



**AUTOMATIC MARSHALL
COMPACTOR
TMB-1540A**

MANUAL USER

www.testmak.com

Automatic Marshall Compactor, ASTM

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1. GENERAL INFORMATION

1.1 GENERAL FEATURES

- ✂ This manual is addressed to the carrier, the installer, the user, the maintenance operator, the scrapping operator.
- ✂ Please read it carefully because it informs you about the operating of the machine in safety conditions.
- ✂ This manual has to be considered a part of the product and concerns only the machine it is delivered with.
- ✂ Keep the manual in order during the whole life of the appliance to consult it for any needs.
- ✂ In case of sale, the manual and its enclosures should be given together with the machine.
- ✂ The manufacturer assumes no liability for any damages caused by a misuse of the machine.
- ✂ The manufacturer has the right to modify this technical literature as well as the machines this refers to without any previous notice.
- ✂ Messages meaning:

ATTENTION : It shows the procedures that can damage seriously the machine if they are not followed carefully.

DANGER : It shows the procedures that can be dangerous to the operator if they are not followed carefully.

1.2 IDENTIFICATION

Manufacturer : TESTMAK INS.LAB.MAK.SAN.VE TİC. PAZ. İTH. İHR. LTD. STİ

Trademark: TESTMAK

Country of Origin : TURKEY

Product name: MARSHALL COMPACTOR

Code of product: TMB-1540A

1.3 APPLICATIONS

The Automatic Marshall Compactor is automatically compacts the sample and stops after the preset number of blows. The mould is held in position by a quick and practical clamping device. The 4536 ± 9 g sliding hammer falls at the 457 ± 3 mm distance for every blow. Automatic control Complete protection for operator safety to CE prescriptions. The unit incorporates a compaction pedestal, comprising a laminate block secured to by a 300 mm square x 25 mm thick steel plate.

ATTENTION

The instructions given in this operating manual are only made for the right use of the appliance. To carry out the test in the right way, the user must refer to the specific standards in force for the test itself.

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1.4 STRUCTURE AND OPERATION OF THE MACHINE

Marshall Compactor is appliance from two main parts:

A- THE COMPACTOR BODY

The Marshall compactor is mainly formed by a steel base placed over a wooden pedestal. A mould housing the specimen is located upon the base. A hammer driven by a trip mechanism provides specimen compaction. The hammer is 4536 ± 9 g weight and lifted to a height of 457 ± 3 mm and allowed to fall free at 55 ± 5 blows per minute.

B- THE CONTROL PANEL

It allows controlling and managing the compactor functions. Consult the enclosed file for further details.

Do not hesitate to get in touch with the manufacturer or with the dealer for any further information.



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2. SAFETY INFORMATION

2.1 GENERAL SAFETY INFORMATION

- ✎ The use, lifting, installation, maintenance and scrapping of the machine are allowed only to qualified staff. A qualified staff is composed by people who are authorised by the safety responsible to do any activities due to their experience and acknowledgement of the operating of the machine and of the standards, rules and actions.
- ✎ The user must be carefully taught about he operating of the machine to avoid any misuse of it and about the safety devices, which the machine could be eventually equipped with. The safety devices will have to be kept always assembled and to be daily checked.
- ✎ The TESTMAK offers training and assumes no liability for any damages due to a misuse of the machine by an unskilled staff.
- ✎ The manufacturer recommends following carefully the instructions and procedures of the operating manual and the safety standards concerning the safety devices and the general rules of the work environment.
- ✎ Verify the accordance of the machine to the standards in force in the state where the machine has to be installed.
- ✎ The operating manual must be carefully read by the safety responsible, by the operators and maintenance engineers. It must always be kept near the machine in order to be able to read it any times it will be necessary.
- ✎ Any tampering or modifications of the machine (electric, mechanical etc.) that are not allowed by a written agreement of the manufacturer must be considered as not permitted and the manufacturer will not accept to be charged for any damages.
- ✎ The removal or the tampering of the safety devices will be an infringement to the EEC Safety Standards. The manufacturer assumes no liability for any damages.
- ✎ The machine has to be installed in places safe from fire and explosions.
- ✎ TESTMAK do recommend using only original spare parts and accessories; on the contrary the manufacturer assumes no liability.
- ✎ Be careful that any dangerous situations won't happen during the working; stop immediately the machine in the event that it will not work properly and ask the manufacturer or the Authorised Service Staff of the dealer at once.

2.2 DANGEROUS PARTS AND RESIDUAL RISK

The dangerous place is the space inside and around the machine where the operator could be wounded or damaged. During some procedures the operator could face some risks of danger.

The risks can be eliminated following carefully the procedures written in this manual and using suitable safety devices.

ATTENTION

In case the machine installation is not done by the Manufacturer, employ only skilled operators particularly trained for the lifting of heavy machinery.

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GENERAL INFORMATION

- ✔ Before starting the standard use of the equipment, ensure that all the components are in good working conditions check there are no defective or damaged parts. If necessary repair or replace any damaged part.
- ✔ Do not wear large clothes, ties, kettles, watches or others, which could entangle in the frame as well as in any moving part of the machine.
- ✔ Pay attention to the risk for electric shocks both direct and indirect, due to a failure to the electric system.
- ✔ Do not subject the appliance to impacts or shocks.
- ✔ Do not expose the appliance to fire, extreme temperatures or weld splatter.
- ✔ Avoid corrosive substances to come in touch with the appliance.
- ✔ Do not wash the machine using water spray.

DURING THE USE

- ✔ In order to grant the maximum security level for the operator, do not touch any moving part of the appliance during the test execution and wear the convenient protection devices.
- ✔ If the appliance is not equipped with safety guards, do not stand nearby during the test execution. This will avoid any incidental contact with the falling hammer.
- ✔ If the appliance is provided with safety guards, pay attention to the risk of finger squeeze when closing the same.

DURING THE LIFTING

- ✔ During the lifting take care that the machine is conveniently held and secured and that it cannot slide.
- ✔ Do not stand in a direct line with the application of force. Do not allow people entrance under loads that are no conveniently supported by mechanical means.

2.3 NOISE

The indicated levels of noise are not necessarily safety levels for the operator. The exposure level of the operator is obviously related to the emission levels of the appliance, but other factors influence the exposure levels as the time of exposure, the environment, other appliances installed near to the appliance etc. The exposure levels permit to value the damages that could be caused by the noise.

Acoustical pressure level equivalent Laeq, in the working place	52 dB(A)
Acoustical power emitted by the appliance LWA	57 dB(A)
Standard above data are referred	EN ISO 3746

DANGER

The continuous use of the machine together with other noisy appliances could cause a high level of exposure to the noise. If the daily exposure of the operator is equal or higher than 85 dB(A), Safety Devices as headphone are suggested to be worn. If the daily exposure is equal or higher than 90 dB(A), the use of the Safety Device is compulsory. For further information consult the standards of the country where the machine has been installed.

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3. INSTALLATION

3.1 LIFTING

The operating instructions must be respected during:

- ✎ The lifting and the storing
- ✎ The first installation
- ✎ The further installations

The machine is usually packed in a wooden case to be moved by a forklift. During the lifting of the case, it is recommended to take the utmost care and to follow the lifting directions labelled on the case. If possible, use forklift or crane and fasten the case with belts and ropes, avoid the use of chains.

ATTENTION The lifting of the case must be effected with great care and following the lifting directions on the case.

ATTENTION Protect the machine from the atmospheric agents. Water and humidity could oxidise it, damaging it seriously.

3.2 UNPACKING

After removing the package, check that any parts of the machine are not damaged. In case of doubt, DO NOT USE THE MACHINE and ask the manufacturer.

DANGER The materials used for the package (plastic, polystyrene, screws, nails, wood etc.) have to be kept far from children. They must be thrown away in a proper collection centre.

ATTENTION Before throwing away the package, pay attention that any accessories, manuals, documents, spare parts are not inside.

3.3 INSTALLATION

The machine has to be placed in an environment suitable for the aim it has been conceived in laboratory. The installation must be done by skilled operator.

ALLOWED TEMPERATURE	from + 5°C to + 40°C
ALLOWED HUMIDITY	from 30% to 95%
MIN. HEIGHT	2500 mm

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GENERAL WARNING

- ✔ The machine must be installed so that it is minimal 50 cm free from each side. This will grant its easy maintenance.
- ✔ No unauthorized people or dangerous objects must be allowed to get in the area near the appliance.
- ✔ The appliance should be installed on a smooth and hard floor, best if made of concrete (for EN model); secure the appliance using the screw hole foreseen under the base plate. Use the provided fixing bolts and check carefully that the trip mechanism is perfectly levelled.

3.4 ELECTRIC CONNECTIONS

DANGER

Skilled operators must arrange the electric connections

DANGER

Before connecting, see the attached electric diagram and the plate on the machine for the information about the voltage, the frequency, etc.

ELECTRIC TOLERANCES

- ✔ Real voltage ± 10 % of the nominal one.
- ✔ Frequency : ± 1 % of the nominal one in a continuous way; ± 2 % of the nominal one for a short period.
- ✔ The harmonic distortion of the sum from the second to the fifth harmonics not more than 10 % of the total voltage as a real value between the conductors. A further distortion of 2% is accepted for the sum from the sixth to the thirtieth harmonics of the real total value between the conductors.
- ✔ With reference to the tension unbalance of the three-phase voltage, the inverted sequence component and the zero sequence component must not be more than 2% of the direct sequence component of the voltage.
- ✔ The voltage pulses must not last more than 1,5 ms with an up/down time between 500 ms and 500 μ s and a peak value not higher than 200 % of the real value of the nominal tension.
- ✔ The electric feeding must not be interrupted or zeroed for more than 3 ms. Between two interruptions it must not take more than 1 s.
- ✔ The interruptions must not overcome 20 % of the tension peak for more than one cycle. Between two interruptions it must not take more than 1 s.

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4. MACHINE FEATURES

Model	TMB-1540A / TMB-1541A
Hammer Weight	4536 ± 9 g
Free Fall Height	457 ± 3 mm
Blows Frequency	55 ± 5
Dimensions	500x500x1910 mm
Weight	125 kg
Power	220 V 50 Hz, 370 W

5. OPERATOR'S INTERFACE

C1	SAFETY GUARDS	Only for EEC appliances. It prevents the operator from coming in touch with the moving parts of the appliance.
C2	FIXING HOLES	They allow fixing the appliance to the floor.
C3	LEVER FOR MOULD BLOCKING	It allows blocking the mould, after its positioning, on the compactor steel base.
C4	MOULDS	It contains the bituminous specimen to be tested.
C5	COMPACTION HAMMER	It allows the compaction of the specimen.
C6	BRACKET TO FIX THE ROD	It holds the hammer driving shaft.
C7	COUPLING LEVER	It allows coupling the moving rod in the upper position when the mould must be positioned on the base of the compactor.
C8	COUNTOR UNIT	Digital Panel

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6. MACHINE USE

6.1 WARNINGS

Before starting the normal use of the equipment it is recommended to verify that it is in good working conditions with no defective or damaged parts. If necessary proceed with the required maintenance operations.

Before starting a test the user must check the main features of the materials composing the specimen and try to foresee the way it will react to the compaction test in order to use the proper cautions.

6.2 SWITCHING ON THE APPLIANCE

Before starting the normal use of the equipment it is recommended to verify that it is in good working conditions with no defective or damaged parts. If necessary proceed with the required maintenance operations.

Before starting a test the user must check the main features of the materials composing the specimen and try to foresee the way it will react to the compaction test in order to use the proper cautions.

ATTENTION Before switching on the appliance ensure it is connected to the power net.

Install the appliance plug in the power supply.

The control panel is configured by the Manufacturer in the stroke-counter mode; in case you realize that the configuration is incorrect and not suitable to the machine features, contact the After Sale Service immediately.

6.3 TOOLING UP

Here under we describe the proper procedure to allow tooling up the appliance correctly even to an operator without a wide experience.

ATTENTION The Manufacturer assumes no liability for any damage caused by an incorrect use of the appliance.

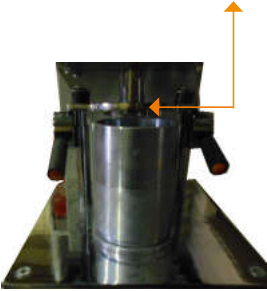
1	Open the safety guards.
2	Lift the shaft and the hammer
3	Turn the blocking lever so that the mould fixing bracket is lifted
4	Place the sample in the mold.
5	Position the mould already filled with the specimen on the centring pin situated on the steel base
6	Turn the blocking lever so that the mould is secured to the base.
7	Move downwards the hammer shaft so that the hammer touches the specimen surface;
8	Close the safety guards and secure it using the special lever.
9	Push "START" button for start test.

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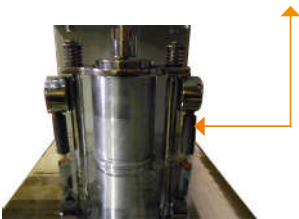
4 Place the sample in the mold.



5 Position the mould already filled with the specimen on the centring pin situated on the steel base



6 Turn the blocking lever so that the mould is secured to the base.



7 Move downwards the hammer shaft so that the hammer touches the specimen surface;



8 Close the safety guards and secure it using the special lever.

9 Push "START" button for start test.

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6.4 PROGRAMMING THE CONTROL PANEL

The control panel is configured by the Manufacturer in the stroke-counter mode; in case you realize that the configuration is incorrect and not suitable to the machine features, contact the After Sale Service immediately.

NOTE If you want to change the settings, follow the procedures below.



S1	You should push "Set" button.
S2	You can increase or reduce the count number with the right and left arrow keys.
S3	Press the "Set" key again after setting the number of blows.

6.5 PROCEDURE FOR THE OPENING OF THE SAFETY GUARDS

The compactor can only work when the safety guard is closed and locked by the special lever. In case the emergency button is pushed during the test running, the Compactor will automatically stop. In this case the stroke number would be lost.

If the operator needs to stop the Compactor at any time and to open the safety guards. Pushing the key the appliance will automatically stop, the stroke counter is reset. It is worth reminding that the test interruption causes its annulations. Before switching on the appliance once again, find and solve the problems, which caused the need for an emergency stop.

6.6 EMERGENCY STOP

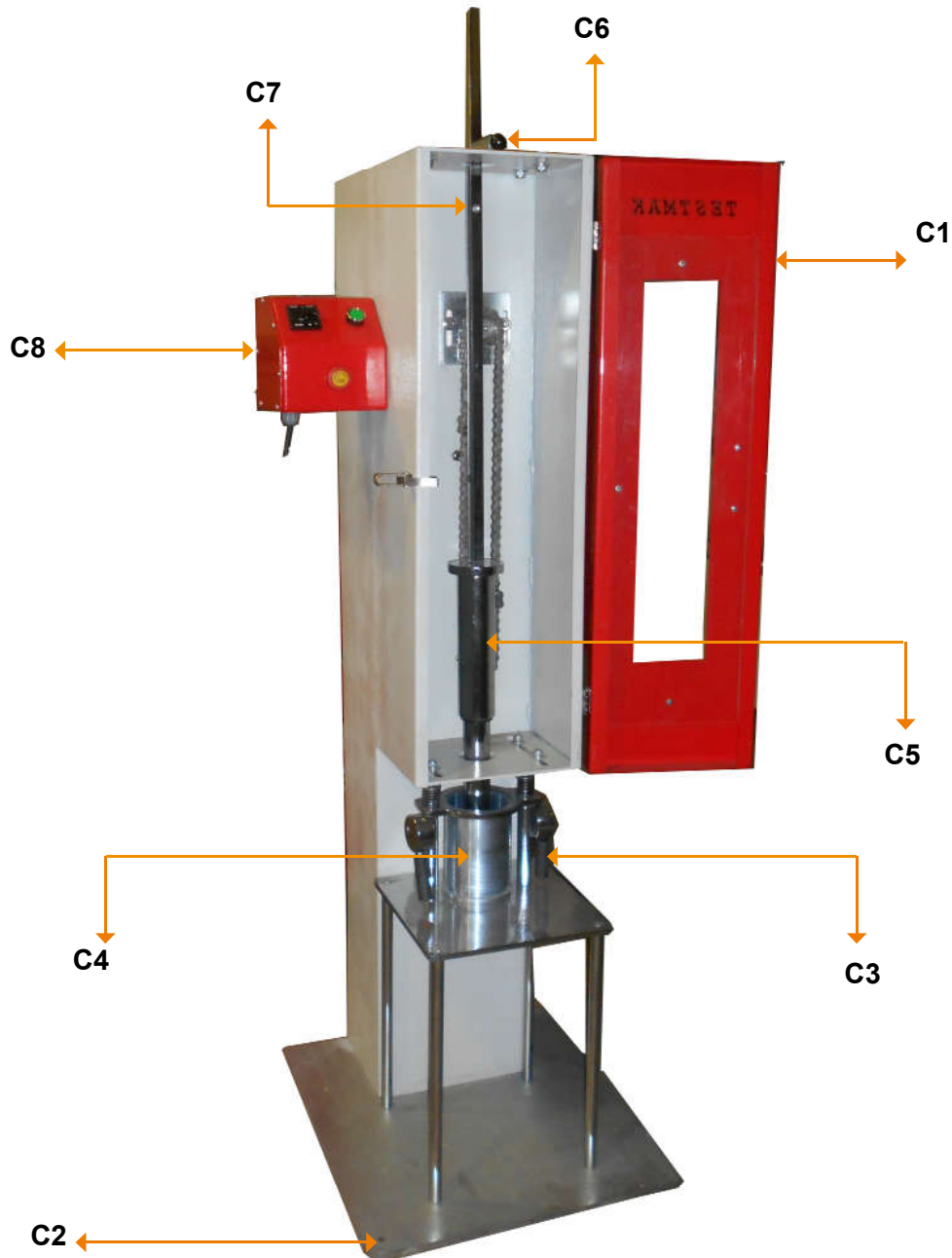
In case of emergency it is possible to stop the test execution at by positioning the emergency button on "0"

6.7 STARTING AFTER AN EMERGENCY STOP

Before switching on the appliance once again, find and solve the problems, which caused the need for an emergency stop. To switch the appliance again, just move the "emergency button", placed on the Control Panel, to position "1", this will reset appliance normal functions.

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MARSHALL COMPACTOR BODY



NOTE You can check page 9 for details.

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7. MAINTENANCE

DANGER

All the maintenance operations must be carried out with the machine turned off and unplugged from the knife switch.

DANGER

Skilled operators instructed about the purposes the machine is made for must carry any kind of maintenance operations concerning the components of the machine and of the electric components, even those that may seem very simple.

DANGER

Only original spare parts are allowed. The Manufacturer assumes no liability in the event that non original parts are used.

DANGER

Only original spare parts are allowed. The Manufacturer assumes no liability in the event that non – original parts are used

7.1 ROUTINE MAINTENANCE

In order to maintain good working of the machine for a long time, clean periodically all the parts and oil the parts that are not painted. Avoid the use of solvents, which could damage the varnished parts and the synthetic ones.

Make regularly all the periodical inspections listed in the chapter “PERIODICAL INSPECTIONS (7.3)” in order to avoid any damage or malfunctioning of the appliance.

7.1 SPECIAL MAINTENANCE

In case of special maintenance operations (repairs, replacement of parts and any other operation not described in this manual) ask directly to the **TESTMAK SERVICE DEPARTMENT**.

7.3 PERIODICAL INSPECTIONS

It is recommended to execute punctually and correctly all the periodical inspections here described. This will help in preventing failures and dysfunctions.

OPERATION	PROCEDURE	FREQUENCY
CHECK OF THE WEIGHT FALLING HEIGHT	Check if the falling height is 457 ± 3 mm, if it isn't, unscrew the screws that are fixing the releasing device installed on the sliding rod of the rammer and set the proper height.	AFTER 50 WORKING HOURS
CHECK THE SPRING OF THE SLIDING DEVICE	Ensure that the push up spring of the sliding device (assembled on the hammer) has not reached its yielding point and that it pushes the device to the max. stroke.	AFTER 50 WORKING HOURS

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OPERATION	PROCEDURE	FREQUENCY
CHECK THE PULL CHAIN ARM AND ITS SPRINGS	Ensure that the pull-chain arm and its springs (located inside the compactor) are working correctly, keeping the chain well stretched.	AFTER 50 WORKING HOURS
CHECK THE LEADING PLATE AND THE SLIDING DEVICE OF THE RAMMER	Verify that the leading plate and the sliding device are not worn out. If necessary replace them.	AFTER 50 WORKING HOURS
CHECK THE LINK BLOCKS OF THE CHAIN	Ensure that the nylon link blocks keep the chain pushed towards the hammer. If necessary adjust them using the fixing screws.	AFTER 50 WORKING HOURS

7.4 PERIODICAL OPERATION

OPERATION	PROCEDURE	FREQUENCY
CLEAN THE DRIVING SHAFT AND THE TRIP MECHANISM	Clean the squared driving shaft and the rammer periodically. ATTENTION Do not grease the squared driving shaft. It must work dry.	WEEKLY
CLEAN AND GREASE THE SLIDING DEVICE ASSEMBLED ON THE RAMMER	Clean thoroughly and grease using silicon oil –highly fluid– the sliding device.	AFTER 50 WORKING HOURS
GREASE THE CHAIN	Disassemble the safety guard backwards; verify that the chain is greased and the support link of the leading plate is free to move. If necessary wash thoroughly the chain and grease it.	AFTER 50 WORKING HOURS

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8. DIAGNOSIS

8.1 DIAGNOSIS

Some easy to solve and simple problem, which can happen during the working of the appliance, are introduced in this chapter.

ATTENTION

All maintenance, checking, control and repairing operations of each part of the machine or of the electric system, must be carried out by skilled operators instructed about the functions and working procedures of the appliance.

PROBLEM	POSSIBLE CAUSE	CURE
After having switched on the main switch the compactor doesn't work	No supply	Check the proper connection of the plug to the main supply.
	Damage to the motor	Contact our After Sale Service
	Damage to the electric supply	Check that the cables and the connections of the electrical supply are not interrupted.
The compactor continues keeping all its functions working even after the lower safety guard has been opened.	Damage to the safety system connected to the safety guard.	Contact our After Sale Service for the proper replacement of the safety micro-switch

9. SCRAPPING

9.1 SETTING ASIDE

In case of setting aside for a long time it is necessary to disconnect the electric feeding. Execute all the maintenance operations. It's recommended to cover the machine against the dust.

9.2 SCRAPPING

When the machine is not used anymore, it is recommended:

- ✂ Disconnect the feeding cable
- ✂ Cover/destroy all the parts which may be dangerous as cutting, projecting or sharpened ones.
- ✂ Disassemble the machine and scrap it as per the actual laws.



TM TEST MAK
MATERIAL TEST EQUIPMENTS

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