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1- Familiarity with extensograph device

The use of Farinographs and extensographs allows flour mills, bread makers, biscuits and other cereal products and research centers to grade all types of flour and wheat according to curves and, if necessary, purchase suitable samples of wheat and flour. And mix to change the properties of flour as desired because in many cases without the above information, the behavior of flour can not be predicted and controlled during the fermentation and baking operations. Using the extension machine, resistance, tension, dough elasticity, energy level, etc. can be obtained. In general, the basis of the operation of this machine is that the amount of force required to pull the dough until it is torn is calculated and the force diagram is drawn in terms of tension. In the new generation of extensograph devices, by designing a monitoring system separate from Farinograph, while saving time and space, it is possible to perform statistical analysis, store information in Excel format, and predict the cooking status, which causes; This device can compete with European models in terms of software features. The basis of operation of this device is in accordance with the National Standard of Iran No. 2-3246 and the International Standard ISO No. 2-5530.



2. Extensograph installation steps

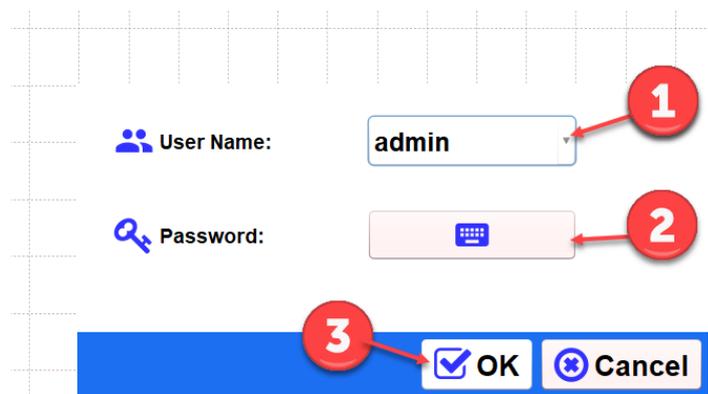
Follow the steps below to install the device.

- 1- Make sure the device is on a flat surface. The unevenness of the surface or the slope of the device can affect the result.
- 2- Connect the device to 220 V 50 Hz power supply.
- 3- Place the stabilizer and earth device on the input power path.
- 4- Turn on the water tank so that the dough compartments reach the desired temperature (30 ° C).

3- Guide on how to use extensographs

After installation and preparation, the device is now ready for testing.

By turning on the key on the back of the device, on the screen, the program displays the user specification request.



The screenshot shows a user login interface on a grid background. It features three main elements with red circular callouts: 1. A 'User Name:' label with a person icon, followed by a text box containing 'admin'. 2. A 'Password:' label with a key icon, followed by a password input box with a keyboard icon. 3. A blue bar at the bottom containing two buttons: 'OK' with a checkmark icon and 'Cancel' with a close icon.

1 Select a username from the list.

2 Click the Password box to open the keyboard and you can enter the password.

3 Click OK to enter the program if the password is correct.

You will now enter the main page of the program, which has the following sections:

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1 In this section, there is a Start button to start a test and a Test Name list to select the test name (time and number).

2 sections Info and Controls that change through section 3, ie tabs. The Info section provides the details of the current experimental group, along with buttons for switching between experimental groups. The Controls section also contains controls for timers and dough preparation motors.

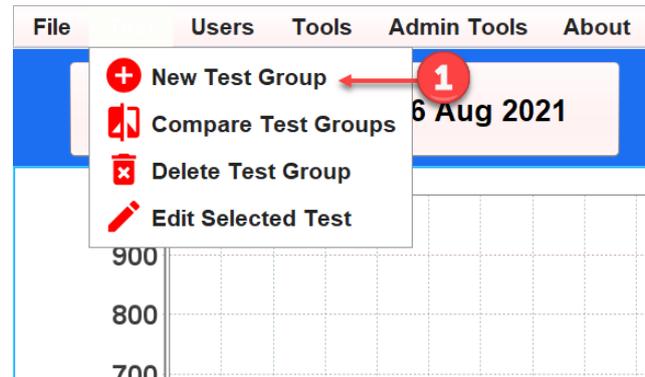
3 tabs that allow you to switch between Info and Controls modes.

Displays the **4** chart diagrams in which the test chart is drawn or the test chart selected in Section 5.

5 Experiments section which contains a list of tests performed in an experimental group along with buttons for selecting, deleting and displaying the report.

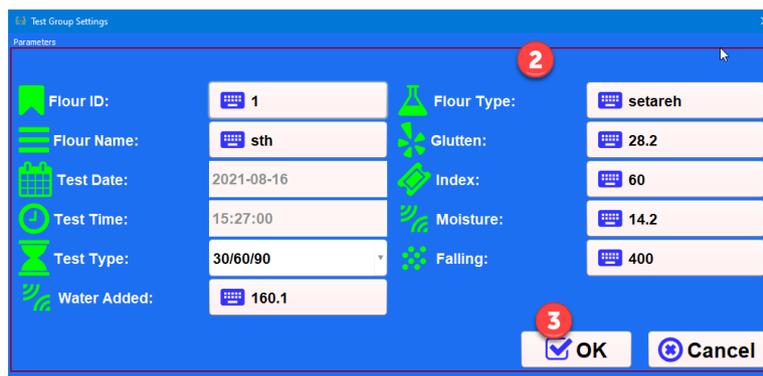
6 menu bars that contain various program commands.

Create an experimental group



Each extensograph test group contains six experiments. Therefore, to test each dough, a test group must first be created for it. To do this, follow these steps:

- 1 From the Test menu, select the New Test Group command. A window will open to enter the details of the test group



- 2 Enter the details of the test group

Important items are:

Flour ID: Enter an ID for the sample.

Flour Name: Enter a name for the flour.

From the Test Type list, specify an item for the test type that is specified in terms of fermentation time (minutes).

- 3 Click OK.

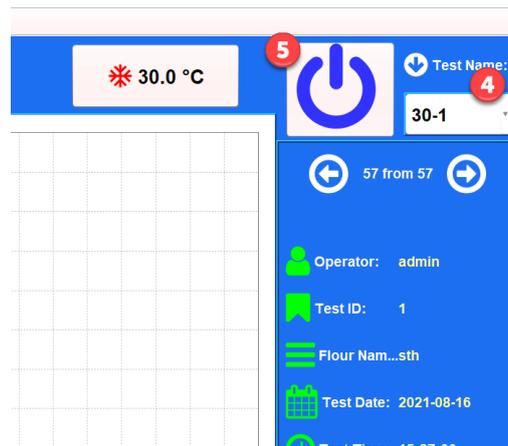
An empty test group is created and its details are displayed in the Info panel on the right, and the test and graph display section is empty.

- 4 To perform the test, make sure that the correct item is selected in the Test Name list.

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For example, if you selected the type of test 30/45/90, item 1-30 must be selected for the first test. The program selects the first empty item by default. But if you select the wrong item, you can select the correct item from the list.

- 5 Click the Start button

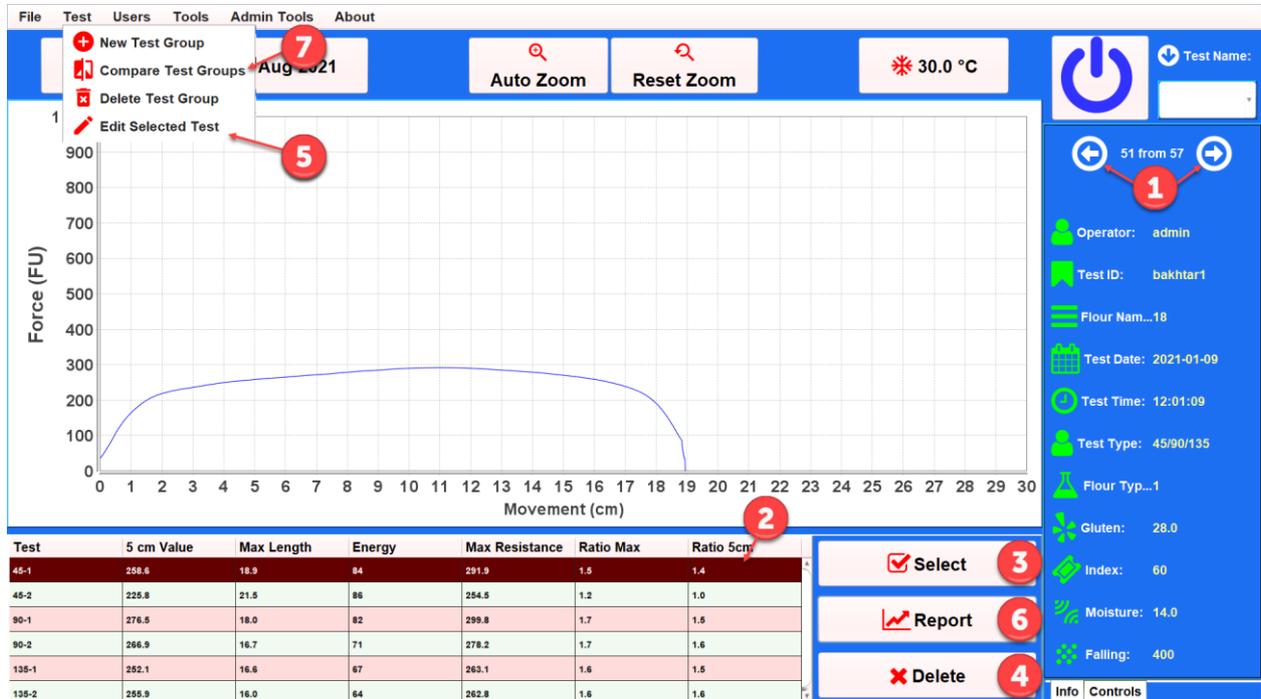


See the results of an experimental group

- 1 Open the test group using the arrows at the top of the Info panel.
- 2 Click one of the tests to highlight it.
- 3 Press the Select button to select highlighted experiments.
The selected test chart now appears on the screen.
- 4 If you want to delete that experiment, click the Delete button. Note that only the test selected with the Select button is deleted.
- 5 To correct a test (delete part of it), after making sure that the correct test is selected, select the Edit Selected Test command from the Test menu. A window will open in which you specify the amount of deletion from the end and the beginning. Apply the desired change and click OK. Note that you must re-select the test to display the result of this edit. .
- 6 Click the Report button to see the full details of an experiment and compare its graphs. A window will open in which the graph of the performed tests will be displayed along with the average of the results and it will be possible to save the report
- 7 To compare this test group with another group, select the Compare Test Groups command from the Edit menu. A window will open allowing you to compare the two



experimental groups and their results



Use the Controls panel

The Controls panel contains controls for timers and dough preparation engines.

- 1 Click the Controls tab to open its panel. In this panel, there are three timers along with the control buttons of the preparation motors.
- 2 To set a timer, first select the fermentation time.
- 3 To correct this time, you can use the up and down arrows next to the minute and second boxes.
- 4 Click Start. The timer starts working and rings after the specified time.

4. Important points when using the device

- 1- Before performing the test, make sure that the temperature of the dough chambers reaches.
- 2- Before placing the dough in the rolling pin, be sure to grease the rolling pin chamber with a brush. Also, in the step, it is necessary to grease the rolling pin dishes.

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3- It is necessary to clean the hooks and jacks after each use of the device.

4- During the test in the intervals between the tests, the lid of the fermentation chambers should be closed to minimize the changes of water pressure and temperature inside the chamber.

5. Accessories with the device.

The table shows accessories with the

Name	Part number
Power cable	1
Dough holder	6
Elevator	1
Elevator hook	1
Edible grease	1
Brush	1
paraffin container	1
Water tank	1
Water tank lid	1

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extensograph.



6_ Technical specifications of the device

The following table shows the technical information of the Extensograph.

Technical specifications of Extensograph	
300 grams of flour + 6 grams of salt + water required	Sample weight
Copper coil material in dimensions 58 × 10 × 25, insulation of temperature and humidity	Tank instead of dough
83 rpm	Bargain speed
Engine and steel plate and round plate hardened	Dough rounding system

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15 rpm	Quickly roll the dough
Steel material with heating and cooling system and water circulation pump	Water storage tank at constant temperature
Hardened aluminum	Dough compartment
Molded aluminum	Dough clamp mold
It has an alternator, an electric rotary motor, an aluminum housing and a corresponding roller	Roll the dough
It has an electric motor and an encoder	Special rails and hooks
1.45 cm per second	Hook speed
Aluminum has a weighing system	The location of the dough
24V and 12V DC	Electro-Motor
Has a control system for different parts of the device	Special board
USB and Bluetooth	Computer connection output board
With the ability to install on tablets and computers in the device	Device related software
Metal	Body Material
13 inch touchscreen	Screen
usb, printer	cable
۴	Raspberry
Metal and plastic	Sartas
20-40 kg	Loader
Power 12 to 24 volts with different cycles	Electro-Motor
HX711-thermometr-hall effect	Types of modules
	Dimensions
830 × 410 × 375 mm	With out elevator



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1150 × 400 mm	Elevator and rake
1475 × 410 × 830	Required space
81 kg	Weight