1D Thermal Analysis of Aft Deck Panel

		check:
Area (foot^2)	1	
Temperature outer surface (F)	**1200**	1200
INCONEL		
K outer skin (btu-in/hr-ft^2-F)	103	
Thickness outer skin (inch)	0.032	
Density outer skin (lbm/in^3)	0.306	
Temperature bottom of outer skin (F)	**1199.80**	1199.8012
MIN-K 1302		
K core material (btu-in/hr-ft^2-F)	0.24	
Thickness inner core (inch)	0.375	
Density inner core (lbm/in^3)	0.0115740741	
Temperature top of bottom skin (F)	**200.00**	200.00316
AL 7050-T7651		
K inner skin (btu-in/hr-ft^2-F)	1060	
Thickness inner skin (inch)	0.032	
Density inner skin (lbm/in^3)	0.102	
Temperature bot of bottom skin (F)	**199.98**	
Weight Panel (lbm/ft^2)	**2.505064**	
Resistance, outer skin (hr-F/btu)	0.0003106796	
Resistance, core (hr-F/btu)	1.5625	
Resistance, inner skin (hr-F/btu)	3.01887E-005	
Resistance, convection (hr-F/btu)	0.125	
Resistance, total (btu/F)	1.6878408683	
Q, total (btu/hr)	639.87074865	
H*A convective coeff*Area (btu/hr-ft^2-F)	8	
Temperature, Air (F)	**120**	

1D Thermal Analysis of Aft Deck Panel

Area (foot^2)	1			
Material Thickness (inch)	0.16		foil thickness (inch)	0.004
Total Panel Thickness (inch)	1		cell hex edge dim. (inch)	0.1875
Total Width (inch)	0.5		cond. Factor	0.0568889
Total Depth (inch)	1			
Temperature outer surface (F)	**1200**			
INCONEL				
K outer skin (btu-in/hr-ft^2-F)	103	103		5.8595556
Thickness outer skin (inch)	0.16	0.16		0.5
Density outer skin (lbm/in^3)	0.306	0.306		
Width (inch)	0.42	0.08		0.5
Resistance, outer skin (hr-F/btu)	0.0036985668	0.0194175		0.1706614
Resistance, outer skin (hr-F/btu-ft^2)	0.4473786408			24.575243
Temperature bottom of outer skin (F)	**1133.76**			
MIN-K 1302				
K core material (btu-in/hr-ft^2-F)	0.24	103		0.24
Thickness inner core (inch)	0.68	0.68		0.25
Density inner core (lbm/in^3)	0.0115740741	0.306		0.0115741
Width (inch)	0.42	0.08		2.0833333
Resistance, core (hr-F/btu)	6.746031746	0.0825243		300
Temperature top of bottom skin (F)	**5596.87**			
INCONEL				
K outer skin (btu-in/hr-ft^2-F)	103	103		
Thickness outer skin (inch)	0.16	0.16		
Density outer skin (lbm/in^3)	0.306	0.306		
Width (inch)	0.42	0.08		
Resistance, inner skin (hr-F/btu)	0.0036985668	0.0194175		
Series Resistance (hr-F/btu)	6.7534288796	0.1213592		
Parallel Resistance (hr-F/btu)	0.1192168938			
Parallel Resistance (hr-F/btu-ft^2)	34.334465426			
Temperature bot of bottom skin (F)	**5530.63**			
Weight Panel (lbm/ft^2)	**15.233813333**			
Resistance, outer skin (hr-F/btu)	0.0015533981			
Resistance, core (hr-F/btu)	2.8333333333			
Resistance, inner skin (hr-F/btu)	0.0015533981			
Resistance, convection (hr-F/btu)	0.125			
Resistance, total (btu/F)	2.9614401294			
Q, total (btu/hr-ft^2)	42645.003765	2373120		
Q, total (btu/hr-ft^2)	2415765.0038			
	12.494986103	695.32416		
	707.8191461			
H*A convective coeff*Area (btu/hr-ft^2-F)	8			
Temperature, Air (F)	**200**			

1D Analysis of Aft Deck Panel:

		check:
Area (foot^2)	1	
Temperature outer surface (F)	**1200**	1200
TOP SKIN: INCONEL		
K outer skin (btu-in/hr-ft^2-F)	103	
Thickness outer skin (inch)	0.1	
Density outer skin (lbm/in^3)	0.306	
Temperature bottom of outer skin (F)	**1199.38**	1199.3815
CORE: FeCrAlY Metal Foam (5%)		
K core material (btu-in/hr-ft^2-F)	0.52	
Thickness inner core (inch)	0.75	
Density inner core (lbm/in^3)	0.013	
Temperature top of bottom skin (F)	**280.57**	280.57123
BOTTOM SKIN: TITANIUM		
K inner skin (btu-in/hr-ft^2-F)	48.6	
Thickness inner skin (inch)	0.1	
Density inner skin (lbm/in^3)	0.17	
Temperature bot of bottom skin (F)	**279.26**	
Weight Panel (lbm/ft^2)	**8.2584**	
Resistance, outer skin (hr-F/btu)	0.0009708738	
Resistance, core (hr-F/btu)	1.4423076923	
Resistance, inner skin (hr-F/btu)	0.0020576132	
Resistance, convection (hr-F/btu)	0.25	
Resistance, total (btu/F)	1.6953361793	
Q, total (btu/hr)	637.04179337	
H*A convective coeff*Area (btu/hr-ft^2-F)	4	
Temperature, Air (F)	**120**	

1D Analysis of Aft Deck Support Structure:

		check:
Area (foot^2)	1	
Temperature top of bottom skin (F)	**280.57**	280.57123
BOTTOM SKIN: TITANIUM		
K inner skin (btu-in/hr-ft^2-F)	48.6	
Thickness inner skin (inch)	0.1	
Density inner skin (lbm/in^3)	0.17	
Temperature Top Thermal Shim (F)	**279.72**	279.71845
THERMAL SHIM: THERMALATE H330		
K core material (btu-in/hr-ft^2-F)	1.85	
Thickness inner core (inch)	0.25	
Density inner core (lbm/in^3)	0.013	
Temperature bot of Thermal Shim (F)	**223.71**	223.71119
ALUMINUM SUBSTRUCTURE		
K inner skin (btu-in/hr-ft^2-F)	1060	
Thickness of Flange (inch)	0.25	
Density inner skin (lbm/in^3)	0.102	
Temperature bot of bottom skin (F)	**223.61**	
Weight Panel (lbm/ft^2)	**8.2584**	
Resistance, outer skin (hr-F/btu)	0.0020576132	
Resistance, core (hr-F/btu)	0.1351351351	
Resistance, inner skin (hr-F/btu)	0.0002358491	
Resistance, convection (hr-F/btu)	0.25	
Resistance, total (btu/F)	0.3874285974	
Q, total (btu/hr)	414.45374714	
H*A convective coeff*Area (btu/hr-ft^2-F)	4	
Temperature, Air (F)	**120**	

1D Analysis of Aft Deck Panel:

Area (foot^2)	1	check:
Temperature outer surface (F)	**1200**	
TOP EXTERNAL CORE: FeCrAlY Metal Foam (5%)		
K core material (btu-in/hr-ft^2-F)	0.52	
Thickness inner core (inch)	0.375	
Density inner core (lbm/in^3)	0.013	
Temperature bottom of outer skin (F)	**841.95**	841.95
TOP SKIN: TITANIUM		
K inner skin (btu-in/hr-ft^2-F)	48.6	
Thickness inner skin (inch)	0.1	
Density inner skin (lbm/in^3)	0.17	
Temperature bottom of outer skin (F)	**840.93**	840.93
INTERNAL CORE: FeCrAlY Metal Foam (5%)		
K core material (btu-in/hr-ft^2-F)	0.52	
Thickness inner core (inch)	0.625	
Density inner core (lbm/in^3)	0.013	
Temperature top of bottom skin (F)	**244.17**	244.17
BOTTOM SKIN: ALUMINUM		
K inner skin (btu-in/hr-ft^2-F)	1060	
Thickness inner skin (inch)	0.1	
Density inner skin (lbm/in^3)	0.102	
Temperature bot of bottom skin (F)	**244.12**	
Weight Panel (lbm/ft^2)	**5.7888**	
Resistance, outer core (hr-F/btu)	0.7211538	
Resistance, outer skin (hr-F/btu)	0.0020576	
Resistance, inner core (hr-F/btu)	1.2019231	
Resistance, inner skin (hr-F/btu)	9.43E-005	
Resistance, convection (hr-F/btu)	0.25	
Resistance, total (btu/F)	2.1752289	
Q, total (btu/hr)	496.49948	
H*A convective coeff*Area (btu/hr-ft^2-F)	4	
Temperature, Air (F)	**120**	

1D Analysis of Aft Deck Support Structure:

Area (foot^2)	1	check:
Temperature top of bottom skin (F)	**244.17**	244.17171
BOTTOM SKIN: ALUMINUM		
K inner skin (btu-in/hr-ft^2-F)	1060	
Thickness inner skin (inch)	0.1	
Density inner skin (lbm/in^3)	0.102	
Temperature Top Thermal Shim (F)	**244.14**	244.14132
THERMAL SHIM: THERMALATE H330		
K core material (btu-in/hr-ft^2-F)	1.85	
Thickness inner core (inch)	0.25	
Density inner core (lbm/in^3)	0.013	
Temperature bot of Thermal Shim (F)	**200.61**	200.60962
ALUMINUM SUBSTRUCTURE		
K inner skin (btu-in/hr-ft^2-F)	1060	
Thickness of Flange (inch)	0.25	
Density inner skin (lbm/in^3)	0.102	
Temperature bot of bottom skin (F)	**200.53**	
Weight Panel (lbm/ft^2)	**5.7888**	
Resistance, outer skin (hr-F/btu)	9.43396E-005	
Resistance, core (hr-F/btu)	0.1351351351	
Resistance, inner skin (hr-F/btu)	0.0002358491	
Resistance, convection (hr-F/btu)	0.25	
Resistance, total (btu/F)	0.3854653238	
Q, total (btu/hr)	322.13457668	
H*A convective coeff*Area (btu/hr-ft^2-F)	4	
Temperature, Air (F)	**120**	