"Turbo HW5"
"Zhaoyi Jiang (.1364)"
"Problem 1"

"Given"
u=250[m/s]
cz=0.6*u
R=0.65
alpha_2=55[degree]

"Normal stage"
phi=cz/u
R=1-0.5*phi*(tan(alpha_2)+tan(alpha_1))
tan(alpha_2)=(1-R+psi/2)/phi

"Velocity triangles"
tan(beta_1)=-(R+psi/2)/phi
tan(beta_2)=-(R-psi/2)/phi
w1=cz/cos(beta_1)
w2=cz/cos(beta_2)
c1=cz/cos(alpha_1)
c2=cz/cos(alpha_2)

"Work"
W=u*(w2*sin(beta_2)-w1*sin(beta_1))*convert(j,kj)

SOLUTION

Unit Settings: SI C kPa kJ mass deg

α_1 = -14.65 [degree]	α_2 = 55 [Degree]
β_1 = -62.59 [degree]	β_2 = -13.42 [degree]
c1 = 155 [m/s]	c2 = 261.5 [m/s]
cz = 150 [m/s]	ϕ = 0.6
ψ = 1.014	R = 0.65
u = 250 [m/s]	W = 63.36 [kj/kg]
w1 = 325.8 [m/s]	w2 = 154.2 [m/s]

No unit problems were detected.