Mechanical Engineering Department

Tutorials-2— Coupling

B E Mechanical SEM IV 181902-Machine Design and Industrial Drafting Year 2016

1	A rigid coupling is used to connect a 45 kW, 1440 rpm electric motor to a centrifugal pump. The starting torque is 225% of rated torque. There are 8 bolts and their pitch circle diameter is 150 mm. the bolts are made of steel 45C8 (S_{yt} = 380 N/mm^2) and factor of safety is 2.5. Determine the diameter of bolt. Assume S_{sy}= 0.577S_{yt}. The bolts are assumed to be finger tight in reamed and ground holes.
2	Design a cast iron protected type flange coupling to connect two shafts of 36 mm diameter transmitting 15 KW at 720 rpm. The overload capacity is 1.25 times the average torque. The bolts and keys are made of C20 steel and flanges are made of FG 200.
3	Design a flexible coupling to connect two shafts which transmit 10 kW at 700 rpm. Material for shaft and key is C40, bolt is 35Mn2 and flange FG250.
4	Design a bush pin type flexible coupling for connecting motor shaft to pump transmitting 40 kW power at 1000 rpm. Diameter of motor shaft is 50 mm and diameter of pump shaft is 45 mm.
5	Design a clamp coupling for transmitting 36 kW at 200 rpm. Allowable shear stress in shear is 45 MPa. Allowable shear stress in key is 40 MPa, and allowable crushing stress in key is 90 MPa. The number of bolts joining the two halves is 4. The permissible tensile stress in bolts is 60 MPa. The coefficient of friction between muff and shaft is 0.25.

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