,
'    ** dependent or independent variables.',/
8815
'    ** View Factors GPU option in Parallel Configuration File',/,
'    ** must be activated.',/
8990
'    ** More than',I9,
' conductances in module CONN2.',/
9001
'    ** More than 100000 element groups in model.',/
9002
'    ** LU Decomposition failure.',/
9003
'    ** An element label exceeds 10000, and the',
' model is axisymmetric.',/
9004
'    ** The axisymmetric element ',I10,
' does not lie in the ',A2,' plane.',/
9005
'    ** Interpolation relationships which ',
'reference material',/,'    ** properties must have a table multipliers',
' equal to 1.',/,'    ** Please check interpolation table',I6,/
9006
'    ** Error in TMG input file INPF:',/,
'    ** Insufficient array data in array',I8,/
9007
'    ** Error in TMG input file INPF:',/,
'    ** Inconsistent X values in array',I8,/
9008
'    ** Error in TMG input file INPF:',/,
'    ** Inconsistent Y values in array',I8,/
9009
```

```
'    **  Error in TMG input file INPF:',/,
'    **  ARRAYTYPE card must appear before ARRAYDATA Card.',/
9010
'    **  Error encountered during element deletion.',/
9011
'    **  Card 2a KSP parameter=',
I10,', which is not the space element number.',/,
'    **  Change it to space element number',I10,/
9012
'    **  You have multilayer shells present and you are',
' performing a restart',/,'    **  run with old data on file MODLF. This ',
'combination is not permitted.',/,'    **  You can restart with multilayer ',
'shells only with old data on file VUFF.',/
9013
'    **  In material',I4,' ',A,' was set while '/,
'    **  ',A,' is zero. This is not permitted.',/,
'    **  If one is non-zero, the other must be non-zero as well.',/,
'    **  If necessary, set it to a small value.',/
9014
'    **  Axisymmetric model with articulation and radiation is not allowed.',
 /
9015
'    **  Table-dependent specific heat above the phase change temperature',/,
'    **  was defined for material',I8,'. This is not allowed. This',/,
'    **  functionality can be achieved by specifying a table-dependent',/,
'    **  specific heat.',/
9016
'    **  Explicit Earth with an axisymmetric model is not supported.',/
9017
'    **  For material ',I8,' on the element''s ',A,' side in the ',A,/
'    **  spectrum the sum of ',A,'+transparency+specular reflectivity',/,
'    **  is > 1.0',/
9018
'    **  One of fields on a VFMERGE Card must be a group name.',/
9019
'    **  A temperature or heat flux nodal boundary condition was',/,
'    **  specified in conjunction with a non-zero solar or IR spectrum',/,
'    **  extinction coefficient in the model. This is not permitted.',/,
'    **  Please change the boundary condition to another type or set',/,
'    **  the extinction coefficient value to zero.',/
9020
'    **  A negative TIME value is specified on a Card 6 Request',/,
'    **  Card - this is not permitted.',/
9021
'    **  A negative PSUN or PIR value is specified on a Card 6 Request',/,
'    **  Card when the TIME Value is not CONSTANT - this is not permitted.',/
9022
'    **  The front sides of elements associated with material',I8,/,
```

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'    ** are specified with null emissivity, while the reverse sides',/,
'    ** have a finite emissivity value. This is not permitted',/,
'    ** for axisymmetric models. Please reverse the order of the ',/,
'    ** emissivities and the orientations of the elements.',/
9023
'    ** Free convection thermal couplings are present in the model,',/,
'    ** but there is no AMBIENT element defined. To create an',/,
'    ** AMBIENT element, create one or more fluid elements.',/
9024
'    ** ',A,/,
'    ** is > 1 for ',A,' property',I8,/
9025
'    ** More than 97 stacked elements are specified on element',
'    ** physical property',I8,' this is not allowed.',/
9026
'    ** You are specifying the file not in your current directory:',/,
'    ** ',/,
'    ** ',A,/,
'    ** ',/,
'    ** with an absolute address, since its name starts with',/,
'    ** a / (slash) character. This is not permitted on Windows ',/,
'    ** platforms. If a file is in a directory different from your ',/,
'    ** current directory, you must specify its name with a relative',/,
'    ** address, i.e. relative to your current directory, and its ',/,
'    ** name must then start with the double dot and a slash (../). ',/,
'    ** As an example, if the file TEMPF is in the directory restartdir',/,
'    ** adjacent to your current directory, you must specify it as:',/,
'    ** ',/,
'    ** ../restartdir/TEMPF',/,
'    ** ',/
9027
'    ** Improper physical properties are specified for layer',I8,' of',/,
'    ** the non-homogeneous multilayer elements whose top layer has',/,
'    ** physical property ID',I8,'. The improper physical property ID',/,
'    ** is',I8,'. A layer''s physical property must be defined for a',/,
'    ** shells and may not specify a multilayer element.',/
9028
'    ** Inconsistent units specified on PARAM UNITS Cards.',/
9029
'    ** No files present in restart directory',/,A,/
9030
'    ** File ',A,' could not be opened with the form=binary ',/,
'    ** option. However, this could not be done, because the file',/,
'    ** was created with the form=unformatted option.',/
9031
'    ** The Analyzer is being run, a SINDA or ESATAN model is',/,
'    ** requested, there are solid elements in the model, and',/,
'    ** the default capacitance redistribution option is ON.',/,
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'    ** This combination is not permitted, since the TMG model',/,
'    ** is not compatible with the ESATAN or SINDA models, which',/,
'    ** require that the capacitances of solid elements not be',/,
'    ** redistributed to the boundary elements. To permit this',/,
'    ** run to continue, please turn on the Do Not Redistribute',/,
'    ** Capacitances flag, or do not request the calculation of',/,
'    ** temperatures.',/
9032
'    ** VARIABLE ',A,/,
'    ** is not defined with a VARIABLE Card.',/,
9033
'    ** The final time is less than start time.',/,
9034
'    ** Improper initial temperature value of ',1P,1E10.3/,
'    ** specified, below absolute zero of ',1E10.3,/,
9035
'    ** Negative capacitance value is specified on XCAP Card',/,
'    ** for element',I10,/,
9036
'    ** Improper negative Stefan-Boltzmann''s Constant is specified.',/
9037
'    ** ',A,' value is improperly defined to be negative',/,
'    ** for material',I8,/
9038
'    ** At node',I10,' duplicate elements',I10,' and',I10,' are',/,
'    ** defined, and one of them is a hydraulic element. This is',/,
'    ** not permitted.',/
9039
'    ** Solar spectrum data file ',/,
'    ** ',A70,/,
'    ** does not exist.',/
9040
'    ** ',A,' with ID 0',/,
'    ** is present in the model. This is not permitted.',/,
'    ** Please use a non-zero ID.',/
9041
'    ** ',A,' with ID 0 for element',I10,/,
'    ** is present in the model. This is not permitted.',/,
'    ** Please use a non-zero ID.',/
9042
'    ** The independent variable on table',I8,' is WAVELENGTH.',/,
'    ** However, the run is not a multispectral run. This is not',/,
'    ** permitted.',/
9043
'    ** Orbit conflict. An orbit calculation point was defined',/,
'    ** at time',1P,E14.7,'. However, on a previous orbit request',/,
'    ** orbit calculation points were defined at times',E14.7,/,
'    ** and',E14.7,'. It falls between two previously calculated',/,
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'    ** time points and thus creates a potential conflict. Please',/
'    ** make sure that if multiple orbit requests are present, the',/,
'    ** time points either coincide or the orbits do not overlap.',/
9044
'    ** The axisymmetric node ',I10,
' does not lie in the axisymmetry plane.',/
9045
'    ** The following',I10,' element(s) have been included in',/,
'    ** more than one AXISYMM card. This is not allowed.',/,
'    ** A complete element list appears in file groups.unv with',/,
'    ** the group name:',/,
'    ** ',A,/,(8X,9I10)
9046
'    ** The model has axisymmetric elements with extinction ',/,
'    ** properties. This is not allowed.',/
9047
'    ** The radiative heating request from source elements',/,
'    ** belonging to group ',A,/,
'    ** is neither specified to occur in the solar bands only',/,
'    ** or in the IR bands only, or referencing a spectral',/,
'    ** distribution of intensity versus wavelength.',/,
'    ** This is not allowed.',/
9048
'    ** The radiative heating request from source elements',/,
'    ** belonging to group ',A,/,
'    ** references tables in both SOLAR and IR spectra. This is',/,
'    ** not allowed if PARAMS SPECTRA CARD is not specified.',/
9049
'    ** The radiative heating request from source elements',/,
'    ** belonging to group ',A,/,
'    ** uses the Monte Carlo method with the option of direct',/,
'    ** computation of radiative heat loads',/,
'    ** (rather than calculating view factors only).',/,
'    ** This is not supported for multispectral runs.',/
9050
'    ** There are elements appearing in multiple cyclic symmetry cards.',/,
'    ** For the list of these elements please see groups.unv file.',/
'    ** The conflicting BC names are:',/,
'    ** ',A,/
9051
'    ** Angle value must be positive or a fraction of 2*Pi',/
9052
'    ** In solution step input for step ',A,/,
'    ** the end time value ',G15.6,' is not greater than',/,
'    ** the previous step end time ',G15.6,'.'/
9053
'    ** A single solution step is present and it is of transient type.',/,
'    ** Either at least one more solution step should be defined',/,
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     '    **  or the step type should be changed to steady state.'/
     9054
     '    **  Multiple solution steps are present with the heater sizing',/,
     '    **  PARAM THERMOSTAT Q_EQUIV option active.',/,
     '    **  This is not supported.'/
     9055
     '    **  Nodes of Rotational periodic element',
     ' are too close to the axis.',/
     9056
     '    **  Inconsistent parameters for free ',
     ' molecular request',I10,/
     9057
        '    **  Two streams ',I10,' and ',I10,' are applied',/,
        '    **  to the same edges/surfaces',/
     9058
     '    **  Invalid dependent variable type for expression ID ',
     I6,/
     9059
     '    **  Table ',I8,' has an entry with negative thermal conductivity.',/
     9060
     '    **  Convective BCs are applied on shared axisymmetric edges.',/
     '    **  This is not allowed.',/
     9061
     '    **  In solution step input for step ',A,/,
     '    **  ',A,' is not greater than zero.'/
     9062
     '    **  A single position for solar vector is specified for solar',/,
     '    **  heating space while articulation is present in the model.',/,
     '    **  Please specify a day segment that encompasses the articulation',/,
     '    **  duration.',/
     9063
     '    **  When PARAM UPDATEOPTICAL is present, all optical properties',/,
     '    **  have to be defined using the "Advanced Thermo-Optical',/,
     '    **  Properties". The optical properties for ID ',I8,' are not',/,
     '    **  defined properly.',/
     9064
     '    **  When PARAM UPDATEOPTICAL is present, emissivity and',/,
     '    **  absorptivity have to be less than 0.99 and greater than 0.01.',/,
     '    **  The optical properties for ID ',I8,' are not defined properly.',/
     9065
     '    **  Table ',I8,' has an entry with negative or zero Area',/,
     '    **  or multiplication factor.',/
     9066
     '    **  Convective BCs are applied on an edge without area.',/,
     '    **  This is not allowed.',/
     9067
     '    **  ',A,' BC ',A,' ',/,
     '    **  with ID number of ',I8,' ',/,
```

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'    ** has a negative HTC of ',E11.4,'.',/,
'    ** Please ensure that proper HTC value is used.',/
9068
'    ** Temperature constraint BC ',A,' ',/,
'    ** with ID number of ',I8,' ',/,
'    ** uses multiple conflicting ways to specify temperature values.',/
9069
'    ** The Ducts/Streams Junction to 3D Flow simulation object',/,
'    ** ',A,/,
'    ** with ID number ',I8,/,
'    ** is not connected to any Duct and Stream.',/
9070
'    ** The Ducts/Streams Junction to 3D Flow simulation object',/,
'    ** ',A,/,
'    ** with ID number ',I8,/,
'    ** with the Pressure Transfer option is connected to more',/,
'    ** than one duct and stream. Only one connection is allowed,',/,
'    ** if the pressure is not specified with the Pressure Transfer',/,
'    ** option.',/
9071
'    ** The Ducts/Streams Junction to 3D Flow simulation object',/,
'    ** ',A,/,
'    ** with ID number ',I8,/,
'    ** is connected to the following stream and duct label IDs',/,
'    ** that are not defined in the model:',/,
'    ** ',A,/
9072
'    ** The Ducts/Streams Junction to 3D Flow simulation object',/,
'    ** ',A,/,
'    ** with ID number ',I8,/,
'    ** with flow direction set to outflow from fluid domain',/,
'    ** is connected to the following Stream IDs that are not ',/,
'    ** defined in the model with automatically determined inlet',/,
'    ** temperature:',/,
'    ** ',A,/
9073
'    ** Fluid duct elements can only participate in one Total ',/,
'    ** Temperature Effects type of Duct Flow Boundary Conditions',/,
'    ** simulation object. The following fluid duct elements ',/,
'    ** have been selected in multiple Total Temperature Effects:',/,
'    ** ',A,/
9074
'    ** Table number ',I8,' contains no data. Please verify ',/,
'    ** the boundary condition where the table is used.',/
9075
'    ** The following',I10,' multilayer elements have shared nodes',/,
'    ** where the average of adjacent element normals is zero. This',/,
'    ** generally comes from conflicting normal orientation between',/,
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'    ** adjacent elements. Please re-orient the elements. A complete',/,
'    ** element list appears in file groups.unv with the group name:',/,
'    ** ',A,/,(8X,9I10)

9076
'    ** The Convection Coupling: ',/,
'    ** ',A,/,
'    ** has fluid duct elements that are part of a One-Sided or ',/,
'    ** Two-Sided Rotational Total Temperature Effects selection ',/,
'    ** where the Relative Temperature Reference Frame option is used. ',/,
'    ** This configuration is not supported with the Adiabatic Wall ',/,
'    ** Temperature for Heat Transfer Calculation option selected in ',/,
'    ** the mentioned Convection Coupling. ',/
9077
'    ** Consider flow rotation for stationary structures is ON ',/,
'    ** for the Convection Coupling: ',/,
'    ** ',A,/,
'    ** The latter overlaps a Duct Flow Boundary Condition with a swirl ',/,
'    ** input type set to Relative Temperature Difference.  ',/,
'    ** This is not supported.',/
9101
'    ** Number of nodes exceeds limits.',/
9102
'    ** Number of elements exceeds limits.',/
9103
'    ** Number of nodes exceeds limits.',/
9104
'    ** External node number',I10 ' not found for element',I10,/,
'    ** Possible mismatch between PROP Card type and element type.',/
9105
'    ** Unable to sort nodes.',/
9106
'    ** Duplicate node number',I10,' found.',/
9107
'    ** Unable to sort element definition table.',/
9108
'    ** Unable to sort element option table.',/
9109
'    ** Unable to sort element geometry table.',/
9110
'    ** Definition not found for element',I10,/
9111
'    ** Unable to sort existing element list.',/
9112
'    ** Number of material property Cards to be read',
' exceeds limits.',/
9113
'    ** Number of physical property Cards to be read',
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 ' exceeds limits.',/
9114
 '    ** Physical property Card out of limits',
 ' for element',I10,/
9115
 '    ** Number of boundary elements exceeds limit',/
9116
 '    ** Number of conductances exceeds limit.',/
9117
 '    ** Error calculating element conductances.',/
9118
 '    ** External node number', I10, ' not found.',/
9119
 '    ** Number of group lists to be read exceeds limits.',/
9120
 '    ** Number of element data to be read exceeds limits.',/
9121
 '    ** Unable to access binary file.',/
9122
 '    ** External element number', I10, ' not found.',/
9123
 '    ** Number of calculation points to be created',
 ' exceeds limits.',/,'    ** Reduce the number of elements in the model',
 ' or use the element',/,'    ** center method.',/
9124
 '    ** Internal element number', I10,
  ' out of limits.',/
9125
 '    ** Internal boundary element number', I10,
 ' out of limits.',/
9126
 '    ** Error writing conductances to MODLF file.',/
9127
 '    ** Error writing data to binary file.',/
9128
 '    ** Orthotropic material defined for',
 ' element ',I10,' has improper',/,
 '    ** directions.',/
9129
 '    ** Expansion of axisymmetric element',I10,
 ' not allowed with ',/,'    ** the element CG method.',/
9130
 '    ** Unable to open file INP2F.',/
9131
 '    ** Error reading file INP2F.',/
9132
 '    ** Internal node number', I10, ' out of limits.',/
9143
```

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'    ** Unable to write element temperature',
' coefficients for element', I10,/
9144
'    ** Duplicate element number',I10,' found.',/
9145
'    ** For element',I10,' the specified reverse side increment is',I10,/,
'    ** This conflicts with existing element number',I10,/
9146
'    ** Cannot use the density and the altitude dependent density ',/,
'    ** heat flux method in the free molecular heating simulation ',/,
'    ** object if an orbit is defined using sun/planet vectors. ',/
9147
'    ** 4D table ',I10, ' has tables with different independent variables'/
9148
'    ** 4D table ',I10, ' Can not have Element ID as independent variables'/
9149
'    ** Cannot use length dependent density table', I10 ,/,
'    ** in case of "Velocity and Density" heat flux method used ',/,
'    ** in the free molecular heating simulation object.   ',/
9301
'    ** Unable to access file tmggeom.dat.',/
9302
'    ** Unable to access file tmg49.dat.',/
9303
'    ** Unable to access file tmgrslt.dat.',/
9304
'    ** Unable to access file TEMPF or GTEMPF.',/
9310
'    ** Unable to sort element definition table.',/
9311
'    ** Unable to sort midside element definition table.',/
9312
'    ** Duplicate element label', I10, ' found.',/
9313
'    ** Element label', I10, ' not found when reading',
' boundary element list.',/
9314
'    ** Node or element label', I10, /,
'    ** not found when reading node interpolation coefficients.',/
9315
'    ** Element label', I10, ' not found when reading',
' boundary element data.',/
9316
'    ** Element label', I10, ' not found when reading',/,
'    ** boundary element connectivity list.',/
9317
'    ** Element label', I10, ' not found when reading',
' merge and elimination list',/
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9318
'    ** Element label', I10, ' not found when reading',
' conductance data.',/
9319
'    ** Unable to sort node temperature interpolation',
' coefficients.',/
9320
'    ** Maximum number of node temperature',
' interpolation coefficients reached.',/
9321
'    ** Maximum number of boundary elements in',
' connectivity list reached.',/
9322
'    ** Maximum number of conductances exceeded.',/
9323
'    ** Maximum number of interpolation Cards',
' exceeded.',/
9324
'    ** Maximum number of interpolation tables',
' exceeded.',/
9325
'    ** Maximum number of interpolation data ',
'exceeded.',/
9326
'    ** Maximum number of group list reached.',/
9330
'    ** Element label', I10, ' not found on ',
'INTERP Card.',/
9331
'    ** Element label', I10, ' not found on ',
'RENUME Card.',/
9332
'    ** Node label', I10, ' not found on RENUMN Card.',/
9333
'    ** Unable to sort interpolation list.',/
9334
'    ** Unable to sort interpolation tables.',/
9401
'    ** The overall normal of the surface ',
' selection is parallel with the user specified direction.',/,
'    ** Specify ',
' another direction or subdivide the surface.',/,
'    ** NORMAL:    ',1E13.6,1X,1E13.6,1X,1E13.6,/,
'    ** DIRECTION: ',1E13.6,1X,1E13.6,1X,1E13.6,/
9402
'    ** Number of TSTREAMs created ',I5,
' more than internal limit 9999.',/,
'    ** Cannot recreate groups to reference all TSTREAMs created.',/,
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9403
'    ** The overall normal of the surface ',
' has too small norm: ',1E13.6,/,
'    ** Try to subdivide the face on smaller ones',/,
'    ** NORMAL: ',1E13.6,1X,1E13.6,1X,1E13.6,/
9404
'    ** The void region ',I5,
' does not reference',/,
'    ** any void non-geometric element.',/
9405
'    ** The normal of the element ',I10,/,
'    ** is parallel to the direction of the radial stream.',/,
'    ** Specify ',
' another direction for radial stream or subdivide the surface.',/,
'    ** NORMAL:    ',1E13.6,1X,1E13.6,1X,1E13.6,/,
'    ** DIRECTION: ',1E13.6,1X,1E13.6,1X,1E13.6,/
9406
'    ** The direction for the stream ',I10,/,
'    ** is undefined at the point ',1E13.6,1X,1E13.6,1X,1E13.6,'.',/
9407
'    ** Void region ',I10,
' and void region ',I10,/,
'    ** belonging to thermal void load ',I10,/,
'    ** have different temperature reference frame types ',/,
'    ** (absolute and relative).',/
9408
'    ** Error processing thermal stream', I10, '.',/,
'    ** Please make sure the plane formed by the stream direction',/,
'    ** and the stream average normal passing through the stream CG',/,
'    ** intersects the stream selection.',/
9409
 A,/
9410
'    ** Negative massflow of ',E15.6,' for stream ',I10,/,
'    ** at time ',G15.6,' is encountered, while no flow reversal',/,
'    ** is defined for the stream.',/,
9411
'    ** The feature: "',A,'" is not supported for',/
'    ** Finite Element Method. Rerun your simulation with',/,
'    ** Finite Element Method disabled.',/,
9412
'    ** The feature: "',A,'" is not supported for',/
'    ** conduction only Finite Element Method (PARAM FEMCOND).',/,
'    ** Rerun your simulation with the full Finite Element',/,
'    ** Method (PARAM FEM).',/,
9413
'    ** The protective layers BC with the name:',/,
'    ** ',A,/,
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'    ** is applied on plane stress elements. This is not supported.',/,
'    ** Please change your element types or remove protective',/,
'    ** layers.',/,

9414
'    ** Cannot run Thermal Correlation feature.',/,

9601
'    ** Unable to access TMG database file',
' tmgmodel.dat.',/,'    ** Check file access privileges.',/
9602
'    ** Internal TMG error 9602.',/,
'    ** Error reading from TMG database file tmgmodel.dat.',/
9603
'    ** Error writing to TMG database file',
' tmgmodel.dat.',/,'    ** Check available disk space or file',
' access privileges.',/
9604
'    ** Internal TMG error 9604',/,
'    ** Error reading from TMG database file tmgmodel.dat.',/
9605
'    ** Internal TMG error 9605',/,
'    ** Error writing to TMG database file tmgmodel.dat.',/
9606
'    ** Internal TMG error 9606',/,
'    ** Error reading from TMG database file tmgmodel.dat.',/
9607
'    ** Internal TMG error 9607',/,
'    ** Error writing to TMG database file tmgmodel.dat.',/
9608
'    ** TMG database file tmgmodel.dat',
' is corrupted.',/,'    ** Analysis must be performed from',
' the beginning.',/
9609
'    ** TMG version is inconsistent',
' with TMG database file tmgmodel.dat.',/,'    ** Use TMG',
' version',I4,' revision',I4,' to perform analysis.',/
9611
'    ** Number of nodes in model exceeds limit',
' of',I10,/
9612
'    ** Number of elements in model exceeds limit',
' of',I10,/
9613
'    ** Number of calculation points in model exceeds',
' limit of',I8,/
9614
'    ** Number of mesh cards in model exceeds limit',
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 ' of',I8,/
9615
 '    **  Number of solar requests in model exceeds',
 ' limit of',I8,/
9616
 '    **  Number of articulation definitions in model',
 ' exceeds limit of',I8,/
9617
 '    **  Number of spinning cards in model exceeds',
 ' limit of',I8,/
9618
 '    **  Number of vector definitions in model exceeds',
 ' limit of',I8,/
9621
 '    **  Duplicate articulation definition number',
 I8,' found',/
9622
 '    **  Corresponding solar request missing for',
 ' spinning definition.',/
9623
 '    **  Start time > end time in',
 ' an articulation parameter card.',/
9624
 '    **  Limit of',I8,' layers reached for shell',
 ' element',I8,/
9750
 '    **  HEMIVIEW works only with true color mode! ',/,
 '    **  Please reset your display mode to true color.',/
9900
 '    **  Invalid GPUId. Please check the validity of GPUId ',/
 '    **  in Parallel Configuration File.',/
9901
 '    **  Device ',I0, ' is not available or not supported.',/,
 '    **  Please check the validity of GPUId in Parallel Configuration File.',/
9801
 '    **  LASERIN input for material number ',I3,' keyword ',A10,
 ' incorrect. ',/,'     Line: ',A60
9802
 '    **  No refractive index input for material number ',I3,' found',
 ' in file LASERIN.',/
9803
 '    **  No piezo-optic input for material number ',I3,' found',
 ' in file LASERIN.',/
9804
 '    **  Error or premature end of file HeatFluxDensity.csv near line',
 A60
9805
 '    **  Error reading line ',I,' of HeatFluxDensity.csv.'
```

```
9806
'    **  Error reading X coordinates in file HeatFluxDensity.csv'
9807
'    **  Error reading Y coordinate in file HeatFluxDensity.csv',/,
'        cell ',A20
9808
'    **  Error reading heat flux in file HeatFluxDensity.csv ',/,
'        in cell containing ',A20
9809
'    **  Error : wrong version of FILES : MODLF or VUFF or',/,
'        tmggeom.dat '

9950
'    **  Number of FE nodes for partitioning is less than',/,
'    **  the number of domains.',/,
'    **  Please enable less than ',I5,' processes in parallel.'
9951
'    **  Number of elements for partitioning is less than',/,
'    **  the number of domains.',/,
'    **  Please enable less than ',I5,' processes in parallel.'
```

Other messages

```
10001
 A80,//
10101
 //,20X,'Free face element generation summary',//
 'On Face ',I1,' of element',I10,' element',I10,' was generated ',A
10102
 //,10X,'Nonhomogeneous multilayer element generation summary ',//,
 'The list includes the elements generated behind the top element,',/,
 'in the order they are generated, including the reverse sides',//,
 'Element ID  List of elements generated behind it',/
10103
 I10,8X,8I10,/,(16X,8I10)
10104
 //,20X,'Details of coincident node merging',//,
 '   Old node ID New node ID',//,(2I12)
10105
 //,20X,'Multispectral Data Summary',//
 'Number of spectral bands:',I26,/,
 'Constant in Planck''s spectral energy distribution',1P,E12.5,/,
 'IR and solar spectrum separation is at ',10X,1P,E12.5,' microns',/,
 'Band limits in microns:',//,
 ('Band',I3,E12.5,'-->',E12.5)
10106
 /,20X,'Free Molecular Heating Orbital Data',//,
 ' Time    Velocity Veloc.   Veloc.   Altitude   Density  Flux',/,
 '                THETA     PHI'/
10107
  7E10.3
10108
 //,10X,'Protective Layers element generation summary ',//,
 'The list includes the elements generated above the original element,',/,
 'in the order they are generated',//,
 'Element ID  List of elements generated on top of it',/
10109
 I10,8X,8I10,/,(16X,8I10)
10110
 ' Stream ',A,' is farther to a junction than the ',
 'length of the shortest stream of the junction (stream ',A,'):',
10111
 '   - Junction: ',A,
10112
 //,20X,'List of Duct Inlet/Outlet BCs:',/
10113
 '   - Duct Inlet/Outlet: ',A,
10114
 //,20X,'List of invalid Fan/pump BC Elements:',/
```

```
10115
'   - Element: ',I0,
10116
 //,20X,'List of invalid Duct opening BC Elements:',/
10117
 'Group ',A,' contains ',I10,' element(s):',/
10118
 16X,8I10,/,(16X,8I10)
10301
 /,20X,'Edge Interface Resistance',//,
 '   Original Node         Duplicated Nodes'
10302
 I10,(20X,20(I10,1X))
10303
 /,20X,'Edge Interface Resistance',//,
 '   Original Element         Duplicated Elements'
10304
 I10,(20X,20(I10,1X))
10401
 'Circular element',I10,1X,A7,
 ' was subdivided into elements',4I10,/,(8X,9I10)
10402
 'Nearest to',I10,1X,A7,' is',I10,1X,A7,
 ' - ',A7,' overlap=',1P,E10.3
10403
 /,'Element =',I10,1P,' and Earth do not face each other at time =',E15.6
10404
 /'Element =',I10,' EarthVF      =',F7.4,
 1X,'at time =',1P,E15.6,1X,'Sub. Param =',I1,/,
 'Element =',I10, ' Albedo Factor =',0P,F7.4,
 1X,'at time =',1P,E15.6,1X,'Sub. Param =',I1,0P,/,
 'Planet block factor  =',F7.4,1X,'Albedo block factor',' =',F7.4
10405
 'Planet: Theta=',F7.2,1X,'Phi=',F7.2,1X,/,'Sun:    Theta=',F7.2,
 1X,'Phi=',F7.2,1X,'Albedo=',F5.3,1X,'H/R=',F5.2
10406
 'No shadowing elements'
10407
 'No shadowing surfaces'
10408
 'Shadowing elements used in calculations',6I10,/,(8X,9I10)
10409
 'Shadowing surfaces used in calculations             ',3I8,/,(7X,9I8)
10410
 'Possibly shadowing elements not used in calculations   ',3I10,/,(7X,9I10)
10411
 'Possibly shadowing surfaces not used in calculations   ',3I8,/,(7X,9I8)
10412
```

```
 'Element',I10,' was merged with element',I10
10413
 /'Element =',I10,7X,'SunVF=',F8.4,' does not face the sun'
10414
 'Sun: Theta=',F7.2,1X,'Phi=',F7.2,1X,'Time=',1P,E15.6
10415
 /'I=',I10,1X,'J=',I10,1X,'do not face each other'
10416
 /'I=',I10,1X,'J=',I10,1X,'estimated view',
 ' factor < Minimum=',1P,E11.4,' - not computed'
10417
 /,28X,'Shadowing surfaces report',//,
 'Number of shadowing surfaces =',I8,' created from',I10,' elements'
10418
 /'Shadowing surface            ',I6,' contains only element',I10
10419
 /'Shadowing surface            ',I6
10420
 'The surface has at least one hole in it'
10421
 'Surface CG (X,Y,Z)        ',1P,3E14.7
10422
 'Surface normal (I,J,K)     ',1P,3E14.7
10423
 'Surface area             ',1P,3E14.7
10424
 'Min and max radii from CG   ',1P,2E14.7
10425
 'Number of elements in surface  ',I10
10426
 'List of elements           ',6I10,/,(31X,6I10)
10427
 'List of perimeter nodes       ',6I10,/,(31X,6I10)
10428
 /'Solar ray trace',I10,' at time=',1P,E15.6,/
10429
 /'Heat flux view factor ray trace',I10,' at time=',1P,E15.6,/
10430
 /'Specular view factor trace',I10,' for element',I10,/
10431
 I8,' Solstr=',1P,E7.1,' IRstr=',E7.1,' X=',E11.4,' Y=',E11.4,' Z=',E11.4
10432
 'Sun',5X,' Solstr=',1P,E7.1,' IRstr=',E7.1,' X=',E11.4,' Y=',E11.4,' Z=',E11.4
10433
 'Space',3X,' Solstr=',1P,E7.1,' IRstr=',E7.1
10434
 2I10,1P,3E15.7
10435
```

```
 'Two spheres intersect, view factor may be incorrect'
10436
 /'I=',I10,1X,'Sun',6X,'SunVF=',F8.4,' at time =',
 1P,E15.6,' Earth blockage'
10437
 /,25X,'View Factor module calculation results',//
10438
 /'I=',I10,' J=',I10,' VFij=',F8.4,' VFji=',F8.4,' Ai*VFij=',1P,E11.3,
 ' Subdiv=',I2
10439
 /'I=',I10,' J=    Sun',' SunVF=',F8.4,15X,
 'Ai*SunVF=',1P,E10.3,' Subdiv=',I2
10440
 'Time=',1P,E15.6
10441
 /,'Specular reflection of ray off element',I10,' originating from the',
 ' Sun',/
10442
 /,'Specular reflection of ray off element',I10,' originating from',I10,/
10443
 /,'                    Shadowing volume report',//,
 'Parameters for generating shadowing volumes:',/,
 'Number of elements in shadowing surface to identify small surface =',I10,/,
 'Total number of shadowing surfaces which triggers shadowing ',/,48X,
 'volume generation =',I8,/,'Minimum number of shadowing surfaces per',
 ' shadowing volume       =',I8,//,
 'Number of shadowing volumes created = ',I6,/
10444
 /,'Shadowing volume       ',I8,/,
 'Volume minimum (X,Y,Z)  ',1P,3E11.4
10445
 /'Volume maximum (X,Y,Z)  ',1P,3E11.4
10446
 /,'List of shadowing surfaces completely in volume ',3I8,/,(32X,6I8)
10447
 /,'List of shadowing surfaces partially in volume ',3I8,/,(31X,6I8)
10448
 /,'Angle dependent properties associated with BRDF in array ',I4,/,
   'Inc Angle(deg)  Emiss.  BRDF-Ref  Spec-Ref  Trans.   Diff-Trans  ',
10449
 1X,E10.3,3X,F9.6,1X,F9.6,1X,F9.5,1X,F9.5,1X,F9.5
10450
 1X,'Total effective emissivity=',F9.6
10501
 /,'Results after view factor adjustment:',//,
 'Maximum view factor sum =',G12.5,' at element',I10,' ',A7,/,
 'Minimum view factor sum =',G12.5,' at element',I10,' ',A7,/
 'Unadjusted black body view factor sums',
```

```
 ' sorted according to deviation from unity',/
10502
 'Element no.',I10,' Sum =',F11.7,' Deviation =',F11.7,' ',A7
10503
 'Oppenheim element',I10,' created for element',I10
10504
 /,'View factor printout summary for selected elements',//,
 'Element i',' Element j','    Unadjusted Vfij    Adjusted Vfij '
10505
 I9,I10,F15.8,F19.8
10506
 'View factor sum',F19.8,F19.8
10507
 /,'View factors for element',I10,/
10508
 'Element',I10,' Oppenheim element:',A,',',A
10509
 'For element',I10,' Oppenheim element is:    none, reverse side is:',I10
10510
 'For element',I10,' Oppenheim element is:',I10,', reverse side is:    none'
10511
 /,'Multispectral run for band',I3,', lambda range:',1P,E9.2,
 '->',E9.2,' microns',/
10512
 /,
 'The Oppenheim element(s) for the ',I4,' IR ',
 'spectrum bands, used in radiative ',/,
 'exchange calculations, are:',//,
 '  Element  Oppenheim elements',/
10513
 I10,9I10,/,(8X,8I10)
10514
 'Oppenheim method used, new elements created with an increment of',I10
10515
 'The residual view factors are to the elements themselves.'
10516
 'KSP =',I10,' The residual view factors are to element',I10
10517
 /,20X,'Calculation data for the ',A,' Module',/,
10518
 'No radiative couplings created.'
10519
 'View factor adjustment is performed...'
10520
 /,'Enclosure no.',I5,' contains',I10,' elements'
11101
 'Element',I10,1X,A7,' was merged into element',I10,1X,A7
11102
```

```
 /,2X,'Element renumbering and radiation patching statistics for',
 ' the MEREL Module',/
 11103
 //
 '     Element generation for homogeneous multilayer elements ',
 '(bottom to top)',//
 11104
 'Element',I10,' was split into layers',5I10,/,(10I10)
 11105
 //,'Table ',I5,' was created from table ',I5,' in the INPF file.',//
 11106
 //,'Array ',I5,' was created from array ',I5,' in the INPF file.',//
 11107
 'Oppenheim element ',I5,' from this articulation time step ',
 'relabeled to ',I5
11108
 /,'Cond. vs. time table ',I6,' created for conductance number ',I10,
11109
 E12.5,3X,E12.5
11110
 /,19X,'Results of radiation patching',//
11111
 /,'Patch no',I5,' contains',I4,' elements:    ',5I10,/,(10I10)
11112
 /,12X,'Results of wavelength-dependent emissivity calculations',/
11113
 /,' Element:',I10,
 ' Band       Wavelength Range    Emissivity  Oppenheim',/,64X,
 ' Element',/
11114
 19X,I2,1P,E15.7,'->',E13.7,E10.3,I10
11115
 /,25X,'Elements With 0 Convection',//
11116
 4X,10I10,/
11117
 /,19X,'Boundary Conditions With 0 Convection',/
11118
 /,4X,A,': ',A,/,
 7X,'List of Elements With 0 Convection for this BC: '
 11201
 /' Summary for hydraulic elements',/
 11202
 1P,
 'Ambient pressure (absolute)       =',E10.3,
 /,'Ambient density                 =',E10.3,
 /,'Ambient temperature             =',E10.3,
 /,'Average density                 =',E10.3
```

```
11203
 1P,'Average viscosity               =',E10.3,
 /,'Maximum Reynolds number          =',E10.3,' at element',I10,1X,A7,
 /,'Minimum Reynolds number          =',E10.3,' at element',I10,1X,A7,
 /,'Average Reynolds number          =',E10.3
11204
 1P,'Maximum static pressure         =',E10.3,
 ' at element',I10,1X,A7,/,'Minimum static pressure          =',E10.3,
 ' at element',I10,1X,A7,/,'Maximum dynamic pressure         =',E10.3,
 ' at element',I10,1X,A7
11205
 1P,
 'Minimum dynamic pressure          =',E10.3,' at element',I10,1X,A7
11206
 ' Maximum heat balance deviation occurs',11X,'at element',I10,1X,A7
11208
 /,'Heat flows into element',I10,/,'Belongs to group: ',A,//,
 '  Labeli   Labelj  Cond no  Boundel  T(i)    T(j)  Cond val Htflowji Type',/
11209
 I10,22X,F10.2,17X,1P,E12.2,1X,A15
11210
 ' Labeli  Labelj  Res no        Pt(i)    Pt(j)   Res i-j   Massflji Type',/
11211
 I10,2I8,7X,1P,2E9.2,E10.3,E10.2,1X,A7
11212
 I10,2I8,7X,2F9.2,1P,E10.2,E10.2,1X,A15
11213
 I10,20X,'H=',1P,E10.2,' AREA(I)=',E10.2
11214
 I10,48X,1P,E13.2,1X,'Heatload'
11215
 I10,48X,1P,E13.2,1X,'Flowi'
11216
 I10,22X,F10.2,9X,1P,E10.2,E10.2,1X,'Heatsum'
11217
 I10,22X,1P,E10.2,19X,E10.2,1X,'Massum'
11218
 /,'Flow parameters summary for',A11,' element',I10,//,
 I10,1P,'  Re(Dhyd) =',E10.3,'  Rho     =',E10.3,'  Velocity =',E10.3,/,
 I10,   '  Hyd. diam=',E10.3,'  Viscosity=',E10.3,'  Area    =',E10.3
 1P,I10,'  Mass flow=',E10.3,'  Vol. Flow=',E10.3,'  Height  =',E10.3,/,
 I10,   '  Pstatic  =',E10.3,'  Pdynamic =',E10.3,'  Ptotal  =',E10.3,/,
 I10,   '  BL length=',E10.3,'  Rho-Rhoam=',E10.3,'  Mach No. =',E10.3
11219
 I10,1P,'  Length   =',E10.3,'  Ktherm   =',E10.3,'  FlowInlet=',1X,A11,/,
 I10,   '  Kloss Eq.=',E10.3,'  4*F*R*L/D=',E10.3,'  Spec. ht =',E10.3,/,
 I10,   '  dPstatic =',E10.3,'  dPdynamic=',E10.3,'  dPbuoyanc=',E10.3
 1P,I10,'  dPt-dPb  =',E10.3,'  dPtotal  =',E10.3,'  K*Ktable =',E10.3,/,
```

```
 I10,  '  Startelem=',I10,  '  End elem =',I10,  '  Nu devel.=',E10.3,/,
 I10,  '  H develop=',E10.3,'  A(start) =',E10.3,'  A(end)   =',E10.3
 1P,I10,'  Del hght =',E10.3,'  Restot   =',E10.3,'  Flow Dir.=',1X,A7,/,
 I10,  '  F Fanning=',E10.3,'  MassFloPB=',E10.3,'  MachStart=',E10.3,/,
 I10,  '  MachEnd  =',E10.3,'  TotalTemp=',E10.3,'  SoundVel =',E10.3
11220
 /'Cond no',1X,'Element A',2X,'Element B',4X,
 'T(A)',3X,'T(B)',2X,'Cond value',2X,'Heat flow',
 2X,'TYPE',/,25X,'(P(A)) (P(B))',11X,' (FLUID FLOW)',/
11223
 //,25X,'Conductance values at time = ',1PE15.6,//,3X,
 3( ' Number    Value    '),//
11224
 //,31X,'Temperature values',//,3('   Elem Name       Temp  '),/
11225
 //,31X,'Capacitance values',//,3('   Elem Name       Cap   '),/
11226
 //,31X,'Heat loads',//,      3('   Elem Name        Q   '),/
11227
 //,31X,'Total pressure values',//,
                    3('   Elem Name       Press '),/
11228
 //,31X,'Phase change temperature values ',//,
                    3('   Elem Name       Temp  '),/
11229
 //,31X,'Latent heat values',//,3('   Elem Name       Q    '),/
11230
 //,4X,'Capacitance values below phase change temperature',//,
                    3('   Elem Name       Cap   '),/
11231
 //,4X,'Capacitance values above phase change temperature',//,
                    3('   Elem Name       Cap   '),/
11232
 //,31X,'Total pressure values',//,
                    3('   Elem Name       Press '),/
11233
 //,26X,'Impressed nodal fluid flow values',//,
                    3('   Elem Name       Flow  '),/
11234
 //,31X,'Quality values',//,   3('   Elem Name       Qual  '),/
11235
 //,31X,'Mass flow through elements',//,
                    3('   Elem Name       MassFl '),/
11236
 3(I10,1P,E15.5)
11237
 3(I10,1X,A7,F11.4)
11238
```

```
 3(I10,1X,A7,1X,1P,E10.3)
11239
 3(I10,1X,A7,1X,F10.3)
11240
 3(I10,1X,A7,1X,1P,E10.3)
11241
 /,'The following describe the pressure network of the hydraulic elements',/
11242
 1P,'Element',I10,1X,'Gsum=',E10.3,1X,'Cap=',E10.3,1X,'RC=',E10.3,1X,A7,A10
11243
 1P,
 /,'RCmin          =',E11.4,' at element',I10,
 /,'RCmean          =',E11.4,
 /,'RCmax          =',E11.4,' at element',I10,
 /,'Total capacitance =',E11.4
11244
 1P,'Good approximation for radiation linearization temp.   =',
 E10.3
11245
 'Element elimination process independent of radiation linearization ',
 'temperature.'
11246
 'Minimum temperature',17X,'=',F10.3,' at element',I10,1X,A7,/,
 'Maximum temperature',17X,'=',F10.3,' at element',I10,1X,A7,/,
 'Average temperature',17X,'=',F10.3
11247
 'Boundary layer of fluid element ',I10,1X,A7,
 ' starts at element',I10,1X,A7
11248
 'Properties of fluid element    ',I10,1X,A7,' obtained'/,
 'From upstream element         ',I10,1X,A7
11249
 'Area of fluid element         ',I10,1X,A7,' obtained'/,
 'From upstream element         ',I10,1X,A7
11250
 ' '
11251
 /,' Summary for thermal elements'/
11252
 //,19X,'Analyzer module calculation results',//
11253
 //,'               Starting run no',I5,/
11254
 /,'Element  Temp    Qcond     Qrad      Qsto',
 '      Qsp     Qnode      Qsum',/
11255
 I10,F7.2,1P,6E11.3
11256
```

```
 'Total  ',F7.2,1P,6E11.3
11257
 1P,
 'Total heat content (Sum C(i)*T(i))  =',1P,E10.3
11258
 /,'Card 2A KSP is not an element, hence QSP=0'
11259
 1P,/,
 'Time=',E15.6,' Intstep=',E9.2,' RCmin=',E8.2,' at element',I10,1X,A7,//,0P,
 'Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 'Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 'Average temperature',17X,  '=',F10.3
11260
 1P,/,'No. of iterations',I6,4X,'   TDmax =',E10.3,' at element',I10,//,0P,
 'Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 'Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 'Average temperature',17X,  '=',F10.3
11261
 I10,I8,8X,I8,2F9.2,1P,E10.2,E10.2,1X,A12
11262
 I10,2I8,5X,F6.1,1X,F6.1,1P,E11.4,2X,E10.3,2X,A4
11263
 I10,'  TotalTemp=',1P,E10.3,'  SoundVel =',E10.3,'  Spec. ht =',E10.3
11264
 I10,1X,A7,' Boundary elements ',5I10,(/,15X,8I10)
11265
 /,15X,'Electrical resistance power dissipation summary'
11266
 /,
 ' Labeli Labelj               Vi      Vj    Condij   ',
 'Current  PowerDiss',/
11267
 1P,I10,21X,5E10.3
11268
 /,'At time',1P,E15.6,' total electrical power dissipation =',E11.4
11269
 /,'At iteration',I8,' total electrical power dissipation =',1P,E11.4
11270
 /,'Total current flowing into element',I10,' =',1P,E11.4
11271
 /,'Total current flowing into       ',A7,' =',1P,E11.4
11272
 'CG element',I10,' has boundary elements',5I10,/,(10I10)
11273
 I10,48X,1P,E13.2,1X,'-C*dT/dt'
11274
 I10,I8,I8,6X,2F9.2,1P,E10.2,E10.2,1X,A7
11275
```

```
 /,' Group-to-Group Heat Flow Report:',//,
 '         Temp       Q          Cap     Description',//,
 ' Groupi:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,/,
 ' Groupj:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,//,
 ' Type          Cond. value  Heat Flow ',A4,'  ScriptFij',
 '  Black Body Vfij',/
11276
 1X,A,1P,E11.4,E14.4,4X,A
11277
 56X,1P,E10.2,1X,A7,/
11278
 1X,/,'The following elements'' conductances',
 ' were modified to make the solution more',/,'robust. ',
 'If possible, modify these elements so they are less distorted.',
 /,(10I10)
11279
 1X,/,'Conductive conductance matrix of element',I10,/,
 ' Labeli  Labelj  Cond no         T(i)    T(j)  Cond val  Htflowji Type',/
11280
 I10,I8,' Equiv*',I8,2F9.2,1P,E10.2,E10.2,1X,A
11281
 /,'Power dissipation in element',I10,//,
 ' Labeli   Labelj             Vi      Vj    Condij   Current  ',
 'PowerDiss',/
11282
 1P,I10,I8,13X,5E10.3
11283
 /,'Total power dissipation in element',I10,' is ',1P,E11.4,/
11284
 /,'Thermostat summary',/
11285
 /,'Thermostat number',I16,/,'Sensor element',I19,A8,/,'Number of heater',1P,
 ' elements',I10,/,'Number of times turned ON',I8,/,'Cut-in temperature',
 E24.4,/,'Cut-out temperature',E23.4,/,'Total time heaters are ON',E17.4,/,
 'Duty cycle',E32.4,'%'/,'Avg. power of heaters when ON',E13.4,/,
 'Heater element list',6X,6I10,/,(25X,6I10)
11286
 /,'Heat flows into element',I10,/,'Connected to fluid element',I10,
 /,'Belongs to group: ',A,//,
 ' Labeli Labelj Cond no  Boundel  T(i)    T(j)  Cond val  Htflowji Type',/
11287
 /,25X,'Temperature summary for groups',//,
 '      Maximum    at   Minimum    at   Average     Total ',
 2(5X,'Total'),/,
 10X,    'Temp  element  Temp   element  Temp     Heat in  ',
 'Capacitance   Mass',/
11288
 ' Group: ',A,/,7X,F8.2,I8,F8.2,I8,F8.2,1X,1P,E10.2,2X,2E10.2
```

```
11289
 /,'Note: Orientation of hydraulic element',I10,' was reversed internally.',
 /,'The reversed orientation is shown above.'
11290
 ' Approx. ScriptFij=',F4.2,2F9.2,1P,E10.2,E10.2,1X,A,/
11291
 /,17X,'Conductance Values at time=',1P,E15.6,//,
 ' Type       Labeli Labelj     Value      Cond    Conductance ',/,
 '                                 No      Parameter',/
11292
 A13,2I8,1P,E15.7,I9,E15.7
11293
 /,'Peltier cooler',I6,' summary:',/,1P,
 /,'Geometrical factor:    ',E11.4,
 /,'Seebeck constant:      ',E11.4,
 /,'Current:               ',E11.4,
 /,'Electrical Resistivity: ',E11.4,
 /,'Voltage:               ',E11.4,
 /,'Number of thermocouples:',1X,I10,
 /,'Hot group:             ',1X,A7,
 /,'Cold group:            ',1X,A7,
 /,'Thot:                  ',E11.4,
 /,'Tcold:                 ',E11.4,
 /,'Qhot, after leakage:   ',E11.4,
 /,'Epower:                ',E11.4,
 /,'Qcold, after leakage:  ',E11.4,
 /,'Thermal conductivity:  ',E11.4,/
11294
 /,' Group-to-Group Heat Flow Report:',//,
 '       Temp      Description',/,
 ' Groupi:',G9.2,A,/,
 ' Groupj:',G9.2,A,//,
 ' Type          Cond. value  Heat Flow i->j'
11295
 1P,' Heat flow into sinks             =',E10.3,
 /,' Heat flow from non-fluid sinks    =',E10.3,
 /,' Heat load into elements           =',E10.3,
 /,' Heat load into sinks              =',E10.3,
 /,' Heat flow from fluid sinks        =',E10.3,
 /,' Deviation from heat balance       =',E10.3,//
11296
 /,' Group-to-Group Heat Flow Report At Time:',1P,E15.6,0P,//,
 '          Temp      Q          Cap       Description',//,
 ' Groupi:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,/,
 ' Groupj:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,//,
 ' Type          Cond. value  Heat Flow ',A4,'  ScriptFij',
 '  Black Body Vfij',/
11297
```

```
 48X,'Black Body VFij=',F7.2
11298
 /,30X,'Elements created by TMG',/
 'TMG element',I10,A
11299
 /,16X,'Association of boundary elements and CG elements',/
11300
 /,'Heat Flow Summary Into Different Sink Entities:',/,
 '      Sink Entity                ',
 'Temperature    Heat in  Heat absorbed',/
 '                                 ',
 '                 since start '
11301
 A40,3X,1P,E11.4,2E12.4
 11302
 1X,/,' The following elements have Reynolds Numbers either below',1P,E11.4,/,
 ' or above',E11.4,/,(10I8)
 11303
 /,'Peltier cooler',I6,' summary:',/,1P,
 /,'Geometrical factor:                ',E11.4,
 /,'Seebeck constant:                  ',E11.4,
 /,'Current:                        ',E11.4,
 /,'Electrical Resistivity:              ',E11.4,
 /,'Voltage:                        ',E11.4,
 /,'Thermal conductivity:                ',E11.4,
 /,'Number of thermocouples:                ',I11,/,
 /,'Hot plate group:                   ',1X,A7,
 /,'Cold plate group:                  ',1X,A7,
 /,'Thot:                         ',E11.4,
 /,'Tcold:                         ',E11.4,
 /,'Peltier effect at Thot:              ',E11.4
 /,'Peltier effect at Tcold:             ',E11.4
 /,'Ohmic losses:                      ',E11.4,
 /,'Hot to cold conduction heat flow:          ',E11.4,/,
 /,'Energy Balance:',
 /,'Qhot (The net heat flow to the environment)',
 /,'  =(PeltierHot + 1/2 Ohmic - Hot2Cold Cond.Flow):  ',E11.4,
 /,'Qcold (The net heat sucked at the cold plate)',
 /,'  =(PeltierCold + 1/2 Ohmic + Hot2Cold Cond.Flow): ',E11.4,/
 11304
 /,'Thermostat number',I16,' ',A,
 /,'Sensor element',I19,A8,
 /,'Number of heater',1P,' elements',I10,
 /,'Number of times turned ON',I8,
 /,'Cut-in temperature',E24.4,
 /,'Cut-out temperature',E23.4,
 /,'Total time heaters are ON',E17.4,
 /,'Duty cycle',E32.4,'%'
```

```
 /,'Avg. power of heaters when ON',E13.4,
 /,'Heater element list',6X,6I10,
 /,(25X,6I10)
11305
 'Thermostat ',I6,' ',A,' is ',A
11306
 /,
 'Note * : An Equiv conductance is not part of the solution matrix, it ',/,
 '       represents an equivalent conductive conductance between two ',/,
 '       adjacent elements. It is calculated by dividing the conductive',/,
 '       heat flow between the two elements through their common boundary',/,
 '       element by the temperature difference of their CG''s. The',/,
 '       element''s conductance matrix is shown below.'
11307
 1P,/,
 'Time=',G15.6,' Integration timestep=',G15.6,/,0P,
 'Cpu time in ANALYZER module=',G11.4,//,
 'Minimum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 'Maximum temperature',17X,  '=',F10.3,' at element',I10,1X,A7,/,
 'Average temperature',17X,  '=',F10.3
11308
 1P,' Heat flow into sinks             =',D22.15,
 /,' Heat flow from non-fluid sinks     =',D22.15,
 /,' Heat load into elements           =',D22.15,
 /,' Heat load into sinks             =',D22.15,
 /,' Heat flow from fluid sinks        =',D22.15,
 /,' Deviation from heat balance       =',D22.15,//
11309
 I10,48X,1P,E13.2,1X,'Multispectr'
11310
 /,' Group-to-Group Heat Flow Report:',//,
 '         Temp       Q          Cap     Description',//,
 ' Groupi:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,/,
 ' Groupj:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,//,
 ' Type           Cond. value  Heat Flow ',A4,'  ScriptFij',/
11311
 /,' Group-to-Group Heat Flow Report At Time:',1P,E15.6,0P,//,
 '         Temp       Q          Cap      Description',//,
 ' Groupi:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,/,
 ' Groupj:',F9.2,1P,E13.4,1X,E13.4,4X,A,0P,//,
 ' Type           Cond. value  Heat Flow ',A4,'  ScriptFij',/
11312
 I10,48X,1P,E13.2,1X,'Radsolve'
11313
 /,'Thermostat number',I16,' ',A,
 /,'Sensor element',I19,A8,
 /,'Number of heater',1P,' elements',I8,
 /,'Number of times turned ON (last period)',I8,
```

```
 /,'Cut-in temperature',E24.4,
 /,'Cut-out temperature',E23.4,
 /,'Total time heaters are ON (last period)',E17.4,
 /,'Duty cycle (last period)',E32.4,'%'
 /,'Avg. power of heaters when ON (last period)',E13.4,
 /,'Heater element list',6X,6I8,
 /,(25X,6I8)
11314
 /,'Heat flows into immersed element',I10,
 /,'Belongs to group: ',A,//,
 ' Labeli Labelj Cond no  Boundel  T(i)    T(j)  Cond val  Htflowji Type',/
11315
 /,'Convecting areas of Convecting Zone BCs (ID, area, name):'
11316
 /,'Convecting areas of Thermal Void Region BCs (ID, area, name):'
11317
 /,'Convecting areas of Thermal Stream BCs (ID, area, name):'
11318
 I10,E15.6,' ',A
11319
 /,'Last period is from time=',1P,E14.7,' to time=',1P,E14.7
11320
 /,'Hydraulic Subnetwork: ', I0,/,
 'No.     Element ID',/,
 '----------------------------'
11321
 '[', I4, '] ',I12
11322
 /,'Hydraulic Branching Junctions',/,
 'No.    0D Element ID     Node ID',/,
 '---------------------------------'
11323
 '[', I4, '] ',1X,I12,2X,I12
 11324
 /,10X,'-----------------------------------------------------',/
 ,24X,'Thermal Correlation Sensors',/
 ,20X,'-----------------------------------',/
  ,4X,'Sensor Name        Temperature Difference        Temperature'
11325
 /20X,'-----------------------------------',/
 /,10X,'-----------------------------------------------------',/
11326
 5X,A20,5X,E11.4,15X,E11.4
11327
 /,10X,'-----------------------------------------------------',/
 ,14X,'Thermal Correlation Sensors at Time ', F15.6, /
 ,20X,'-----------------------------------',/
 ,4X,'Sensor Name        Temperature Difference        Temperature'
```

```
11601
 /19X,'Orbital position calculations',/
11602
 /,'Vehicle orbit coordinate system is planet oriented '
11603
 /,'Vehicle orbit coordinate system is sun oriented '
11604
 'Albedo: ',6X,1F15.3,/,'Solar declination :',F10.3
11605
 'Periapsis angle :',F12.3
11606
 'Orbit inclination : ',F9.3,/,
 'Orbit eccentricity :',F9.3
11607
 'Semimajor axis ratio :',F7.3,/,
 'Angle from local noon to',/,'orbit ascending node:',F8.3,/,
 'Orbit period  :',F14.3
11608
 'Number of subintervals :',I5
11609
 'Initial time  :',1E15.6,/,
 'Initial Theta :',F15.3,/,
 'Final Theta   :',7X,1F8.3
11610
 'Rotation order is:',8X,A3
11611
 'Rotation angles X, Y, Z: ',17X,3F8.3
11612
 'Rotation angle increments for one orbit:  ',3F8.3
11613
 /,'Rotation angles with time are: ',/,1X
11614
 /,'Sun angles',/,1X
11615
 'Thetas=',F8.3,' Phis=',F8.3,' Time=',1P,E15.6,0P,' at orbit theta=',F8.3
11616
 /,'Planet angles',/,1X
11617
 'Hr ratio=',F6.3,' Thetae=',F8.3,' Phie=',F8.3,' Time=',1P,E15.6
11618
 /,24X,'Element elimination information',/
11619
 'Element',I10,1X,A7,1P,' Cap=',E9.2,' RC=',E9.2,' Gsum=',E9.2
11620
 'Element',I10,1X,A7,1P,' Cap=',E9.2,' RC=',E9.2,' Gsum=',E9.2
11621
 'Name assignment report',/,
 'Name    First element   Last element   Increment'
```

```
 11622
  A7,4X,I8,7X,I6,4X,I5
 11623
  'Beta - angle between orbit plane and sun vector (degrees):',F8.3
 11624
  /,'     Element assignment list for cubic space elements',/
 11625
  A7,1X,9I8,/,(10I8)
 11626
  /,'Element',I10,' was transformed into the reverse side of element',I10
 11627
  //,16X,'List of surface coated elements',/
 11628
  'Element',I10,' was coated with:',6I10,/,(32X,6I10)
 11629
  //,10X,'MAT Cards created from combining OPTICAL and MAT Cards',//,
  'New MAT Card   Old MAT Card  Front OPTICAL Card Reverse OPTICAL Card'/
 11630
   I8,I16,I16,I20
 11631
   A
 11632
  '               Card 9 PARAMS Cards',/
 11633
  'STREAM ',I10,': ',A,' creates ',I10,' elements',/
 11634
  10(I10,1X)
 11635
  'VOID ',I10,': ',A,' creates element',I10,/
 11636
  'The following 1D fluid flow elements were created ',/,
  'for the following Stream BC''s: ',/
 11637
  'The following void elements were created for the following void BC''s: ',/
 11638
  'The following fluid flow elements were created ',/,
  'for the following Convecting Zone BC''s: ',/
 11639
  'CONVECTING ZONE ',I10,': ',A,' creates ',I10,' elements',/
 11640
  /'The following ',I3,' MAT Card conversion(s) enabled:',/
11641
  5X,'- MAT Card ',I3,' converts to MAT Card ',I3,' when ',A4,' > ',F8.3/
 11801
  24X,'Echo of input data'
 11802
  //,'Element ',I10/,I1
 11803
```

```
 1P,'Node',I10,8X,'X=',E11.4,3X,'Y=',E11.4,3X,'Z=',E11.4
11804
 /,1P,
  'Surface normal is X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4,
 /,'C.G. is at       X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4,
 /,'El. center is at  X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4
 /,1P,/,'Area             =',  E11.4,
 /,'Infrared emissivity=',E11.4,/,
  'Solar absorptivity =',E11.4
11805
 /,1P,
  'Unit axis vector  X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4,
 /,'C.G. is at       X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4,
 /,'El. center is at  X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4
 /,'Area            =',1P,E11.4,
 /,'Infrared emissivity=',E11.4,
 /,'Solar absorptivity =',E11.4
11806
 1P,'Solar transmissivity',E11.4
11807
 1P,'Cond.','*','Thickness',4X,'=',E11.4
11808
 1P,'Cond','*','X-section area=',E11.4
11809
 1P,'Cap. per unit area',1X,'=',E11.4
11810
 1P,'Cap. per unit lngth=',E11.4
11811
 1P,'Capacitance       =',E11.4
11812
 1P,'Area factor       =',E11.4,/,
 'Diameter         =',E11.4
11813
 1P,'Capacitance       =',E11.4
11814
 1P,'Length          =',E11.4
11815
 1P,'Spec. reflectivity =',E11.4
11816
 /,1P,
 /,'C.G. is at       X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4,
 /,'El. center is at  X=',E11.4,1X,'  Y=',E11.4,1X,'  Z=',E11.4
 /,1P,
  'Volume          =',  E11.4,
 /,'Thermal cond.     =',E11.4,
 /,'Specific heat     =',E11.4,
 /,'Capacitance       =',E11.4
11817
```

```
 'This is a circular element'
11818
 /,'Calculating model terms for articulation time step ',I8,/
11819
 'Patch',I6,':',I3,' elements merged to',I10,', list:',4I10
 (10I10)
11820
 /,'Summary of patch creation for view factor calculations:',/
11821
 /,'Rotation angles',/,1X
11822
 'Rotation angle=',F8.3,' Time=',1P,E15.6,
12801
 /, 1P, 'CONDN found non-zero net mass flow into the solid element.'
12802
 1P,'Element:',I10, ' net mass flow: ', 1E12.5
13401
 /, 1P,'Hemiview found inactive faces that are seen by other elements.'
13402
 1P,'See group: ',A22, ' in groups.unv.'
13403
 1P,'Emitter element and the inactive face it sees: '
13404
 1P,'Element:', I10, ' sees rev. side of:',I10
13405
 'Interface Elements : ',/,
  10(I10,1X)
14001
 '    ** MP ERROR ',I5,
 '    ** Invalid MP input file.'
14002
 '    ** MP ERROR ',I5,
 '    ** The parallel configuration path should not be relative.'
14003
 '    ** MP ERROR ',I5,
 '    ** The input file name ',A512,
 '    ** exceeds ',I3,' characters.'
14004
 '    ** MP ERROR ',I5,
 '    ** Could not process input file ',A128
14005
 '    ** MP ERROR ',I5,
 '    ** Did not find <MP section>.'
14006
 '    ** MP ERROR ',I5,
 '    ** Duplicate solver name ',A128
14007
 '    ** MP ERROR ',I5,
```

```
 '    ** Invalid solver information ',A128
14008
 '    ** MP ERROR ',I5,
 '    ** Undefined solver ',A128
14009
 '    ** MP ERROR ',I5,
 '    ** Invalid coupling mode.'
14010
 '    ** MP ERROR ',I5,
 '    ** Invalid value for maximum iteration number.'
14011
 '    ** MP ERROR ',I5,
 '    ** Invalid entry for continue on fail behavior.'
14012
 '    ** MP ERROR ',I5,
 '    ** Invalid step type.'
14013
 '    ** MP ERROR ',I5,
 '    ** Invalid step case label.'
14014
 '    ** MP ERROR ',I5,
 '    ** Invalid step end times.'
14015
 '    ** MP ERROR ',I5,
 '    ** Invalid entry for dynamics type.'
14016
 '    ** MP ERROR ',I5,
 '    ** Invalid times definition.'
14017
 '    ** MP ERROR ',I5,
 '    ** Invalid mesh tolerance.'
14018
 '    ** MP ERROR ',I5,
 '    ** No solvers specified.'
14019
 '    ** MP ERROR ',I5,
 '    ** Identical ports specified.'
14020
 '    ** MP ERROR ',I5,
 '    ** Invalid external solver for ',A128
14021
 '    ** MP ERROR ',I5,
 '    ** Could not find an external solver for ',A128
14022
 '    ** MP ERROR ',I5,
 '    ** Unable to select verification solver ',A128
14023
 '    ** MP ERROR ',I5,
```

```
 '   ** Incorrect number of solvers for scenario ',A128
14024
 '   ** MP ERROR ',I5,
 '   ** Incorrect solvers for scenario ',A128
14025
 '   ** MP ERROR ',I5,
 '   ** Build solver interfaces failed.'
14026
 '   ** MP ERROR ',I5,
 '   ** Startup failed - solver ',A128
14027
 '   ** MP ERROR ',I5,
 '   ** Inconsistent API version - solver ',A128
14028
 '   ** MP ERROR ',I5,
 '   ** Cannot load external solver connection dll.'
14029
 '   ** MP ERROR ',I5,
 '   ** ',A128
 '   ** failed.'
14030
 '   ** MP ERROR ',I5,
 '   ** Solver ',A128
 '   ** has aborted due to errors.'
14031
 '   ** MP ERROR ',I5,
 '   ** Solver ',A128
 '   ** used in a <cfdcoupl> plugin is not part of the coupling.'
14032
 '   ** MP ERROR ',I5,
 '   ** Invalid solver used in a <cfdcoupl> plugin.'
14033
 '   ** MP ERROR ',I5,
 '   ** Solver ',A128
 '   ** used in an external solver BC is not part of the coupling.'
14034
 '   ** MP ERROR ',I5,
 '   ** Invalid solver used in a <cfdcoupl> plugin or in an external'
 '   ** solver BC.'
14035
 '   ** MP ERROR ',I5,
 '   ** MP solution steps are incompatible with TMG solution steps.'
14036
 '   ** MP ERROR ',I5,
 '   ** Received ',A128
 '   ** timestep failed.'
14037
 '   ** MP ERROR ',I5,
```

```
'    ** Coupling time should not be <structural>,'
'    ** no structural solver present.'
14038
'    ** MP ERROR ',I5,
'    ** Coupling time should not be <smallest>,'
'    ** no structural solver present.'
14039
'    ** MP ERROR ',I5,
'    ** Unsupported coupling mode.'
14040
'    ** MP ERROR ',I5,
'    ** MP convergence not achieved, aborting ...'
14041
'    ** MP ERROR ',I5,
'    ** The solver ',A128
'    ** failed to solve, aborting ...'
14042
'    ** MP ERROR ',I5,
'    ** Failed to map ',A128
'    ** from ',A128
'    ** to ',A128
14043
'    ** MP ERROR ',I5,
'    ** Found two case-solvers ',I10,' and'
'    ** ',I10,'.'
14044
'    ** MP ERROR ',I5,
'    ** Mismatch in cases definition: no cases received at run time.'
14045
'    ** MP ERROR ',I5,
'    ** Invalid case label received at run time.'
14046
'    ** MP ERROR ',I5,
'    ** Invalid case label ',I10
'    ** is specified in the user files.'
14047
'    ** MP ERROR ',I5,
'    ** Invalid solution type in solver ',A128
14048
'    ** MP ERROR ',I5,
'    ** Orientation mismatch for ',A128
'    ** and ',A128
14049
'    ** MP ERROR ',I5,
'    ** Origin mismatch for ',A128
'    ** and ',A128
14050
'    ** MP ERROR ',I5,
```

```
'    ** Invalid case label specified in solution step ',I10,'.'
14051
'    ** MP ERROR ',I5,
'    ** Points used for alignment are located along a line - '
'    ** (almost) collinear.'
14052
'    ** MP ERROR ',I5,
'    ** Model alignment using three points method failed.'
14053
'    ** MP ERROR ',I5,
'    ** Dll name is incorrect, solver ',A128
14054
'    ** MP ERROR ',I5,
'    ** Could not load dll, solver ',A128
14055
'    ** MP ERROR ',I5,
'    ** API callbacks verification failed, solver ',A128
14056
'    ** MP ERROR ',I5,
'    ** Invalid nodes received, solver ',A128
14057
'    ** MP ERROR ',I5,
'    ** Duplicate elements found, solver ',A128
14058
'    ** MP ERROR ',I5,
'    ** Profile is not found for dummy solver ',A128
14059
'    ** MP ERROR ',I5,
'    ** Invalid mesh file for dummy solver ',A128
14060
'    ** MP ERROR ',I5,
'    ** Solver name is not specified.'
14061
'    ** MP ERROR ',I5,
'    ** Solver application name is invalid, solver ',A128
14062
'    ** MP ERROR ',I5,
'    ** Solver application type is invalid, solver ',A128
14063
'    ** MP ERROR ',I5,
'    ** Could not evaluate total memory.'
14064
'    ** MP ERROR ',I5,
'    ** Solution type is not specified, solver ',A128
14065
'    ** MP ERROR ',I5,
'    ** Invalid entry for continue on fail behavior, solver ',A128
14066
```

```
'    ** MP ERROR ',I5,
'    ** Input file is invalid, solver ',A128
14067
'    ** MP ERROR ',I5,
'    ** Invalid entry for output mode, solver ',A128
14068
'    ** MP ERROR ',I5,
'    ** Invalid entry for initial conditions, solver ',A128
14069
'    ** MP ERROR ',I5,
'    ** Invalid entry for dilate to scale flag, solver ',A128
14070
'    ** MP ERROR ',I5,
'    ** Invalid port, solver ',A128
14071
'    ** MP ERROR ',I5,
'    ** No active variable has valid convergence criteria, solver ',A128
14072
'    ** MP ERROR ',I5,
'    ** Two variables have the same name in the solver.'
'    ** Variables: ',A128
'    ** Solver:    ',A128
14075
'    ** MP ERROR ',I5,
'    ** Invalid solver installation name, solver Nastran.'
14076
'    ** MP ERROR ',I5,
'    ** Invalid solver installation version, solver Nastran.'
14077
'    ** MP ERROR ',I5,
'    ** Invalid solver version.'
14078
'    ** MP ERROR ',I5,
'    ** Invalid entry for variable ',A128
14079
'    ** MP ERROR ',I5,
'    ** Invalid variable, name is not specified.'
14080
'    ** MP ERROR ',I5,
'    ** Invalid data location type for ',A128
14081
'    ** MP ERROR ',I5,
'    ** Invalid dimension for ',A128
14082
'    ** MP ERROR ',I5,
'    ** Invalid convergence criteria for ',A128
14083
'    ** MP ERROR ',I5,
```

```
'    ** Invalid convergence norm for ',A128
14084
'    ** MP ERROR ',I5,
'    ** Invalid damping coefficient for ',A128
14085
'    ** MP ERROR ',I5,
'    ** Meshes are not similar enough.'
14086
'    ** MP ERROR ',I5,
'    ** Mapping to faces with no nodal identical is not implemented.'
14087
'    ** MP ERROR ',I5,
'    ** Duplicated element is ignored.'
'    ** Label:  ',I10
'    ** Solver: ',A128
14088
'    ** MP ERROR ',I5,
'    ** Unsupported element types.'
14089
'    ** MP ERROR ',I5,
'    ** Unsupported element convention.'
14090
'    ** MP ERROR ',I5,
'    ** Sending buffered data failed.'
14501
'    ** MP WARNING ',I5,
'    ** Specified run directory is invalid and will be reset.'
14502
'    ** MP WARNING ',I5,
'    ** The log file specification is invalid.'
14503
'    ** MP WARNING ',I5,
'    ** A potential file conflict for the following persistent'
'    ** extensions: ',A128
14504
'    ** MP WARNING ',I5,
'    ** Invalid entry: ',A128,': ',A128
14505
'    ** MP WARNING ',I5,
'    ** Invalid entry: ',A128
14506
'    ** MP WARNING ',I5,
'    ** Invalid header for input file.'
14507
'    ** MP WARNING ',I5,
'    ** Could not open dump file ',A128
14508
'    ** MP WARNING ',I5,
```

```
'    ** Mesh similarity check disabled.'
14509
'    ** MP WARNING ',I5,
'    ** The pair'
'    ** variable: ',A128
'    ** solver:   ',A128
'    ** is not compatible with this coupling type and has been removed.'
14510
'    ** MP WARNING ',I5,
'    ** Inactive'
'    ** variable: ',A128
'    ** solver:   ',A128
14511
'    ** MP WARNING ',I5,
'    ** Unable to receive solver messages.'
14512
'    ** MP WARNING ',I5,
'    ** MP convergence is not achieved, continue ...'
14513
'    ** MP WARNING ',I5,
'    ** The solver ',A128
'    ** failed to solve the problem.'
'    ** It is highly unlikely that the solver will continue properly.'
'    ** Please consult the output files to diagnose the problem.'
14514
'    ** MP WARNING ',I5,
'    ** Not enough arguments for [-verify] option.'
14515
'    ** MP WARNING ',I5,
'    ** Not enough arguments for [-verify solver] option.'
14516
'    ** MP WARNING ',I5,
'    ** Unsupported option'
'    ** ['
'    ** -verify ',A128
'    ** ]'
14517
'    ** MP WARNING ',I5,
'    ** Input file name is missing for [-if] option.'
14518
'    ** MP WARNING ',I5,
'    ** Log file name is missing for [-lg] option.'
14519
'    ** MP WARNING ',I5,
'    ** Run directory name is missing for [-rd] option.'
14520
'    ** MP WARNING ',I5,
'    ** Testing option is not specified.'
```

```
14521
 '   ** MP WARNING ',I5,
 '   ** Testing mode is not specified.'
14522
 '   ** MP WARNING ',I5,
 '   ** Invalid testing mode.'
14523
 '   ** MP WARNING ',I5,
 '   ** Solver name is missing for [-dummy] option.'
14524
 '   ** MP WARNING ',I5,
 '   ** User-specified cases are ignored.'
14525
 '   ** MP WARNING ',I5,
 '   ** No case-solver - user flag [cases ALL] is ignored.'
14526
 '   ** MP WARNING ',I5,
 '   ** NXThermal solver alignment points ',I1,' and ',I1
 '   ** are too close to each other.'
14527
 '   ** MP WARNING ',I5,
 '   ** External solver alignment points ',I1,' and ',I1
 '   ** are too close to each other.'
14528
 '   ** MP WARNING ',I5,
 '   ** Alignment point sets for NXThermal and External solvers'
 '   ** are not similar.'
14529
 '   ** MP WARNING ',I5,
 '   ** Number of solver messages exceeded the limit.'
 '   ** Solver ',A128
14530
 '   ** MP WARNING ',I5,
 '   ** Invalid memory limit (resetting to default).'
 '   ** Solver ',A128
14533
 '   ** MP WARNING ',I5,
 '   ** Attempt to run on a non-heterogeneous platform.'
 '   ** Solver ',A128
14534
 '   ** MP WARNING ',I5,
 '   ** Solver architecture is not specified, local hosting is assumed.'
14535
 '   ** MP WARNING ',I5,
 '   ** Non-similar zones ',A512
14536
 '   ** MP WARNING ',I5,
 '   ** Invalid time profile ',A512
```

```
14537
 '   ** MP WARNING ',I5,
 '   ** A Thermal Deactivation Set is specified in a '
 '   ** Multiphysics solution.'
 '   ** Make sure a Structural Deactivation Set, that'
 '   ** includes the thermal deactivation set selection,'
 '   ** is specified in the solution.'
15001
 '   ** Selected source zone ',A128,/,
 '   ** does not belong to the solution source map file.',/,
15002
 '   ** Cyclic zone ',A128,/,
 '   ** has an invalid number of segments.',/,
15003
 '   ** Cyclic zone ',A128,/,
 '   ** has an invalid rotation axis.',/,
15004
 '   ** Symmetry zone ',A128,/,
 '   ** used for mapping contains non-axisymmetric meshes.',/,
15005
 '   ** Symmetry zone ',A128,/,
 '   ** used for mapping contains inconsistent axisymmetric meshes with',/,
 '   ** variable axis coordinates and/or segment numbers.',/,
15006
 '   ** Symmetry zone ',A128,/,
 '   ** used for mapping contains axisymmetric meshes with unsupported',/,
 '   ** axis values.',/,
 '   ** The only supported axis are OX, OY, OZ.',/,
15007
 '   ** Symmetry zone ',A128,/,
 '   ** used for mapping contains elements that do not all belong',/,
 '   ** to a single plane containing the axis.',/,
15008
 '   ** Symmetry zone ',A128,/,
 '   ** cannot use the option <From Element> for <Axis> as',/,
 '   ** the containing FEM does not have an axisymmetric extension.',/,
15009
 '   ** Could not get coordinates of the node ',I10,'.',/,
15010
 '   ** Node ',I10,' could not be mapped -',I1,'-.',/,
15011
 '   ** Could not open results file ',A128,/,
15012
 '   ** Could not open input file <fldmap.dat>.',/,
15013
 '   ** Not all source alignment points are defined.',/,
15014
 '   ** Not all target alignment points are defined.',/,
```

```
15015
 '   ** Points used for alignment are located along a line - ',/,
 '   ** (almost) collinear.',/,
15016
 '   ** Layer specification zone(s) exist, but the source bun file',/,
 '   ** does not contain elemental temperatures.',/,
 '   ** This cannnot be handled.',/,
15017
 '   ** The <Append Results> function is enabled, but the current',/,
 '   ** output times are different from those in the file to append to.',/,
15018
 '   ** Target zone ',A128,/,
 '   ** intersects target zone ',A128,/,
 '   ** One example of a common node is ',I10,/,
15019
 '   ** There are transient gradient zones defined in the solution,',/,
 '   ** but the source bun file does not contain nodal results.',/,
 '   ** This is not supported.',/,
15020
 '   ** The <Append Results> function is enabled, but the current',/,
 '   ** target model is different from the one in the file to append to.',/,
15021
 '   ** Mapper input data are not valid.',/,
15022
 '   ** Invalid Source Model: it does not seem to have a mesh.',/,
 '   ** Check the <Source Model Results File> and its corresponding',/,
 '   ** input xml file.',/,
15023
 '   ** The mapping geometry source file tmggeom.dat does not exist.',/,
 '   ** Make sure that the following mapping source files',/,
 '   ** 1) tmggeom.dat, 2) INPF, 3) TEMPF or WATERDENSF',/,
 '   ** are present in the mapping source directory: ',A128,/,
15024
 '   ** The mapping data source file INPF does not exist.',/,
 '   ** Make sure that the following mapping source files',/,
 '   ** 1) tmggeom.dat, 2) INPF, 3) TEMPF or WATERDENSF',/,
 '   ** are present in the mapping source directory: ',A128,/,
15025
 '   ** The mapping temperature (or water density) source file',/,
 '   ** TEMPF (or WATERDENSF) does not exist.',/,
 '   ** Make sure that the following mapping source files',/,
 '   ** 1) tmggeom.dat, 2) INPF, 3) TEMPF or WATERDENSF',/,
 '   ** are present in the mapping source directory: ',A128,/,
15026
 '   ** Symmetry zone ',A128,/,
 '   ** Some axi target nodes are not in the symmetry plane.',/,
15027
 '   ** More than one Source Model Mapping simulation object detected',/,
```

```
'    ** in solution. Only one Source Model Mapping simulation object',/,
'    ** per solution is supported. Please review solution accordingly.',/,

15028
'    ** Element ',I10,' found in mapping target set selection',/,
'    ** has unsupported type ',I6,'.',/,

15501
'    ** Could not associate cyclic zone ',A128,/,
'    ** to ',A128,/,
15502
'    ** Cyclic zone ',A128,/,
'    ** has no eligible elements.',/,
15503
'    ** Detected a target node that belongs to a shell element',/,
'    ** as well as to a non-shell element.',/,
15504
'    ** Could not associate thermal zone ',A128,/,
'    ** to ',A128,/,
15505
'    ** Could not associate flow zone ',A128,/,
'    ** to ',A128,/,
15506
'    ** Thermal zone ',A128,/,
'    ** has no eligible elements.',/,
15507
'    ** Flow zone ',A128,/,
'    ** has no eligible elements.',/,
15508
'    ** Symmetry zone ',A128,/,
'    ** used for mapping overrides the axis',/,
'    ** defined as FEM axisymmetric extension.',/,
15509
'    ** Symmetry zone ',A128,/,
'    ** used for mapping contains axisymmetric',/,
'    ** meshes that have been overriden.',/,
15510
'    ** Could not associate symmetry zone ',A128,/,
'    ** to ',A128,/,
15511
'    ** Symmetry zone ',A128,/,
'    ** has no eligible elements.',/,
15512
'    ** Unable to determine the thickness for',/,
'    ** the gradient pair (',I10,',',I10,').',/,
15513
'    ** Could not associate transverse grad zone ',A128,/,
'    ** to ',A128,/,
```

```
15514
 '   ** Transverse grad zone ',A128,/,
 '   ** has no eligible elements.',/,
15515
 '   ** Output is requested for structural solver(s) that',/,
 '   ** expect temperature gradient results on nodes.',/,
 '   ** The transverse grad target zone ',A128,/,
 '   ** only contains elements.',/,
 '   ** No nodal values will be mapped for this zone.',/,
15516
 '   ** Output is requested for structural solver(s) that',/,
 '   ** expect temperature gradient results on elements.',/,
 '   ** The transverse grad target zone ',A128,/,
 '   ** only contains nodes.',/,
 '   ** No elemental values will be mapped for this zone.',/,
15517
 '   ** Unsupported element type ',A128,/,
15518
 '   ** Unsupported node card.',/,
15519
 '   ** Unsupported element card.',/,
15520
 '   ** Hydraulic element found.',/,
15521
 '   ** Field data are not available at time ',E12.6,'.',/,
15522
 '   ** Unsupported unit system.',/,
15523
 '   ** Source model contains non-axisymmetric meshes.',/,
 '   ** Regular mapping will be applied.',/,
15524
 '   ** Source model contains inconsistent axisymmetric meshes with',/,
 '   ** variable axis coordinates and/or segment numbers.',/,
 '   ** Regular mapping will be applied.',/,
15525
 '   ** Source model contains axisymmetric meshes with unsupported',/,
 '   ** axis values.',/,
 '   ** The only supported axis are OX, OY, OZ.',/,
 '   ** Regular mapping will be applied.',/,
15526
 '   ** Source model contains elements that do not all belong',/,
 '   ** to a single plane containing the axis.',/,
 '   ** Regular mapping will be applied.',/,
15527
 '   ** Source model does not have an axisymmetric extension.',/,
 '   ** Regular mapping will be applied.',/,
15528
 '   ** No results of the requested type are found.',/,
```

```
15529
 '   ** Source alignment points MAP',I1,' and MAP',I1,/,
 '   ** are too close to each other.',/,
15530
 '   ** Target alignment points MAP',I1,' and MAP',I1,/,
 '   ** are too close to each other.',/,
15531
 '   ** Source and target alignment point sets are not similar.',/,
15532
 '   ** The bun file to append to already contains results',/,
 '   ** for the some of the nodes. Those results will be ovewritten',/,
 '   ** by the new mapping results.',/,
 '   ** Here are some of those nodes:',
15533
 '   ** Transverse gradient values are currently not supported',/,
 '   ** with TMG input files and have been omitted from',/,
 '   ** the <*.gtempf> and <*.tempf> files.',/,
15534
 '   ** Transient output times are not specified.',/,
 '   ** Mapping will be done at all printout times.',/,
15535
 '   ** Source data are not available at time ',E12.6,'.',/,
15536
 '   ** The requested output time ',E12.6,' is outside the range',/,
 '   ** of the source file.',/,
 '   ** The closest source time data were used for mapping.',/,
15537
 '   ** Field data are not available at the exact time ',E12.6,'.',/,
 '   ** Instead using the data at time ',E12.6,'.',/,
15538
 '   ** Unsupported parameter ',A128,/,
15539
 '   ** Unsupported parameter ',A128,/,
 '   ** and value ',A128,/,
15540
 '   ** The source environment ',A128,/,
 '   ** is different from the target environment ',A128,/,
 '   ** This may lead to wrong mapping results and should be avoided.',/,
15541
 '   ** The target model contains mixed order elements.',/,
 '   ** The current value of the MIXED_ORDER_OPTION in fldmap.prm file',/,
 '   ** in the run directory is either OFF',/,
 '   ** or NO_RESULTS and therefore no',/,
 '   ** mapped temperature bun file has been created.',/,
 '   ** To create the bun file with results on all nodes, set',/,
 '   ** the MIXED_ORDER_OPTION to MIXED_ORDER.',/,
 '   ** To create the bun file with',/,
 '   ** the mixed order elements displayed as linear elements,',/,
```

```
 '   ** set the MIXED_ORDER_OPTION to LINEAR.',/,
15542
 '   ** The target model contains mixed order elements.',/,
 '   ** The current value of the MIXED_ORDER_OPTION in fldmap.prm file',/,
 '   ** in the run directory is either LINEAR or ON and therefore the',/,
 '   ** mixed order elements are represented as linear elements in the',/,
 '   ** mapped temperature bun file.',/,
 '   ** To create the bun file with results on all nodes, set the',/,
 '   ** MIXED_ORDER_OPTION to MIXED_ORDER.',/,
15543
 '   ** Invalid target model.',/,
 '   ** It does not seem to have a mesh.',/,
15544
 '   ** No results of ',A128,/,
 '   ** type are found in source file.',/,
15545
 '   ** The alignment translation based on MAP1 points would break',/,
 '   ** source model axisymmetry. To avoid this, ',/,
 '   ** no translation is done for the radial component.',/,
15548
 '   ** The <Append Results> function is enabled, but the requested',/,
 '   ** output times are different from those in the file to append to.',/,
 '   ** The results in the file to append to will be interpolated to',/,
 '   ** the requested output times.',/,
15549
 '   ** The bun file to append to already contains results',/,
 '   ** for the following nodes. Those results will be ovewritten',/,
 '   ** by the new mapping results.',
15550
 '   ** The alignment translation based on Source Model Mapping ',/,
 '   ** simulation object would break source model axisymmetry.',/,
 '   ** To avoid this, no translation is done for the radial component.',/,
15551
 '   ** For the Source Model Mapping simulation object, ',/,
 '   ** "Axis and Angle" method is selected and a non-zero angle',/,
 '   ** is defined. However, no Rotation Axis is defined. ',/,
 '   ** Rotation transformation will be ignored for this',/,
 '   ** mapping solution. Please revise the SO dialog in the UI and',/,
 '   ** define a rotation axis if Rotation transformation is desired.',/,

15552
 '   ** The mapping geometry source file tmg50.h5 does not exist.',/,
 '   ** However, the source model is of finite element type.'/'
 '   ** Make sure that the source file tmg50.h5 is present',/,
 '   ** in the mapping source directory: ',A128,/,
```

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Maya HTT Better thinking Better future®

Email
info@mayahtt.com

Tel.
+1.514.369.5706

Web
mayahtt.com

Address
1100 Atwater Avenue, Suite 3000
Westmount, QC H3Z 2Y4 Canada