



## TOWER CRANES

October 2009

# IMPROVED COMFORT AND SAFETY

With the new  
European standard  
EN 14439

### The EN 14439:2009

Standard on 'Safety - Tower Cranes' has been developed after wide expert consultation in order to provide a balanced and up-to-date 'harmonised standard' requested by the European Community Machinery Directive.



**POTAIN** 

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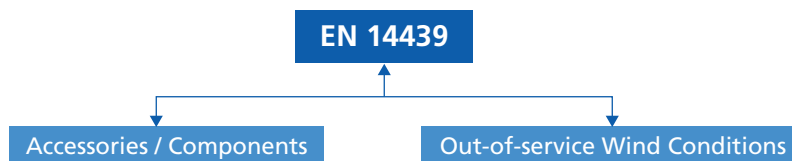
**WOLFFKRAN**

# A Significant Step Forwards

<b>What?</b>	This new safety standard EN 14439 applies to all kinds of Top Slewing and Self-Erecting Tower cranes.
<b>Why?</b>	The Machinery Directive is a European law concerning the essential Health and Safety requirements for machines. It calls for a 'harmonised standard' as a way of complying with the Machinery Directive's requirements. This harmonised standard did not exist for tower cranes...until recently.
<b>Where?</b>	The Machinery Directive and therefore the new standard applies to all tower cranes sold in the European Union and affiliated countries.
<b>When?</b>	The new harmonised standard is now applicable. A significant group of manufacturers has decided to apply the EN 14439 on all cranes manufactured and sold from 1st January 2010.

## Quick Explanation

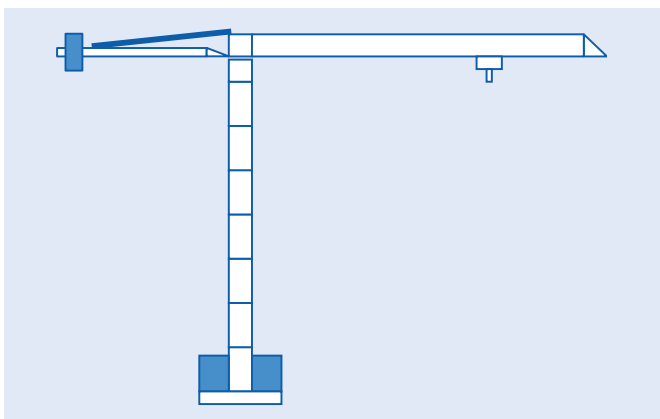
There are essentially 2 parts of the standard:



Accessories and Components are physical changes needed to meet requirements on driver comfort, safe access, acceptance of anti-collision systems and so on. For more details see page 3.

Concerning the wind, in service wind conditions do not change. Out-of-service wind conditions are modified to take the wind into account in a more realistic way. Concerning out-of-service wind speeds and associated calculation methods, EN 14439 requires FEM 1.005 to replace the standards used before.

With previous standards like FEM 1.001 and DIN 15018, the main out-of-service wind speed considered for most job sites was 151km/h, independently of where the crane was erected. The latest standard takes geographical position and wind speed probabilities into account.



### Example of a crane 60m high:

Before (DIN 15018, FEM 1.001):  
out-of-service wind speed 151km/h

Now: (EN 14439, using FEM 1.005 C25):  
out-of-service wind speed 161km/h.

In many cases the crane configuration has to be adapted to the higher out-of-service wind.

For more details, see last page. The same logic applies to luffer, tie-bar and self-erector cranes

# More Details

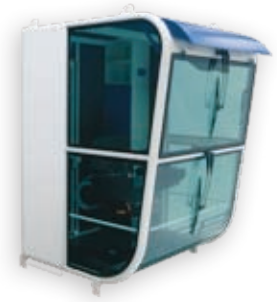
The new European Standard brings a wide range of benefits to users and owners through:

- Increased Construction Site, Technician and Driver Safety
- Improved Operator Comfort
- More Flexibility for Owners
- Improved Crane Safety in Out-of-Service Conditions



## Increased Construction Site and Driver Safety

- ▶ Anemometer (wind sensor) required for cranes above 30m high to better monitor the wind hazard.
- ▶ Cranes must be able to be equipped with anti-collision devices, as and when they may be necessary following site conditions or local regulations.
- ▶ Indicators are required in order to provide a driving support.
- ▶ Improved visibility from the driver's cab with compulsory windscreen wipers.



## Improved Operator Comfort

- ▶ Requirements on cab heating and control station layout.
- ▶ Rest platforms in the mast.

## Improved Safety for Erectors, After-Sales Technicians & Drivers

- ▶ Requirements for covers and minimum safety distances to reduce crushing hazards.
- ▶ Requirements to provide better access.
- ▶ Improving the safety of climbing systems is also under preparation.



## More Flexibility for Owners, Higher Re-Sale Values

- ▶ Some 'best practices' from certain countries have been incorporated in the standard which means that cranes can travel more easily between regions and even countries. Having the right crane for the right site brings less work behind the scenes as cranes are more likely to meet local requirements without modification. More potential outlets can also reinforce re-sale values.
- ▶ Manufacturers will offer machine configurations using the same common standards.

## Improved Safety in Out-of-Service Conditions

- ▶ Wind is an important environmental factor for the stability of tower cranes and the new standard recognises that wind needs to be considered in a more realistic way: for example, by taking the tower crane's height as well as regional wind history into account when calculating the crane's composition (see Appendix 1 below). This directly reduces the risk of accidents due to out-of-service wind conditions.

# Appendix 1:

## Out-of-Service Wind Conditions and FEM 1.005

Previous standards and regulations were often determined at a national level and made no reference to areas, such as the coast, where wind conditions can be very different from those found elsewhere in the same country.

Reference wind speeds: Europe has therefore been divided not on national boundaries but according to a wind speed level classification (A being the lowest and F being the highest). As it can be seen, most of Europe is covered by the C category<sup>1</sup>.

Wind Speed Profile: for cranes with heights between 20m and 100m, the maximum expected speed for out-of-service wind was 151km/h using most previous standards. The profiles in the new standard are more representative.

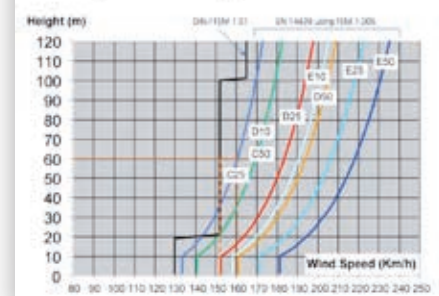
Wind Recurrence: wind speed profiles can be set according to various levels, based on the time period considered for identifying the highest probable wind-speeds. The longer the time period, the more probable it is to find bigger storms and therefore higher wind speeds. Typical wind speed profiles are defined for 10, 25 or 50 years, hence the labels. '25' is recommended as being suitable for a standard tower crane application.

Tower cranes sold in compliance with the EN 14439 standard should therefore always mention in commercial and technical documents a letter (C, D, E, F) for the reference wind speed followed by a number (10, 25, 50) for the wind recurrence, for example C25.

<sup>1</sup> C category, shown in blue, is the minimum required reference wind speed by the EN 14439 standard, even for areas A & B. The map used here is only for illustration purposes. Please refer to national / local wind references.



Wind Speed profile depending on the height from the ground



### Example: 'C25'

Used for a tower crane in an area covered by a 'C' reference wind speed and a wind speed profile based on a 25 year recurrence.

For a crane at a height of 60m [orange dotted lines], this means that the out-of-service wind speed to be used is 161km/h, under previous standards it was 151km/h.

## What Tower Crane Owners and Users Need to Know

- ▶ Before erecting a crane, consult the local metrological office for the future site in order to establish which wind reference should be used (C, D...).
- ▶ Analyse any supplementary 'site effects' which may come from the particular surroundings.
- ▶ Use the manufacturer's technical information (request it if needed) for determining the crane composition covering the site and wind reference in question.
- ▶ In order to ensure crane stability in the wind areas identified as C25 or above, in some cases more base ballast and/or a reduction in hook height will be required compared to previous standards.

The EN 14439 is a benchmark standard for modern, readily acceptable and safe cranes.

Look out for references to it on crane specification documents.

CECE - Committee for European Construction Equipment

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