



MINIMIX

User manual Version 3.1

MCR
PROCÉDÉS &
TECHNOLOGIES

Dear Customer,

Thank you for purchasing the *Minimix*. We want to make sure that you received the instrument in good order and that you do not have any problems with the initial operation.

After many years of process follow-up and troubleshooting in collaboration with wastewater treatment plant operators, *MCR Process & Technology* has developed new tools to assist operators in their daily tasks. The Minimix is one of these tools and was designed to meet a need for portable jar tests.

We hope you will be pleased with the operation and performance of your new instrument. If you have any problems related to the operation or questions about the instrument, call us at 1-418-651-9039.

Sincerely,

Alain Durocher, Eng.
President

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1 INTRODUCTION

The jar test is an old water treatment test procedure, first introduced in the 1930s. It has remained essentially unchanged since then, although there have been various refinements such as increased mixing speeds and the use of square jars instead of cylindrical beakers.

As basic as the jar test may be, it remains one of the best methods of assessing and optimizing the various processes and options available for treatment of potable and other types of water and wastewater.

Properly done, it can provide a great deal of information during all phases of a treatment system's development - initial process screening and development, equipment sizing, operational optimization, troubleshooting, settling aids evaluation on secondary clarifier and evaluation of potential alternative treatment processes. All this can be achieved at relatively little cost, and without the need for a great deal of high-tech knowledge and expertise.

However, unlike most analytical procedures used in the water and wastewater supply industry, there is no standardization of jar testing procedures and the results are almost always open to different interpretations and conclusions. Therefore, a great deal of thought and care, as well as more than a little experience, is essential if the jar test procedure is to achieve its full potential.

Equipment for conducting jar tests has been available for a long time. MCR offers several jar testing systems, each intended for a different purpose. The Minimix is specifically designed for very small size, light weight, portability and ease of operation.

It is not the intent of this manual to discuss in detail all the various planning, objectives, calculations, procedures, and other considerations that are involved in conducting a jar test; this information is available from many different sources. Rather, the intent is to describe the aspects of the procedures that are specific to the Minimix.

2 SHIPPING INSPECTION

At the reception, inspect the contents to ensure that no damage occurred during shipment. If damage is present, save shipping box in case damage claim is necessary. Any damage in shipment should be reported immediately to MCR.

2.1 Packing list

The items listed below should be included in the Minimix shipping carton. Please check that all items are present and undamaged, and contact MCR if there is a problem.

1. Minimix mixer unit with control panel.
2. Sample container (jar) assembly, with 4 compartments.
3. Four of each: 1-3-5-10 mL syringe
4. Plug-in universal power supply (wall transformer) with cord.
5. Foam-lined carrying case.
6. Illumination base (optional).
7. Sampling ports (optional): Four of each: 50 mL beaker, threaded adapter, stopcock, cap, tubing adapter, tubing.
8. Other options if purchased.

2.2 Shipping tape

To prevent the possibility of parts becoming separated, moving around in the carrying case, and damaging each other, the Minimix is shipped with the main mixer assembly and the jar module taped together. Remove this tape after unpacking for the first time.

For transportation in your vehicle, the Minimix can be put safely inside its padded case without this shipping tape provided minimal precautions should be used when handling. However, it would probably be wise to consider re-taping the two main parts if the Minimix is to be shipped by a commercial courier. For transportation in the cargo space of an aircraft **we strongly recommend** the use of a more robust case and designed for this purpose.

2.3 Protective sheet over the LCD screen

The LCD screen (main control panel) is protected with a sheet to avoid scratches during transportation. Remove the protective sheet after unpacking for the first time.

2.4 Serial number

Each Minimix has a unique four-digit serial number. This can be found on the back of the mixer unit, near the power jack.

3 DO'S AND DON'TS

3.1 Do's

- Please read the entire manual before attempting to unpack, set up, or operate the equipment and pay attention to all the warnings, cautions and notes. Failure to do so may result in injury to the operator or damage to the equipment.
- **The Minimix is a laboratory equipment and should be used as such:**
 - Handle the equipment with care.
 - Always use this equipment indoor and preferably in a non-humid, dust-free and non-corrosive environment.
- The jar support platform (illuminated diffuser) is sealed to the base unit and can accept spillage from the jars. From time to time, check that the diffuser is not cracked or damaged, and that there is no visible leakage of water through the joint between the diffuser and the base.
- Remove power before any manipulation of the apparatus or cleaning operation.
- The Minimix mixer unit is designed to operate from a 12 volts DC power source. The system is supplied with a plug-in power supply unit which provides 12V DC from any AC electrical outlet. If an alternative power source is used, be sure that the mixer unit receives only 12V DC, with positive to the center pin of the jack.
- Use only non-abrasive cleaners for plastics.
- The unit should be placed in it's carrying case so that it is upright (not upside down) when being carried by the handle in the normal way. This means that the top of the unit should be nearest the handle (bottom towards the case hinge).
- Stopcocks must be removed from the jars before closing the lid of the carrying case. This takes only a few seconds. If the stopcocks are not removed, they could easily be damaged by closing the lid on them.
- Initial verification. Check the following items:
 - Water tightness of the acrylic jar assembly.
 - The light from the illumination base comes on.
 - Motor operates and paddles move correctly.

3.2 Don'ts

- **Never open the unit under the warranty period as this will void the warranty.**
- Do not attempt to use the equipment with any other power source that is indicated on the rear label.
- The Minimix operates on low voltage DC power and is therefore safe electrically. Also, the unit has been designed to be reasonably drip and splash resistant, but it is not waterproof. Consequently, take care to avoid submerging the unit or subjecting it to unnecessary amounts of water. This can damage internal components or interfere with their operation. If water does enter the unit, immediately disconnect the equipment from the power supply and leave it to drain and dry out completely, then have it checked by a qualified electrician before using again.
- Do not rinse or clean the equipment with water over 35°C. Hot water may cause damage to the acrylic and graduated scales finish and can loosen the joints.
- Do not hold the paddles while they are turning, or in any other way try to stop them from rotating. Do not try to rotate the paddles by hand. This could cause injury or damage the drive mechanism.

Warning

- Even if the Minimix has a high torque motor, there is always a limit.
 - **The Minimix system is designed to run jar test with samples having a water-like consistency (raw potable water, wastewater, mixed liquor, polymer solution to maximum 0,1% solids).**
 - **Under no circumstances should the device be used with dewatering sludge or any highly viscous liquids (like crude oil, molasses, high viscosity polymers, etc.) or very thick sludge. Doing so could overload and damage the drive system.**
 - **If your application differs, please contact us to see if you can use the Minimix; otherwise the warranty will not apply.**
- Minimix is also set up with all four paddles having the same alignment (in a straight line for look). Of course, it makes no difference at all to the jar test itself if the paddles are aligned or not.
- If there is a significant force on any of the paddles (by mixing a very viscous sample, jamming a paddle somehow, or any one of several other possibilities) they may well move relative to each other.
- Note that the paddle shafts have some free play in their sleeves, and the paddles may therefore “wobble” slightly. The clearance between the paddle shaft and sleeve is deliberate and is carefully controlled to ensure that there is no binding of the shaft. It does not indicate a problem with the Minimix unit.

4 PART IDENTIFICATION AND EQUIPMENT DESCRIPTION

4.1 Part identification

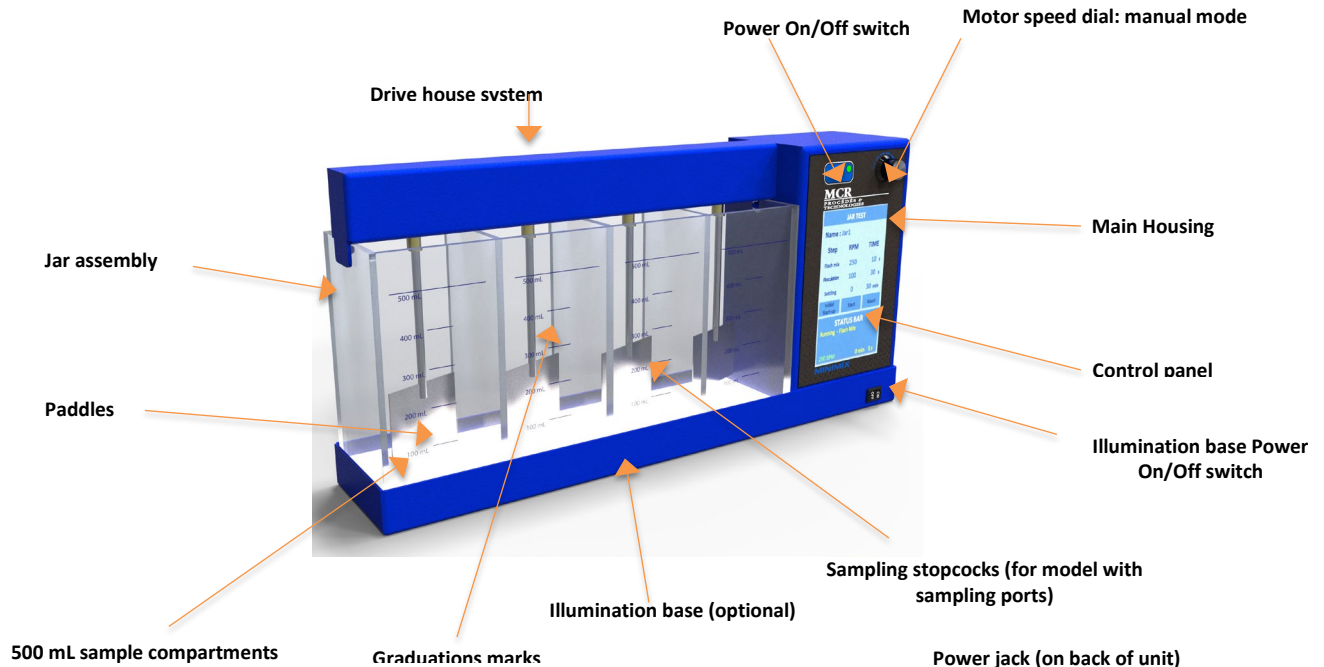


Figure 4.1 : Minimix main components

4.2 EQUIPMENT DESCRIPTION

The Minimix is constructed from the same high-quality materials used in our other systems - epoxy coated aluminum housings, stainless steel paddles and shafts, long-lasting nylon gears, lubricated oil-impregnated bronze bearings, and clear acrylic jar assembly.

4.2.1 Main components

Figure 4.1 shows the main features of the Minimix system. It consists of five main components:

1. The mixer unit.
2. The independent 4 x 500 ml jars or the integrated four-jar sample assembly with sampling ports (optional).
3. The control panel and power supply.
4. An illumination base (optional).
5. A padded carrying case for storing and transporting the equipment.

4.2.2 Mixer unit

The mixer unit is made up of two main parts:

Main housing

This enclosure contains:

1. Mixer drive motor.
2. Coupling to the paddle drive shaft.
3. Speed control circuit board;
4. Power on/off switch;
5. Manual speed adjustment control.

The housing also has a power jack on the rear (for connection to a 12V DC power source). Access to the inside of the housing is by removing the screws holding the end panel on the right side of the housing.

Drive system housing

The basic structure consists of an aluminum housing with rear cover plate. It also contains bearings for the main drive shaft and each of the paddle shafts. The shafts are coupled to the main drive shaft by nylon miter gears.

The mixer unit is simply placed on top of jar assembly that was placed before on the illumination base. The mixer stay in place, and the whole assembly can be lifted and moved about if desired. There is no need to manipulate individual paddles.

4.2.3 Jar assembly

Each jar or jar assembly is constructed from clear acrylic sheet and contains four sample compartments with graduation marks at the 100-200-300-400-500 mL level.

Sets of 4 dosing syringes (1-3-5 and 10 mL) are provided.

Sampling ports system (optional)

Each compartment is supplied with the threaded adapters already in the sample ports on the front of the jar assembly. If not, insert them and tighten snugly (do not overtighten). These adapters are normally left permanently in position.

For subsurface sampling (mostly for potable water), each jar is supplied with:

1. Sampling stopcock which attaches to the threaded adapter.
2. Flexible sampling tube with connector.
3. 50 mL beaker;
4. Cap that can be used in place of the stopcock when subsurface sampling is not required.

4.2.4 Control panel

The Minimix can be powered from any 12V DC supply, through a standard power jack on the rear of the unit. The input power jack on the Minimix is designed to accept a plug with a 2.1 mm inside diameter, 5.5 mm outside diameter, and 12 mm barrel length.

Normally, this power would be provided by the 12V DC plug-in wall transformer supplied with the system. This transformer is designed to operate with input AC power from 100 to 240 volts, 50 to 60 Hz.

It comes with a Qualtek or equivalent power cord selected during ordering to suit your outlet configuration (North America, Americas, Europe, UK, and Australia). Most countries use one of these standard configurations, so the Minimix power supply can be used directly in nearly every country in the world without the need for adapters of any kind.

For those countries with different electrical outlet configurations, it will be necessary for the user to supply either a plug style adapter (see the Adaptec website for help), or a different transformer to suit local conditions. These are easily available nearly everywhere, at very low cost. Any new transformer to be used should have an output of 12 volts DC (unregulated) at 5.4 amps (a higher current rating would be OK but is not necessary). Be sure that the output plug has the center pin positive.

Controls for the Minimix are simple:

- Power on/off switch on front of the panel with a green light when on.
- Manual mixer speed adjustment control,
- LCD panel with automatic control of the entire sequence (see complete details in Section 5)
 - o Jar test sequence (flash mix, flocculation and settling).
 - o Polymer preparation sequence (Dissolution and aging).
 - o Sequences are programmable and can be stored.
 - o For each step, motor rpm and time can be adjusted.
 - o 3 languages available: English, Spanish and French.

4.2.5 Illumination base (optional)

Proper illumination is essential for visual observation of each jar test step of the samples being tested. The Minimix illumination base incorporates a high-efficiency LED system for illumination of the base and samples. The illumination can be turned on or off as desired.

The LED strip lights have a rated life of at least 50000 hours, equivalent to over 135 years' operation at an hour each day.

4.2.6 Carrying case

The Minimix is supplied in a rugged lightweight molded plastic carrying case. For those who are flying a lot and not interested in carrying a jar tester unit in the plane we strongly recommend a more robust carrying case (in option).

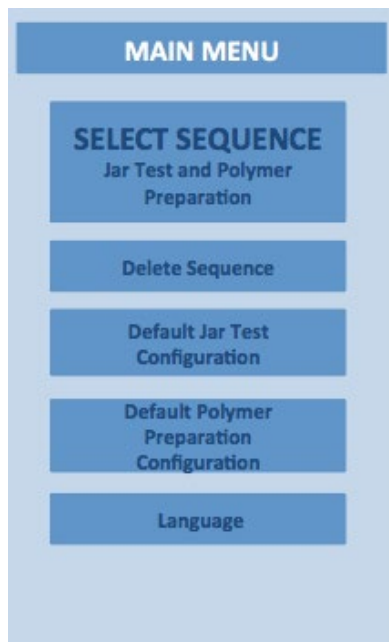
The case is padded to hold the mixer unit, jar assembly, illumination base and power supply with space left over for the other accessories (dosing syringes, sample containers, tubes). We recommend carrying chemicals separately to avoid the possibility of spills damaging the equipment.

The carrying case is similar in size to an ordinary briefcase, about 19"x 15,5" x 7,5". The carrying case with the Minimix and typical accessories weight less than 13,4 lbs (6,1 kg).

5 MINIMIX CONTROL PANEL OPERATION

5.1 Start Up

5.1.1 Powering the instrument

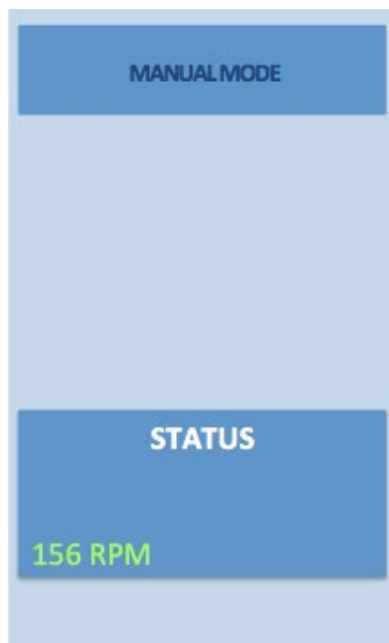


1. Plug the external power supply into an electrical outlet.
2. Press the On/Off switch for approximately one second to power on the instrument.
3. Press the On/Off Switch for 3 to 5 seconds to turn the instruments off.
4. When the instrument is turned ON, the **MAIN MENU** appears.

5.1.2 Choosing the operating Mode

The Minimix comes with two separate modes of operation: **Manual mode** or **Programmable mode**.

5.1.3 Manual mode

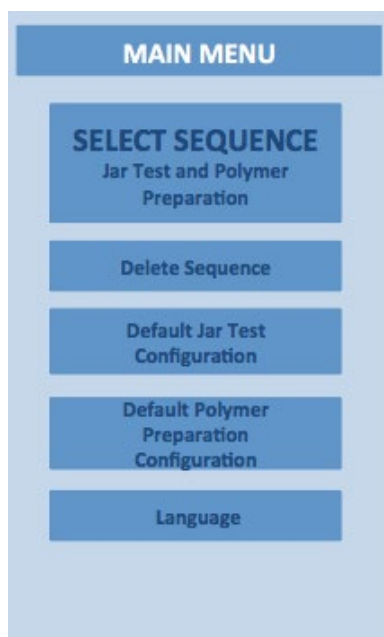


Manual mode allows manual operation of the mixing, regardless of the programmed sequence (flash mix, flocculation and settling). The user controls the speed and time desired for each step of the test.

To enter **Manual mode**, turn the **Motor Speed Dial** button clockwise to increase the motor speed. Motor RPM is indicated on the screen.

In manual mode, access to the **Programmable mode** is not possible. To change to **Programmable mode**, turn the speed control knob fully counter-clockwise to stop the motor rotation. The CLM will then be in **Programmable mode**.

5.1.4 Programmable mode



In **Programmable mode** the following actions are available from the **Main menu**:

- Select a Jar test or a Polymer preparation sequence;
- Delete a sequence;
- Change the basic settings of a Jar Test or Preparation polymer sequence;
- Choose language.

5.2 Standard Operations in programmable mode

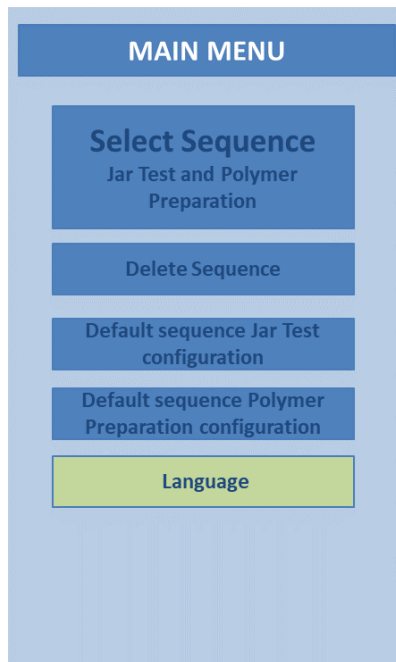
5.2.1 Getting started

5.2.1.1 Tips for using the touch screen

The whole screen responds to touch. To choose an option, tap with a fingernail, fingertip, an eraser or a specialized stylus. Do not touch the screen with sharp objects, such as the tip of a ballpoint pen.

- Press buttons, words or icons to select them.

5.2.1.2 Language selection



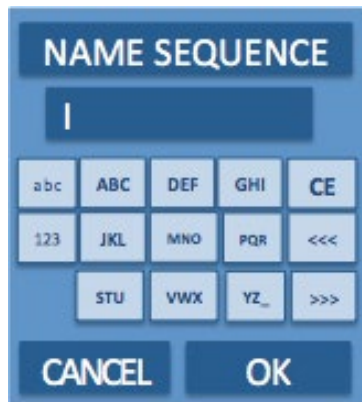
The software includes three language options.

1. Select **Language** in the **Main menu**. The languages available will appear.
2. Chose the desired language.
3. The instrument will then return to the **Main menu** in the selected language.

Once the language is selected, the instrument will power up in that language until a different language is selected.



5.2.1.3 Use of the alphanumeric keypad



This display is used to enter letters, numbers and symbols as needed when programming the instrument. Unavailable options are disabled (greyed out). The icons on the right and left of the screen are described in Table 5.1.

The central keypad changes to reflect the chosen entry mode. Press a key repeatedly until the desired character appears on the screen. Using the underscore on the YZ_ key can enter a space.

Press **Cancel** to cancel an entry, or press **OK** to confirm an entry.

Table 5.1 : Alphanumeric keypad

Icon / key	Description	Function
ABC/abc	Alphabetic	Toggles the character input mode between upper and lower case.
123	Numeric	For entering regular numbers.
CE	Clear Entry	Clear the entry.
<<<	Back	Deletes the current character and goes back one position.
>>>	Next	Navigates to the next space in an entry.

As an example, say you want to assign a sequence name "Quebec 01":

- To type the letter Q press  twice.
- To change to lowercase letters, press .
- Continue entering the name with lowercase letters. To enter "u", press  3 times (to select the "u"), and so on for the other letters.
- To enter numbers, press . The keyboard will indicate numeric characters. Enter the desired numbers. To return to the alphanumeric keypad, press .

5.2.2 Instrument setup mode

The Minimix default settings can be changed as desired.

5.2.2.1 Setting the default Jar Test configuration

Step	RPM	TIME
Flash Mix	300	10 s
Floc 1	30	30 s
Floc 2	0	0 s
Settling	0	30 min

Main Menu Save Reset Default

1. Select **Default sequence Jar Test Configuration** in the **Main menu**.
2. The indicated screen will appear.
3. Use the alphanumeric keypad to enter for each **Step** – Flash mix, flocculation 1 and 2 and settling - the **RPM** and the **TIME** as desired number.
4. When finished, press **OK**.

The maximum available RPM is 300. If you try to select more than 300 RPM, the following message will appear:

MAXIMUM RPM IS 300

The minimum RPM is 30. If you try to select less than 30 RPM, the following message will appear:

MINIMUM RPM IS 30

Step	RPM	TIME
Flash Mix		10 s
Floc 1	30	30 s
Floc 2	0	0 s
Settling	0	30 min

1

7	8	9	CE
4	5	6	<<<
0	1	2	3

CANCEL OK

5. To save the new parameters press **Save**.
6. **SAVED values** will appear on the screen.

*Then, all sequences name as **Default**, will be re-initialized based on the new desired configuration setting.*

Once this configuration is done, the instrument will power up with the new data until a different configuration is entered.

7. To restore the default parameters, press the **Reset Default** button.
8. **RESTORING TO DEFAULT** will appear on the screen.

For each step, the default parameters are:

Flash Mix: 300 RPM 10 s.
Floc 1: 30 RPM 30 s.
Floc 2: 0 RPM 0 s.
Settling: 0 RPM 30 min.

5.2.2.2 Setting the default Polymer preparation configuration

DEFAULT POLYMER PREPARATION SEQUENCE CONFIGURATION		
Step	RPM	TIME
Dissolution	180	60 s
Aging	0	30 min

Main Menu
Save
Reset Default

1. Select **Default Polymer preparation sequence configuration** in the **Main menu**.
2. The indicated screen will appear.
3. Use the alphanumeric keypad to enter for each **Step** – Dissolution and Aging - the **RPM** and **TIME** desired.
4. Press **OK**.
5. To save the new parameters press **Save**.
6. **SAVED values** will appear on the screen.

Once this configuration is done, the instrument will power up with the new data until a different configuration is entered.

7. To restore the default parameters, press the **Reset Default** button.
8. **RESTORING TO DEFAULT** will appear on the screen.

For each step, the default parameters are:

Dissolution: 180 RPM 60 s.

Aging: 0 RPM 30 min.

5.2.3 Running a Jar Test

Sixteen stored jar test sequences are available. These can be accessed though the **Select Sequence** screen from the **Main menu**.

5.2.3.1 Selecting a Stored Jar Test Sequence

SELECT SEQUENCE	
Jar Test	
DEFAULT	DEFAULT
DEFAULT	DEFAULT
DEFAULT	DEFAULT
DEFAULT	DEFAULT
DEFAULT	DEFAULT
DEFAULT	DEFAULT
DEFAULT	DEFAULT
DEFAULT	DEFAULT
Polymer Preparation	
DEFAULT	DEFAULT
DEFAULT	DEFAULT

Main Menu
Delete

1. From the **Main Menu**, press **Select Sequence – Jar Test and Polymer preparation** to view a list of the programmable sequences.
2. Select the desired sequence by pressing the appropriate button.

*Buttons containing registration **Default**, etc. contain the basic parameters of the system.*

JAR TEST		
Name : DEFAULT		
Step	RPM	TIME
Flash mix	300	10 s
Floc 1	100	30 s
Floc 2	0	0 s
Settling	0	30 min
Initial Start up	Start	Abort
STATUS BAR If Parameters OK Press INITIAL STARTUP and wait		
Main Menu	Save	Select

From the detailed window for a sequence, a new sequence can be selected, by pressing **Select**. Before doing this, a running sequence must be ended, by pressing **Abort**.

5.2.3.2 Running a jar test sequence

JAR TEST		
Name : DEFAULT		
Step	RPM	TIME
Flash mix	300	10 s
Floc 1	100	30 s
Floc 2	0	0 s
Settling	0	30 min
Initial Start up	Start	Abort
STATUS BAR If Parameters OK Press INITIAL STARTUP and wait		
Main Menu	Save	Select

1. The selected sequence appears as shown.
2. Status Bar shows: **If parameters OK**
3. If yes, **Press INITIAL START UP and wait**
4. Otherwise, modify the parameters as indicated below.

**DEFAULT JAR TEST
SEQUENCE CONFIGURATION**

Step	RPM	TIME
Flash Mix		10 s
Floc 1	30	30 s
Floc 2	0	0 s
Settling	0	30 min

I

7	8	9	CE
4	5	6	<<<
0	1	2	3

CANCEL OK

- Each step of a sequence can be easily changed. For example, to change the RPM of Flash mix from 300 RPM to 250 RPM, touch the RPM number and a window will open with alphanumeric keys to change it.
- Enter the desired value and press **OK**.

The first time a parameter is changed from a default one, the software will ask to save it as a new sequence (see section 5.2.4). To not save it, press CANCEL, otherwise refer to section 5.2.4.

- Once all the parameters have been set, start the sequence by pressing **Initial Start Up**.
- The Status Bar then shows the progression of the speed in RPM
- When the speed reaches the specified RPM for the Flash mix, the Status bar displays

STATUS BAR

Running Start Up
Add Chemicals then
Press **START SEQUENCE**

250 RPM

This indicates that the device is ready to begin the sequence.

- Add desired chemicals to each jar as quickly as possible.
- Press **Start** to start the sequence.

12. The STATUS BAR indicates progress of each step (flash mix, flocculation, settling) with the RPM and time.

A beep indicates completion of one step and the start of the next.

JAR TEST		
Name : Jar1		
Step	RPM	TIME
Flash mix	250	10 s
Floc 1	100	30 s
Floc 2	0	0 s
Settling	0	30 min
Initial Start-up	Start	Abort
STATUS BAR Running - Flash Mix 250 RPM 0:10 min		
Main Menu	Save	Select

JAR TEST		
Name : Jar1		
Step	RPM	TIME
Flash mix	250	10 s
Floc 1	100	30 s
Floc 2	0	0 s
Settling	0	30 min
Initial Start-up	Start	Abort
STATUS BAR Running – Floc 1 100 RPM 0:45 min		
Main Menu	Save	Select

JAR TEST		
Name : Jar1		
Step	RPM	TIME
Flash mix	250	10 s
Floc 1	100	30 s
Floc 2	0	0 s
Settling	0	30 min
Initial speed Start-up	Start Sequence	Abort Sequence
STATUS BAR Running- Settling 0 RPM 15:05 min		
Main menu	Save sequence	Select sequence

13. During the settling step. a beep will sound every 5 minutes.

14. Three beeps indicate completion of the sequence.

JAR TEST

Name : Jar1

Step	RPM	TIME
Flash mix	250	10 s
Floc 1	100	30 s
Floc 2	0	0 s
Settling	0	30 min

Initial Start-up
Start
Abort

STATUS BAR
Sequence Ended
Since 1 : 12 min

Main Menu
Save
Select

15. The Status Bar will then show "Sequence ended". The RPM and the timer indicate zero.
16. A timer on the screen indicates when the sequence was completed.

JAR TEST

Sequence has been modified.
Save ?

Confirm Save

CANCEL

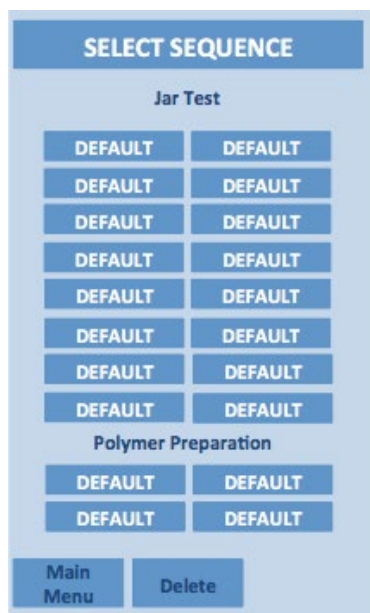
17. If a test value has been changed since the last **Save sequence**, a window asks for a confirmation before saving.
18. After pressing **Confirm Save**, **SAVING** will appear on the screen.
19. To exit without saving, press **CANCEL**.

*While a sequence is running, the only button that is active is the **Abort** button. This interrupts the current running sequence.*

5.2.4 Running a polymer preparation

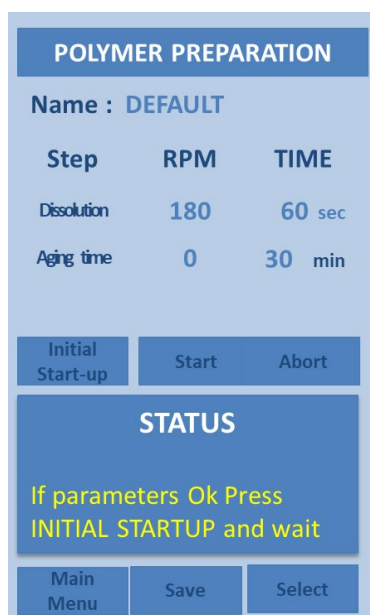
The Minimix allows four programmable polymer preparation sequences, accessible through the **Select Sequence** menu.

5.2.4.1 Selecting a Stored Polymer preparation Sequence



1. From the **Main Menu**, press **Select Sequence – Jar Test and Polymer preparation** to view a list of the programmable sequences.
2. Select the desired sequence by pressing the appropriate button.

*Buttons **DEFAULT** indicate the basic parameters of the sequences.*



*From the window of a running sequence a new sequence can be selected by pressing **Select**. Before doing this, a running sequence must be ended by pressing **Abort**.*

5.2.4.2 Running a polymer preparation sequence

POLYMER PREPARATION

Name : **DEFAULT**

Step	RPM	TIME
Dissolution	180	60 sec
Aging time	0	30 min

Initial Start-up Start Abort

STATUS

If parameters Ok Press
INITIAL STARTUP and wait

Main Menu Save Select

DISSOLUTION RPM CONFIGURATION

NAME : **DEFAULT**

Step	RPM	TIME
Dissolution		60 s
Aging	0	30 min

I

7	8	9	CE
4	5	6	<<<
0	1	2	3

CANCEL OK

1. The selected sequence appears as shown.
2. Status Bar show: **If parameters OK Press INITIAL START UP and wait.**

3. Each step of a sequence can be easily changed. For example, to change the RPM of Dissolution from 180 RPM to 150 RPM, touch the RPM number and a window will open with alphanumeric keys to change it.
4. Enter the desired value and press **OK**.

The first time a parameter is change from a default one, the software will ask to save it as a new sequence (see section 5.2.5). To not save it, press CANCEL, otherwise refer to section 5.2.5.

5. Once all the parameters have been set, start the sequence by pressing **Initial Start Up**.
6. The Status Bar then shows the progression of the speed in RPM
7. When the speed reaches the specified RPM for the Flash mix, the Status bar displays

STATUS

Running Start Up
Add Chemicals then
Press **START SEQUENCE**

150 RPM

This indicates that the device is ready to begin the sequence.

POLYMER PREPARATION

Name : DEFAULT

Step	RPM	TIME
Dissolution	150	60 s
Aging	0	30 min

Initial Start-up

Start

Abort

STATUS

Running – Dissolution

150 RPM 0 : 48 min

Main Menu

Save

Select

POLYMER PREPARATION

Name : DEFAULT

Step	RPM	TIME
Dissolution	150	60 s
Aging	0	30 min

Initial Start-up

Start

Abort

STATUS

Running – Aging

0 RPM 10 : 48 min

Main Menu

Save

Select

8. Add chemicals to each jar.
 9. Press **Start** to start the sequence.
 10. Status bar indicates progress of each step (dissolution, aging) with the RPM and time.
- A beeping sound indicates completion of one step and start of the next.*

11. Three beeps indicate completion of the sequence.

POLYMER PREPARATION

Name : DEFAULT

Step	RPM	TIME
Dissolution	150	60 s
Aging	0	30 min

Initial Start-up Start Abort

STATUS

Sequence Ended
Since 1 : 45 min

Main Menu Save Select

12. The Status Bar will then show "**Sequence ended.**" The RPM and the timer indicate zero.
13. A timer on the screen indicates since when the sequence was completed.

POLYMER PREPARATION

Sequence has been modified.
Save ?

Confirm Save

CANCEL

14. If a test value has been changed since the last **Save sequence**, a window asks for confirmation before saving.
15. After pressing **Confirm Save**, **SAVING** will appear on the screen.
16. To exit without saving, press **CANCEL**.

*While a sequence is running, the only button that is active is the **Abort** button. This interrupts the current running sequence.*

5.2.5 Saving a sequence

Step	RPM	TIME
Flash Mix	250	10 s
Floc 1	30	30 s
Floc 2	0	0 s
Settling	0	30 min

NAME :

I

abc ABC DEF GHI CE

123 JKL MNO PQR <<<

STU VW X YZ_ >>>

CANCEL OK

To save the sequence that just ended:

1. Press **Save**. The indicated screen will appear.

This window will also appear each time that the software asks to save a sequence just being modified.

2. Using the alphanumeric key enter the name of the sequence as described in section 5.2.1.3,
3. Press **OK**. The name will appear in the top of the sequence.

5.2.6 Aborting a sequence

Step	RPM	TIME
Flash mix	300	10 s
Floc 1	100	30 s
Floc 2	0	0 s
Settling	0	30 min

Name : DEFAULT

Initial Start up Start Abort

STATUS BAR

If Parameters OK Press
INITIAL STARTUP and wait

Main Menu Save Select

To interrupt a running sequence,

1. Press **Abort**. The indicated screen will appear and the sequence will stop.

The Minimix is then ready to restart the sequence. The system retains the previous settings. For example, if a flash mix of 250 RPM for 10 secs was set instead of a basic setting at 300 RPM for 3 seconds, it will be maintained. If a previously modified sequence is selected, that will then be retained.

5.2.7 Back to main menu

The **Main menu** can be recalled at any time by pressing **Main Menu**.

6 JAR TEST PROCEDURE

6.1 General

The basic objective of the jar testing procedure is to simulate, as far as is practical, the processes that are being, or might be, used in a full-scale treatment plant. Because there are fundamental differences between batch and continuous flow processes, the jar test does have its limitations. Nevertheless, it can prove very useful as a simple, rapid, and economical means of evaluating how well proposed water treatment processes can be expected to work, and in determining certain process parameters such as chemical dosages and reaction times.

Of course, each situation will be unique, with its own circumstances and objectives. Therefore, only a simplified, general test procedure can be given; this must be modified as required by the specific situation.

6.2 Material

- Minimix and accessories.
- Bucket.
- Paddle.
- Thermometer.

6.3 Reagents

- Reagents to test.

6.4 Sampling and storage

6.4.1 Sampling

- Take a grab or composite sample. Be sure that the sample will be taken in zone where it will be representative of the process you want to simulate.

6.4.2 Storage

- The test should be done as soon as possible after sampling.
- No storage possible without affecting the results.

6.5 Suggested basic jar test procedure

1. Sample water or the liquid to be subjected to the test.
2. Fill the jars to the 500 mL mark with the water being tested.
3. Place the jar assembly over the illumination base (if purchased).
4. Then put the mixer in position on top of the jar assembly. The whole assembly can now be lifted and moved about as desired.
5. For each of the test stations being used, fill syringes with the appropriate amount of stock chemical (such as alum coagulant and/or polymer).
6. Start the automatic sequence as presented in Section 5 or use the manual mode.
7. For the automatic sequence (see Section 5)
 - a. Choose:
 - i. Motor speed and duration of Flash mix
 - ii. Motor speed and duration of the flocculation
 - iii. Settling time
 - b. Start the sequence
 - c. Inject the chemicals into the jars.
 - i. It should be easily possible to dose all jars within one or two seconds of each other.
Inject chemicals
 - d. Let the sequence unfold automatically.
8. For the manual mode sequence
 - a. Choose:
 - i. Motor speed and duration of Flash mix
 - ii. Motor speed and duration of the flocculation
 - iii. Settling time
 - b. Start the mixer motor and set it to the desired speed on the control panel dial; usually 300 rpm for the flash mix stage.
 - i. Note: For simulation of the short, high-intensity “flash mixing” often used in coagulant addition, the mixer speed should be reduced after a time corresponding as closely as possible to the actual mixing time that would be used in a full-scale plant. In many cases, this would be almost immediately after coagulant addition.
 - c. Inject the chemicals into the jars.
 - i. It should be easily possible to dose all jars within one or two seconds of each other.
 - d. Set the mixer speed to provide the mixing intensity desired for the flocculation stage at the low speeds (30 to 100 rpm) where most jar testing work is carried out.
 - e. After completion of the flocculation stage, allow the contents of the jars to settle for the desired periods.
9. Carry out visual observations for each step (floc formation speed, floc size, etc.)
10. At the end of the settling period, carry out sampling of the supernatant and laboratory analysis as desired.

6.6 Interferences

- Variations in suspension temperature, sampling and agitation methods, and time between sampling and start of the determination significantly affect the results.
- Avoid sun exposure during the test.

6.7 Recommendations

- Stir the initial sample to be sure it is representative.

6.8 Safety

- Use laboratory gloves and goggles.
- Wash your hands after testing is ended.

7 MAINTENANCE

7.1 General

The Minimix requires very little maintenance, other than cleaning and occasional minor lubrication.

7.2 Cleaning

The unit should be cleaned up immediately after each run, particularly the jars. If solids such as floc are allowed to dry out on component surfaces, they may be much more difficult to remove later.

Always clean with a non-abrasive cleaner for plastics with a brush having soft bristles. Avoid using brushes with hard bristles that could scratch the inside of the plastic surfaces.

Rinse with clean water (<35°C), or wipe down with a damp cloth, as appropriate. **Do not use organic solvents such as acetone or alcohol, which may damage plastic surfaces or paint finishes.**

7.3 Lubrication

All bearings in the Minimix are oil-impregnated bronze and should require lubrication only very occasionally. If the mixer seems rough or noisy, a small amount of light oil can be applied to the paddle shaft bearings.

7.4 Tools

No special tools are needed for operation and maintenance of the Minimix. All screw are standard types (slotted, Phillips, or Hex head) and drivers for these are easily obtainable everywhere.

Included with the Minimix is a small Allen key for adjusting the mitered gear if required.

8 WARRANTY

What we cover:

MCR warrants its instruments and accessories to be free from defects in materials and workmanship under normal use and service for a period of 12 months from the date of shipment from MCR. If you experience any problems with our products, just phone, fax, email, or write and we will make every effort to resolve the matter to your satisfaction.

If your instrument becomes defective within one year of purchase, MCR will repair or replace your instrument free of charge, including surface shipping costs.

What we do not cover:

MCR is not responsible for replacing parts damaged by accident or neglect. Your instrument must be installed and operated according to instructions in the User's Manual. Damage from corrosion is not covered. Damage caused by customer modification of the instrument or used with viscous liquid is not covered. This warranty covers only MCR products and is not extended to equipment used with our products.

Shipping: Although our instruments are built to withstand hard use, we cannot be responsible for damage incurred during shipment. Therefore, to avoid both cosmetic and structural damage if the instrument is shipped in the future, we recommend that you save the original packing material in which we shipped the instrument.

Obtaining Service: Please contact us for repair service. Never ship an instrument to us without prior telephone or written contact. Often the problem is a relatively simple one that you can solve yourself with our direction.

If you are within North America pack the instrument well; insure it; and ship it back to us. If the instrument is under warranty, we will repair or replace the unit and pay for roundtrip shipment. If the instrument is not under warranty shipping costs, both ways are your responsibility.

If you are outside North America, you are welcome to send the instrument for a free repair within the limits of the warranty. You will be responsible to pay for shipment to us, duties and documentation costs outside North America. We will pay for return shipment. If it is not under warranty, you will be responsible to pay for roundtrip shipping, duties and documentation costs outside North America.

9 SPECIFICATIONS

<u>Items</u>	<i>Minimix</i>
<u>Basic features</u>	
Number of stations	4
Sample volume	500 mL
Sample container (jar) volume	615 mL
Mixer speed range	30 to 300 rpm
Electrical supply (to mixer unit)	12V DC
Maximum current draw	5,0 amp
<u>Dimensions</u>	
Mixer/jar units, assembled	400 x 197 x 91 mm (15,75 x 7,75 x 3.6 in.)
Carrying case	425 x 305 x 108 mm (16,75 x 12.0 x 4,25 in.)
Shipping carton	500 x 180 x 390 mm (20 x 7 x 16 in.)
<u>Weights</u>	
Mixing unit+ illumination base	3.0 kg (6,6 lb)
Jar module with fittings	0.7 kg (1.6 lb)
Wall transformer and jar accessories	0.5 kg (1,1 lb)
Carrying case	1.4 kg (3.0 lb)
Total for equipment and carrying case	5,6 kg (12,3 lb)
Total shipping weight with carton	5.8 kg (13 lb)
<u>Materials of construction</u>	
Mixer unit	Aluminum and PVC, with epoxy paint coating
Paddles and shafts	Stainless steel 304
Paddle system bearings	Oil-impregnated bronze
Paddle system gears	Nylon
Sample jars	Clear acrylic
Carrying case	Molded polyethylene

10 SPARE PARTS

The following spare parts are available from MCR:

- Jar assembly with graduated scale.
- Transformer 12V.
- 304 SS paddles.
- Robust carrying case.

11 TECHNICAL ASSISTANCE

If you have any questions about the use of this product, please contact us at:

MCR Procédés & Technologies

Phone : (418) 650-9154 (Alain Durocher)

e-mail : adurocher@mcrpt.com