



**Wacker Metroark Chemicals Pvt Ltd.
D.H Road, Chandi, 24 Parganas (S)
West Bengal – 743 503, India**

**Report into CSTR 34 FM2 Category of Free movement
areas of the new warehouse**

Prepared for
Lamba Techno Flooring Solutions Pvt Ltd

Report dated 15 June 2014

Surveys By:

Muralidhar. V

Report Compiled & Checked By

Muralidhar. V / Pauline Blackburn MIAT

On Behalf of

Monofloor Technology Limited

Industrial Flooring Consultants & Project Managers

Tel: +44 (0)121 236 5218

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Floor Level & Flatness Survey Report

Introduction

Monofloor Technology Ltd was commissioned to carry out a survey of the new floor slab at the above site between 30th to 31st May 2014. The purpose of the survey was to ascertain whether the floor meets the requirements of the contract specification as set out in the Concrete Society TR34: 2003. The required standard to be achieved was FM2 Property II and IV.

Survey Procedure

Property II Flatness Survey

Property II

Property II of TR34 is the measurement of the change in slope of the floor over two successive 300mm distances (sometimes described as the 600mm curvature). It is a measure of the flatness or 'bumpiness' of the floor.

Equipment

An electronic floor profiling device (FloorPro) was used to take flatness readings to an accuracy of 0.01mm. The slope of the floor between the front and back wheels of the robot is measured continuously using a digital inclinometer and the FloorPro provides digital data output for the slope of the floor every 15cm.

Method

In accordance with TR34, the flatness was measured across a sample of the grid lines used when carrying out the level survey. The total length of the survey lines in metres was calculated as the floor area in square metres divided by 10. The lines were distributed uniformly across the floor where possible with the total length of lines in each direction proportional to the dimensions of the floor.

Survey Analysis

The measurements are downloaded to a computer and analysed using the proprietary software. For Property II, this software calculates the change in elevational difference between two consecutive measurements of elevational difference each measured over 300mm, based upon the slope output data reported by the FloorPro. After the first 600mm measurement interval, the Property II value is reported every 150mm, twice as often as required by TR34:2003. These measurements are transferred into an Excel Spread sheet and the number of readings outside the specified tolerance calculated and compliance with the specification assessed. The survey results are summarised at the top of the spread sheet.

Property IV Level Survey

Equipment

A Sokkia B20 precise level fitted with a parallel plate micrometer and an "E" staff was used to take level readings to an accuracy of 0.1mm.

MONOFLOOR TECHNOLOGY LIMITED

Industrial Flooring Consultants & Project Managers

Unit 9 Caroline Point, Caroline Street, Birmingham B3 1UF

Tel: +44 (0) 121 236 5218

Email: consultants@monofloor.com

Registered in England and Wales, Company Registration Number 2902071



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Method

In accordance with TR34 a 3m grid was set out starting 1.5m from each wall at the corner of the slab. The precise level was set up in the centre of the area to be surveyed and a level reading was taken on the datum used for setting the finished floor levels during the pour. A reading was then taken on each intersection point of the 3m grid and recorded to the nearest 0.1mm. Any point closer than 1.5m to an existing structure (walls, dock levellers, columns etc) was, as described in TR34, omitted from the survey.

Survey Analysis

The readings were transferred into an Excel Spread sheet and the elevational difference between adjacent points was calculated. This was first done by comparing all the readings vertically down the page to produce the downcheck sheet and then the readings horizontally across the page to produce the crosscheck sheet. The number of readings outside the specified tolerance was calculated and compliance with the specification assessed. This is shown on the summary sheet together with the maximum, minimum and average deviation from the original datum of all the level readings.

Results

The Property II survey complies with the FM2 specification.

The Property IV survey complies with the FM2 specification.

Pauline Blackburn MIAT
Director

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