"Turbo"
"HW3 P2"
"Zhaoyi Jiang(.1364)"

"Velocity triangle"
cz=170[m/s]
u=280[m/s]
alpha_2=60[degree]
beta_3=-60[degree]
c2=cz/**cos**(alpha_2)
w2=((c2***sin**(alpha_2)-u)^2+(cz)^2)^0.5
beta_2=**arccos**(cz/w2)
alpha_3=-beta_2
c3=w2
w3=c2
c1=c3
w1=w3

"Degree of reaction"
R=(w3^2-w2^2)/((c2^2-c1^2)+(w3^2-w2^2))

"Work"
W=u*(cz***tan**(alpha_2)-cz***tan**(alpha_3))***convert**(m,km)

"Utilization factor"
epsilon=(c2^2-c3^2)/(c2^2-R*c3^2)

"Efficiency"
t1=1450[K]
p1=15[bar]
p3=12[bar]
h1=**enthalpy**(***Air***,***T***=t1)
h01=h1+c1^2/2***convert**(m,km)
s1=**entropy**(***Air***,***P***=p1,***T***=t1)
s1=s3ss
h3ss=**enthalpy**(***Air***,***s***=s3ss,***P***=p3)
h03ss=h3ss+c3^2/2***convert**(m,km)
eta_ts=W/(h01-h3ss)
eta_tt=W/(h01-h03ss)

SOLUTION
Unit Settings: SI K bar kJ mass deg

α_2 = 60 [Degree]	α_3 = -4.858 [degree]	β_2 = 4.858 [degree]
β_3 = -60 [Degree]	c1 = 170.6 [m/s]	c2 = 340 [m/s]
c3 = 170.6 [m/s]	cz = 170 [m/s]	ε = 0.856
η_{ts} = 0.8231	η_{tt} = 0.9555	h01 = 1590 [kj/kg]
h03ss = 1500 [kj/kg]	h1 = 1576 [kj/kg]	h3ss = 1485 [kj/kg]
p1 = 15 [bar]	p3 = 12 [bar]	R = 0.5
s1 = 6.63 [kj/kg-k]	s3ss = 6.63 [kj/kg-k]	t1 = 1450 [K]
u = 280 [m/s]	W = 86.49 [kj/kg]	w1 = 340 [m/s]
w2 = 170.6 [m/s]	w3 = 340 [m/s]	

No unit problems were detected.