COMBINED FLOORING SERVICES LTD

Mr Graeme Patterson
Head Office
Croft Mill
Albert Close
Whitefield
Manchester
M45 8EH

19th February 2010

BAE Systems Building 610-Salmesbury.

Dear Mr Patterson

Following our recent correspondence, we can confirm that the survey carried out recently at the BAE systems site Balderstone, showed full compliance to the FM2 property II criteria. On average more than 99% of the readings complied to the 95% limit with all readings fully compliant to the 100% criteria.

We would consider this an excellent result when compared to the limits for property II.

If you need further information please do not hesitate to contact me

Yours faithfully

Martin Rogers

FLOOR LEVEL / FLATNESS SURVEY

SGG/BAM CONSTRUCTION

BAE SYSTEMS

BALDERSTONE

Specification:TR34 FM2 (2003) Porperty II

DECEMBER 2009

Combined Flooring Services Ltd, Unit 6 Shakespeare Business Centre, Hathaway Close, Eastleigh, Hants SO50 5SR
Tel 02380 262017 Fax 02380 276162 Email info@combinedflooring.co.uk
Vat 522043006 Registered in England 2300981

FLOOR SURVEY.

Combined Flooring Services was commissioned to carry out a floor survey of the new building at the above site. The purpose of the survey was to ascertain whether the floor met the required contract specification as set out in the Concrete Society publication TR34 2003. The required standard to be achieved was FM2 property II only.

REQUIRED FLATNESS SPECIFICATION PROPERTY II.

The requirements for property II limits the maximum 600 mm curvature to 5.5 mm and also requires that 95% of the slope readings should be less than 3.5 mm.

RESULTS (Property II)

Numerous runs were taken, all of which are shown in the Data section of this report.

SURVEY APPARATUS FOR PROPERTY II

A Combined Flooring Services Profileograph was used to survey the floors for property II at the the above site.

SURVEY PROCEDURE.

In accordance with the clients requirements.
To survey areas set out by clients. Areas are shown on the enclosed sketch.

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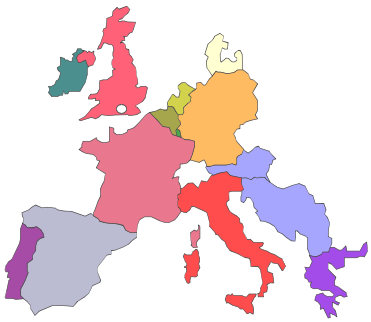
COMBINED FLOORING SERVICES LTD

At Combined Flooring Services we are acknowledged experts in design, consultation and measurement of industrial concrete floors. With many years experience we offer wide ranging services covering many aspects of this specialised field.Our services range from giving advice about construction techniques and the design of floors, to the use of tools and materials checking.We specialise in quality control and our unique surveying equipment enables us to measure flatness and levelness quickly with minimal disruption to others.



Now considered the European leader as specialised advisers to the industrial flooring industry we are actively involved in writing and advising on British, European, and American Flatness standards for floors.Our philosophy is that no country is unreachable and we have worked worldwide to help with the installation of superflat floors.

Building owners and engineers can be assured that if involved with a project from the outset we continually monitor progress to help ensure the floor under construction achieves the required standard.

Whatever the requirements, Combined Flooring Services are ready to ensure an unsurpassed quality control service at all levels of floor construction.

1: WHY FLOORS NEED TO BE FLAT

2: FLOOR SPECIFICATIONS

3: METHODS FOR FLATNESS AND LEVELNESS CHECKING

4: CONSTRUCTING AND FINISHING SUPERFLAT FLOORS

5: FLOOR CONSTRUCTION WITH THE LASER SCREED SYSTEM

6: TOLERANCES ACHIEVED BY DIFFERENT CONSTRUCTION SYSTEMS

7: HOW FLATNESS IS AFFECTED BY CURLING/CRACKING

8: CORRECTING FLATNESS DEFECTS

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WHY FLOORS NEED TO BE FLAT

During the 1970's fork-lift truck manufacturers developed special reach trucks that lifted higher than 12m.These place pallets on high racking in very narrow aisles (VNA). The width of the racking needed is such that the trucks have very little clearance between the rack faces, sometimes as little as 50mm.

It soon became apparent that floors constructed for normal warehouse purposes were not flat enough to operate these high reach trucks. It was not uncommon for the trucks to sway violently and in some cases collide with the racking.

The consequences of an unlevel and/or unflat floor are:
- Reduced truck speeds leading to reduced throughput,
- Premature truck wear and driver fatigue caused by vibration and swaying of the trucks,
- Loss or damage of stock.

As technology advanced it became clear that other industrial machines also needed to run on much flatter floors. Typical examples can be seen with automatically guided vehicles (AGV), hover transport and fabric cutting machines.

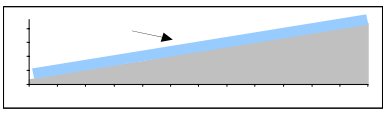
FLOOR SPECIFICATIONS

Many types of floor flatness/levelness specifications have been used over the last ten years.

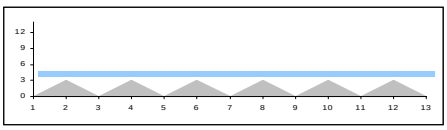
Flatness and levelness are two different properties which should be understood by the specifier.

Flatness = the smoothness or waviness of a surface.
Levelness = the difference in height between two points

A flat but not level surface



A level but not flat surface



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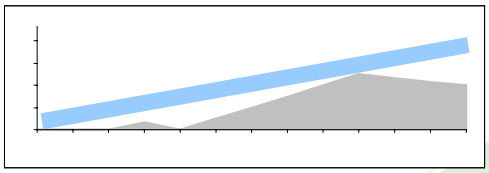
FLOOR FLATNESS SPECIFICATIONS

1 BS 8204: Part 2

This Specification limits the maximum gap under a 3m straightedge to 3mm (SR1), 5mm (SR2) or 10mm (SR3). The straightedge is required to sit in contact with the floor surface, under its own weight.The floor can be checked in any place or direction.



Note that the straightedge specifications SR1, 2 & 3 do not control the level difference or slope on a floor surface. The straightedge could be placed on a slope with a level difference of 10mm between two ends of the straightedge yet still show acceptable gap measurement to the surface

2 The Concrete Society Technical Report 34

In 1994 the Concrete Society together with the British Industrial Truck Association published the second edition of Technical Report 34 (TR34), entitled 'Concrete Industrial ground floors'.
TR 34 sets out limits for floor flatness and levelness of warehouses and other industrial floors. The category of defined movement traffic for very narrow aisle trucks forms the major part of the flatness specification in the document. In June 1997 the Concrete society published a supplement to TR 34 which details flatness specifications for floors in free movement (FM) areas.

Defined movement

The defined movement specification (TR 34, 1994) has 3 classifications for flatness within aisles.These are **Superflat, Category 1 and Category 2** and all include the same properties for flatness measuring.

Property I.

Controls the difference in level between two points separated by 300mm along each wheeltrack.The limit values listed in the table 7:1 TR34 are absolute and must not be confused with a deviation from a horizontal plane as in other specifications.

Property II.

The 600mm change in slope (rate of change) relates to the difference between any 2 consecutive Property 1 readings.

Property III.

Controls the difference in level between two points separated by the forklift truck's wheeltrack. The values listed in the table of TR34 are absolute and must not be confused with a deviation from a horizontal plane.

Free movement

Free movement areas are those where trucks can travel in multi-directional paths.
These movement areas are considered less critical in terms of flatness and TR 34 sets out parameters on how an individual floor should be checked. The Free Movement (FM) specification (TR 34) has 3 classifications for flatness within free movement areas. These are **FM1, FM2 and FM3** and all include the same properties for flatness measuring.

Property II.

The 600mm change in slope (rate of change) relates to the difference between two consecutive 300mm slope.

Property IV

States the difference in elevation between two points on a 3m grid should not exceed a certain value depending on the FM classification.

3 Alternate International Specifications

- North America: F Number System.

- Canada: Wave Form System.

- Europe: DIN 18 202. This standard has been adopted by many European countries, all using slightly different variations of the specifica-

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METHODS FOR CHECKING FLATNESS AND LEVELNESS

Many instruments can be used for checking floor flatness and levelness.
Flatness checking requires instruments of greater accuracy than those used for checking overall levels to datum.

INSTRUMENTS FOR CHECKING FLATNESS.

SCANNER III
Scanner III is a self propelled device that travels across a floor surface and can measure the difference in elevation over 300mm, 600mm and 3000mm. This information can be printed out in real time giving instant results and also downloaded to calculate compliance with many different world-wide specifications.

FLOOR PROFILEOGRAPH
The profileograph is a fork-lift truck simulator that travels across a floor surface where an industrial fork-lift truck will operate. The profileograph measures local differences in level to produce an instant graphical printout of the floor's surface regularity. The profileograph is designed to survey the continuous path of the proposed fork lift trucks' wheeltracks. The profileograph should always be used in instances where a defined wheeltrack area is specified.

The data collected can be used to calculate compliance to many different world-wide specifications.

INSTRUMENTS FOR CHECKING LEVELNESS.

LASER LEVEL

PRECISE LEVEL
This is an optical device that can be accurate to 0.1mm if used with a 5mm Invar staff.

CONSTRUCTING AND FINISHING SUPERFLAT FLOORS

Critical factors involved in achieving a superflat floor must be considered at the design stage.

1: **Required use and intended traffic** - A designer needs to know what floor to specify to suit the specific needs of the end user.

2: **Racking design and layout** – This must be considered as must bay widths. Superflat floor bays should not exceed 6m.

3: **Floor joint layout -** The joints should always be located under the racking. This is essential as the required flatness/levelness tolerances are difficult to achieve near the joints. Joints in trucking aisles are always likely to breakdown, causing down-time when repairs are required. Curling which is apparent on joints will effect the local flatness tolerances.

4: **Concrete quality and supply** - The concrete supplier plays a very important role in the construc-

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consistent concrete quality and slump, and equally, provide concrete uninterrupted throughout the pour. Waiting times of more than 20 minutes between loads will usually cause a flatness defects.

5: **Formwork -** The best method is to use side forms with top steel adjustable angle.However,timber forms with or without attached angle have been used with a great deal of success. Any form must be able to retain a flat profile throughout the construction period.

6: **Levelling Instruments** - The only instrument suitable to set forms for superflat floor construction is a precise level fitted with a parallel plate micrometer. Laser levels do not yet have the accuracy necessary to set formwork to the tolerances required.

7: **Vibration-consolidation -** Razorback, double beam and poker vibrators have all been used in the construction of Superflat floors. Beam vibrators are the most common. However, poker vibrators, if used correctly can produce good results.

8: **Placement and Strikeoff** - The most critical part of floor construction has to be the placement and straight-edging of the wet concrete. Particularly important are the specialist tools required for this operation, most of which are not found on normal projects.Tools such as highway straight edges, (bump cutter) vibrating beams and precision formwork are obvious examples.Equally critical is skilled labour who must be trained to place a superflat floor to satisfactory standards.

9: **Finishing -** Critical to the construction of a superflat floor is the need to finish the surface to ensure that it is flat. Mandatory use of a bump cutter (highway straightedge) and very careful timing of the power-trowelling is critical. Without these operations a superflat floor will not be achieved.

FLOOR CONSTRUCTION WITH THE LASER SCREED

The Laser Screed system is the latest technique for placing concrete floors. It has been responsible for creating fast track, high quality floors and in most cases will achieve category 2 and FM2 limits. With careful supervision a very experienced contractor will be able to achieve a Category 1 floor with below 10% of the total aisle area needing to be ground. The Laser Screed used with experienced operators is an excellent machine for placing and levelling concrete. Cautious consideration should be given to using a contractor for category 1.

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TOLERANCES ACHIEVED BY DIFFERENT CONSTRUCTION SYSTEMS

It is impossible to state accurately what flatness will be achieved with the different methods of construction. **Most people fail to realise that tools and machines for placing concrete are only aids to the flooring contractor.**The tolerances achieved are controlled by the labour on site.A good flooring contractor will achieve good flatness and level using old worn tools whereas an incompetent flooring contractor will produce poor flatness results even with good tools and equipment.

Combined Flooring Services are often employed by flooring companies to train their floor laying operatives to the necessary standard required for laying high tolerance floors.

Long-strip construction with bay widths around 5m can achieve Superflat Category with very little grinding [i.e. less than 2%]. Category 1 can be achieved with no grinding at all.

It is however essential that constant flatness checking is carried out throughout all stages of the floor construction on all Superflat and Category 1 floor projects. This will establish the quality of floor being placed and identify any problems as each section is laid. Modifications can then be made to subsequent pours to correct them.

Laser Screed systems are generally used to lay floors to a category 2 and FM2 flatness standard where a floor needs to be constructed quickly. Laser screed machines with experienced contractors can achieve a category 1 floor with grinding.

The mass pour system known as **wet screed** will not generally achieve better than FM3.However a method known as the **Pienform** system has proved successful in achieving a 98% compliance to FM2 requirements on many occasions.

Wide bay construction (More than 8m) is not likely to achieve tolerances better category 2.

HOW FLATNESS AND LEVELNESS IS AFFECTED BY CURLING/ CRACKING

Floor flatness and levelness are affected by shrinkage, cracking and curling. In most cases however, operations on the floor are not greatly affected. Measurements of flatness are taken over very local gauge-lengths (ie: 300mm) so any curling/shrinkage that takes place will not significantly change the flatness.

Concrete is a material that shrinks as it dries out. The amount of shrinkage is dependent upon many factors, e.g. water content, curing, cement content, aggregate size etc.Like any other material that shrinks it will be under tensile stress.If the stress is significant the slab will crack. Generally a floor will curl less at a crack than at a formed joint, due partly to aggregate interlock at the crack. For this reason engineers are advised to place joints in areas of the floor that will have less use.

CORRECT FLATNESS DEFECTS

In many cases floor grinding is the remedial action necessary to correct minor flatness defects on new floors.

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However in extreme cases floor toppings have to be considered. Grinding is an expensive operation and an additional cost to the flooring company.Only specialists with the appropriate measuring devices to monitor the operation can avoid over-grinding areas, which itself results in more problems.

Grinding of an old floor can produce the flatness tolerances required. If the floor has major flatness defects however, a thin floor topping may be a better option.Trenches could also be ground into the floor but these can cause further problems that do not occur if feather grinding is used.

FLOOR SPECIFICATION REQUIRED > TYPE OF CONSTRUCTION

TR 34 DEFINED TRAFFIC			TR 34 FREE MOVEMENT (FM) 2003		
SUPERFLAT	*CATEGORY 1*	*CATEGORY 2*	*TR34 FM 1*	*TR34 FM 2*	*TR34 FM 3*
LONG STRIP ONLY *BAY WIDTH 4M > 5.5M* (Expect grinding 2%)	***LONG STRIP*** *BAY WIDTH 4M > 5.5M*	***LONG STRIP***	***LONG STRIP*** *BAY WIDTH 4M > 5.5M*	***LONG STRIP LASER SCREED***	***LONG STRIP LASER SCREED***
	LONG STRIP *BAY WIDTH 6M > 9M* (Expect grinding 5 %)	***LASER SCREED*** (Expect grinding 2 %)	***LONG STRIP*** *BAY WIDTH 5.5M > 7.0 M* (Expect 95% compliance)	***MASS POUR WITH TEMPORARY HARD FORMS***	***MASS POUR WITH TEMPORARY HARD FORMS***
	LASER SCREED (Expect grinding 7 %)	***MASS POUR WITH TEMPORARY HARD FORMS*** (Expect grinding 5 %)			***WET SCREED***

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Flooring Feature

Floor flatness for Very Narrow Aisle (VNA)

Flat Floors Fit For Purpose??

Martin Rogers.

Written by Martin Rogers (Co Author TR 34 Supplement 1997. Member of TR34 working groups 1988, 1994 and 2003)

There has been much debate surrounding the topic of floors suitable for the safe and efficient operation of very narrow aisle (VNA) trucks for many years. Clearly, VNA trucks working in such confined environments need a degree of floor flatness that ensures satisfactory operation and adequate safety clearances.

The standard of flatness must also allow the VNA truck to attain the required performance speeds and subsequently pallet/picking throughputs.

In an ideal world, a floor would always be cast or upgraded to the most precise tolerances, however, the ever increasing cost of achieving floor surfaces suitable for VNA truck operation, leaves the building owner with a dilemma of whether installation of a VNA system can justify the cost of a high specification floor.

Combined Flooring Services have always advocated that the needs of every client are different and two clients with identical warehouses and racking systems are likely to have different material flow throughput requirements. A very flat surface is required to allow VNA trucks to operate at high speeds, however, if high speed operation is not the most critical requirement, then a lower floor specification may be acceptable providing the safety criteria is met. In simple terms, the flatter the floor the faster the trucks can operate. (Subject to manufacturers safety constraints)

When we are approached by clients seeking advice on floors relating to VNA installations, we give various options for the floor specification based on the client's individual needs.

These options take into account the required truck travelling speed, racking height, wheel track spacing and the clearance between truck and racking/stored loads.

In instances where clients have particularly short aisles, the maximum speed is normally limited therefore a costly high specification floor may not be required.

In contrast, when a client needs to attain exceptionally high speeds, the floor tolerances may need to be closely controlled and the resultant floor surface of a very high standard.

Truck manufacturers' perspective

Working together with fork lift truck manufacturers for many years, we think it is now time for industry to understand that every client's needs are different, therefore any specification should be able to reflect this.

Fork lift truck manufacturers see the benefits of this approach as the risk of assuming every client needs a high standard floor could prove damaging to their industry, particularly if the standard adopted is unnecessarily onerous and becomes mandatory.

Fig 1

CURRENT TR 34 TRANSVERSE STATIC LEAN TABLE					PROPOSED SPECIFICATION LEAN TABLE		
Lift Height		Transverse Limit mm *	Static Tilt	Potential ** Tilt	Transverse Limit mm	Static Tilt	Potential ** Tilt
15	Superflat	2.5	31	94	1.9	24	72
14		2.5	29	88	2.1	24	72
13	Category 1	3.5	38	114	2.2	24	72
12		3.5	35	105	2.4	24	72
11		3.5	32	96	2.6	24	72
10		3.5	29	88	2.9	24	72
9		3.5	26	79	3.2	24	72
8		3.5	23	70	3.6	24	72
7	Category 2	5	29	88	4.1	24	72
6		5	25	75	4.8	24	72
5		5	21	63	5.8	24	72
4		5	17	50	7.2	24	72

* 100% Limit
** Potential tilt based on 3 times static tilt
Wheeltrack spacing 1.2m

Existing UK standards

Currently the UK standard is centred on recommendations set out in the Concrete Society Technical Report 34 (TR34). This standard is ***not mandatory***, however has become widely accepted as the benchmark specification since its introduction in 1988. TR34 in its entirety only takes into account the racking height to determine the floor classification.

It was originally put together as a guide for new constructions and recommends a specific category of floor based solely on racking height.

For example, when the racking height exceeds 8 metres but is less than 13 metres high the floor flatness criteria remains as category 1, despite the fact that floors for 13m high racking clearly should be better than that for 8 metre racking. For this reason over specification can occur when the racking height is just over 8 metres, yet under specification can occur at 13 metres (see fig 1).

A specification enhancing the existing TR34 standard

We propose a simple measurement system based on four key elements.

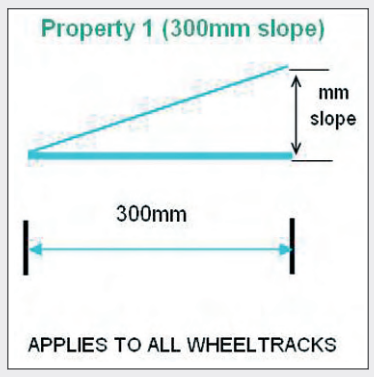
This takes into account the clients specific requirements as detailed below; (Fig 2)

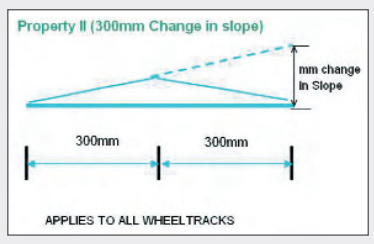
- Pallet or load unit / truck clearance
- Racking height
- Required truck speed
- Truck Wheel-track configuration

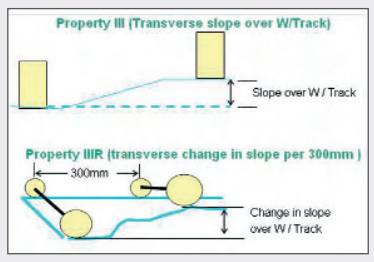
Below are the key measurement properties for a floor measurement specification. These are currently found in TR34**.

- **Property 1:** Slope over 300mm
- **Property II:** Change in slope of property 1
- **Property III:** Transverse slope
- **Property IIIR:** Transverse slope rate of change

** Property IIIR added







Utilising the key criteria shown in fig 2, enables anyone to establish the required limits for all measurement properties. Essentially faster trucks with minimal clearance will require flatter floors.

Clearly another significant benefit of this specification is the fact that we are utilising ***all*** of the existing measurement properties proven in TR34 since 1988. This makes the transition between specifications more straightforward.

Calculations for the limits can be established either by utilising one of three formats:

- Spreadsheet calculation (fig 3)
- Formula
- Table text / graph format (fig 4)

How to apply the new specification for new and existing floors.

For a new construction with a known racking layout and fork lift configuration the choice of specification is very simple. The precise racking height (H) is selected, which will dictate the specification. (It would be assumed that a maximum 9 Kph travelling speed would be required for new floors constructed with a pallet/load unit to truck clearance of 125mm)

Example VNA for new floors to be constructed

H12 indicates that racking height will be 12 Metres

H 8 indicates that racking height will be 8 Metres

e.g.:

H12 allows 2.0mm per metre transverse. (Therefore 1.3 wheel track truck allows 2.6mm limits)

H08 allows 3.0mm per metre transverse. (Therefore 1.3 wheeltrack truck allows 3.9mm limits)

Example: On existing floors where VNA is to be considered

H12 indicates that the racking height will be 12 Metres. A reduced floor specification could be considered providing a lower truck speed profile is chosen or the truck / racking clearance is greater than 125mm.

The specification written into a contract would simply read:

New floor constructed specifically for VNA:

- The floor will be constructed to flatness tolerances as set out in XXX document. The limits will be in accordance with H12 requirements. (Racking height 12m)

Existing floors intended to be used for VNA:

The floor will be surveyed and analysed to flatness tolerances as set out in XXX document. The limits for the survey analyse will be in accordance with H12 requirements. (Racking height 12m)

Where non compliance occurs consultation with intended fork lift truck supplier and surveyor should take place to establish acceptability of floor for VNA use. Document XXX should be referred to for advice on non compliance.

Conclusion

Any new specification that is adopted for the new European standard must ensure the end user is not required to attain a floor significantly better than that is proven to be required. Otherwise the upgrade or construction costs could cause the client to consider the financial viability of a VNA system.

The benefits of this system is that any truck manufacturer has the ability to select a floor flatness requirement according to the clients actual requirements, rather than assume that with all installations, the truck is always required to run at the maximum speed within minimum truck / racking clearance.

Equally, when the trucks are required to run at very high speeds (12 Kph rail guided), the specification can accommodate this.

Martin Rogers:

Martin has worked in the industry since 1980. He was the first UK floor flatness surveyor utilising specialist survey equipment. He has been involved in all the working groups of TR34 since 1988 and was co-author of TR34 1997. His company Combined Flooring services advises fork lift truck companies, flooring contractors and end users on all aspects of concrete floors in particular flatness for VNA installations. Clients are truly worldwide with contracts being undertaken as far away as Korea, Singapore and Japan.

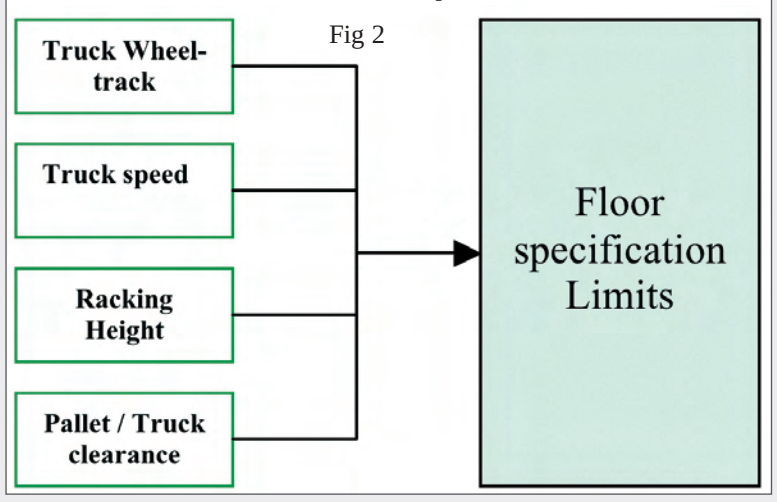
Martin feels that to often there is a misunderstanding regarding floors for VNA and too often clients can end up unnecessarily spending excessive amounts of money on upgrading floors to tolerances that are not proven to be required for there particular application. Similarly clients can under specify floor tolerances and then be disappointed when the speed throughputs are not attained.

Martin believes that a better understanding is required within industry on this subject and aims to promote this by working closely with material handling manufacturers.

Combined flooring Services Ltd,
99 Lakewood Road, Chandlers ford,
Hampshire UK. SO53 5AD
Tel 02380 262017
Fax 02380 276162
Email Sales@combinedflooring.co.uk
www.combinedflooring.co.uk

Flowchart showing clients specific requirements for choosing correct floor flatness specifications:

Fig 2



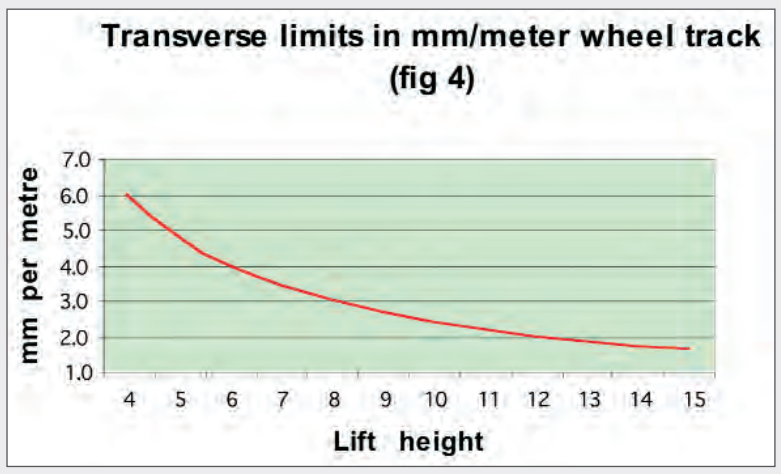


FIG: 3 Variable criteria that can be changed

Height meters	13.0	300mm Slope	300mm change in slope	Transverse slope	Transverse rate of change
Speed KM P/H	8.0				
Wheeltrack spacing M	1.2	Property I	Property II	Property III	Property IIIR
Pallet / truck Clearance cm	12	1.9	1.1	2.2	1.3

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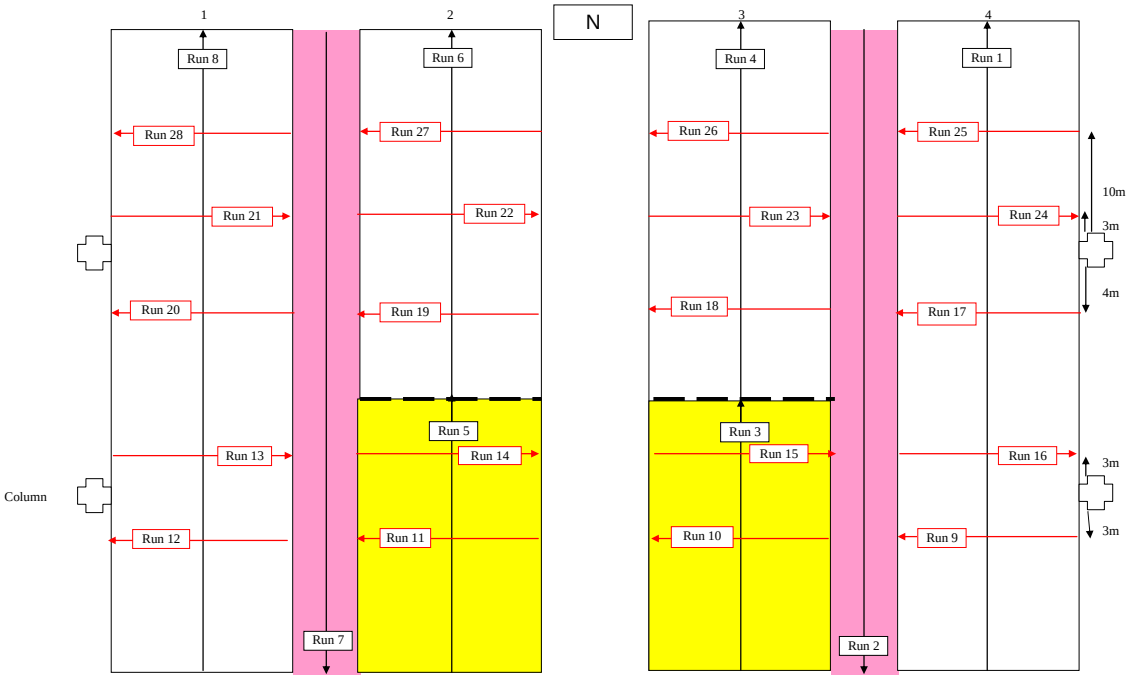


DRAWNG NOT TO SCALE .

TO SHOW ORIENTATION ONLY

S

TO SHOW WHERE RUN STOPS

TO SHOW WALK WAY

Run 4

Run 11

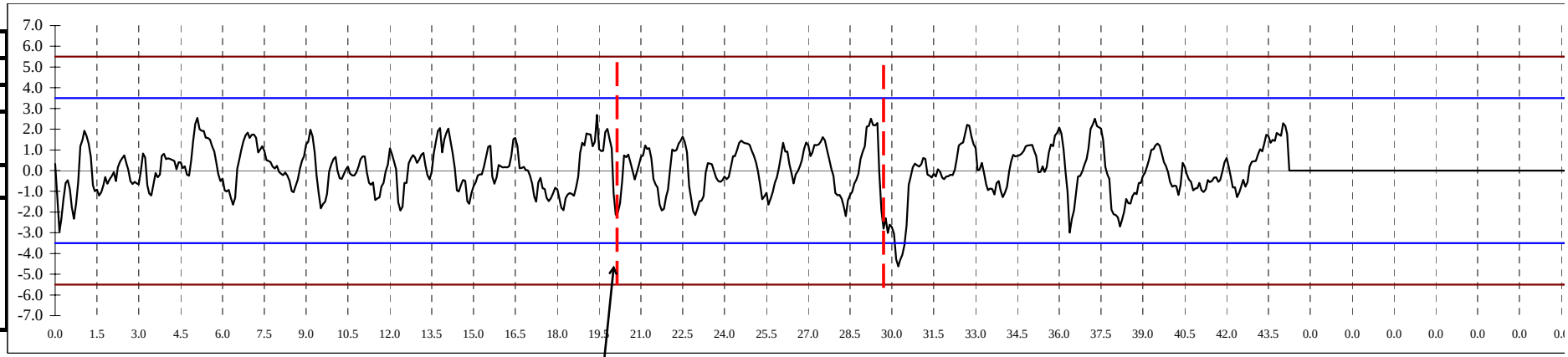
TO SHOW RUN DIRECTION

AND RUN NUMBER

Data Analysis		
TR34 Category		FM2
Run length (m)		44.2
Limit	A	B
Property II	98.1	100.0

Target percentage to be greater than 95% for limit A

Target percentage to equal 100% for limit B

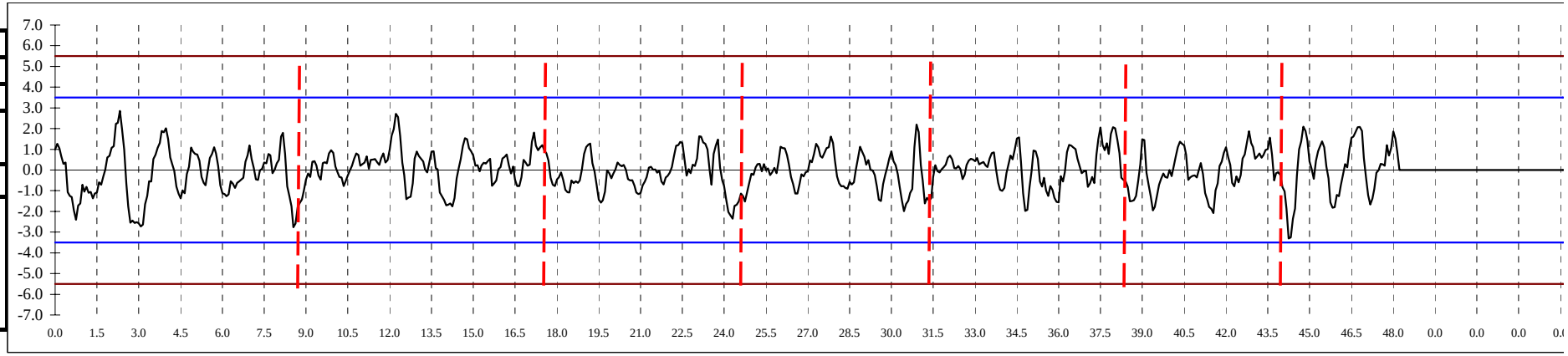


LINES SHOW JOINT LOCATIONS

Data Analysis		
TR34 Category		FM2
Run length (m)		48.2
Limit	A	B
Property II	98.1	100.0

Target percentage to be greater than 95% for limit A

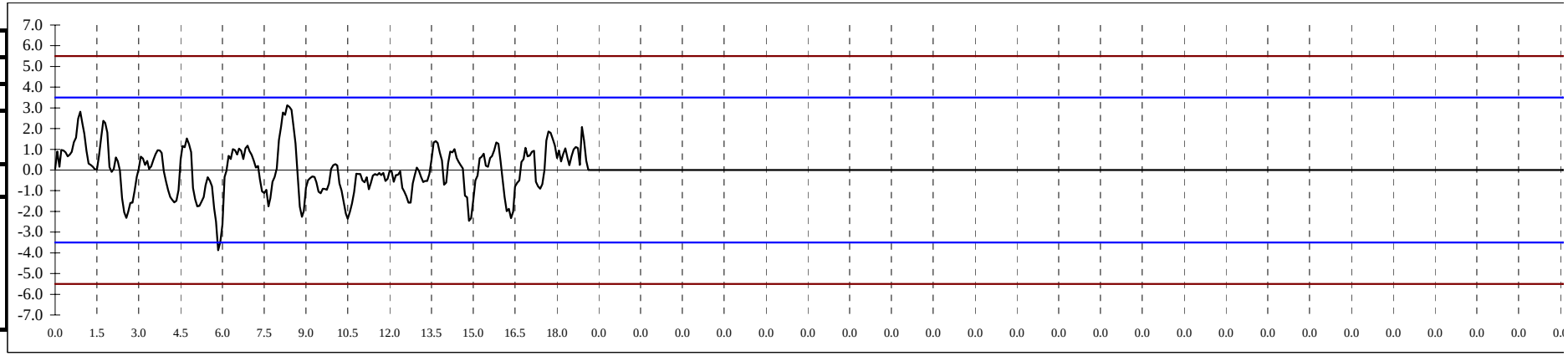
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		19.0
Limit	A	B
Property II	98.4	100.0

Target percentage to be greater than 95% for limit A

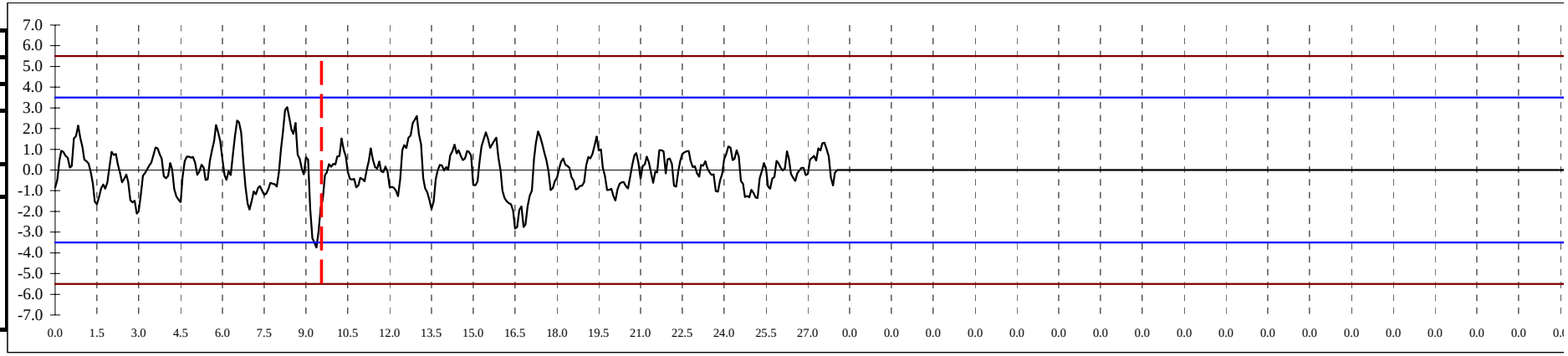
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		28.0
Limit	A	B
Property II	98.4	100.0

Target percentage to be greater than 95% for limit A

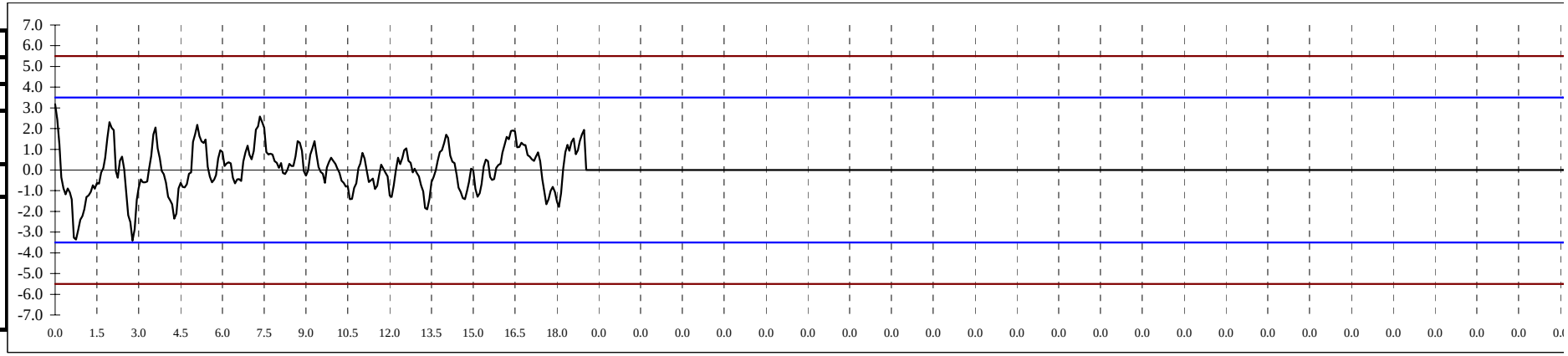
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		19.0
Limit	A	B
Property II	99.2	100.0

Target percentage to be greater than 95% for limit A

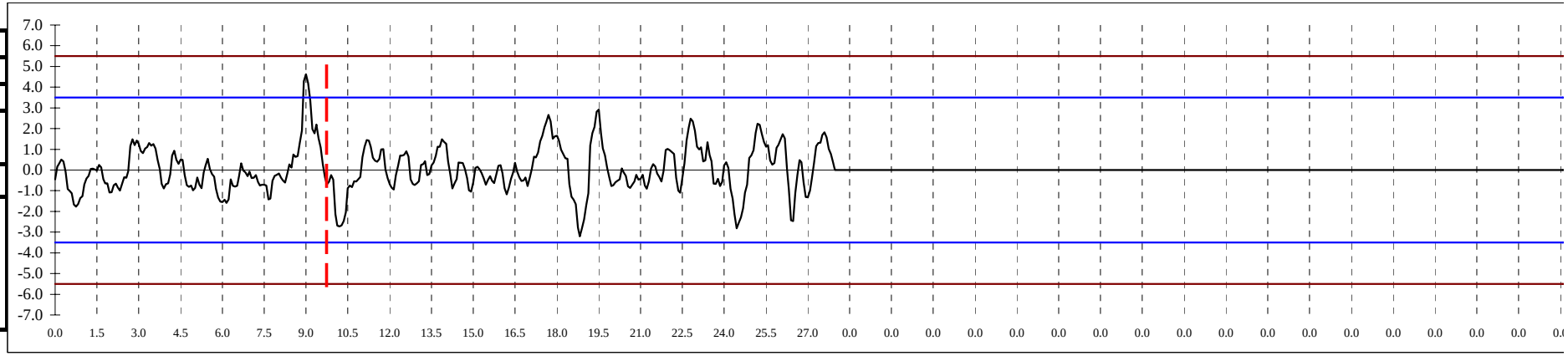
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		27.9
Limit	A	B
Property II	97.9	100.0

Target percentage to be greater than 95% for limit A

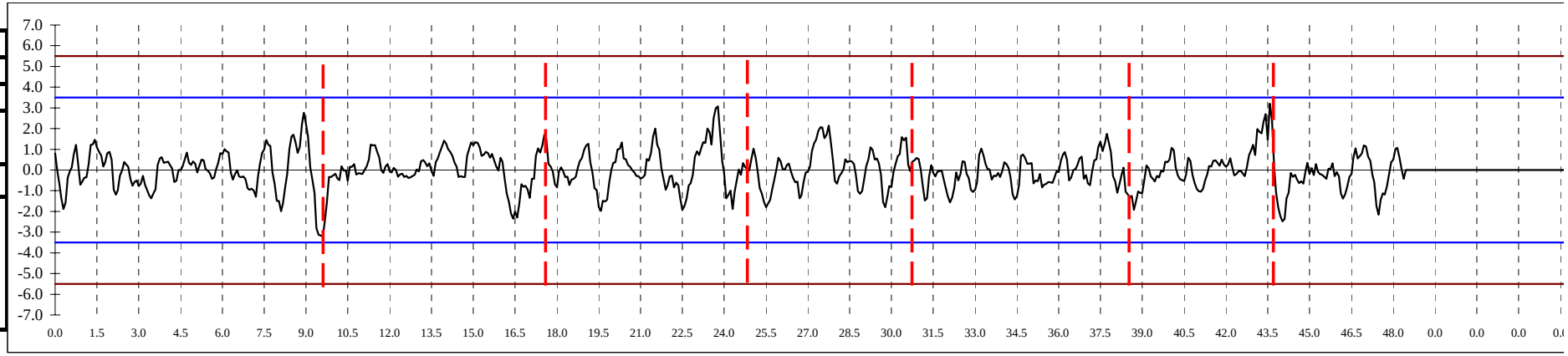
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		48.4
Limit	A	B
Property II	99.4	100.0

Target percentage to be greater than 95% for limit A

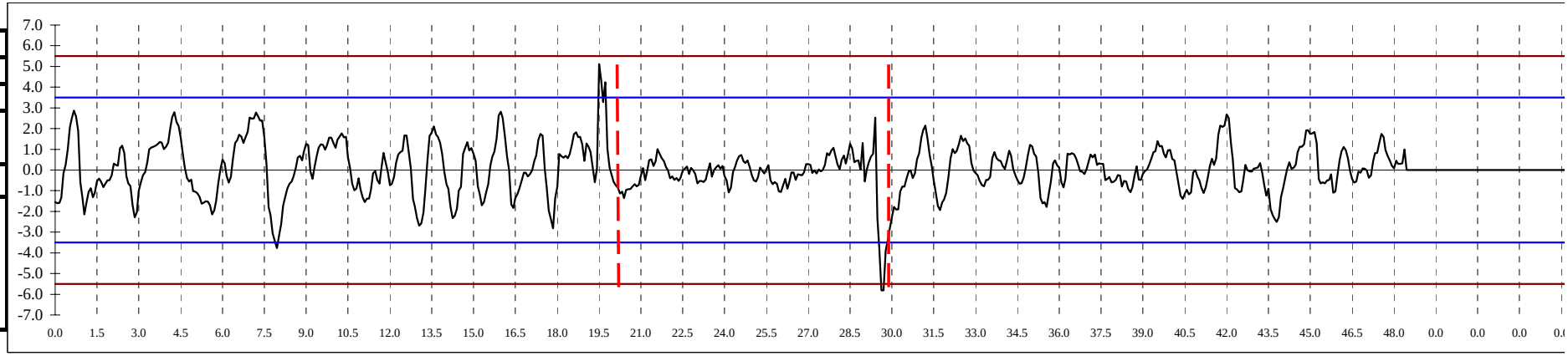
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		48.4
Limit	A	B
Property II	96.3	99.7

Target percentage to be greater than 95% for limit A

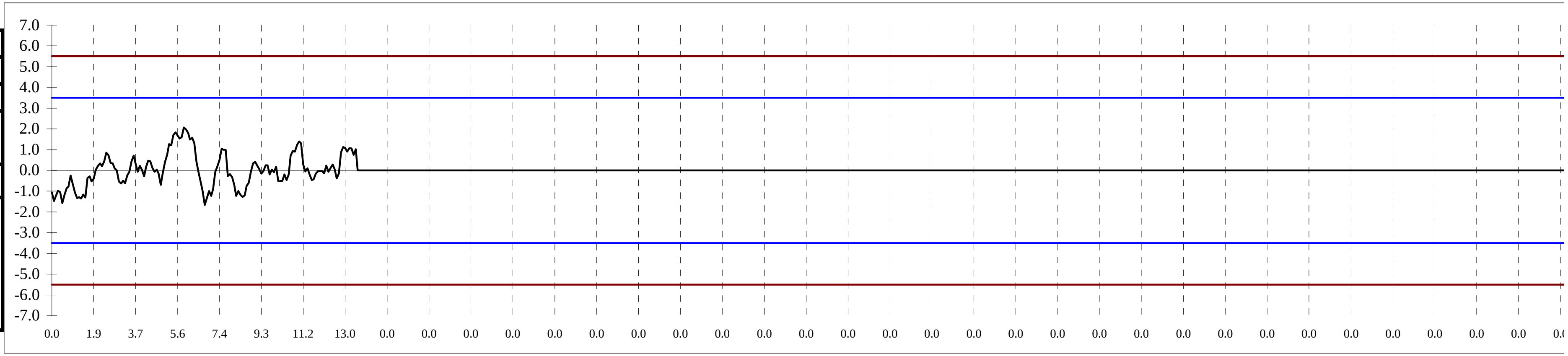
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.5**
Limit	A	B
Property II	**100.0**	**100.0**

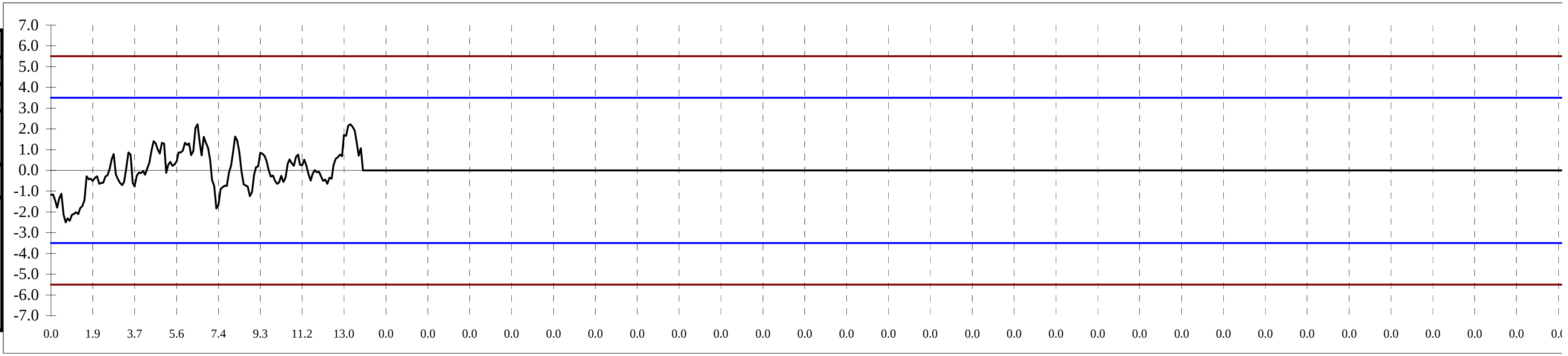
Target percentage to be greater than 95% for limit A

Target percentage to equal 100% for limit B



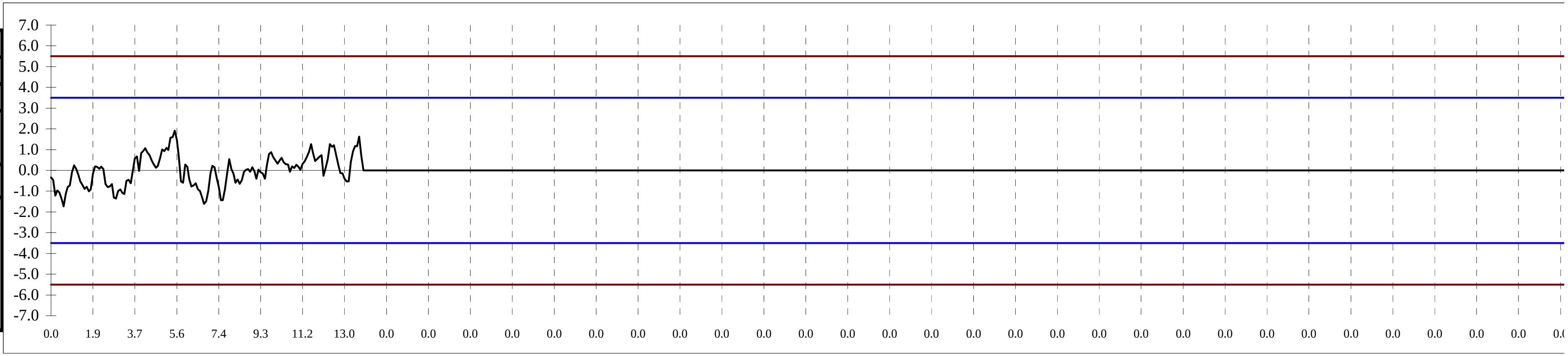
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.8**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



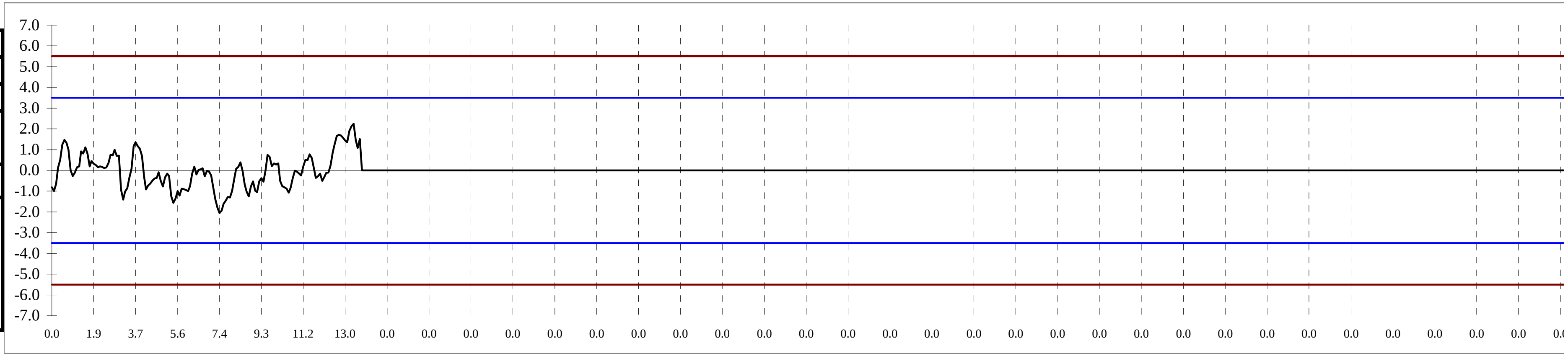
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.8**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.7**
Limit	A	B
Property II	**100.0**	**100.0**

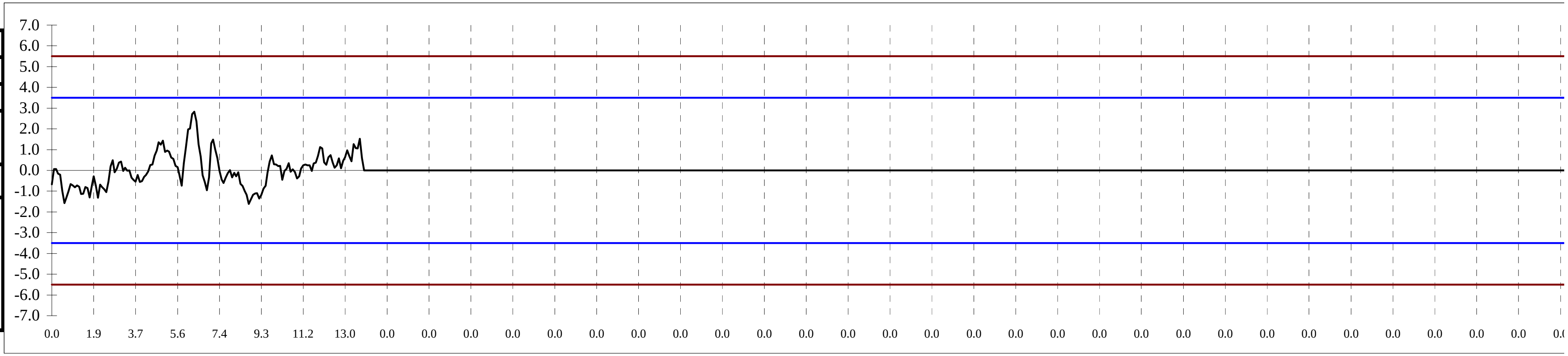
Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.8**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A

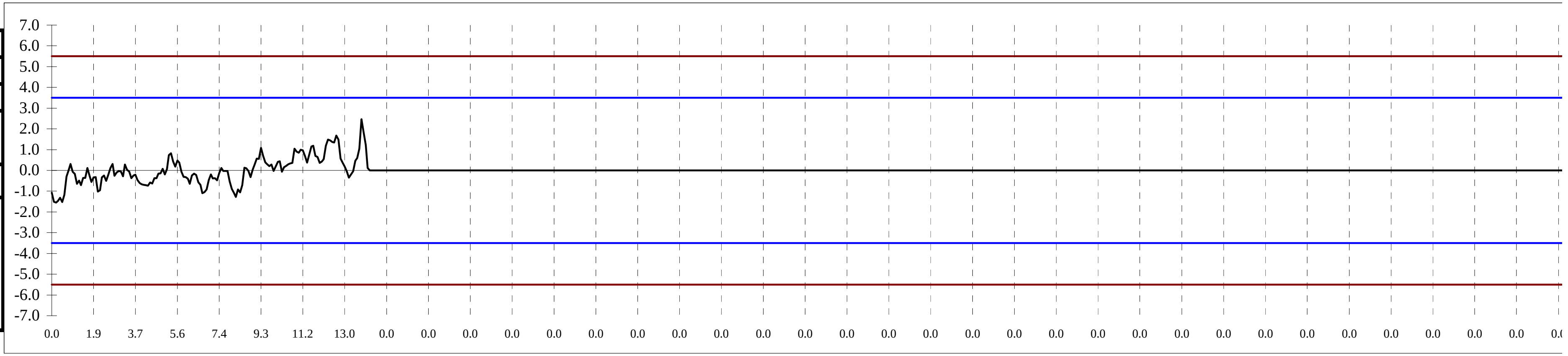
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**14.0**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A

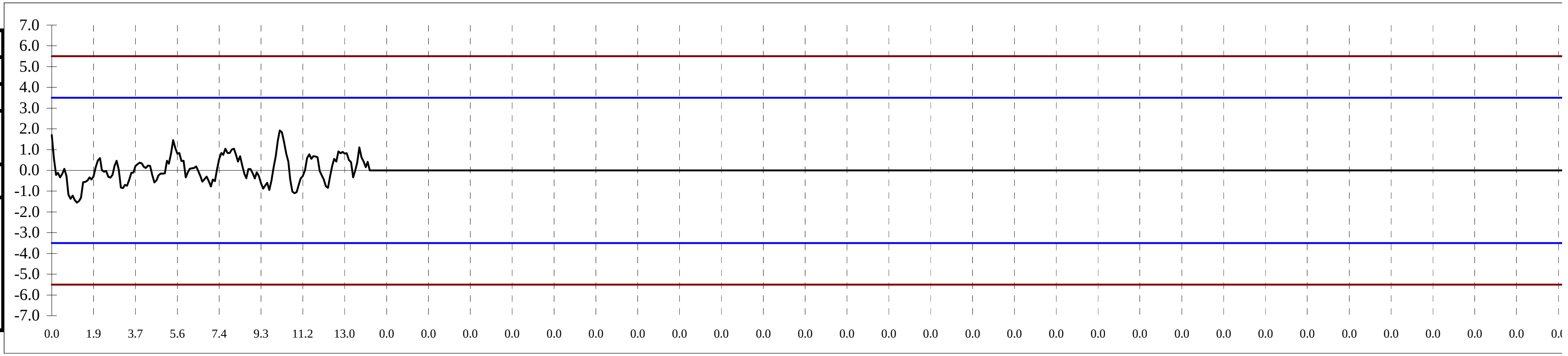
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**14.0**
Limit	A	B
Property II	**100.0**	**100.0**

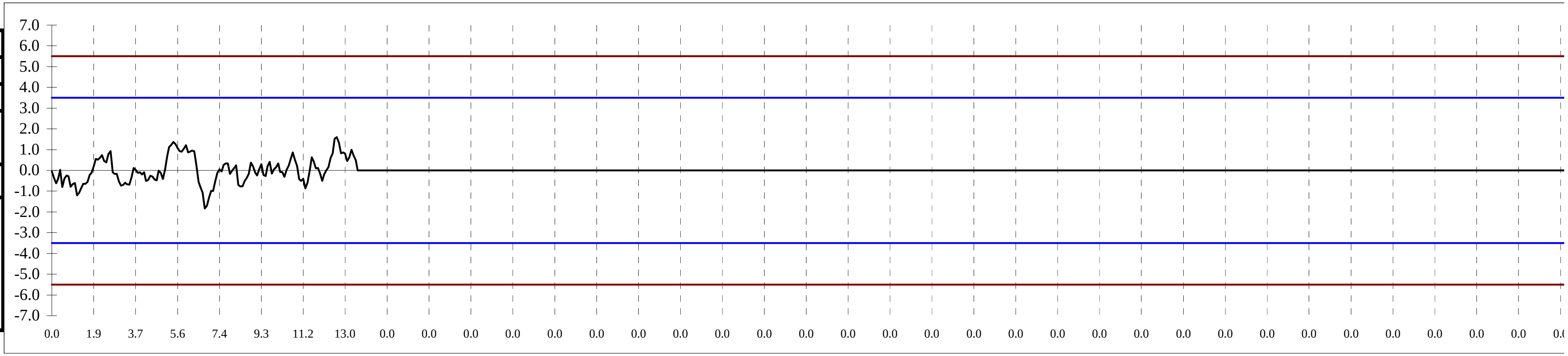
Target percentage to be greater than 95% for limit A

Target percentage to equal 100% for limit B



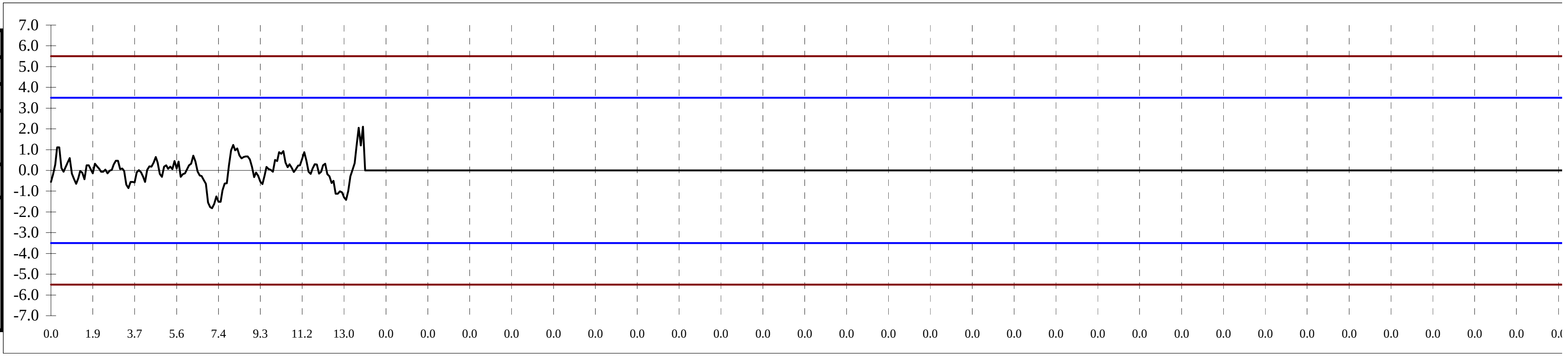
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.5**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



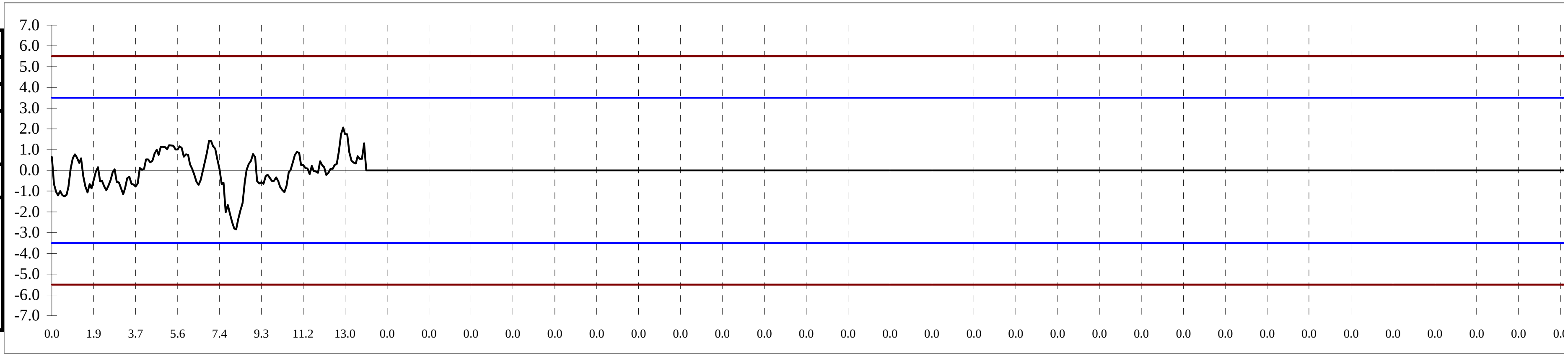
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.9**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.9**
Limit	A	B
Property II	**100.0**	**100.0**

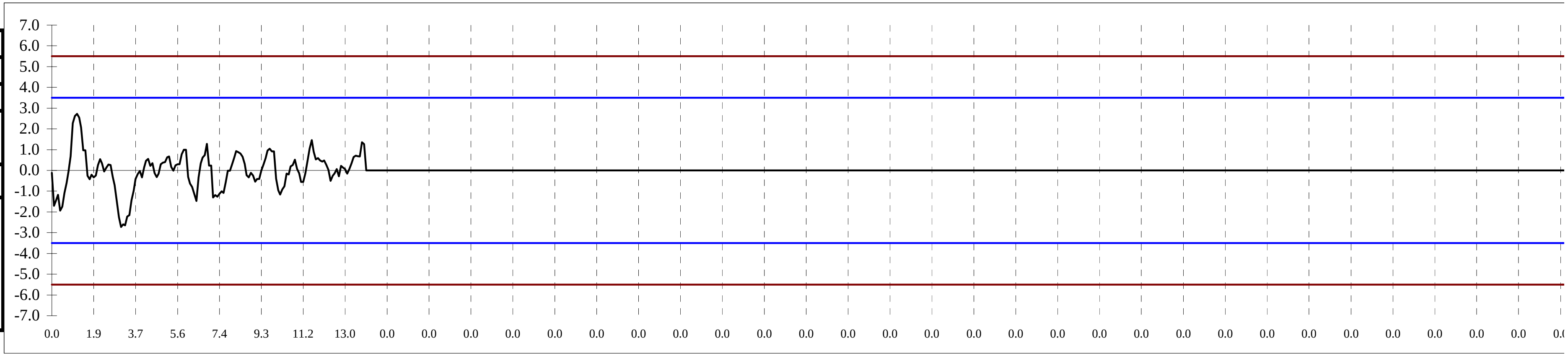
Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.9**
Limit	A	B
Property II	**100.0**	**100.0**

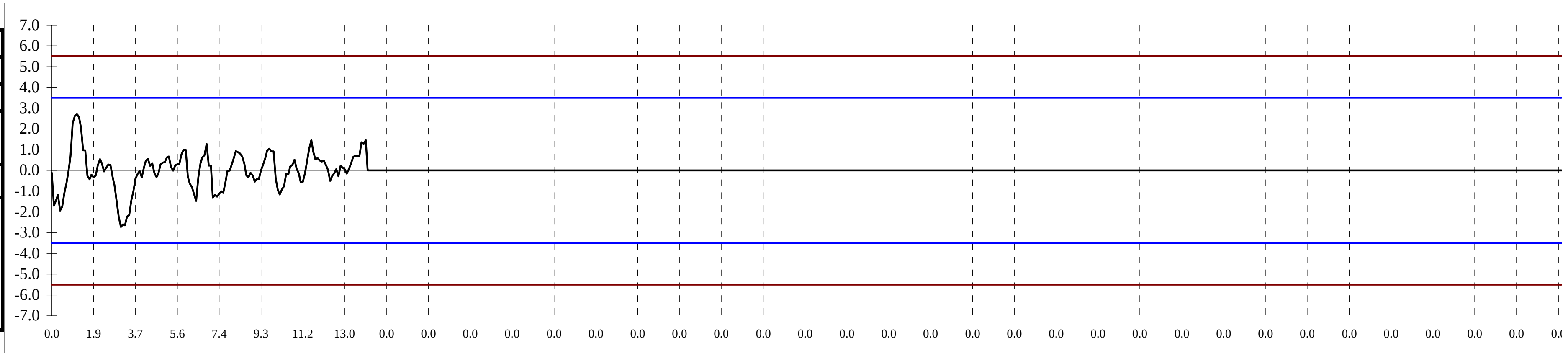
Target percentage to be greater than 95% for limit A

Target percentage to equal 100% for limit B



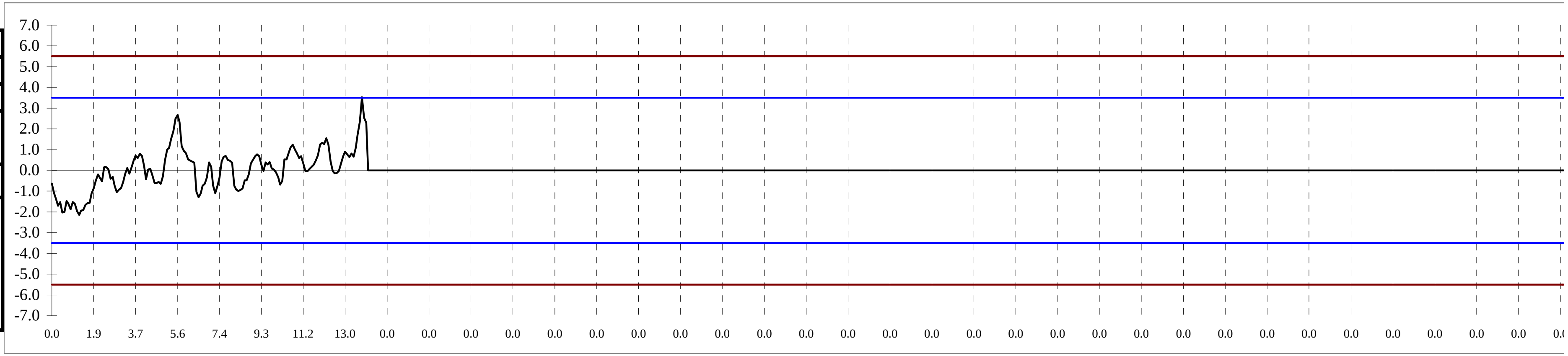
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**14.0**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**14.0**
Limit	A	B
Property II	**100.0**	**100.0**

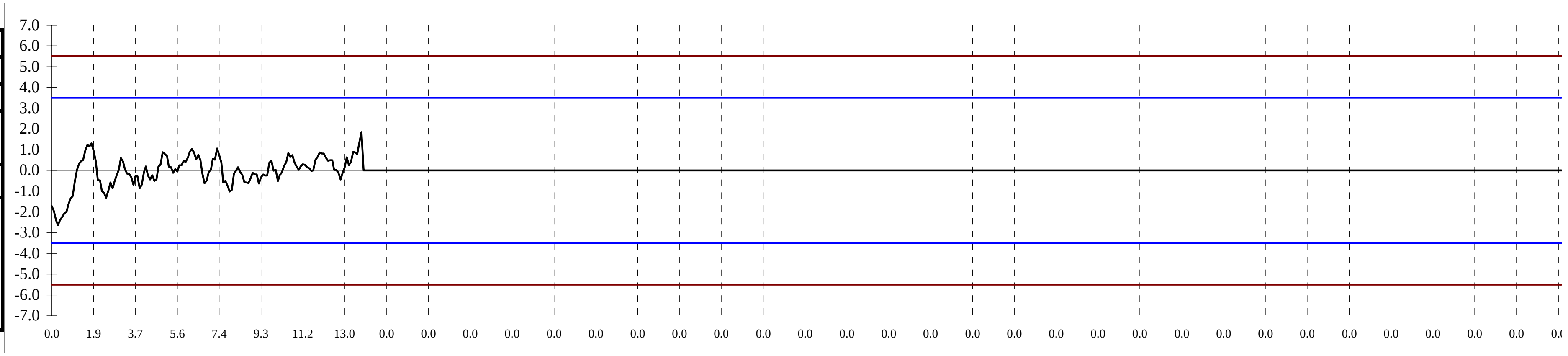
Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



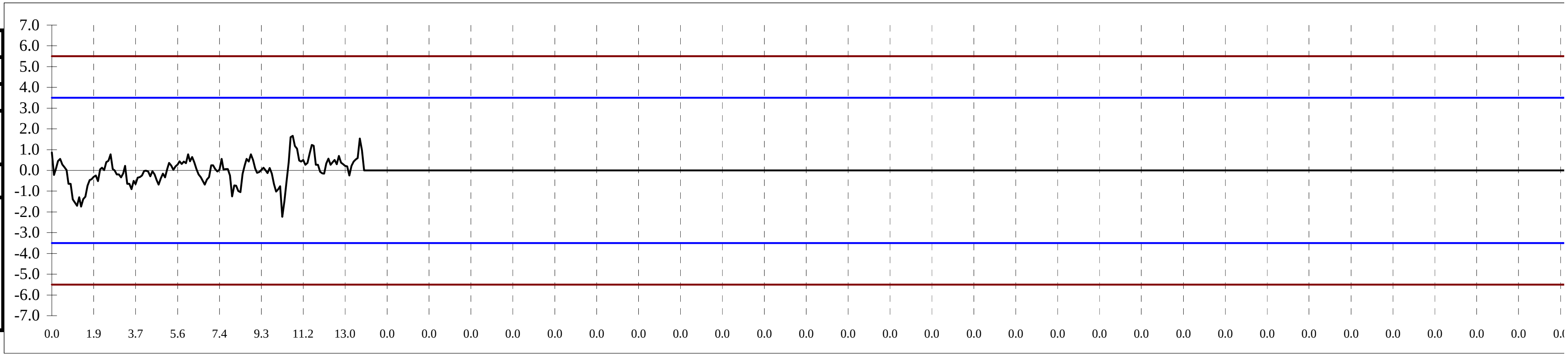
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.8**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A

Target percentage to equal 100% for limit B



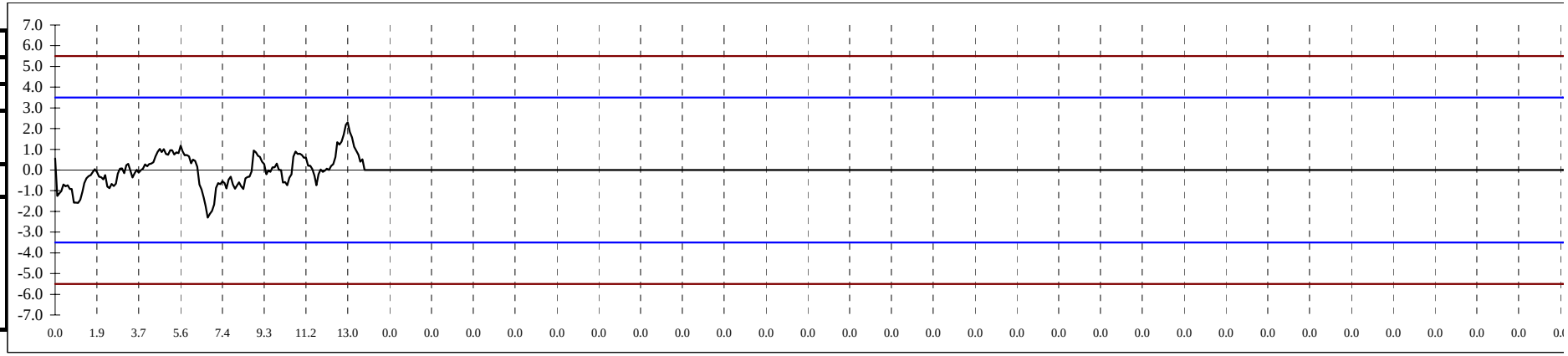
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.8**
Limit	A	B
Property II	**99.3**	**100.0**
Target percentage to be greater than 95% for limit A Target percentage to equal 100% for limit B		



Data Analysis		
TR34 Category		FM2
Run length (m)		13.7
Limit	A	B
Property II	100.0	100.0

Target percentage to be greater than 95% for limit A

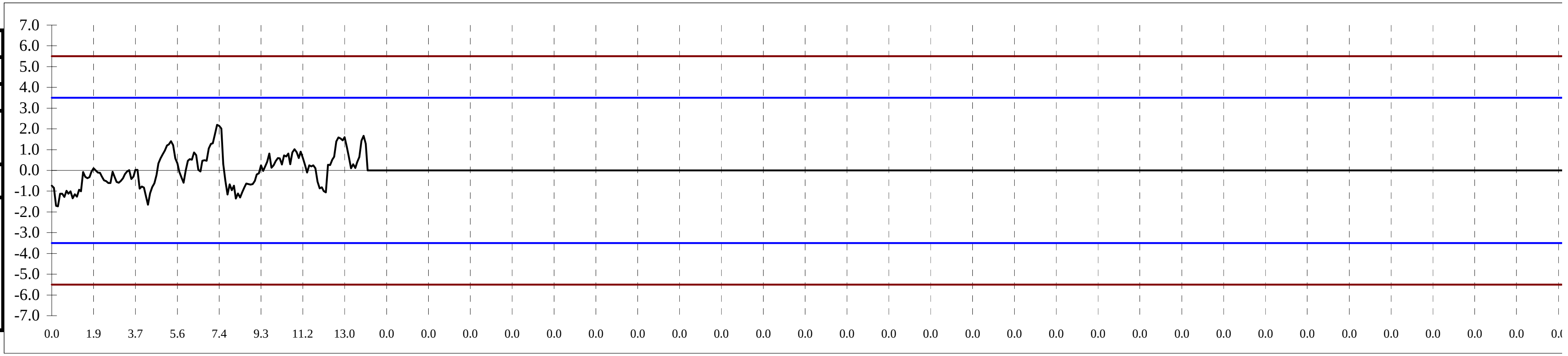
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		**FM2**
Run length (m)		**14.0**
Limit	A	B
Property II	**100.0**	**100.0**

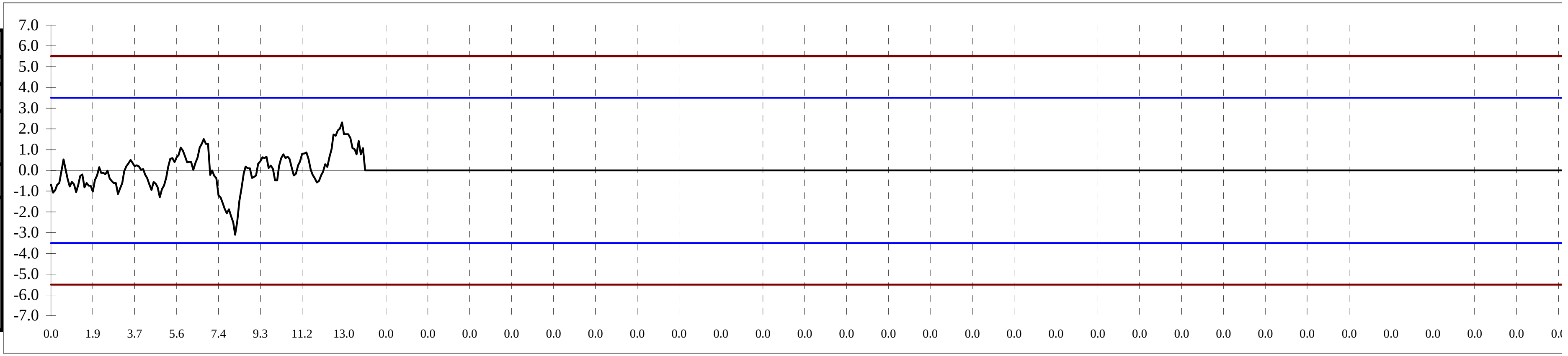
Target percentage to be greater than 95% for limit A

Target percentage to equal 100% for limit B



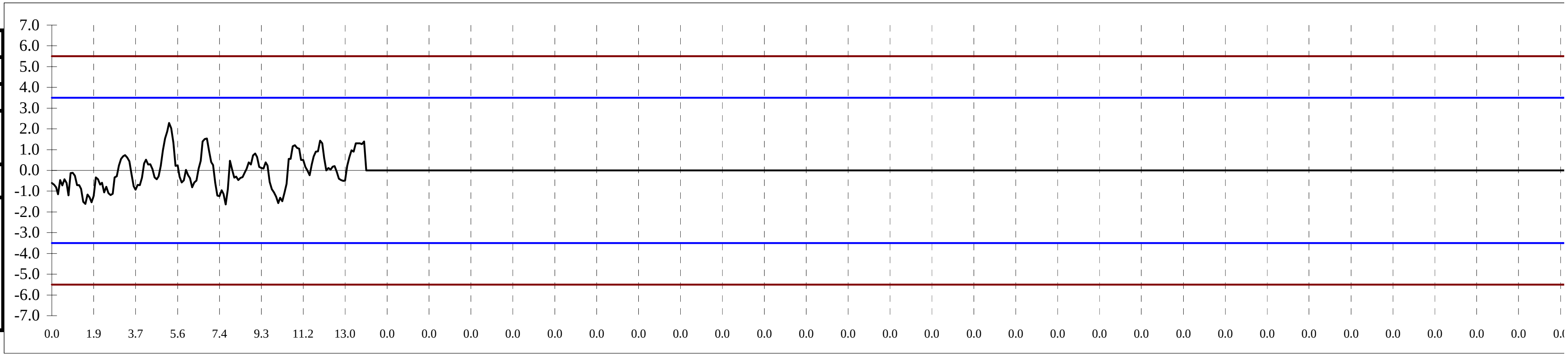
Data Analysis		
TR34 Category		**FM2**
Run length (m)		**13.9**
Limit	A	B
Property II	**100.0**	**100.0**

Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		13.9
Limit	A	B
Property II	100.0	100.0

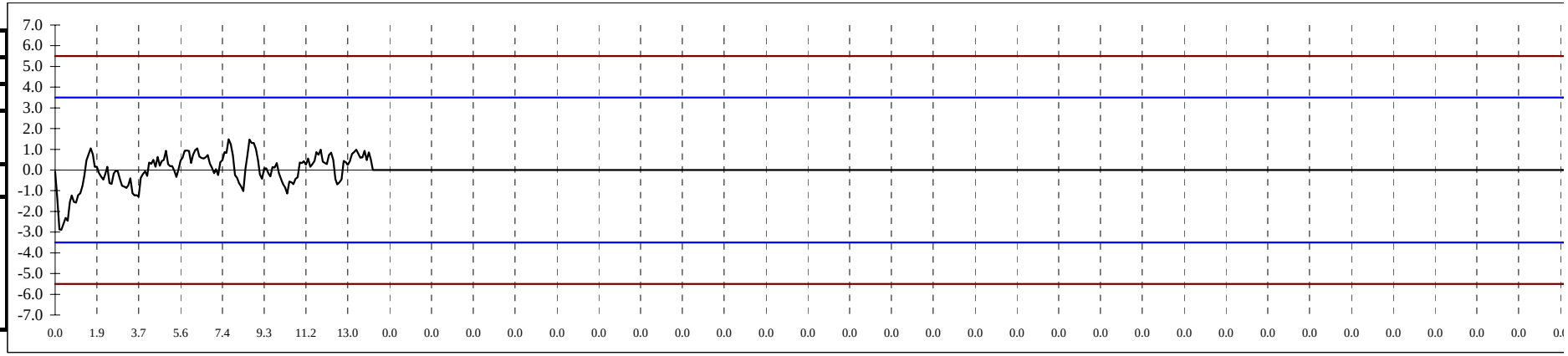
Target percentage to be greater than 95% for limit A
Target percentage to equal 100% for limit B



Data Analysis		
TR34 Category		FM2
Run length (m)		14.0
Limit	A	B
Property II	100.0	100.0

Target percentage to be greater than 95% for limit A

Target percentage to equal 100% for limit B



RUNS	PROPERTY II	
	A	B
1	98.0	100.0
2	98.1	100.0
3	98.4	100.0
4	98.4	100.0
5	99.2	100.0
6	97.9	100.0
7	99.4	100.0
8	96.3	100.0
9	100.0	100.0
10	100.0	100.0
11	100.0	100.0
12	100.0	100.0
13	100.0	100.0
14	100.0	100.0
15	100.0	100.0
16	100.0	100.0
17	100.0	100.0
18	100.0	100.0
19	100.0	100.0
20	100.0	100.0
21	100.0	100.0
22	100.0	100.0
23	99.3	100.0
24	100.0	100.0
25	100.0	100.0
26	100.0	100.0
27	100.0	100.0
28	100.0	100.0
	99.5	**100.0**