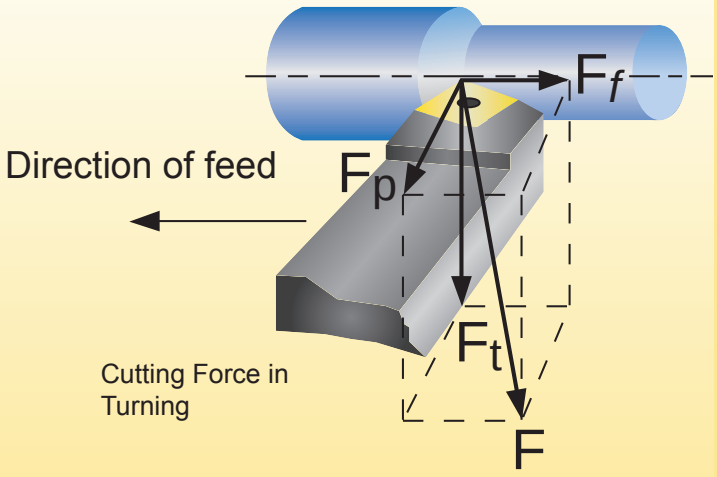
для размещения заказа - kennametal@kennametal.su

STELLRAM

Calculations of Cutting Forces



* The specific cutting force (kc) is constant for each material. It is unique for each material and it refers to the material machinability. See catalog page C196.

Calculations of Power

The availability for the power calculation for the material removal is particularly important for roughing, so it is necessary to verify if the machine's power is enough for the application.

The parameters for the power calculation are v_c and F_c.

The machine efficiency ŋ, is also a factor to be considered referring to the energy loss because of the drive and the motor efficiency. This value is between 0,7-0,9 depending on the machine.

Terminology

The main force **F** can be split into 3 different forces:

F_t(N)= Tangential force, downward and usually the largest

F_f (N)= Axial force or feed force, toward the longitudinal axis of the workpiece

F_p (N)= Radial force on the perpendicular of the centre line of the workpiece

Formula

Values F_f and F_p are affected by the approach angle, the cutting depth and the nose radius of the tool. The following formula can be used for the tangential cutting force:

$$Fc = Kc \times a_r \times f$$

in which:
Kc = Specific cutting force(N/mm2)*
a_r = Cutting depth (mm)
f = Feed (mm/rev)

Formula

The formula for the net cutting power calculation is:

$$P = \frac{Vc \times F_C}{\eta \times 60 \times 1000} \quad (KW)$$

$$\text{Where } F_C = a_p \times f \times K_C$$

$$\text{then } P = \frac{Vc \times a_p \times f \times K_C}{\eta \times 60 \times 1000} \quad (KW)$$

KW to HP conversion: 1 KW = 1.34102209 hp

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