Table 47 Maximum absolute values of stresses in the optimized designs listed in Table 33 as predicted by BIGBOSOR4 (elastic, Eq.8), BOSOR5 (elastic-plastic, Eq.7), and STAGS (elastic, Eq.7). Units are psi.

	isogrid-stiffened, imperfect (segment, node, fiber)		**isogrid-stiffened, perfect, Wimp=.0001 (segment, node, fiber)**		**unstiffened, imperfect (seg.node,f)**	**unstiffened, "perfect" (seg.node,f)**
Program/Imperfection shape/ Region 1 or Region2 (See Fig. 2 for definition of Region 1 and Region 2).	maximum effective stress in skin	maximum meridional stress in isogrid	maximum effective stress in skin	maximum meridional stress in isogrid	maximum effective stress in skin	maximum effective stress in skin
BOSOR4/+mode 1/Region 1	89086 (5,8)	86190 (1,8)	101570 (4,12)	119670 (1,1)	84689 (2,1)	95914 (4,1)
BOSOR5/+mode 1/Region 1	89090 (5,8,outer)	127834 (1,9,inner)	101530 (4,12,out)	157442* (1,1,inner)	84630 (2,1,outer)	96050 (4,1,outer)
STAGS /+mode 1/Region 1	89330	126900 (1,9,inner)	100600 (4,12,out)	150510 (1,1,inner)		
BOSOR4/+mode 1/Region 2	105430 (12,1)	124760 (9,7)	121610 (11,2)	122490 (10,2)	117440 (7,13)	118290 (12,2)
BOSOR5/+mode 1/Region 2	105420 (12,1,outer)	115920 (9,7,inner)	121490 (11,2,in)	105456 (10,2,innr)	117840 (7,13,outer)	118260 (12,2,inner)
STAGS /+mode 1/Region 2	100300 (12,1,inner)	116532 (9,7,inner)	120600 (11,1,in)	105902 (10,2,innr)	115800 (7,13,outer)	116900 (12,1,inner)
BOSOR4/+mode 2/Region 1	83974 (5,1)	122550 (1,3)			116160 (1,13)	
BOSOR5/+mode 2/Region 1	83920 (5,1,outer)	157136* (1,3,inner)			116080 (1,13,outer)	
STAGS /+mode 2/Region 1	83000	176231 (1,3,inner)				
BOSOR4/+mode 2/Region 2	114380 (12,1)	123310 (12,3)			123210 (11,8)	
BOSOR5/+mode 2/Region 2	114450 (12,1,inner)	102718 (12,4,innr)			122780 (11,8,inner)	
STAGS /+mode 2/Region 2	111300 (12,1,inner)	99884 (12,4,innr)			120300 (11,8,inner)	
BOSOR4/-mode 1/Region 1	120520 (1,3)	117640 (5,13)			122840 (1,13)	
BOSOR5/-mode 1/Region 1	120560 (1,3,outer)	145544* (1,2,inner)			122450 (2,7,outer)	
STAGS /-mode 1/Region 1	116500 (1,3,outer)	138524 (1,2,inner)			122900 (2,7,outer)	
BOSOR5/-mode 1/Region 1		134918* (5,13,innr)				

STAGS /-mode 1/Region 1		128414 (5,13,innr)				
BOSOR4/-mode 1/Region 2	114310 (12,1)	121540 (12,4)			115250 (11,9)	
BOSOR5/-mode 1/Region 2	114390 (12,1,inner)	101108 (12,4,innr)			115250 (11,9,inner)	
STAGS /-mode 1/Region 2	111500 (12,1,inner)	100174 (12,4,innr)			116200 (11,9,inner)	
BOSOR4/-mode 2/Region 1	103830 (1,3)	122000 (1,2)			111300 (2,5)	
BOSOR5/-mode 2/Region 1	104210 (1,3,outer)	156492* (1,2,inner)			111360 (2,5,outer)	
STAGS /-mode 2/Region 1	100200 (1,3,outer)	179644 (1,2,inner)			111700 (2,5,outer)	
BOSOR4/-mode 2/Region 1		121910 (2,7)				
BOSOR5/-mode 2/Region 1		138782* (2,7,inner)				
STAGS /-mode 2/Region 1		136689 (2,7,inner)				
BOSOR4/-mode 2/Region 2	105050 (12,1)	124810 (10,5)			122620 (10,2)	
BOSOR5/-mode 2/Region 2	105070 (12,1,outer)	113022 (10,5,innr)			122190 (10,2,inner)	
STAGS /-mode 2/Region 2	100800 (12,1,outer)	113247 (10,5,innr)			115900 (10,2,inner)	

* some plastic flow occurs in the BOSOR5 model

Region 1: $0. < x < 17.63477$ inches; Region 2: $17.63477 < x < x(\text{equator})$, in which x = radial coordinate.

The STAGS results have (segment, node) entrees that are the same as those for the BOSOR5 results because the STAGS contour plots of stress show this approximately to be the case. The nodal point numbers do not apply literally in the case of the listings for STAGS.

BOSOR5 and STAGS agree reasonably well because in both applications the isogrid "layer" is treated as an elastic isotropic layer with smeared stiffeners and Poisson's ratio, nu = 1/3. In the BIGBOSOR4 application the same "smeared" model is used to compute the 6 x 6 constitutive matrix, C_{ij}, but the extreme fiber stress in the isogrid "layer" is calculated as if the most critical isogrid member is oriented in the meridional coordinate direction. The extreme fiber stress in that meridionally oriented member is obtained as described in Table 27 and in Eq.(8).

Where the BOSOR5 and STAGS predictions disagree the difference is caused primarily by plastic flow. The BOSOR5 results listed here account for plastic flow but the STAGS results are for elastic material.