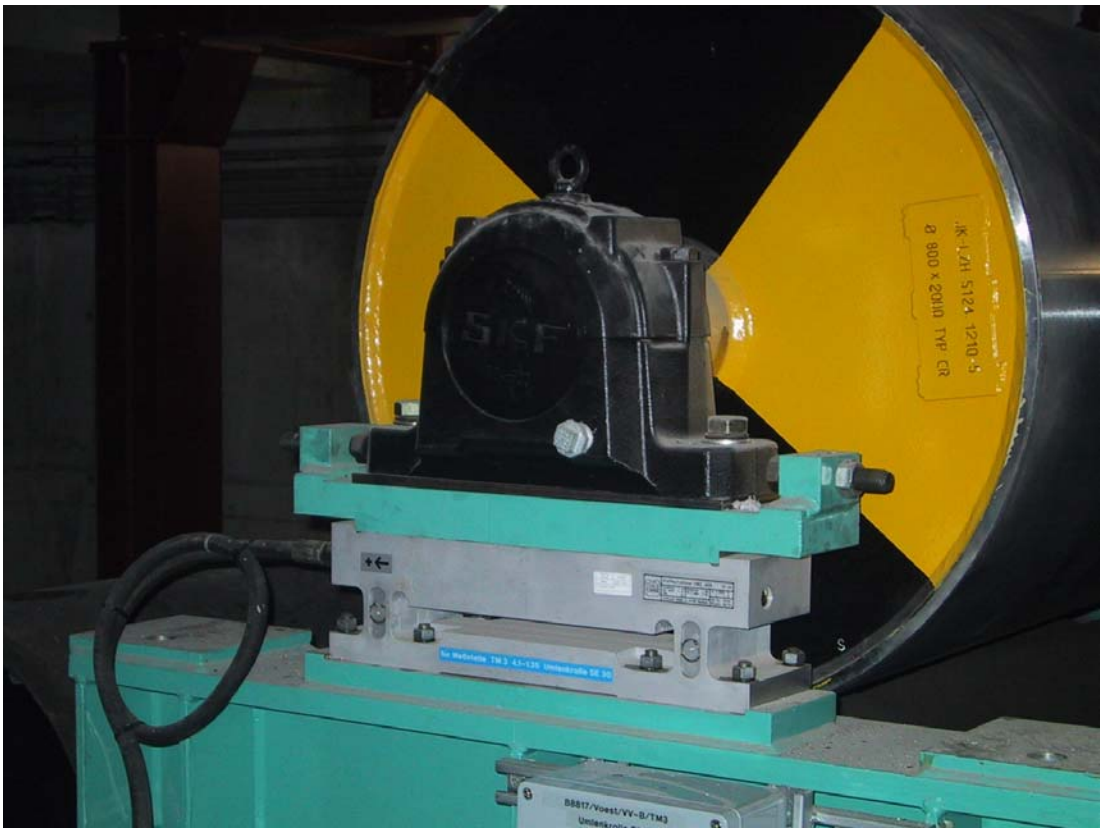
Band Tension Device BZA
Survey



Purpose
Measuring of band tension in production and further treatment, indication, output for controlling

Operation
Band tension F is measured indirectly by the force L imposed by band to one bearing of the deflection pulley twisted with contact arc 2 α. Neglecting the deformation work we have:

$$L = F \sin \alpha.$$

Forces are measured by band tension transdu-cers in strain gauge technics (see page 2 and data sheets E 37.1…4) mounted between bea-ring and machine frame combined with analo-gous or digital electronics(data sh. E 37.5).

Advantages
- Band tension transducers in strain gauge technics: faster reaction than other models
- Very robust and corrosion-protected
- Well temperature-compensated
- Many different models suitable for nearly all usual machine constructions
- Internal CAL-resistance facilitates initiation and moreover servicing
- Flexible and reliable electronics
- Experience by several hunderts approved devices

Application
Rolling mills for metallic band, plastics band, folies. Continous heat-treating furnaces. Devi-ces for tinning or coating. Paper making machines.

Transducers BZA
We produce the following models (see page 2):
- **HBZ** for horizontal measuring direction or for direction parallel to the mounting base of pillow block (data sheet E 37.1)
- **VBZ, VBZP** for vertical measuring direction or for direction vertical to the mounting base of pillow block (data sheet E 37.2)
- **SBZ, UBZ** f. cylindric bearings, small forces (data sheet E 37.3)
- **HVBZ** biaxial for horizontal **and** vertical force direction at pillow blocks (data sheet E 37.4) esp. for pulleys with variable arc of contact, e.g. near the coiler
- **Special models**, e.g.f.heat-treating furnaces.

The BZA (except SBZ, UBZ) contain upper and base plates connected by measuring areas and perhaps additional beams. Measuring areas operate by bending for small, by shearing for large force. Often BZA are produced out of **one** piece of metal, esp. for large force and over-load. The materials are high-strength alumi-nium or special steel.

Dr. Brandt GmbH
Rombacher Hütte 9
D-44795 Bochum
T.+49-234-94393-0

Selecting Transducers

(Numbers) are data sheets

For designing band tension devices we need:

- Working and maximal value of band tension
- Thickness and width of band
- Angle of band inducing and running out
- Arc of contact
- Tare and dimensions of deflection pulley
- Construction of machine frame
- Data needed for controlling

With these data designing the band tension device is possible, e.g. by a discussion between the designer and our advising engineer. There are several solutions; we try to find the best of them. We describe some examples:

Small resulting bearing force up to 5000 N
At vertical measuring direction **SBZ**, at anyone direction **UBZ** are suitable (data sheet E 37.3).

Narrow band
Often measuring of only one bearing force is sufficient. Both forces measured we need the sum only. Devices with 1 or 2 transducers and 1 amplifier we call **BZA-1**.

Broad band
Both bearing forces are to be measured. We need 2 transducers, 2 amplifiers: **BZA-2**. Mostly sum and difference of forces is generated, the last for controlling straight running.

Thick band
allows small arc of contact only. Commonly band will run nearly horizontal resulting force being nearly vertical. Suitable are **VBZ** (E 37.2) with horizontal base, see drawing 1, or **HBZ** (E 37.1) with vertical base, drawing 2. Machi-ne engineers prefer VBZ, but the costs are somewhat higher than HBZ. Measuring includes tare in both cases.

Thin band with 90° arc of contact
mostly runs horizontal/vertical. Suitable are **HBZ**(E 37.1) base mounted to 45°, drawing 6. Resulting force is 1.41 x band tension. Measuring includes 0.7 x tare. Machine engineers prefer construction as drawing 5, HBZ measuring horizontal component = band tension, without influence of tare.

Thin band, 180° arc of contact, vert. running
Suitable are horizontal mounted **VBZ** (E 37.2), see drawing 7, measuring 2 x band tension. Or it is possible to take vertical mounted **HBZ** (E 37.1). Tare is measured with in both cases.

Thin band, 180° arc of contact, hor. running
Suitable are horizontal mounted **HBZ** (E 37.1), see drawing 3, measuring 2 x band tension. Tare has none influence. Otherwise take vertical mounted **VBZ** (E 37.2), drawing 4. But we prefer HBZ.

Devices with measuring eveness
need extremely rigid transducers. Take special models **VBZ P** (E 37.2).

Devices with varying arc of contact
e.g. with pulley near the coiler. If it is possible to have a signal for coil radius, maybe by level with coil contact, or by tension or frequency of a generator at the coil-wheel, suitable mounted HBZ or VBZ are sufficient, measuring only the horizontal or vertical component. A computer will give the band tension by means of the above mentioned signal. - Without such signal, take biaxial transducers **HVBZ**(E 37.4) measuring horizontal **and** vertical component. The computer will give arc of contact, direction of resulting force and actual band tension.