



Homework-2

Student Name: _____

Grade: $\frac{\quad}{5}$

1- An annealed *Low-C Steel* strip 200 mm wide and 10 mm thick was rolled to a thickness of 0.7 cm. Its strength coefficient (K) = 530 MPa and strain hardening (n) = 0.26. The roll radius is 200 mm, and it rotates at 200 rpm.

- a- Assuming there is no friction, calculate the force (F).
- b- Calculate the total power (P).
- c- Calculate the torque (T)



2- An Aluminum 1100-O strip 9 in wide and 1 in thick is rolled to a thickness of 0.8 in. The roll radius is 12 in, and the rolls rotate at 100 rpm.

- a- Assuming there is friction, calculate the force (F).
- b- Calculate the total power (P).
- c- Calculate the torque (T)

**TABLE 2.3****Typical Values for K and n for Metals at Room Temperature**

	K (MPa)	n
Aluminum		
1100-O	180	0.20
2024-T4	690	0.16
6061-O	205	0.20
6061-T6	410	0.05
7075-O	400	0.17
Brass		
70-30, annealed	900	0.49
85-15, cold-rolled	580	0.34
Cobalt-base alloy, heat-treated	2,070	0.50
Copper, annealed	315	0.54
Steel		
Low-C, annealed	530	0.26
4135, annealed	1,015	0.17
4135, cold-rolled	1,100	0.14
4340, annealed	640	0.15
304 stainless, annealed	1,275	0.45
410 stainless, annealed	960	0.10

TABLE 1 | Typical Values for K and n for Metals at Room Temperature