```
ic_geo_new_family GEOM
ic_boco_set_part_color GEOM
ic_empty_tetin
#----------------Set Variables----------------------------------
set R 35.0; set TW 2.0; set PITCH 8.0; set THETA 75.0; set n 7
set CL 0.5; set H 5.0;
set R1IN 30.0; set R2IN 38.0; set R1OUT 30.0; set R2OUT 38.0
set INEXTN 20.0; set INSTEP1 5.0; set INSTEP2 10.0
set OUTEXTN 20.0; set OUTSTEP1 5.0; set OUTSTEP2 10.0
#---------------Set DERIVED Variables---------------------------
set dt [expr {$H/tan($THETA*3.1415/180.0)}]
set BT [expr {$PITCH-2.0*$H/tan($THETA*3.1415/180.0)-$TW}]
#-----------------------------------------------------------------
ic_point {} GEOM p1 0,$R,0
ic_point {} GEOM p2 p1+vector(0,$CL,0)
ic_point {} GEOM p3 p2+vector(0,$H,0)
ic_point {} GEOM p4 p3+vector($TW,0,0)
ic_curve  points GEOM c1  {p1 p2}
ic_curve  points GEOM c2  {p2 p3}
ic_curve  points GEOM c3  {p3 p4}

set j 5
for {set i 1} {$i <= $n} {incr i}  {
ic_point {} GEOM p$j p[expr {$j-1}]+vector($dt,-$H,0)
ic_curve points GEOM c[expr {$j-1}] "p$j p[expr {$j-1}]"
ic_point {} GEOM p[expr {$j+1}] p$j+vector(0,-$CL,0)
ic_curve points GEOM c$j "p$j p[expr {$j+1}]"
ic_point {} GEOM p[expr {$j+2}] p[expr {$j+1}]+vector($TW,0,0)
ic_curve points GEOM c[expr {$j+1}] "p[expr {$j+1}] p[expr {$j+2}]"
ic_point {} GEOM p[expr {$j+3}] p[expr {$j+2}]+vector(0,$CL,0)
ic_curve points GEOM c[expr {$j+2}] "p[expr {$j+3}] p[expr {$j+2}]"
ic_point {} GEOM p[expr {$j+4}] p[expr {$j+3}]+vector($dt,$H,0)
ic_curve points GEOM c[expr {$j+3}] "p[expr {$j+3}] p[expr {$j+4}]"
ic_point {} GEOM p[expr {$j+5}] p[expr {$j+4}]+vector($BT,0,0)
ic_curve points GEOM c[expr {$j+4}] "p[expr {$j+4}] p[expr {$j+5}]"
set j [expr {$j + 6}]
                                }
# j = 5 + 6*n(=8) = 53
set z [expr {$j-1}]
ic_point {} GEOM p$j p[expr {$j-1}]+vector(0,-$H,0)
ic_point {} GEOM p[expr {$j+1}] p$j+vector(0,-$CL,0)

set j 1
set p 1
for {set i 1} {$i < $n} {incr i}        {
ic_curve points GEOM ct$i "p[expr {$j+4}] p[expr {$j+7}]"
ic_curve points GEOM cv$p "p[expr {$j+6}] p[expr {$j+11}]"
ic_curve points GEOM cv[expr {$p+1}] "p[expr {$j+7}] p[expr {$j+10}]"
set j [expr {$j+6}]
set p [expr {$p+2}]
                                                                }
ic_curve points GEOM ct$n "p[expr {$j+4}] p[expr {$j+7}]"
ic_curve points GEOM cv[expr {$n*2-1}] "p[expr {$j+7}] p[expr {$j+10}]"
ic_curve points GEOM cv[expr {$n*2}] "p[expr {$j+6}] p[expr {$j+11}]"
ic_curve points GEOM c[expr {$j+9}] "p[expr {$j+9}] p[expr {$j+10}]"
```

```
ic_curve points GEOM c[expr {$j+10}] "p[expr {$j+10}] p[expr {$j+11}]"

ic_curve  points GEOM cc  {p5 p2}
ic_curve  points GEOM c0  {p6 p1}
ic_surface 2-4crvs SEAL s01 {0.001 {c0 c1 cc c5}}
ic_surface 2-4crvs SEAL s02 {0.001 {c2 c3 c4 cc}}

set j 1
set k 1
for {set i 1} {$i < $n} {incr i}        {
ic_surface 4pts SEAL s$k "p[expr {$j+4}] p[expr {$j+5}] p[expr {$j+6}] p[expr {$j+7}]"
ic_surface 4pts SEAL s[expr {$k+1}] "p[expr {$j+7}] p[expr {$j+8}] p[expr {$j+9}] p[expr {$j+10}]"
ic_surface 4pts SEAL s[expr {$k+2}] "p[expr {$j+6}] p[expr {$j+7}] p[expr {$j+10}] p[expr {$j+11}]"
set j [expr {$j+6}]
set k [expr {$k+3}]
                                                                }
# puts stdout $j
# j = 1+n*6 = 43 at the end of the above "FOR" loop
ic_surface 4pts SEAL s[expr {$k-2}] "p[expr {$j+4}] p[expr {$j+5}] p[expr {$j+6}] p[expr {$j+7}]"
ic_surface 4pts SEAL s[expr {$k-1}] "p[expr {$j+6}] p[expr {$j+7}] p[expr {$j+10}] p[expr {$j+11}]"
ic_surface 4pts SEAL s$k "p[expr {$j+7}] p[expr {$j+8}] p[expr {$j+9}] p[expr {$j+10}]"

#-------------Create INLET and OUTLET extension geometry
if {$INSTEP2 > $INSTEP1} {
ic_point {} SEAL v0 p2+vector(-$INSTEP1,0,0)
ic_point {} SEAL v1 p1+vector(-$INSTEP1,0,0)
ic_point {} SEAL v2 v1+vector(0,-[expr {$R-$R1IN}],0)
ic_point {} SEAL v3 v2+vector(-[expr {$INSTEP2-$INSTEP1}],0,0)
ic_point {} SEAL v4 v3+vector(-[expr {$INEXTN-$INSTEP2}],0,0)
ic_point {} SEAL v5 v4+vector(0,[expr {$R-$R1IN}],0)
ic_point {} SEAL v6 p2+vector(-$INEXTN,0,0)
ic_point {} SEAL v7 v5+vector(0,[expr {$R2IN-$R}],0)
ic_point {} SEAL v8 v3+vector(0,[expr {$R2IN-$R1IN}],0)
ic_point {} SEAL v9 p3+vector(-$INSTEP2,0,0)
ic_point {} SEAL v10 p3+vector(-$INSTEP1,0,0)
ic_point {} SEAL v11 v8+vector([expr {$INSTEP2-$INSTEP1}],0,0)
ic_point {} SEAL v12 v11+vector($INSTEP1,0,0)
ic_point {} SEAL v13 v1+vector(-[expr {$INSTEP2-$INSTEP1}],0,0)
ic_point {} SEAL v14 v0+vector(-[expr {$INSTEP2-$INSTEP1}],0,0)
              for {set i 0} {$i < 11} {incr i} {
              ic_curve points SEAL l$i "v$i v[expr {$i+1}]"
              }
              ic_curve points SEAL la {p1 v1}
              ic_curve points SEAL lb {p2 v0}
              ic_curve points SEAL lc {v12 v11}
              ic_curve points SEAL ld {p3 v10}
              ic_curve points SEAL le {v1 v0}
              ic_curve points SEAL lf {v0 v11}
              ic_curve points SEAL lg {v1 v13}
              ic_curve points SEAL lh {v0 v14}
              ic_curve points SEAL li {v8 v11}
              ic_curve points SEAL lj {v13 v5}
              ic_curve points SEAL lk {v14 v6}
              ic_curve points SEAL ll {v3 v13}
              ic_curve points SEAL lm {v13 v14}
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            ic_curve points SEAL ln {v14 v8}
ic_surface 4pts SEAL sf1 {p1 p2 v0 v1}
ic_surface 4pts SEAL sf2 {p2 v12 v11 v0}
ic_surface 4pts SEAL sf3 {v12 p3 v10 v11}
ic_surface 4pts SEAL sf4 {v10 v9 v8 v11}
ic_surface 4pts SEAL sf5 {v8 v14 v0 v11}
ic_surface 4pts SEAL sf6 {v14 v13 v1 v0}
ic_surface 4pts SEAL sf7 {v13 v3 v2 v1}
ic_surface 4pts SEAL sf8 {v3 v13 v5 v4}
ic_surface 4pts SEAL sf9 {v13 v14 v6 v5}
ic_surface 4pts SEAL sf10 {v14 v8 v7 v6}

} elseif  {$INSTEP2 < $INSTEP1}            {
ic_point {} SEAL v0 p2+vector(-$INSTEP2,0,0)
ic_point {} SEAL v1 p1+vector(-$INSTEP2,0,0)
ic_point {} SEAL v2 p1+vector(-$INSTEP1,0,0)
                                           }

if {$OUTSTEP2 > $OUTSTEP1} {
ic_point {} SEAL v20 p[expr {$z+1}]+vector($OUTSTEP1,0,0)
ic_point {} SEAL v21 p[expr {$z+2}]+vector($OUTSTEP1,0,0)
ic_point {} SEAL v22 v21+vector(0,-[expr {$R-$R1OUT}],0)
ic_point {} SEAL v23 v22+vector([expr {$OUTSTEP2-$OUTSTEP1}],0,0)
ic_point {} SEAL v24 v23+vector([expr {$OUTEXTN-$OUTSTEP2}],0,0)
ic_point {} SEAL v25 v24+vector(0,[expr {$R-$R1OUT}],0)
ic_point {} SEAL v26 p[expr {$z+1}]+vector($OUTEXTN,0,0)
ic_point {} SEAL v27 v25+vector(0,[expr {$R2OUT-$R}],0)
ic_point {} SEAL v28 v23+vector(0,[expr {$R2OUT-$R1OUT}],0)
ic_point {} SEAL v29 p$z+vector($OUTSTEP2,0,0)
ic_point {} SEAL v30 p$z+vector($OUTSTEP1,0,0)
ic_point {} SEAL v31 v28+vector(-[expr {$OUTSTEP2-$OUTSTEP1}],0,0)
ic_point {} SEAL v32 v31+vector(-$OUTSTEP1,0,0)
ic_point {} SEAL v33 v21+vector([expr {$OUTSTEP2-$OUTSTEP1}],0,0)
ic_point {} SEAL v34 v20+vector([expr {$OUTSTEP2-$OUTSTEP1}],0,0)
            for {set i 20} {$i < 30} {incr i} {
            ic_curve points SEAL l$i "v$i v[expr {$i+1}]"
            }
            ic_curve points SEAL laa "p[expr {$z+2}] v21"
            ic_curve points SEAL lab "p[expr {$z+1}] v20"
            ic_curve points SEAL lac {v32 v31}
            ic_curve points SEAL lad "p$z v30"
            ic_curve points SEAL lae {v21 v20}
            ic_curve points SEAL laf {v20 v31}
            ic_curve points SEAL lag {v31 v30}
            ic_curve points SEAL lah {v20 v34}
            ic_curve points SEAL lai {v31 v28}
            ic_curve points SEAL laj {v33 v25}
            ic_curve points SEAL lak {v34 v26}
            ic_curve points SEAL lal {v23 v33}
            ic_curve points SEAL lam {v33 v34}
            ic_curve points SEAL lan {v34 v28}
ic_surface 4pts SEAL sff1 "p[expr {$z+1}] p[expr {$z+2}] v21 v20"
ic_surface 4pts SEAL sff2 "p[expr {$z+1}] v20 v31 v32"
ic_surface 4pts SEAL sff3 "v32 v31 v30 p$z"
ic_surface 4pts SEAL sff4 {v30 v31 v28 v29}
```

```
ic_surface 4pts SEAL sff5 {v31 v20 v34 v28}
ic_surface 4pts SEAL sff6 {v20 v21 v33 v34}
ic_surface 4pts SEAL sff7 {v21 v22 v23 v33}
ic_surface 4pts SEAL sff8 {v23 v24 v25 v33}
ic_surface 4pts SEAL sff9 {v33 v25 v26 v34}
ic_surface 4pts SEAL sff10 {v34 v26 v27 v28}
}

ic_delete_geometry curve patterns s* 0
ic_delete_geometry point patterns SEAL* 0
ic_build_topo 0.01 -angle 30 -no_concat -new_family TMP_TOPO_PART_NAME GEOM SEAL
ORFN

ic_set_meshing_params surface_global 0 mesh_type 2 mesh_method 1 simple_offset 0
bunch_respect 1 protect_line 0 bound_smooth 0 block_mapping 0.40 adjust_nodes_max 0.0
proj_surf 1 surf_sizes 0 ign_size 0.03 try_harder 1 impr_level 1 mesh_dormant 0 smooth_dormant
0 max_area 0.0 max_length 0.0 min_angle 0.0 max_nodes 0 max_elements 0 merge_surfs 1
mapped_method 1 free_bunch 0 shrinkwrap_nsmooth 5 shrinkwrap_projfactor 0.1 snorm 0
quadratic 0

set j 8
for {set i 1} {$i < $n} {incr i}        {
ic_set_meshing_params curve "c$j c[expr {$j+2}]" emax 0.3 emin 0 ehgt 0 edev 0 hrat 0 ewid 0
nlay 0
ic_set_meshing_params curve "cv[expr {$i*2-1}] cv[expr {$i*2}] c[expr {$j+1}]" emax 0.2 emin 0
ehgt 0.1 edev 0 hrat 0 ewid 0 nlay 0
set j [expr {$j+6}]
                                                        }
for {set i 1} {$i <= [expr {$n*3}]} {incr i}       {
ic_set_meshing_params surface s$i emax 0 emin 0 ehgt 0 edev 0 erat 0 ewid 0 nlay 0 etyp 2
emethod 0
                                                                                }
```