Title (en)

ROLLER GROUP

Title (de)

WALZENGRUPPE

Title (fr)

GROUPE DE CYLINDRES

Publication

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Application

EP 99939959 A 19990628

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Abstract (en)

[origin: DE19828722A1] One roller, in a group of calender rollers, is a hard cast roller body or shells as a reference roller, with a central drilling to give a wall thickness of 100-300 mm. The roller has a specified natural bending action. One roller, in a group of calender rollers, is a hard cast roller body or shells as a reference roller, with a central drilling to give a wall thickness of 100-300 mm. The roller has a natural bending action (fref) of 0.1-0.2 mm/m of roller length through gravity and with support at the end bearings. The drilling through the other roller bodies has a diameter which takes into account its gravity force (G) at the web length (L) and its mean elasticity module (E) to give equal bending (f) values at all the rollers to meet the equation: drilling diameter = (D<4>-G * KG (f * E))<1/4>. G is the gravity force of the roller body (N) at the web length (L), E is the elasticity module (N/m<2>), D is the outer roller body diameter (ins), f is the applied bending (m) generally equal to fref, and KG is a group constant (m3) to meet the equation: KG = (5/(6 * pi) * L<3> * (1+2, 4 * (LM-L)/L+2 * Dref/L)<2>). L is the web length of the roller group (m), LM is the mean bearing interval in the roller group, Drefis the diameter of the reference roller (m). The roller body carries peripheral drillings, for the passage of a liquid or condensing gas heating/cooling medium structured to meet the equation: drilling diameter = (D<4> - Zp* Dp<2> * (Dp<2>+2 * Tp<2>) - G * KG(f* E))<1/4>. Zp is the number of peripheral drillings, Dp the diameter of the peripheral drillings, Tp is the arc of the peripheral drilling circle (m). The rollers are fitted with an elastic mantle cladding, with a thickness of 10-30 mm. The roller bodies without journals, which are not reference rollers, have a weight G at the web length (L) to satisfy the equation: G = Gref E * J * f/(Eref * Jref * fref) Gref is the weight force of the reference roller body (N) without journals at the web length (L), Eref is the elasticity module of the reference roller body (N/m<2>), Jref is the moment of inertia of the cross section of the reference roller body (m<4>), fref is the bending of the reference roller (m), E is the elasticity module (N/m<2>), J is the moment of inertia of the roller cross-section (m<4>), f is the applied bending (m). The body of the reference roller can be a different material from a hard casting or hard cast shells, such as forged steel. Rollers of a hard polymer can be used which, when in a new condition, have the same bending as hard cast roller at low temps. and have the same wear as the max. allowed for hard cast rollers at high operating temps. All the rollers, or separate rollers, have a displacement body in the center drilling, with a space to allow the heat carrier medium to flow between the body and the drilling wall. All the rollers have the same outer diameter, and the weight of at least one roller is reduced by additional drillings through it near the neutral line of the roller wall. The center and/or peripheral drillings are filled wholly or partially by a ballast, such as water or a granular material. An Independent claim is included for the production of a calender roller. Preferred Features: The maximum diameter of the center drilling takes into account the max. permissible change into an oval roller shape. To set the common bending action of rollers of a hard cast material or shells, the resulting moment of inertia of the roller cross section is adjusted by reducing the outer diameter within the conventional finishing tolerance of 1%. Initially, the mean elasticity module is established for the roller body during its production where the bending is through its own weight or through at least one external force by measurement or through the inherent frequency. The outer diameter is shaped within the conventional finishing tolerance of 1%, and the diameter of the center drilling is established and set according to the local elasticity modules. To determine the roller bending during subsequent working, the vol. of the heating medium is measured at the peripheral drillings or the central drilling, to be controlled and taken into account. The roller is wholly or partially filled with a ballast after the roller production, and adjusted. The rollers are dimensioned so that they do not have to be operated close to the semi-critical rotary speed, to prevent oscillations in the separate roller groups.

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