```
Table a34 List of the file, usrfab.template.F.
This file is part of the STAGS software written by
the authors of STAGS (Charles Rankin, et al).
This "template", or "skeletal" version of SUBROUTINE USRFAB,
must be "fleshed out" by the STAGS user for any case in
which the wall thickness varies over the surface of the shell.
"Fleshed out" versions of SUBROUTINE USRFAB for the 360-degree
"eqellipse" model and for the 180-degree "soccerball" model
are listed in the next two tables.
SUBROUTINE USRFAB is used in connection with a "GCP" model,
that is, when NGCP = 1 in the STAGS input file, *.inp .
NOTE: From the experience gained in generating the results
for the generic case, equivellipse, (see especially Fig. 175
and the discussion associated with Fig. 175), the writer
urges future STAGS users to use USRFAB rather than WALL.
================================================================
c=deck    usrfab
c=purpose Template for user-written subroutine USRFAB
c=author  F.A. Brogan (with W.A. Loden revisions)
c=version May, 2002

#include "keydefs.h"

#if    _usage_
*
*      Calling sequence:
*
*          call USRFAB ( t,       Pa,       Pb,       iunit,
*                        ielt,   kelt,    kfab,    eltip,
*                        XYZg,   XYs,      ntvals, tvals,
*                        nlayrs, lays,     laymat, laythk,
*                        layint, layang, zeta,    ecz,
*                        ilin,   iplas )
*
*      Input Arguments
*      ===============
*      t      = Time (seconds)
*      Pa     = Load factor for system A
*      Pb     = Load factor for system B
*      iunit  = Unit number; unit = 0 specifies the entire model
*      ielt   = Local element number within the specified unit; when
*                   unit = 0, elt specifies the global elt number
*      kelt   = 1 -- Unit is a shell unit
*             = 2 -- Unit is an element unit
*      kfab   = Fabrication number assigned for this element
*      eltip  = Surface (volume) integration point number in element
*      XYZg   = Global coordinates at integration point
*      XYs    = Shell X,Y coordinates at integration point
```

```fortran
*       ntvals = Number of temperature sampling points
*       tvals  = Temperature gradient at sampling points
*       nlayrs = Number of layers in fabrication KFAB
*       lays   = Integer array for (optional) use in call to MATSET
*
*       Output Arguments
*       ================
*       laymat(j) = Material identifier for layer j
*       layint(j) = # of through-layer integration pts for layer j
*       laythk(j) = Thickness of layer j
*       layang(j) = Fabrication orientation angle of layer j
*       zeta      = Angle from wall-ref coord to fabrication coord
*       ecz       = Eccentricity in Z' dirn (Z' coord of mid surface)
*       ilin      = 0 -- Non-inear strain-displacement relations
*                 = 1 -- Linear strain-displacement relations
*       iplas     = 0 -- Elastic material properties used
*                 = 1 -- Plasticity theory enforced at all integ pts
*                 = 2 -- Plasticity theory enforced at elt centroid
*
#endif


*********************************************************************
        subroutine USRFAB ( t,       Pa,       Pb,      iunit,
     &                              ielt,    kelt,    kfab,    eltip,
     &                              XYZg,    XYs,     ntvals,  tvals,
     &                              nlayrs,  lays,    laymat,  laythk,
     &                              layint,  layang,  zeta,    ecz,
     &                              ilin,    iplas )
*********************************************************************

        _implicit_none_

        Real      t
        Real      Pa
        Real      Pb
        Integer   iunit
        Integer   ielt
        Integer   kelt
        Integer   kfab
        Integer   eltip
        Real      XYZg(3)
        Real      XYs(2)
        Integer   nlayrs
        Integer   ntvals
        Real      tvals(ntvals)
        Integer   lays(nlayrs)
        Integer   laymat(nlayrs)
        Real      laythk(nlayrs)
```

```fortran
      Integer   layint(nlayrs)
      Real      layang(nlayrs)
      Real      zeta
      Real      ecz
      Integer   ilin
      Integer   iplas

#include "mater1.h"
#include "mater2.h"
#include "mater3.h"
#include "mater4.h"
Cinclude "mater5.m"
Cinclude "mater6.m"
Cinclude "mater7.m"
#include "mater8.h"
#include "mater9.h"
#include "mater10.h"
#include "stndcm.h"

      Logical   debug
      Logical   NTITLE

*     ====================
*     MATERIAL TYPE CODES:
*     ====================
*
*     Code   Items   Description
*     ----   -----   -----------
*      1       7     Linear elastic isotropic material
*      2      18     Linear elastic orthotropic material
*      3      54     Mechanical sub-layer plasticity material
*      4      44     Linear elastic orthotropic brittle material
*      5      12     Shape-memory-alloy material
*      6      54     Plane-strain material
*      7      36     PDCOMP/PDLAM property material
*      8      40     Abaqus umat material
*      9      10     Membrane wrinkling material
*     10      19     Nonlinear elastic orthotropic material

      debug = .false.
      if (NTITLE('X_UsrFab')) debug = .true.

      write (not,1000)
1000  format (//'ERROR: Subroutine USRFAB has not been provided.' )

      STOP

      end
```

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