



HIGH SPEED WHEELS FOR AGRICULTURAL TRACTORS (≥50 KM/H)

Geometrical uniformity of wheels and first harmonic point

ES -3.21

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ROUES HAUTE VITESSE POUR TRACTEURS AGRICOLES (≥50 KM/H)
HOCHGESCHWINDIGKEIT RAEDER FUER SCHLEPPER (≥50 KM/H)

1 - SCOPE

This EUWA specification provides, for standardised disc wheels and adjustable wheels for agricultural tractors, radial run out first harmonic high point marking. This marking is used to match-mounting with tyres on wheels to minimise the assembly radial force variation.

It has been found that the radial run out has a big influence on the handling of the tractor. Moreover, the amplitude of the vehicle vibration is proportional to the first harmonic of the radial run out of the two bead seats.

2 - DEFINITIONS

2.1 - Radial run out – Total Indicator reading (TIR) is taken simultaneously at the two bead seats, for a minimum of one revolution, with the wheel located on the specified equipment. From the starting point, it is so possible to run out trace of the two bead seats versus the degrees of rotation.

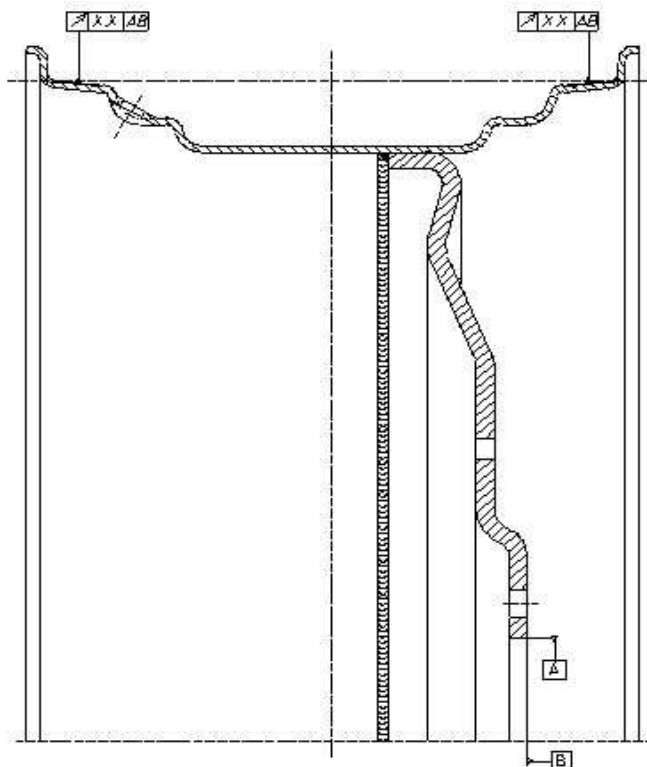


FIGURE 1 - RADIAL RUN OUT ON THE TWO BEAD SEATS

Main changes compared to the previous issue: Amendment April 2005: Replaced wrong sentence in paragraph 2.4.2 by the right one. Amendment October 2007: Added capability for speed ≥ 50Km/h; added option in marking position. October 2008: text confirmed, to be submitted to the G.A. for acceptance

2.2 – Equipment – The combination of physical features to locate the wheels during run out measurements. The rotation axis is defined by the centre of the bore and the disc mounting plane, for wheels which are centred by the central bore on the vehicle hub, and by the disc mounting plane and the centre of the bolt holes, for wheels which are located on the countersinks of the bolt holes.

2.3 – First harmonic – The magnitude of the sinusoidal component of the radial run out, representing one cycle per revolution of a run out trace (dimension in mm).

2.4 – High point – Experiences gained from the tractor manufacturers in cooperation with the wheel and tyre manufacturers have defined two options for the value to be marked, depending on the tractor characteristics: the worse of the two bead seats first harmonic or, as an option, the first harmonic calculated from the average of two bead seats run out.

2.4.1 – Worse of the two bead seat first harmonic – The location on a wheel at which the maximum value of the worse of the two bead seats first harmonic occurs.

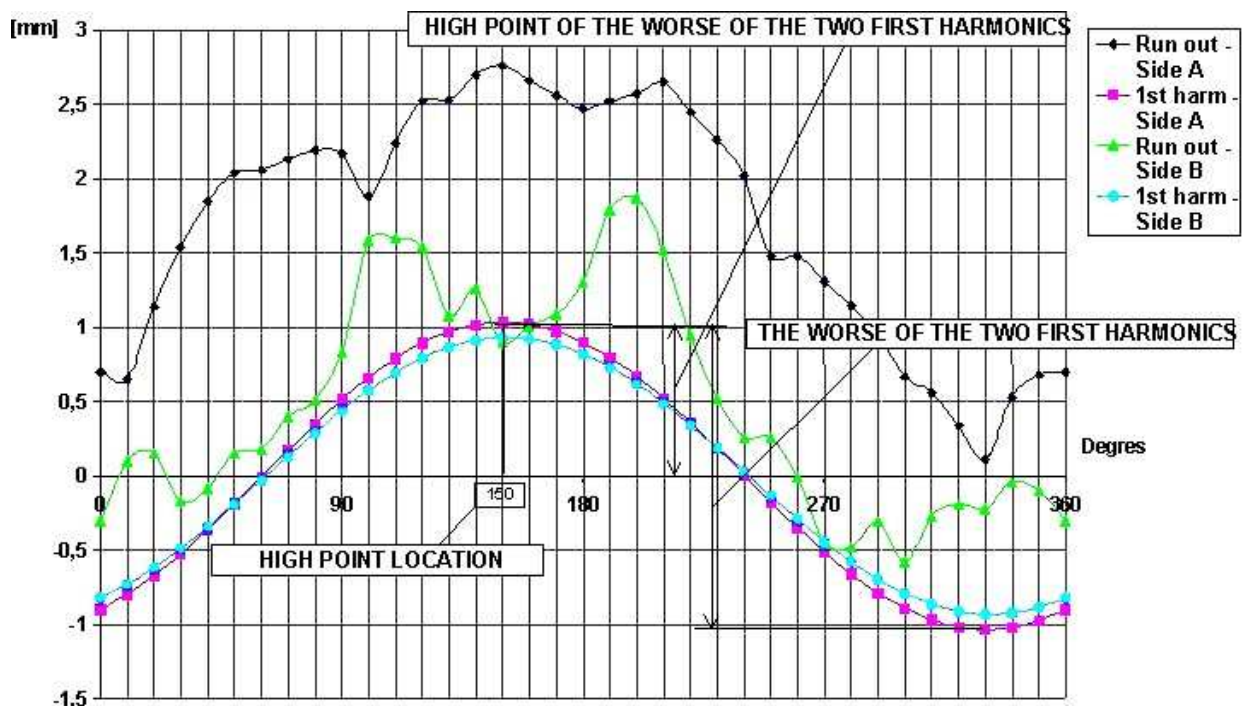


FIGURE 2 - EXAMPLE OF RUN OUT (SIDE A AND SIDE B) AND FIRST HARMONIC (SIDE A AND SIDE B)

2.4.2 – First harmonic of the vector average of the two beads run outs. – The location on a wheel at which the maximum value of the first harmonic of the vector average of the two bead seats radial run out occurs.

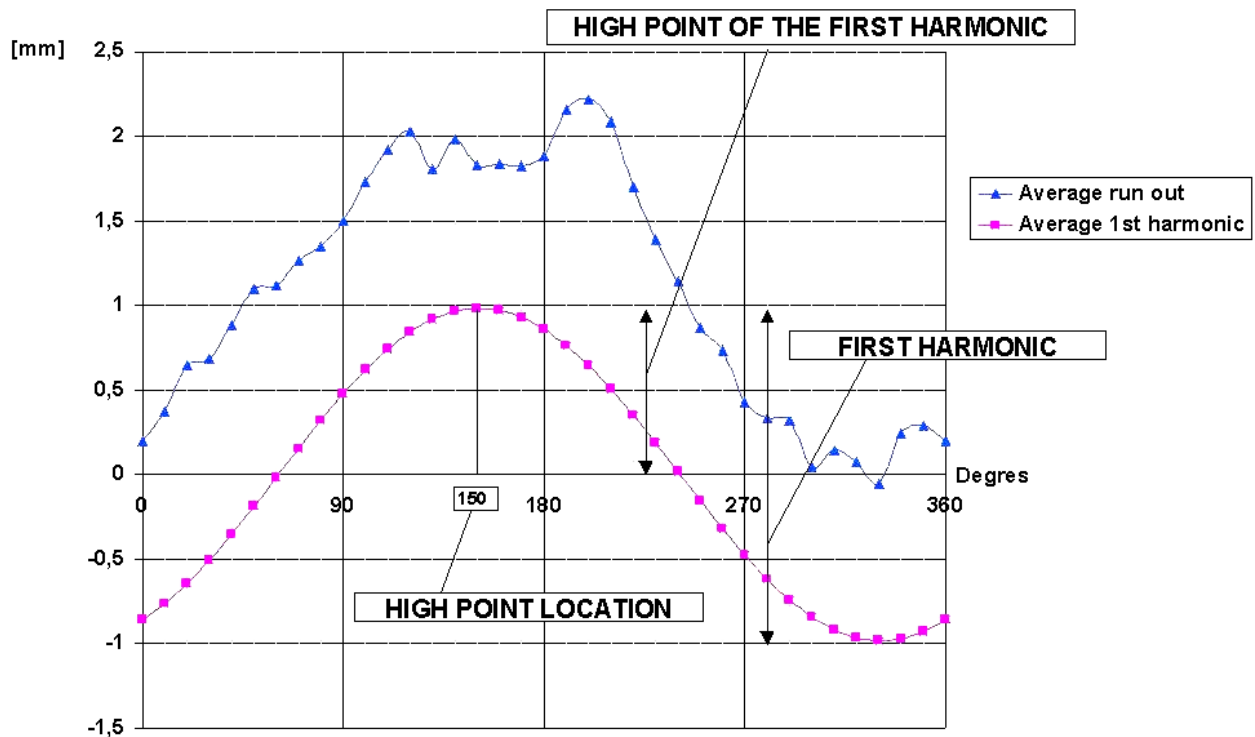


FIGURE 3 – EXAMPLE OF RUN OUT (VECTOR AVERAGE OF THE TWO BEAD SEATS) AND FIRST HARMONICS

3 - MEASUREMENT PROCEDURES AND EQUIPMENT

3.1 – Equipment requirement

3.1.1 – Hub piloted wheels shall use as equipment features a disc mounting face, and the wheel centre hole periphery.

3.1.2 – Stud-piloted wheels shall use as equipment features a disc mounting face and the stud hole chamfers.

3.2 – The measuring device must be capable of either computing the values of the first harmonics of the two bead seats and identify the worse, together with the location of its high point, or collecting the values of the two radial run outs, then computing the average of the two radial run outs and calculate the first harmonic, together with the location of its high point.

3.3 – A minimum of 128 points should be measured for the calculation of the first harmonic.

NOTE: it is an EUWA suggestion to use a flat stud holes area on the discs to have optimum results, both for uniformity, its measurement and its life in the field.

4 - MARKING

4.1 - Requirement – The wheel surface is to be legibly and permanently marked at the measured high spot.

4.2 – Format – The high point mark is a capital letter [i.e. “B”] (the same of the speed index of agricultural tyre to be mounted) of rectangular shape with a minimum height of 5 mm and a minimum depth of 0,13 mm.

4.3 – Location – The marking is to be located on the rim, valve hole side, in the external vertical area of the flange or, as an option, in the external part of the rim. In this case a paint spot or a sticker must be put on the corresponding external vertical area of the flange.

4.4 – Accuracy – The location of the marking must be within $\pm 10^\circ$ of the actual position. For adjustable wheels this tolerance is valid in their assembly and ship position only, even if the high speed adjustable wheels have a system for centring the disc when the user changes the disc position.

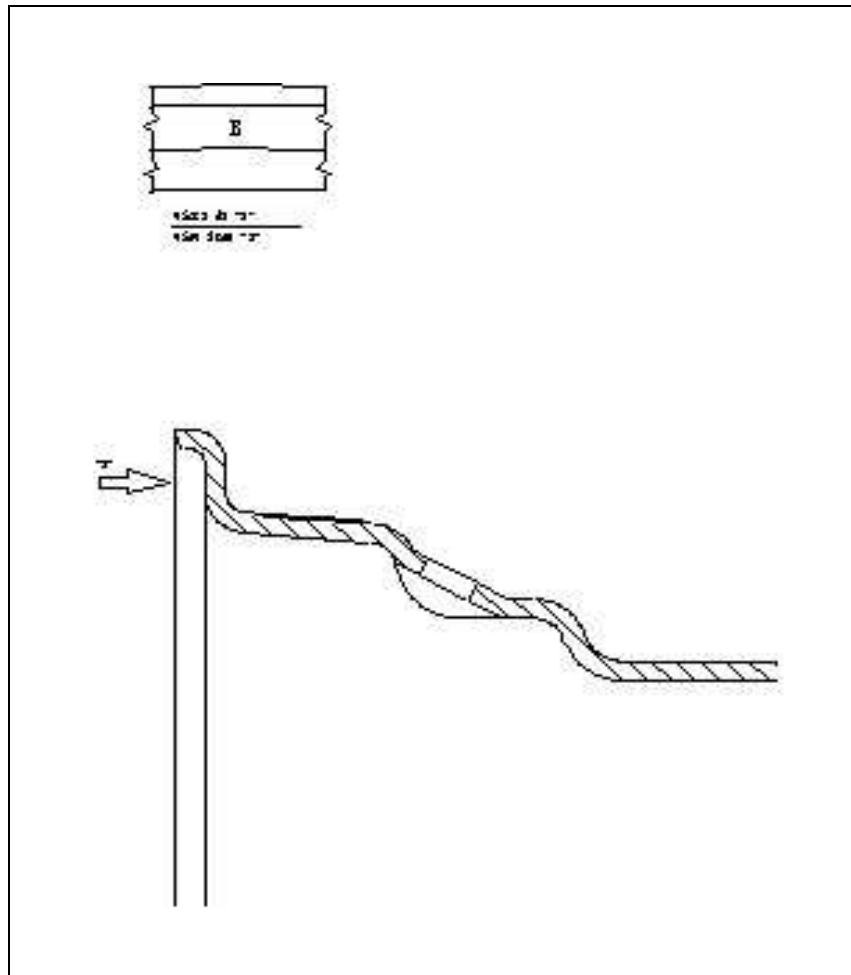


FIGURE 4 – MARKING PLACEMENT