Gas Turbine Parametric Study w/different fluid property models

Real Fluid Model (air_ha)

CR

CR

[F]

1

0.85

686.9

851.1

 η_c

1

8.0

Run 1

Run 2

. Vol₁

Vol₁

[cfm]

99292

175795

[hp]

36579

55969

HR

HR

[Btu/kw-hr]

7998

14376

 η_{th}

0.4266

0.2373

bwr

bwr

bwr

0.4532

0.6427

12			[F]		[cfm]	[hp]		[Btu/kw-hr]			
Run 1	1	1	751.2	4.018	94052	35703	0.4098	8327	0.4398		
Run 2	0.8	0.85	874.2	3.64	175491	56626	0.2388	14288	0.6468		
Air Standard Cycle (ASC) – Ideal Gas Model (air) with variable c _p											

			[F]		[cim]	[hp]		[Btu/kw-hr]	
Run 1	1	1	751.2	4.031	94269	35731	0.4095	8333	0.4403
Run 2	0.8	0.85	874	3.652	176082	56730	0.2384	14311	0.6475

Cold Air Standard Cycle (ASC) – Ideal Gas Model (air) with constant c. at T[1]

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1.2	ης	ν ₂ η _t	 3	T ₄	CR	vol ₁	s w	t T	η _{th}	s HR	9	1

4.014

Run 2	0.8	0.85	814.9	3.627	191527	59974	0.2426	14064	0.6665
									> /-

Air Standard Cycle (ASC) - Ideal Gas Model (air) with constant c. at (T[1]+T[3])/2

3.78

All Standard Cycle (ASC) — Ideal Gas Model (all) with constant c _p at (1[1]+1[3])/2											
12	1 η _c	² η _t	³ T ₄ [F]	⁴ CR ■	vol ₁ [cfm] ⊾	⁶ W _t [hp]	⁷ η _{th}	s HR [Btu/kw-hr]	9 bwr		
Run 1	1	1	729.5	4.163	94843	35525	0.4053	8418	0.437		