

Directive 2000/14/EC of the European Parliament and of the Council of 8 May 2000 on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors

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### ANNEX III

#### METHOD OF MEASUREMENT OF AIRBORNE NOISE EMITTED BY EQUIPMENT FOR USE OUTDOORS

## PART B

### NOISE TEST CODES FOR SPECIFIC EQUIPMENT

#### 53. TOWER CRANES

Basic noise emission standard

EN ISO 3744:1995

Measurement surface/number of microphone positions/measuring distance

Measurements at ground-level

Hemisphere/6 microphone positions according to Part A paragraph 5/according to Part A paragraph 5.

Measurements carried out at jib-height

Where the lifting mechanism is located at the jib-height, the measurement surface shall be a sphere of 4 m radius, the centre of which shall coincide with the geometrical centre of the winch

Where the measurement is carried out with the lifting mechanism on the jib stay of the crane, the area of measurement surface is a sphere;  $S$  is equal to 200 m<sup>2</sup>

The microphone positions shall be as follows (see figure 53.1):

Four microphone positions on a horizontal plane passing through the geometric centre of the mechanism ( $H = h/2$ )

with  $L = 2,80$  m

and  $d = 2,80 - l/2$

$L$  = half-distance between two consecutive microphone positions

$l$  = length of mechanism (along axis of jib)

$b$  = width of mechanism

$h$  = height of mechanism

$d$  = distance between microphone support and mechanism in direction of jib

The other two microphone positions shall be located at the points of intersection of the sphere and the vertical line passing through the geometric centre of the mechanism

Operating conditions during test

Mounting of equipment

Measurement of lifting mechanism

The lifting mechanism during the test shall be mounted in one of the following ways. The position shall be described in the test report

- (a) Lifting mechanism at ground level

The mounted crane shall be placed on a flat reflecting surface of concrete or non-porous asphalt

- (b) Lifting mechanism on the jib stay

The lifting mechanism shall be at least 12 m above the ground

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(c) Lifting mechanism fixed to the ground

The lifting mechanism shall be fixed to a flat reflecting surface of concrete or non-porous asphalt

Measurement of the energy generator

Where the energy generator is attached to the crane, whether or not it is linked to the lifting mechanism, the crane shall be mounted on a flat reflecting surface of concrete or non-porous asphalt

Where the lifting mechanism is situated on the jib stay, the noise measurement may be carried out with the mechanism either mounted on the jib stay or fixed to the ground

Where the energy source powering the crane is independent from it (electrical power generator or mains, or hydraulic or pneumatic power source), only the noise level of the mechanism winch shall be measured

Where the energy generator is attached to the crane, the energy generator and the lifting mechanism shall be measured separately if they are not combined. Where these two devices are combined, the measurement shall refer to the whole assembly

During the test the lifting mechanism and the energy generator shall be installed and used in accordance with the manufacturer's instructions

Test free of load

The energy generator incorporated in the crane shall operate at the full power rating indicated by the manufacturer

The lifting mechanism shall operate free of load, with its drum turning at the rotation speed corresponding to the maximum hook-displacement speed, in the raising and lowering modes. This speed shall be specified by the manufacturer. The greater of the two sound power levels (raising or lowering) shall be used for the results of the test

Test under load

The energy generator incorporated in the crane shall operate at the full power rating indicated by the manufacturer. The lifting mechanism shall operate with a cable tension at the drum corresponding to the maximum load (for the minimum radius) with the hook moving at the maximum speed. The load and speed figures shall be specified by the manufacturer. The speed shall be checked during the test

Period(s) of observation/determination of resulting sound power level if more than one operating condition is used

For the measurement of the sound pressure level of the lifting mechanism, the measuring period shall be  $(t_r + t_f)$  seconds:

$t_r$  being the period in seconds prior to activation of the brake, with the lifting mechanism operating in the manner specified above. For the purpose of the test  $t_r = 3$  seconds

$t_f$  being the period in seconds between the moment when the brake is activated and that when the hook comes to a complete standstill

If an integrator is used, the integration period shall be equal to  $(t_r + t_f)$  seconds

The root mean square value at a microphone position  $i$  shall be given by:

$$L_{pi} = 10 \lg \left[ \frac{(t_r 10^{0,1L_{ri}} + t_f \cdot 10^{0,1L_{fi}})}{(t_r + t_f)} \right]$$

$L_{ri}$  being the sound pressure level at microphone position  $i$  during period  $t_r$

$L_{fi}$  being the sound pressure level at microphone position  $i$  during breaking period  $t_f$

Figure 53.1

Arrangement of microphone positions where the lifting mechanism is located on the jib stay

