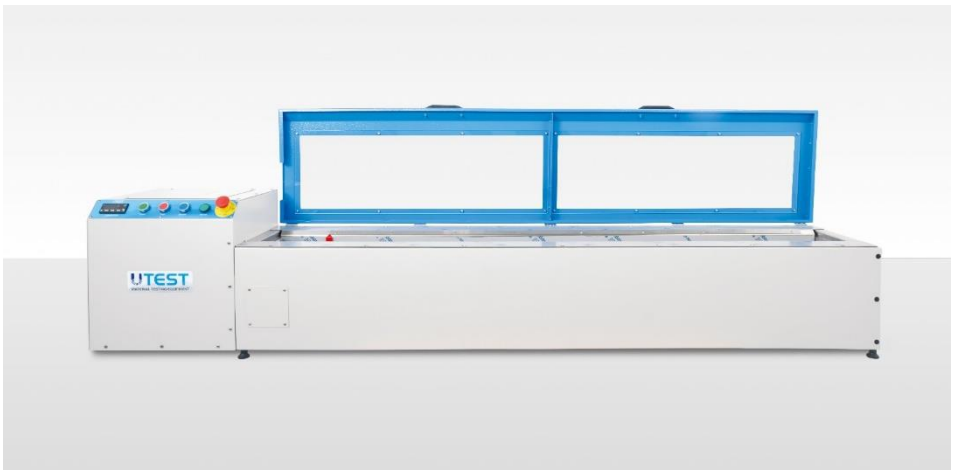




UTB-1420

## DUCTILITY TESTING MACHINE



USER MANUAL

|                                   |     |
|-----------------------------------|-----|
| LIABILITY AND SAFETY.....         | i   |
| Safety Symbols and Markings.....  | i   |
| Liability.....                    | ii  |
| General Safety Instructions ..... | iii |
| Device Handling .....             | iv  |
| 1. INTRODUCTION.....              | 1   |
| 1.1 Product Description .....     | 1   |
| 1.2 Units of the Device .....     | 3   |
| 2. INSTALLATION.....              | 4   |
| 2.1 Environment .....             | 4   |
| 2.2 Unpacking .....               | 6   |
| 3. OPERATION .....                | 6   |
| 3.1 Preparation of Samples .....  | 6   |
| 3.2 Test Procedure .....          | 8   |
| 4. MAINTANENCE.....               | 12  |
| 5. TROUBLESHOOTING.....           | 14  |
| 6. DECLARATION .....              | 15  |
| 7. WIRING DIAGRAM .....           | 16  |
| 8. CONTACT INFORMATION.....       | 17  |

Figure 1: Parts of the UTB-1420 ..... 3

Figure 2: Pouring Bitumen into the Mould..... 7

Figure 3: Cutting off excess bitumen ..... 8

Figure 4: On/Off Switch ..... 8

Figure 5: Temperature Control Unit ..... 9

Figure 6: Mould Holder and Pins ..... 10

Figure 7: Moulds..... 11

Figure 8: Drainage Valve ..... 13





Figure 9: Extraction of Box..... 14

Figure 10: Fuse with its Spare..... 14

Table 1: Technical Specifications of the UTB-1420..... 2

Table 2: UTB-1420 Electrical Connection Properties..... 4

This manual contains important information on the safe usage and maintenance of UTB-1420 Ductility Testing Machine and of its related components. Please read through the manual carefully before operating the device for the first time and keep it for the future reference.

| Symbol  | Description  |
|---|--|
|    | <p><b>WARNING:</b> In conjunction with one of the signal words this symbol indicates a hazard which will or could result in death or serious injury.</p>   |
|    | <p><b>ELECTRIC HAZARD:</b> In conjunction with one of the signal words this symbol indicates a hazard involving electrical voltage and identifies information about protection against electrical voltage.</p> |
|  | <p><b>HIGH TEMPERATURE WARNING:</b> This icon indicates a hot surface warning. Protective gear must be worn at all times while working with or close to the sections marked with this warning icon.</p>        |
|  | <p><b>NOTE:</b> Recommendations and important information on how to handle the product.</p>  |

UTEST General Terms and Conditions of Sales and Delivery apply in all cases. Warranty and liability claims arising from personal injury and damage to property cannot be upheld if they are due to one or more of the following causes:

- ✓ Unauthorized modifications to the device and its components.
- ✓ Failure to use the instrument in accordance with its designated use and purpose which is described in this manual.
- ✓ Failure to adhere to the sections of the manual dealing with the performance check, operation and maintenance of the instrument and its components.
- ✓ Incorrect performance checks for operation and maintenance of the instrument and its components.
- ✓ Damage resulting from the effects of foreign bodies, accidents, vandalism and force majeure.
- ✓ If the instructions given in troubleshooting cannot help to solve your problem, plug out the power cable and call UTEST technical service.

The instrument is only to be used for its designated purpose as describe herein. Replace faulty components only with original replacement parts from UTEST. Accessories should only be installed or connected to the instrument if they are expressly authorized by UTEST. If other accessories

are installed or connected to the instrument, then UTEST will accept no liability and the product guarantee is forfeit.

## General Safety Instructions



This part contains important safety instructions that the user must follow for operation and storage of UTB-1420.

This part contains important safety instructions that the user must follow for operation and storage of UTB-1420 Ductility Testing Machine.

- ✓ Device should be seated on a steady and competent base.
- ✓ Always follow basic safety precautions when using this product to reduce risk of injury from any dangerous situations.
- ✓ Read and understand all instructions in the documentation that comes with UTB-1420.
- ✓ Avoid contact with these materials if any organic or inorganic chemicals are used in the test to be performed with the equipment. Wear safety glasses, gloves and a lab coat before starting the test.
- ✓ Observe all warnings and instructions marked on the product.
- ✓ Before removing any covers or performing maintenance repair and service, isolate from electrical supply by removing mains plug.
- ✓ If the instructions given in troubleshooting cannot help to solve your problem, plug out the power cable and call UTEST technical service.

- ✓ Do not lean the cabinet to the wall at zero distance.
- ✓ While the test is in operation do not remove any covers or attempt to adjust any part of the machine.

The machine is equipped with an emergency button that once pressed deactivate all the power functions of the equipment.



**WARNING:** *The equipment is not allowed to be operated by children or anyone under the influence of alcohol, drugs or pharmaceutical preparations. Anyone who is not familiar with this manual must be supervised when using the equipment. Carry out the stipulated maintenance properly and at the correct time. Following completion of the maintenance tasks, perform a functional check.*

## Device Handling

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The electronic and mechanic parts of UTB-1420 are sensitive components. Please handle them carefully.

- ✓ Do not place any heavy objects on the device.
- ✓ Avoid any impact or rough handling that might damage the device.
- ✓ Do not change the calibration settings of the machine.
- ✓ Do not disassemble UTB-1420.

- ✓ Install the product in a protected location where no one can step on or trip over the power cord and in a location where the power cord cannot be damaged.

UTB-1420 Ductility Testing Machine is used to determine the ductility of bituminous materials in a briquette mould by measuring the breaking elongation at a constant speed of 50 mm/min in 25° C degree water. It is designed for testing 3 specimens simultaneously. The internal tank is made of stainless steel. The bath is fitted with an immersion heater in order to obtain (in normal conditions), the 25° C test temperature. Maximum elongation (pull) capacity of the device is 1500 mm. Also UTB-1420 is equipped with cooling unit located under the device to stay stable temperature of the water in addition to the heater. Moulds and mould base plates should be ordered separately.

This version of the force ductility machine can be used for testing in accordance with:

- ✓ ASTM D 6084: “Standard Test Method for Elastic Recovery of Asphalt Materials by Duclilometer”
- ✓ ASTM D 113: “Standard Test Method for Ductility of Bituminous Materials”
- ✓ EN 13398: “Bitumen and bituminous binders – Determination of the elastic recovery of modified bitumen”
- ✓ AASHTO T51: “Standard Method of Test for Ductility of Asphalt Materials”

The ductility test gives a measure of adhesive property of bitumen and its ability to stretch. In flexible pavement design, it is necessary that binder should form a thin ductile film around aggregates so that physical interlocking of the aggregates is improved. Binder material having insufficient ductility gets cracked when subjected to repeat traffic loads and it provides pervious pavement surface. Ductility of a bituminous material is measured by the distance in centimeters to which it will elongate before breaking when two ends of standard briquette specimen of material are pulled apart at a specified speed and specified temperature.

Technical specification of the device is given in the following table:

Table 1: Technical Specifications of the UTB-1420

| Specifications                    | Value             |
|-----------------------------------|-------------------|
| Table Speed                       | 50mm/min          |
| Test Temperature                  | 25 °C / ± 0.5 °C  |
| Bath Capacity                     | 25 lt             |
| Mains Supply                      | 220V/50-60 Hz/1ph |
| Power Rating                      | 350 W             |
| External Dimensions ( w x l x h ) | 300x1850x550      |
| Device Net Weight                 | 80 kg             |

Main parts of the UTB-1420 consists of temperature control unit, protective cover, emergency stop button, cooling unit, and elongation measurement ruler. Parts of the device is shown in the Figure 1.

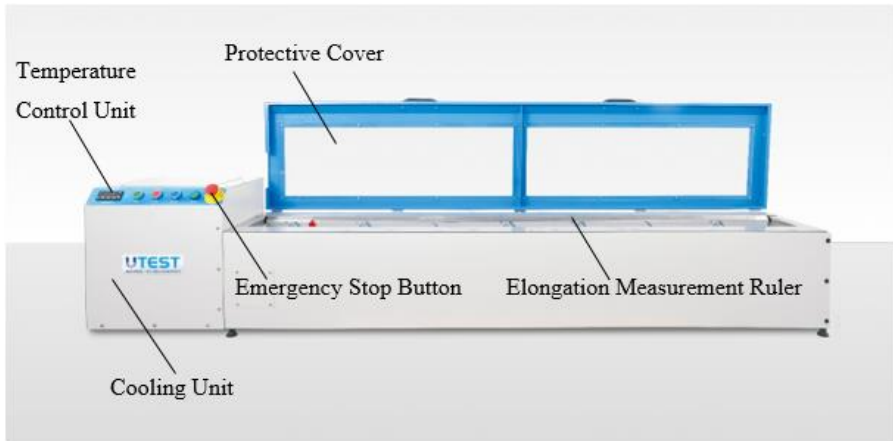


Figure 1: Parts of the UTB-1420

**Temperature Control Unit:** Temperature can be adjusted via the temperature control unit on the device. To do this, first press the L1 button on the temperature control unit. After the screen change, you can increase the temperature by pressing the L1 key again or decrease the degree by pressing the L2 key. You can save the degree you set by pressing the Enter button on the far left of the temperature control unit (see Figure 5).

**Emergency Stop Button:** The machine is equipped with an emergency button that once pressed deactivate all the power functions of the equipment.

**Protective Cover:** This cover is used to hold any object that might fall into the device during testing or when the device is not in use and to protect it from damage or injury.

**Elongation Measurement Ruler:** It is used to find out the test result (to find out how long the bitumen samples elongate). Thanks to this 150 cm long ruler, the user can find the amount of elongation. Since the red sign on this ruler moves with the endless mile, the point where this red sign is at the end of the test gives elongation.

## 2. INSTALLATION

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### 2.1 Environment

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Make sure that the room in which the device is going to be placed have a proper mains supply which is in compliance with the machines specifications, and enough number of plugs for the connection of the device, PC/laptop, etc. Check the voltage (V), ampere (A), frequency (Hz), and the phase of the mains supply in Table 1.

Table 2: UTB-1420 Electrical Connection Properties

| UTB-1420 Electrical Connection Properties |        |            |       |
|---|--------|------------|-------|
| Voltage                                   | Ampere | Frequency  | Phase |
| 220 - 240 V                               | 8 A    | 50 - 60 Hz | 1Ph   |

Main electricity line must be free from instabilities and repetitive power cuts for both the extended life of the device and the continuity of testing. Therefore, make sure that the mains supply is well grounded. If the power cuts are frequent or the grounding is not well enough, the use of an uninterruptible power supply (UPS) is recommended.

Make sure that the device is placed in a clean and dry surrounding. Direct contact of the device with the sunlight should be avoided. A conditioned room for example, will comply the above conditions and will result in best operational performance and measurement results. Device should be well accessible from the front and the sides for connections, testing and maintenance.

In order to prevent inaccurate test results, the ground should be rigid enough to minimize vibrations or shocks. If there are any other testing equipment or a source that creates vibrations on the floor, UTB-1420 should be placed maximum possible distance to that source. Surface of the ground should be horizontal and smooth enough so that the horizontal and vertical alignment of the device are not shifted.



**NOTE:** *If remote assistance will be required from the UTEST Technical Service Department, the room should have an internet access.*

Open the wooden case without damaging the contents and remove all packaging materials. Check for completeness and damages if exist. Report any irregularities directly to the supplier.

Take necessary precautions and carefully transport and place the device to its place.

Before starting the test, make sure that the bitumen specimens meet the requirements of the standards. It is useful to understand preparation procedure before starting the test.

Heat the sample with care to prevent local overheating until it has become sufficiently fluid to be poured. To avoid local overheating, you can stir the bitumen with a proper spoon or stick. Assemble the mold according to the Figure 2 and place it on its proper base. Pour bitumen into the mold following in the Figure 2.

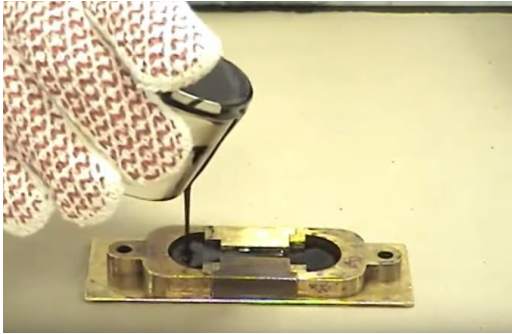


Figure 2: Pouring Bitumen into the Mould



**NOTE:** *Because bitumen sample is overheated, you should wear the glove while pouring it into to mould.*

To prevent the material under specimen from sticking, thoroughly cover the surface of the plate and interior surfaces of the sides with a mixture of glycerin and dextrin, talc or china clay.

Check that the plate, upon which the mold is placed, is perfectly flat so that the bituminous material results leveled. Let the mould containing the material cool to room temperature for a period of 30 - 40 min. and then place it in the water bath maintained at the specified test temperature (25°C).

After 30 minutes take out the mold and plate and cut off any excess bitumen with a hot straight-edged putty knife or spatula. This operation should be done carefully In the meantime, prepare the second and third specimen following the same procedure.



Figure 3: Cutting off excess bitumen

### 3.2 Test Procedure

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1. Read the requirements of the standard to be tested before starting the test. Prepare all materials required to conduct the test.
2. Fill the water bath with clean water according to related standard.
3. Plug the power cable. Turn on the device by turning the On / Off button (see Figure 4).



Figure 4: On/Off Switch

4. Set the temperature to the 25°C. Temperature can be adjusted via the temperature control unit on the device. To do this, first press the L1 button on the temperature control unit. After the screen change, you can increase the temperature by pressing the L1 key again or decrease the degree by pressing the L2 key. You can save the degree you set by pressing the Enter button on the far left of the temperature control unit (see Figure 5).

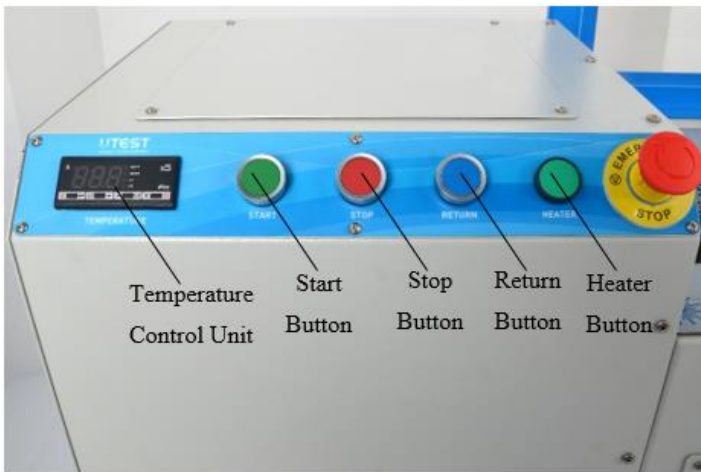


Figure 5: Temperature Control Unit

5. Press Heater Button and wait until water reaches set temperature. Temperature of the water can be seen on the screen of the temperature control unit (see Figure 5).
6. Put the mould in ductility bath and wait 30 minutes to equal the water and sample temperature. To put the moulds insert the moulds to the pins on the mould holder (see Figure 6). Before

doing this operation be sure that mould holder stays at appropriate distance. To adjust the distance and return button can be used.



Figure 6: Mould Holder and Pins

7. Before starting the test, check the zero position of the specimens.
8. Disassembly the sides of the moulds (see Figure 7).



Figure 7: Moulds

9. By pressing Start Button apply a small traction force to the samples so that the clearance between hole and pin is removed.
10. Press Stop Button after a small traction. Record starting position and press Start Button again to start the motor. The rotation of transmission shaft allows the carriage to move forward and the specimen to elongate. The test speed defined by standard specifications is 50 mm/min.
11. When failure of each specimen is observed, measure the elongation on the ruler. From the three readings, each corresponding to failure of one specimen, take the medium value.
12. After the failure press Stop Button to stop the motor. To make a new test press Return Button to send the shaft to the zero position.



**ELECTRIC HAZARD:** *It is important to care that the unit must be switched off and the main cable must be removed before starting any maintenance for user's safety.*

As with all electrical equipment, machine must be used correctly and maintenance and examination must be performed at regular periods. Such precautions will guarantee the safe and sufficient functioning of the equipment.

We recommend that the device is cleaned of any particles and dust, bitumen from the scattered specimen after the test with a damp cloth and brush to avoid incrustations which could damage the paint work. Clean the bitumen pieces with trichloroethylene or gasoline. Pour the required amount of trichloroethylene or gasoline to the damp cloth and wipe out the bitumen pieces.

After the test is finished and the water inside the device has been drained, so open the drainage valve located at the backside of the device (see Figure 8) and wipe the device with a dry cloth, especially the ball screw. Even if the material is stainless steel, when it stays in the water, rusty marks are seen. For this reason, UTEST is not responsible for the device when it is not cleaned from water.



Figure 8: Drainage Valve

**Neglecting to do this will shorten the device life. Bitumen in molds can be cleaned with gasoline after testing is done. At certain times, for example, once a week, the screw shafts of the device must be lubricated.**

Maintenance to the equipment is responsibility of the purchaser and must be performed as stated by this chapter. Failing to perform the recommended maintenance actions or maintenance performed by unauthorized people can void the warranty.

Possible problem and repair technics are mentioned below. Please read this section before calling UTEST technical service.

If the machine does not switch on, fuse in rocker switch is changed with its spare given. You must first plug out the power cable to perform this operation. After that extract the box which carries the fuse with screwdriver and change the fuse with its spare (See Figure 12 and 13).



Figure 9: Extraction of Box



Figure 10: Fuse with its Spare



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|   |   |   |
|---|---|---|
| <b>Firma Adı</b><br>Company Name                            | : | UTEST MALZEME TEST CİHAZLARI VE MAKİNELERİ İMALATI VE DIŞ TİCARET ANONİM ŞİRKETİ            |
| <b>Adres</b><br>Address                                     | : | 1. ORGANİZE SANAYİ BÖLGESİ URAL CAD. NO:18 SİNCAN/ANKARA/TÜRKİYE                            |
| <b>Ürün Tanımı</b><br>Product Description                   | : | DÜKTİLİTE DENEY CİHAZI<br>DUCTILITY TESTING DEVICE  |
| <b>Ürün Markası/Modeli/Tipi</b><br>Product Brand/Model/Type | : | UTEST/UTB-1400, UTB-1420, UTB-1430, UTGE-4110, UTGE-4110-N                                  |
| <b>Referans Yönetmelik(ler)</b><br>Reference Directive(s)   | : | 2006/42/AT Makine Emniyet Yönetmeliği Ek-1<br>2006/42/EC Machinery Safety Directive Annex-1 |
| <b>Test Raporu</b><br>Test Report                           | : | Benart Uluslararası Teknik Kontrol Ve Belgelendirme Ltd.Şti. : LVD-2772                     |
| <b>Sertifika No</b><br>Certificate No                       | : | 3103  |
| <b>Yayın Tarihi</b><br>Issue Date                           | : | 23.01.2019  |
| <b>Geçerlilik Tarihi</b><br>Expiry Date                     | : | 22.01.2020  |

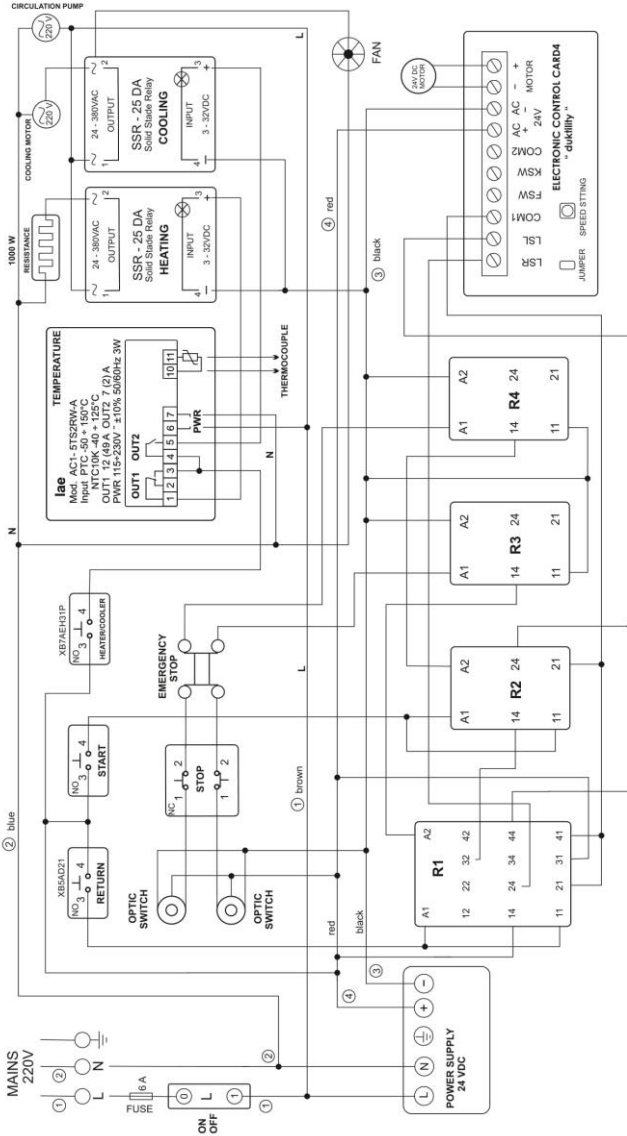
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# 7. WIRING DIAGRAM



**WITH COOLING SYSTEM**

| DUCTILITY TESTING MACHINE |                           |
|---------------------------|---------------------------|
| PRODUCT NUMBER:           | UTAS-4420                 |
| PRODUCT DATE:             | PHASE NUMBER: 1/1         |
| NAME:                     | Electrical Specifications |
| DESIGNER:                 | ADONIS                    |
| DESIGNED BY:              | ADONIS                    |
| CONTROLLED BY:            | ADONIS                    |
| APPROVED BY:              | ADONIS                    |
| DATE:                     | ADONIS                    |
| REVISION:                 | ADONIS                    |
| PHASE:                    | ADONIS                    |
| POWER:                    | 1000 W                    |
| FREQUENCY:                | 50/60 Hz                  |
| VOLTAGE:                  | 220-240V                  |
| AMPERES:                  | 6 A                       |
| PHASE:                    | 1PH                       |

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