Quality Parameters of Gears

**Tooth Thickness**

- **$S_t$**
  - Tooth thickness deviation
  - The tooth thickness $S_t$ results from the difference between the actual and nominal tooth thickness.

**Profile**

- **$f_{Ha}$**
  - Profile slope deviation
  - The profile slope deviation $f_{Ha}$ is derived from the deviation of the actual slope of the involute of a tooth flank and the nominal slope without influence of the form deviations.

- **$f_{Fa}$**
  - Profile form deviation
  - The profile form deviation $f_{Fa}$ is derived from the deviation of the actual to the nominal form without the angular influence.

- **$p_a$**
  - Total profile deviation
  - The total profile deviation $p_a$ is derived from the superposition of the profile slope deviation and the profile form deviation.

**Lead**

- **$f_{Hp}$**
  - Helix slope deviation
  - The helix slope deviation $f_{Hp}$ is derived from the deviation of the actual trace of a lead to the nominal slope deviation without influence of form.

- **$f_{Hp}$**
  - Helix form deviation
  - The helix form deviation $f_{Hp}$ is derived from the deviation of the actual to the nominal form without the angular influence.

- **$p_p$**
  - Total helix deviation
  - The total helix deviation $p_p$ is derived from the superposition of the helix slope deviation and the helix form deviation.

**Pitch**

- **$f_p$**
  - Single pitch error
  - The single pitch error $f_p$ is derived from the deviation of the actual transverse pitch and the nominal position of a single transverse pitch, separately evaluated for the left and right flank.

- **$p_p$**
  - Total pitch error
  - The total pitch error $p_p$ results from continuous addition of the single pitch errors for left and right flanks.

**Runout**

- **$p_r$**
  - Runout error
  - The runout error $p_r$ of a gearing is the radial position deviation of a stylus tip (ball) which is successively placed in all tooth gaps in such a manner that simultaneous contact is made with both the left and right flanks of each tooth gap at the center of the profile.

- **$R_{fr}$**
  - Runout measurement
  - Mostly evaluated out of the pitch measurement.

**Helix Corrections**

- **$C_{ha}$**
  - Profile angle modification
  - The profile angle modification $C_{ha}$ is an intended angular deviation from the nominal pressure angle.

- **$C_{hb}$**
  - Helix crown height
  - Helix crown height $C_{hb}$ is an intended deviation of the theoretical tooth flank form in the direction of the face width, so that the actual lead is curved towards the inside of the tooth.

- **$R_{fh}$**
  - Profile twist
  - Profile twist $R_{fh}$ describes the range of the profile twist.

- **$R_{hb}$**
  - Helix twist
  - Helix twist $R_{hb}$ describes the range of the helix twist.

**End Relief**

- **$C_{ba}$**
  - Tip and root relief
  - Tip relief $C_{ba}$ and root relief $C_{ba}$ are an intended additional removal of material in profile direction at the tip and/or root area.

- **$C_{nb}$**
  - End relief reference side
  - The amount of end relief on the reference side $C_{nb}$ and the amount of end relief on the non-reference side $C_{ba}$ are specified as reduction of tooth thickness at the reference side and/or non-reference side of the tooth flank.

- **$C_{hb}$**
  - End relief non-reference side
  - Mostly evaluated out of the pitch measurement.

**Profile Crown Height**

- **$C_{ca}$**
  - Profile crown height
  - Profile crown height $C_{ca}$ is an intentional deviation of the theoretical form in the direction of the profile, so that the actual profile is curved towards the inside of the tooth.

- **$C_{cb}$**
  - Helix crown height
  - Due to targeted corrections, production influences or heat treat distortion, teeth can have a twist.

- **$R_{pp}$**
  - Profile twist
  - $R_{pp}$ describes the range of the profile twist.

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