

# **ScalesNet-M**

## **(Modularity)**

# **Weight Calibration Software**

## **Brief Description**

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## General Information

### Connecting Balances by Network

One of the most important criteria in mass metrology is the accurate recording of weighing data and corresponding parameters. To ensure that these requirements could be met, the ScalesNet program was tested continuously during the development phase in a DKD laboratory, for correct functioning and suitability for use. These concomitant tests in an accredited DKD laboratory played an essential role in ensuring a high degree of functionality and giving users the confidence they demand.

One of the stringent requirements in quality management today is providing certification of traceability to a national standard for all calibrated weights. This can be realized using ScalesNet.

When a weight is calibrated, the data that must be recorded includes the work order or customer, as well as weight-specific data such as serial number, manufacturer, design, characteristics, etc., to ensure unambiguous identification of the weight. This identifying data is stored in a database, which makes it possible to generate a history of the weight at any time.

The mass comparators used in calibration of weights are monitored by ScalesNet, and must be calibrated and adjusted at specified intervals. The results of these procedures are also stored in a database.

Furthermore, ScalesNet uses connected sensors to monitor reference weights and climate stations. The user is informed when a particular reference weight, climate station or mass comparator is due for calibration; if calibration is not performed within a defined period, the particular device is blocked by ScalesNet from further use.

The calibration intervals for weighing instruments, reference weights and climate stations are set by the user in accordance with the applicable regulations.

**We developed a customized solution for equipping a simple measurement laboratory through to the complete equipping of a national institute.**

### **IMPORTANT**

**For remote support the TeamViewer Application is a mandatory requirement.**

## Benefits of ScalesNet

- Safe weight calibration
- Efficient measurement laboratory management
- Calculation and evaluating according to international guidelines such as OIML|ASTM
- Basis for an accredited measurement laboratory according to DIN EN ISO/IEC 17025
- Transparent documentation and archiving of all process relevant data
- Automatic monitoring of test medium in laboratory
- Display of the customer and reference weight calibration history
- Incorporation of existing customer and calibration data into ScalesNet-M database
- Individual software module adaption
- Connecting of comparators and climate measurement station from any manufacturer
- Flawless, time saving and automatic creation of multilingual, linguistically accurate calibration certificates
- Verifiable software
- Individual service package

## ScalesNet Features

- Calibration of any class and values of customer weights
- Suitable for all weighing cycles in accordance with international guidelines (OIML|ASTM)
- Subdivision mass comparison for calibrating E1 weights
- Automatic evaluation of calibrating results
- Quick comparison of weights without logging
- Monitoring, recording and visual presentation of climate data
- Order preparation
- Examples integrated for weighing scheme
- Presentable history of all process
- Cycles with and without additional weights and sensitivity weights
- All weight classes are already integrated in accordance with OIML and ASTM
- Inputting of own weight classes

- Automatic uncertainty calculation
- Continual test medium monitoring
- Automatic syntactically correct printout of calibration certificates
- UNICODE SQL database structure for customer, weights, balances etc.
- Administration of user rights
- Automatic generation of inventory lists
- Plausibility test when standard weight and comparator are selected
- Manual input of weighing data for comparator without RS232 connection.
- Statistik functions (e.g number of weights per defined period, useful live of the balance per defined period)
- ScalesNet is protected by Sentinel Protection Key (Dongle)

## **ScalesNet Modul Components**

The following main modules are available:

### **ScalesDesk:**

Module for the administration of all base data, work orders, and printouts. The connection to the ScalesNet database server is implemented over Ethernet.

### **ScalesMass:**

This module handles the data concerning test piece and reference weight calibration and calibration/adjustment of mass comparators. The connection to the ScalesNet database server is implemented over Ethernet or WLAN.

### **ScalesMass Mobil:**

This module handles the data concerning test piece and reference weight calibration and calibration/adjustment of manual mass comparators only. The connection to the ScalesNet database server is implemented over WLAN.

**This version works only with Android Tables. (Available from Autumn 2018)**

### **ScalesServer:**

This module administers the database and organizes all tasks; records the transactions carried out between database and user; establishes the connection to the climate stations and provides climate data when a request from the ScalesMass module is received, and polls climate stations for parameters in the mass metrology laboratory at user-defined intervals. In addition, climate parameters are polled during a weighing procedure and allocated to the corresponding weighing data. If the climate station used is not compatible with the system, the "*Data Logger Converter*" module is required; this module converts climate data to a form that ScalesNet can read. Data are transferred over an Ethernet connection to the database server.

### **ScalesPrinter:**

Organizes the printer spooler and print jobs, to ensure that each print job is sent to the selected network printer.

To print protocols, certifications e.g **Microsoft Word®** is required

**For installing ScalesNet local administration rights on all PC's and laptops are strictly necessary.**

## Database Model

- ScalesNet is based on the "thin client/fat server" model. This means as many processes as possible run directly on the server, rather than on the client machine. The database logic is represented on the server.
- No data records are deleted. Each data record has a "Deleted" field. This field is set to 0 when active, and is set to 1 when the record is marked for deletion. As is the case with all changes in the database, the deleting of a record is noted in the log file.
- Every time parameters in a data record are changed, a new record is created and the previous version of the record is marked for deletion. Simultaneously, an entry is recorded in the log file with references to the new and old data records.
- The log file also contains the name of the table, type of access, date and time of access, user ID, etc.
- When a report is created, the data record for that report contains the IDs to all data records required for generating the report. This means the report can be printed out at any time without having to save all the calculation results. Later modification of the data (for example, calibration of the weighing instrument is renewed) does not affect the record retroactively.

## Network connection diagram for ScalesNet

### ScalesNet Network Overview

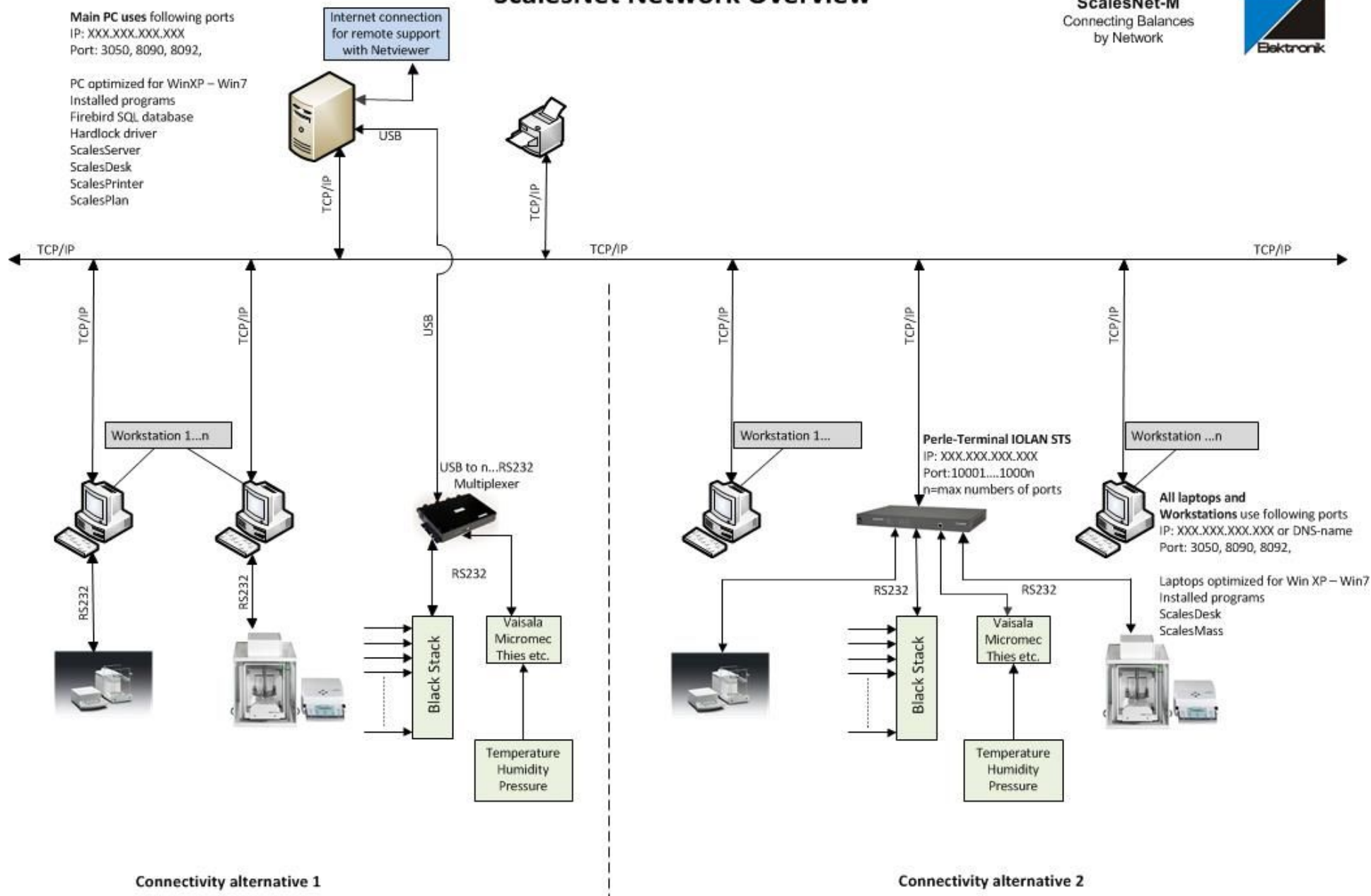
**ScalesNet-M**  
Connecting Balances  
by Network



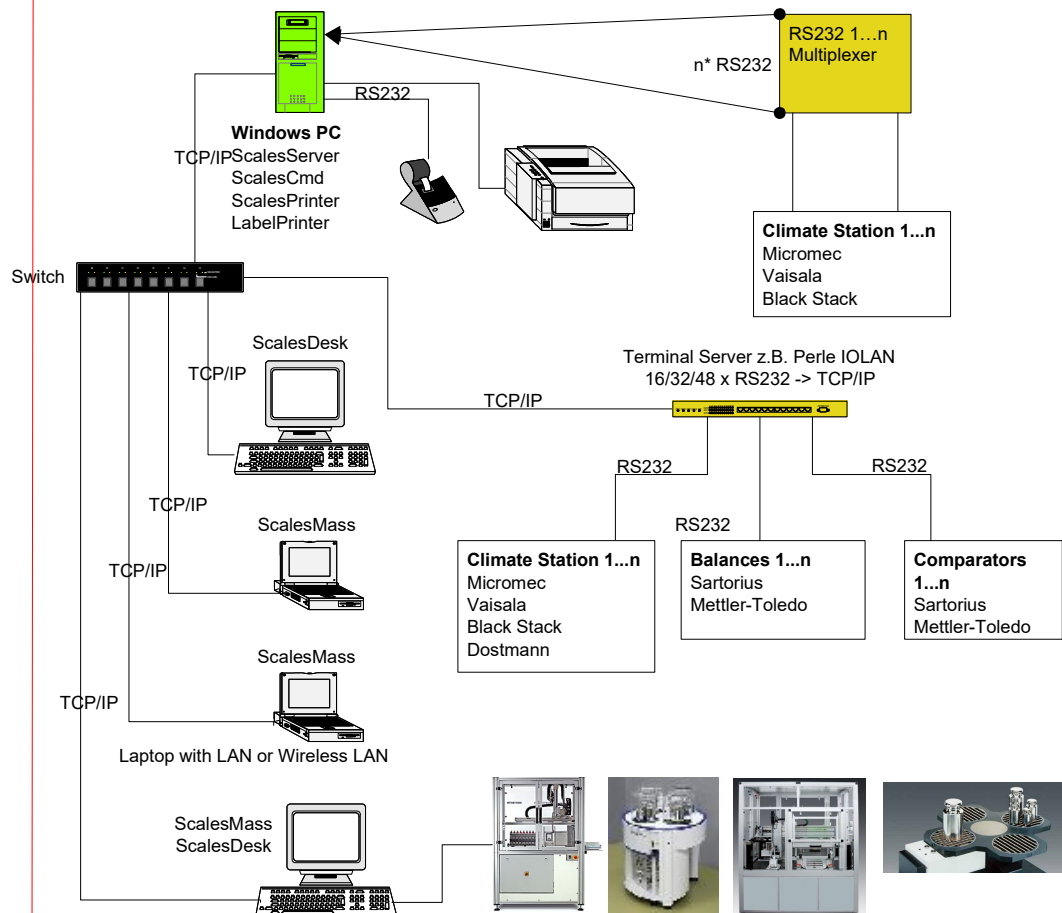
**Main PC uses following ports**  
IP: XXX.XXX.XXX.XXX  
Port: 3050, 8090, 8092,

PC optimized for WinXP – Win7  
Installed programs  
Firebird SQL database  
Hardlock driver  
ScalesServer  
ScalesDesk  
ScalesPrinter  
ScalesPlan

Internet connection  
for remote support  
with Netviewer



## ScalesNet Configuration



## **Calibration of Customer Weights (Test Pieces)**

### **General Information**

Calibration of test pieces is processed on the basis of a work order. This work order lists the job number, customer name or numbers, weight or weight set to be tested, type of test, mass comparator used, reference weight set and type of report. These data must be entered, or selected from the available data, before beginning the test. When robotic weighing instruments are used, a job can be defined for each magazine (weight platform for automatically loading weights onto the weighing instrument) encompassing  $n$  work orders,  $n$  serial numbers, the reference weight and the number of weights to be tested. This program sequence also includes the display of mass scales.

## **Calibration of Reference Weights**

### **General Information**

Data on reference weights are entered in the base data for administration. In the calibration of reference weight sets, a distinction is made between external and internal calibration. All reference weight sets that require internal calibration are listed under Work order\Internal\Reference set, and can be calibrated internally in accordance with the specified guidelines. During internal calibration, the sequence is the same as for calibration of customer's weights, with the exception that no customer is selected.

For reference weight sets requiring external calibration, data can be updated in the base data, with calibration date, calibration certificate number and calibration instance, by clicking on the "New calibration" button; the "Deviation" and "Uncertainty" fields are cleared.

## **Dissemination with Weighing Plan**

### **General Information**

Calibration of test pieces with dissemination is processed on the basis of a work order. This work order lists the job number, customer name or number, weight or weight set to be tested, type of test and type of report. The test pieces used in dissemination are not always from a single work order; for this reason, a job must be defined (similar to that described above for the robotic weighing instrument) that contains all work orders, customers and test pieces. Once this job has been defined, the weighing plan must be selected and the data pertaining to the weights (customer no., manufacturer, serial no., etc.) entered in the plan. The comparisons defined in the weighing plan form the basis of the comparative measurements to be performed on the weights. Results are in the entered matrices and calculated, and the values yielded are allocated to the individual weights.

When robotic weighing instruments are used, multiple jobs can be defined for each magazine (weight platform for automatically loading weights onto the weighing instrument) encompassing  $n$  work orders,  $n$  serial numbers, multiple reference weights and the weights to be tested.

## **Quick Comparison of Weights**

### **General Information**

Select this menu item to perform a quick test. This feature lets you compare a test piece either to a reference weight or to a manually entered value, for comparison without placing a reference weight on the weighing instrument. This test is not recorded in the database.

## **Manual Input of Weighing Data**

### **General Information**

This module is for weighing instruments that do not have a data interface. The weighing instrument is defined in the base data and the operating mode "manual operation" is selected. Calibration of weights with this module is distinguished by manual input of weighing data. Subsequent calculations and printouts correspond to those described under "Calibration of Customer Weights (Test Pieces)."

## **Calibrating the Weighing Instrument**

### **General Information**

Calibration of the weighing instrument yields an *sp* value which can be used as the basis for calculating the permissible class. Calibration is performed at defined intervals. The intervals and a "grace period" are defined in the base data of the weighing instrument.

When the calibration interval has elapsed, the weighing instrument is marked by a yellow symbol in the tree diagram, and the weighing instrument remains available for use during the grace period. If calibration is not performed before the grace period has elapsed, the instrument is marked by a red symbol and blocked from further use. When the ScalesMass program is run, a message window shows the weighing instruments for which the grace period is active or which are blocked from further use pending calibration.

## **Adjusting the Weighing Instrument**

### **General Information**

Adjustment of the weighing instrument is performed at defined intervals. The intervals and a "grace period" are defined in the base data of the weighing instrument. When the calibration interval has elapsed, the weighing instrument is marked by a yellow symbol in the tree diagram. If calibration is not performed before the grace period has elapsed, the instrument is marked by a red symbol and blocked from further use. The next time the program is run, a message window shows the weighing instruments for which the grace period is active or which are blocked from further use pending calibration. The distinction between internal and external calibration/adjustment affects the sequence of the procedure.

## **Preparing Reports and Records**

### **Type of Report or Record**

Reports and records are used for printing measurement data and header data. A distinction is made between internal and external reports or records.

### **Internal Records**

The following are internal records:

- Test piece calibration record
- Inventory list for the weighing instrument
- Inventory list for the reference weights
- Inventory list for the climate stations
- Record of results from weighing instrument calibration

These records are made available in the form of MS Word templates, with bookmarks representing measured values or texts. These bookmarks are replaced by the corresponding value or text when the record is printed.

### **External Records**

The external records are Microsoft Word® templates generated by the user. The required bookmarks are presented in a list for selection by the user; users can also add bookmarks for user-defined text passages. All bookmarks that represent text passages can be generated bilingually in this report. The language setting is saved along with the report (Word template.dot). This makes it possible to create DKD calibration certificates in a variety of language combinations (e.g., German / English, Italian / English, etc.).

Because the report uses a Word template, graphics can be inserted as well; for example, to add a logo, signature, stamp, etc.

## **Hardware Requirements ScalesNet**

### **PC as ScalesServer and Data Base**

PC running operating systems Windows 7 – Windows 10 or Windows Server  
Processor at least Intel i7 - optimized for Windows OS  
Minimum System Memory 16 GB RAM  
Free Hard Drive capacity > 25 GB SSD  
Networking, integrated Ethernet port with RJ45 connector

### **Client PC (Laptop)**

Laptop running operating systems Window 7 – Windows 10  
Processor Intel i5 - optimized for Windows OS  
Minimum System Memory 8GB of RAM  
Hard Drive capacity 128 GB SSD  
Networking, integrated Ethernet port with RJ45 connector

### **Android Tablet**

10" Tablet with Adroid OS; available 2019

### **RS232 to Network Converter (optional)**

All Balances and Climate Stations are connected through the “Converter” to the Network.  
(we recommend PERLE or MOXA converter)

## **Operations**

ScalesNet is designed for installation in IP networks. Hardware components such as climate stations, mass comparators, robots etc. must be installed and configured.

The components to be connected can be integrated as follows:

The climate stations must directly or indirectly serve the ScalesServer module:

- Direct climate station connection over RS232
- Indirect connection over COM2LAN converter to the IP network

The weighing process must always be started by ScalesMass. For this purpose, ScalesMass must be installed on a laptop with direct or indirect connection to the mass comparator:

- Direct connection of mass comparator to laptop over RS232 or USB
- Indirect connection of mass comparator over COM2LAN converter to the IP network and ScalesMass communicates with the mass comparator over WLAN

Mixed operation is possible, i.e. the mass comparators can be connected directly or indirectly. The same also applies to the climate stations.

**Basic + Network version includes:**

- 1 x CD and Hardlock with following licenses:
- 1 x License ScalesServer, Firebird UNICODE SQL database
- 1 x License for Network
- 1 x License ScalesDesk, to administrate the database
- 2 x License ScalesMass, to communicate with balances
- 1 x License ScalesPrinter, to print all certificates
- 1 x License ScalesPlan, to start daily backup
- 1 x License Climate Station, to add a climate station
- 1 x License manual mass comparator, to add 5 manual mass comparator.
- 1 x License to use class OIML class M, class F and equivalent ASTM classes

**Optional enhancements:**

- License for OIML E1, E2, ASTM 0, 1
- License for 5 manual Comparators
- License for auto load alternator
- License for robots
- License for mass dissemination
- License for ScalesMass
- License for ScalesDesk
- License for Climate Station
- License ScalesPrinter

**Enhancements**

The ScalesNet-M basic version can be extended remotely to all available licences individually at any time, including Automatic Comparators, Climate Stations, Dissemination (Mass Code), all Weight Classes of OIML and ASTM, as well as Robot Systems (Brand dependent).

### **Enhancements**

The basic module of ScalesNet can be extended remotely to all available versions individually at any time, including Network, Automatic Comparators, Climate Stations, Dissemination (Mass Code), all Weight Classes of OIML and ASTM, as well as Robot Systems (Brand dependent).

**For installing ScalesNet local administration rights on all PC's and laptops are strictly necessary.**

<p style="text-align: center;"><b>Important</b> <b>If the dongle is lost, it will not be replaced</b></p>
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For further information please visit  
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