

## Outline

Softening efficiency

Overview of settings

- Salt dosage

- Grain capacity

- Reserve capacity

- Hardness setting

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Optimizing settings

- Truing up hardness setting

- Lowering salt dosage

- Truing up reserve capacity

Practice scenarios

# Level 2, part II: Optimization process



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Truing up reserve  
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# An optimized softener

- Has a **hardness setting** that matches the hardness of the source water.
  - Has the lowest possible **salt dosage**.
  - Has a **reserve capacity** that reflects the actual soft water use of the building.
- *Regenerates only when it needs to and uses the least amount of salt per regeneration*



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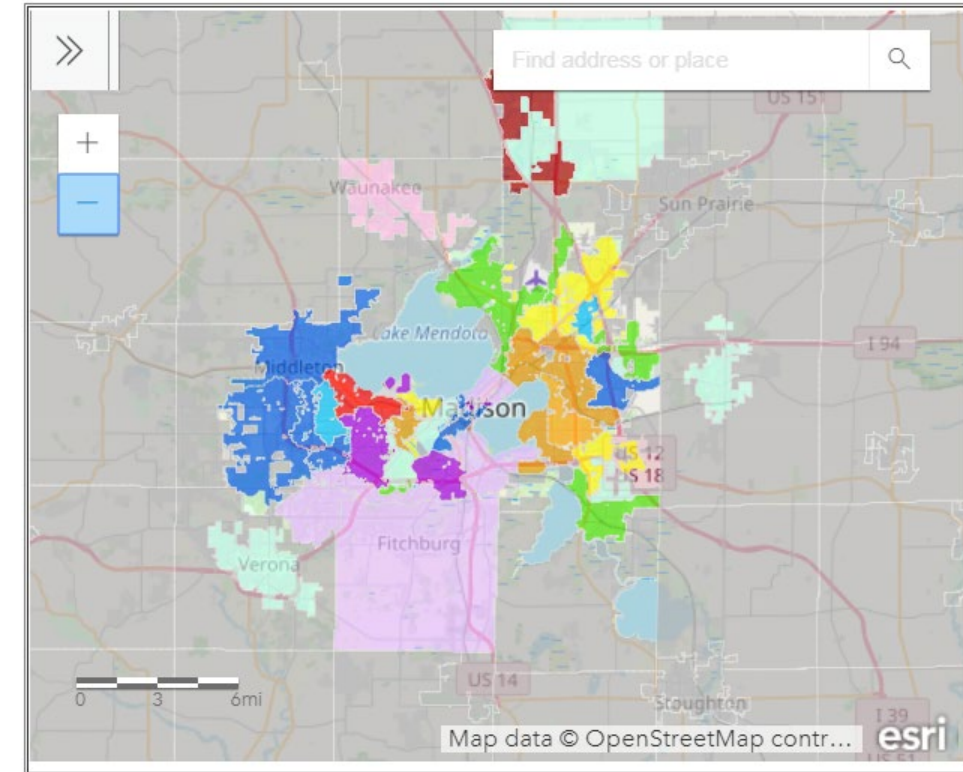
# Optimizing hardness setting

**Set the hardness setting equal to the actual hardness of source water.**

→ **Best: Use municipal well hardness data**

→ If served by multiple wells, consult utility

→ If not available for address, test source water for hardness



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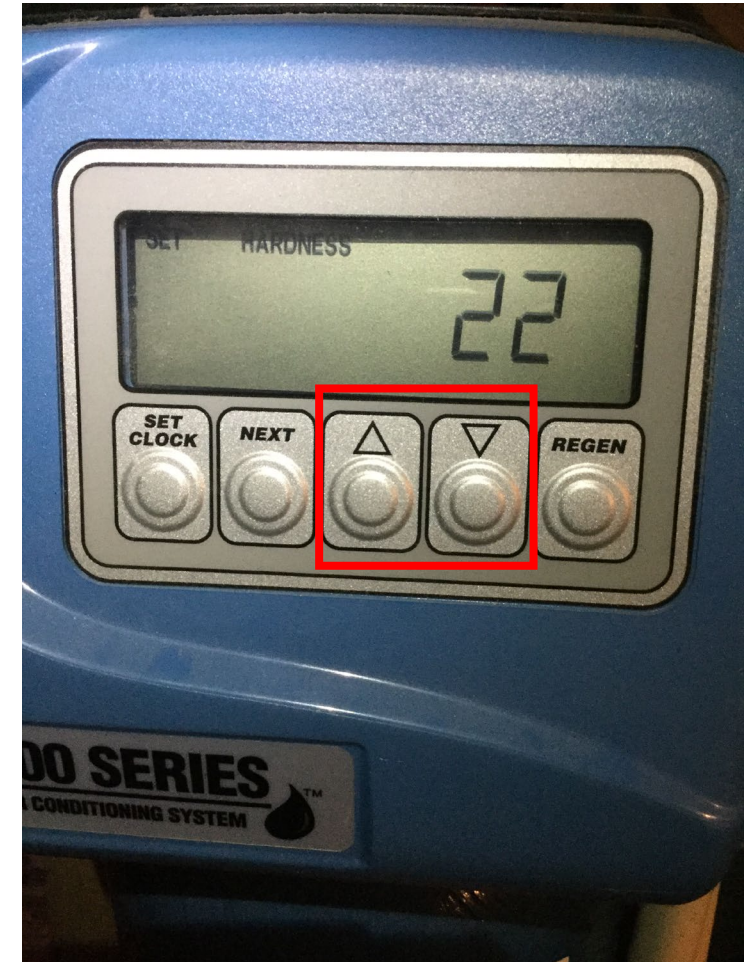
Lowering salt dosage

Truing up reserve capacity

Practice scenarios

# Optimizing hardness setting – digital control

- 1) Check municipal hardness map for well serving building.
- 2) Locate hardness setting on softener.
- 3) Adjust hardness setting to match actual hardness of source water.



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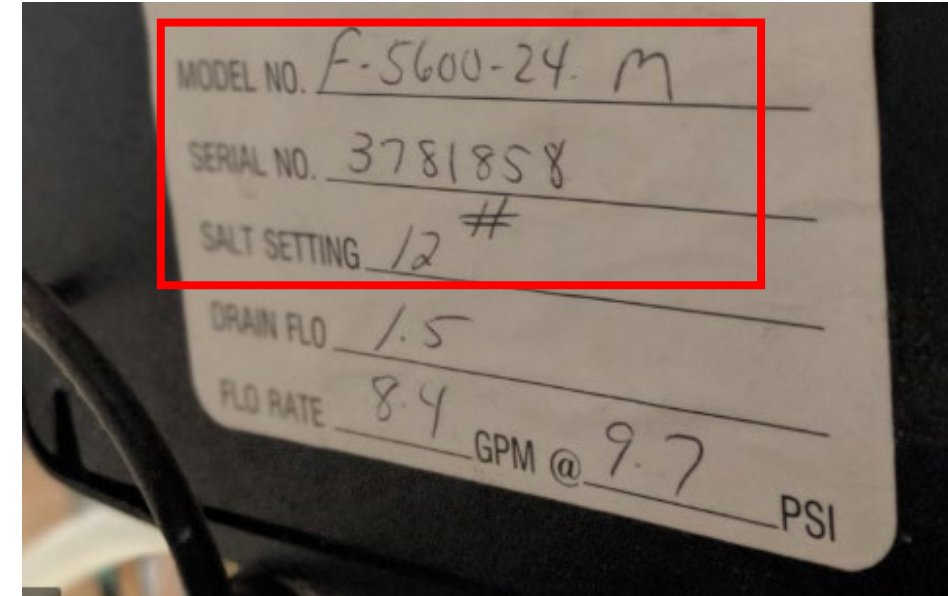
Lowering salt dosage

Truing up reserve capacity

Practice scenarios

# Optimizing hardness setting – dial control

- 1) Check municipal hardness map for well serving building.
- 2) Do you know softener's grain capacity?
  - If yes: calculate gallon capacity based on grain capacity and hardness setting
  - If no: **not advised to change gallon capacity**





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# Optimizing hardness setting – dial control

- 1) Check municipal hardness map for well serving building.
- 2) Look up grain capacity for model at existing salt setting.  
(*Need specs or manual*)
  - *Adjust for age as necessary*
- 3) Divide grain capacity by actual hardness to determine gallon capacity.
- 4) Adjust dial to new gallon capacity.



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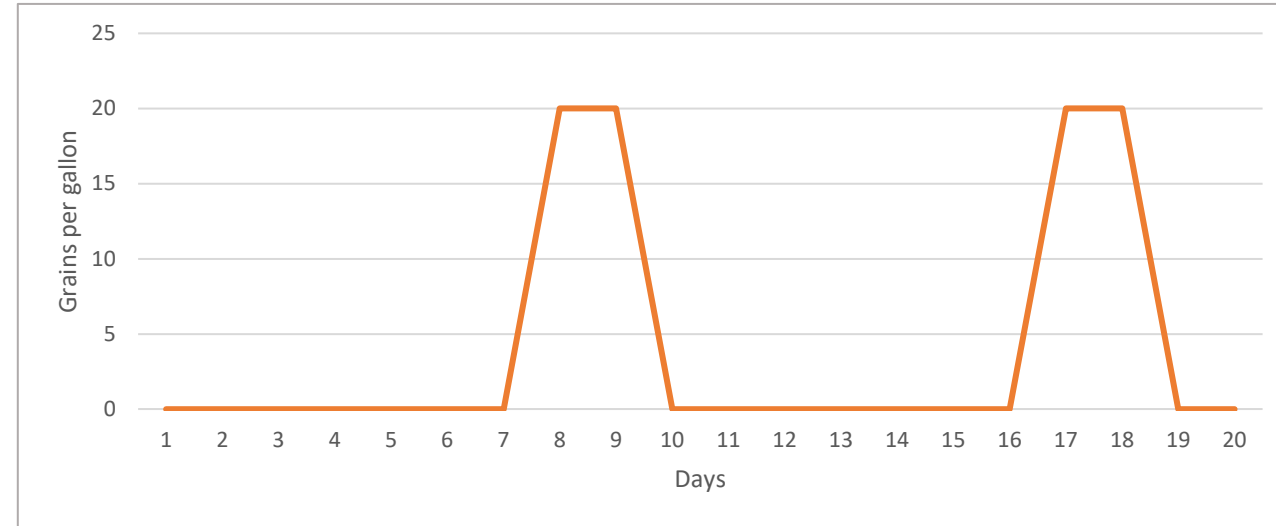
Truing up reserve  
capacity

Practice scenarios

# Allowing some hardness through

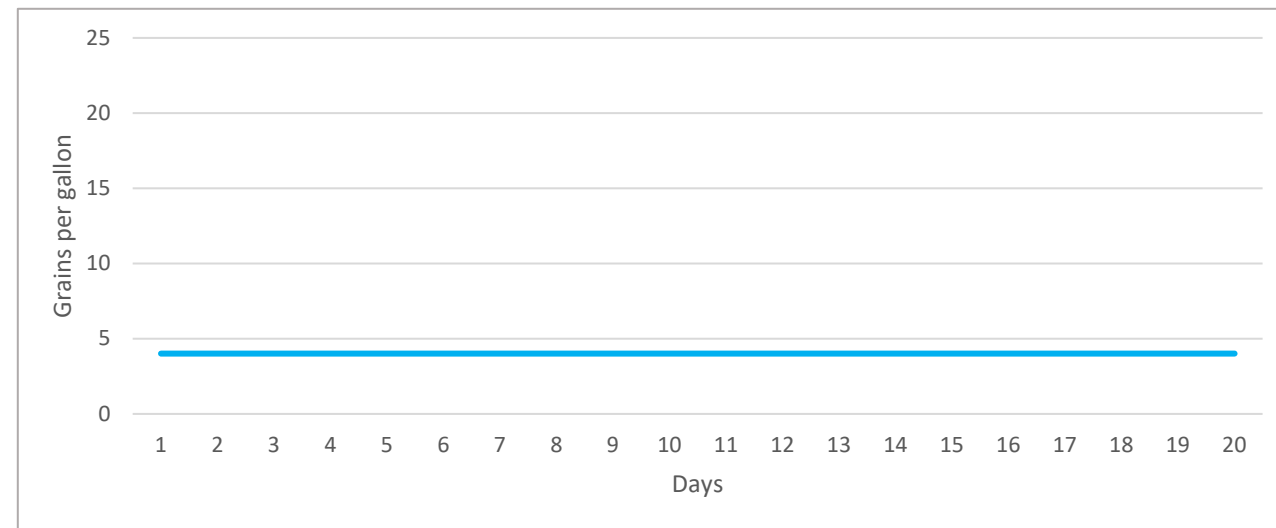
**Scenario 1:** Hardness setting lower than actual hardness.

→ Hard water breaks through in spurts between exhaustion of capacity and regeneration



**Scenario 2:** Blending valve allows some hard water to bypass softener and mix with softened water.

→ Constant low-level hardness in water



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# Group exercise – Optimizing hardness

## Page 12 of workbook – Adjusting hardness setting exercise

1) Determine actual source water hardness.

Look up address on [www.madsewer.org/waterhardness](http://www.madsewer.org/waterhardness)

Hardness at address = 18 grains per gallon

2) Determine grain capacity.

32,000 grains

3) Divide grain capacity by actual hardness.

$32,000 \text{ grains} \div 18 \text{ grains} = 1778 \text{ gallons}$





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# Optimizing salt dosage



- Set salt dosage to lowest setting appropriate for system design.
- **Only adjust the salt dosage if you are familiar with that model and lowest capacity.**
- Changing the salt dosage may require manual changes to grain capacity or equipment itself.



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# Optimizing salt dosage and capacity

- 1) Determine the rated low salt dosage for unit and corresponding grain capacity (**needs specs or manual; data for some units is in app**)
- 2) Locate salt dosage on softener.
- 3) Adjust salt dosage to the low setting.
  - Adjust grain capacity (if adjustable) to corresponding low capacity.
    - Convert to gallon capacity if set in gallons
    - Adjust for age, if necessary



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# Age adjustment for capacity

Softeners lose about 2% capacity each year

- Adjustment:

Example:

Rated grain capacity

4267

- (Rated grain capacity \* 0.02 \* Age)

- (4267 \* 0.02 x 7)

---

Age-adjusted grain capacity

---

3669 grains



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# Age adjustment for capacity

- Note: as softeners get older, an optimization could actually increase salt use (with the age adjustment)
- Efficiency calculations are helpful in determining outcome of optimization
- Worth a conversation with the customer about replacement at that point



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# Optimizing reserve capacity



- Set reserve capacity to Auto, or equal to the actual soft water use per day.
- If recommending new units, twin-tank an option to eliminate reserve capacity.



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# Optimizing reserve capacity

- 1) If softener has an “Auto” reserve setting, make sure that it is on.
- 2) If the softener has a fixed reserve capacity,
  - Best: use actual, measured daily water use.
  - If unable to determine actual, measured water use, use conservative estimates:
    - 50 gallons/person/day (hot and cold softened)
    - 20 gallons/person/day (hot only softened)
- 3) Adjust reserve capacity or gallon capacity to reflect actual water use.





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# Group exercise – Optimizing reserve capacity

## Page 12 of workbook – Adjusting reserve capacity exercise

1) Determine maximum gallon capacity

$$24,000 \text{ grains} \div 15 \text{ grains per gallon} = 1600 \text{ gallons}$$

2) Determine actual soft water use per day

$$100 \text{ gallons}$$

3) Subtract actual soft water use from maximum gallon capacity to adjust the reserve..

$$1600 - 100 = 1500 \text{ gallons}$$



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# Example optimization with app



MMSD Evaluation and Optimization Form

Job information

Your name:

Test User

Location of facility where job is taking place:

You will need to be connected to a network, and your location services must be on, to access your location. If you are not currently connected to a network, enter the job location when you are connected.

43°2'N 89°21'W

Street address:

Number and street name

1610 Moorland Rd

Municipality where job is taking place:

☒ Town of Dunn

☐ Village of McFarland

☐ Other

Source water hardness at location: \*

16

Is iron present in the source water at a concentration of 0.3 mg/L or higher? \*

☐ Yes

☒ No

☐ Unknown

What initiated this service?

Add-on to a service call for another service

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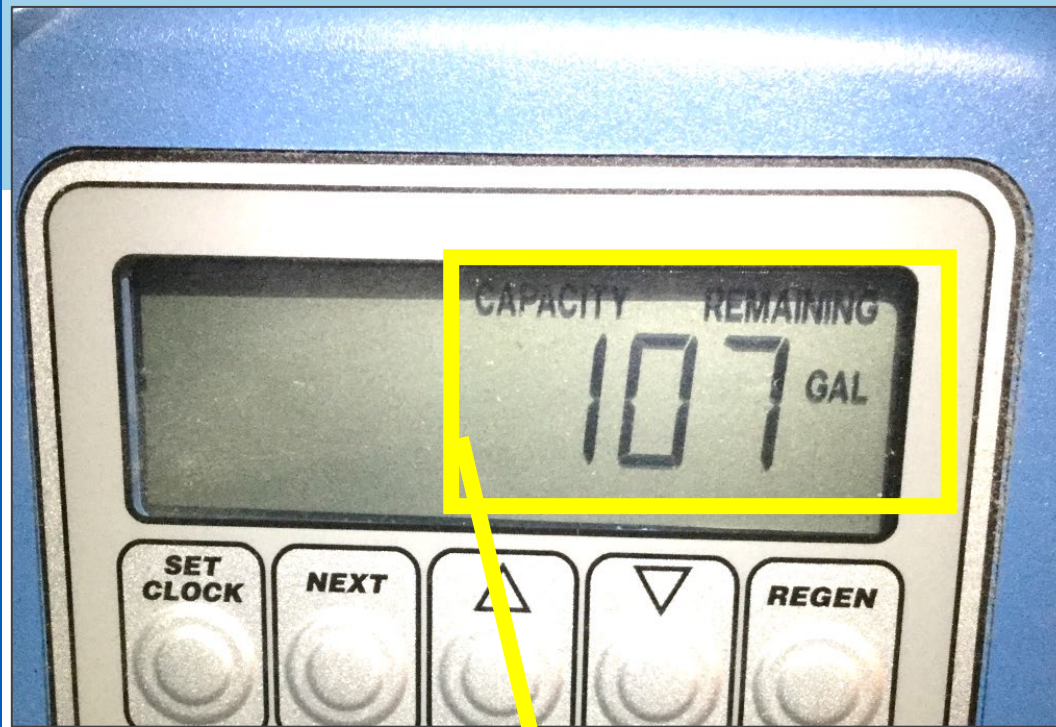
Optimizing settings

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“Capacity remaining” shown in gallons tells us that this softener regenerates based on demand.

 MMSD Evaluation and Optimization Form  

**Softener evaluation**



Does this water softener regenerate based on days or on gallons?

☐ Day-based (time-clock)

☒ Gallon-based (demand)

☐ Unable to determine

Upload a picture of the portion of the control head that demonstrates the regeneration type.



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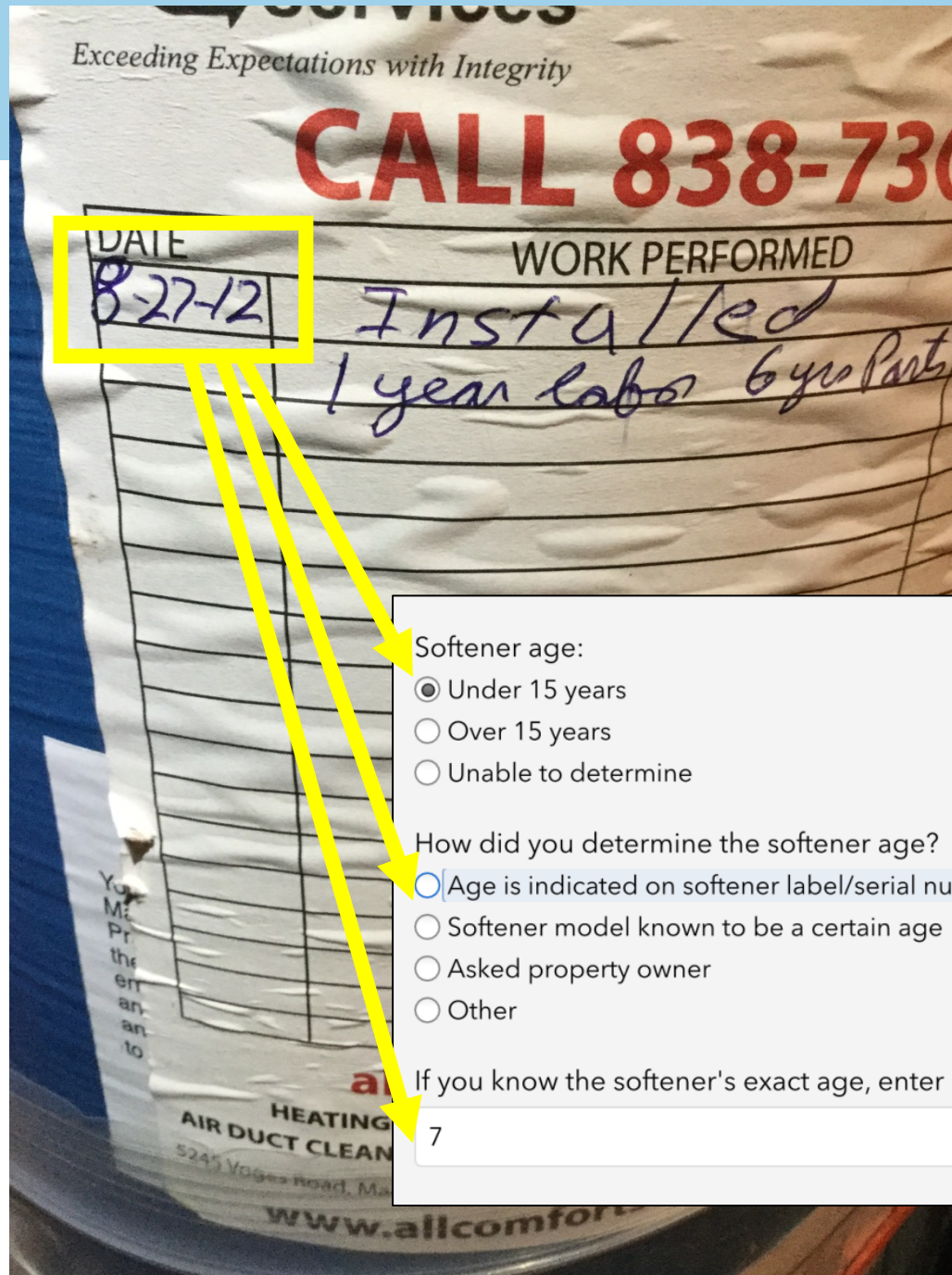
Optimizing settings

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This softener has clear labeling indicating the age. If this isn't available, ask the property owner if they know the age.

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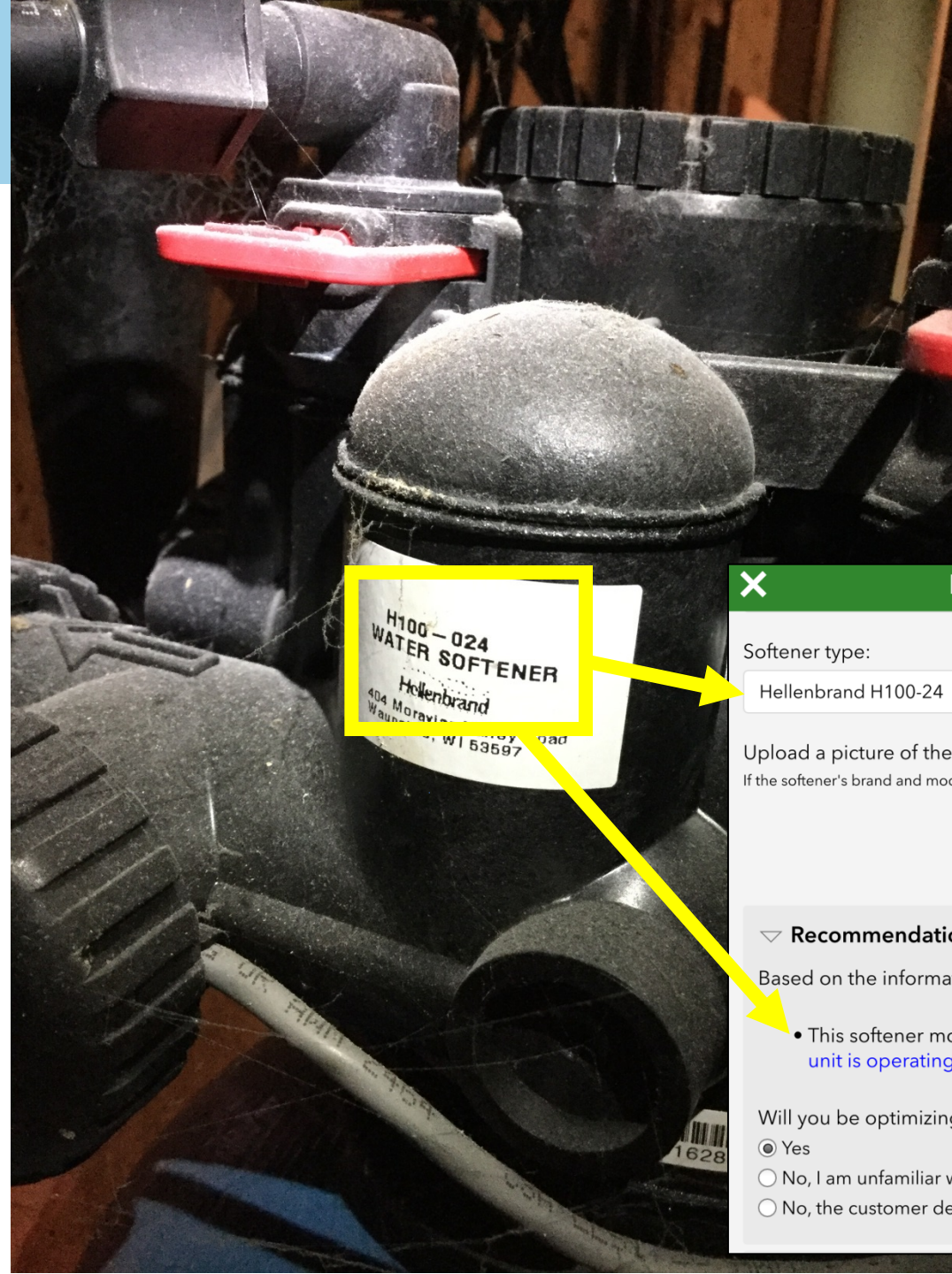
Optimizing settings

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Practice scenarios



This softener has clear labeling indicating the brand and model. If not available, you would need to be familiar with that equipment to identify on sight.

MMSD Evaluation and Optimization Form

Softener type:

Hellenbrand H100-24

Upload a picture of the softener.

If the softener's brand and model are marked on the unit, make sure that this information is clearly visible.

Recommendations

Based on the information you entered about this softener, the following actions are recommended:

- This softener model has been identified as an optimizable unit. [An optimization to ensure this unit is operating at highest salt efficiency is recommended.](#)

Will you be optimizing the softener at this time?

☒ Yes

☐ No, I am unfamiliar with this unit

☐ No, the customer declined an optimization



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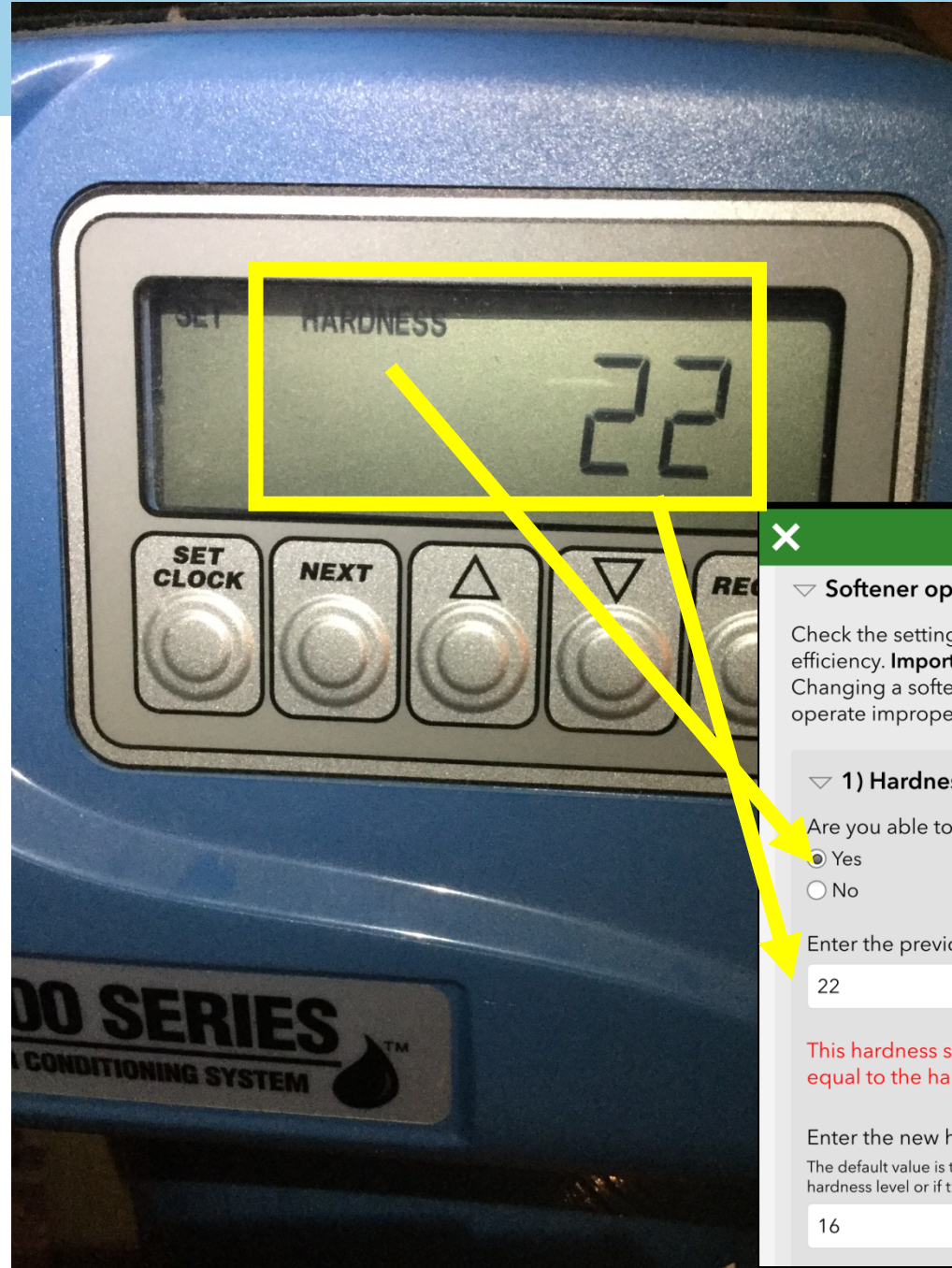
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On this softener, the Up and Down arrows are used to adjust the hardness setting. After you change the hardness, enter the new hardness in the app.

**MMSD Evaluation and Optimization Form**

✕

▼ **Softener optimization**

Check the settings in this section to determine whether this softener is operating at its highest salt efficiency. **Important:** Make changes to units only if you are familiar with the settings on that unit. Changing a softener setting without changing other related settings can cause the softener to operate improperly.

▼ **1) Hardness setting**

Are you able to access this softener's hardness setting?

☒ Yes  
☐ No

Enter the previous hardness setting:

22 ✕

This hardness setting is above the actual hardness of the source water. Set the hardness setting equal to the hardness of the source water.

Enter the new hardness setting:

The default value is the entered water hardness for this location. Leave as-is if you set the hardness setting to match this hardness level or if this is already the setting of the softener.

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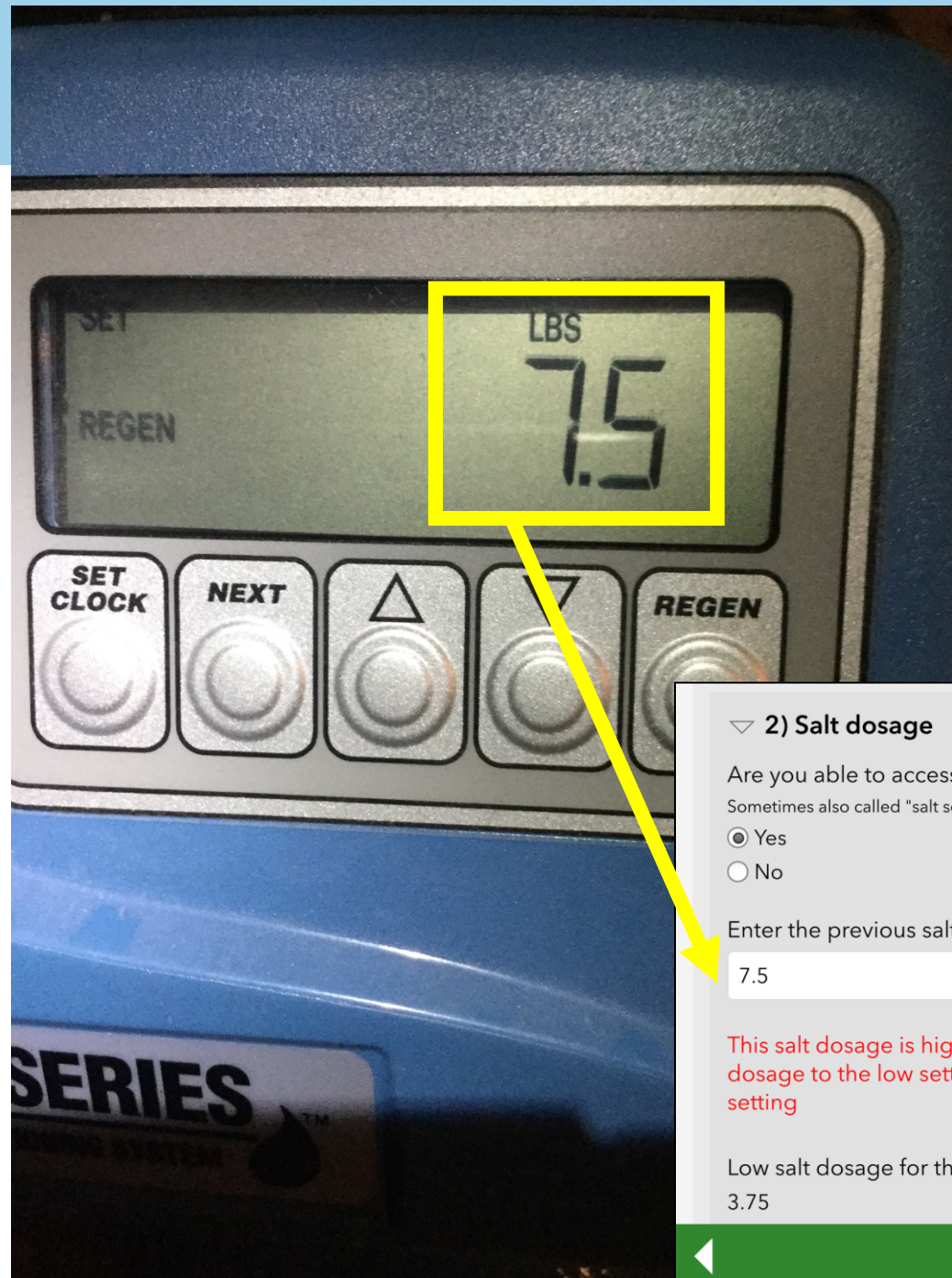
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A setting labeled “pounds” refers to the salt dosage. Remember that several softeners require you to change the grain capacity if you change the salt dosage, so only change this setting if you know what other changes are necessary.

### 2) Salt dosage

Are you able to access this softener's salt dosage?

Sometimes also called "salt setting."

☒ Yes

☐ No

Enter the previous salt dosage:

7.5

This salt dosage is higher than the low salt dosage for this unit. If you are able, lower the salt dosage to the low setting and adjust the grain or gallon capacity to the corresponding low setting

Low salt dosage for this unit:

3.75

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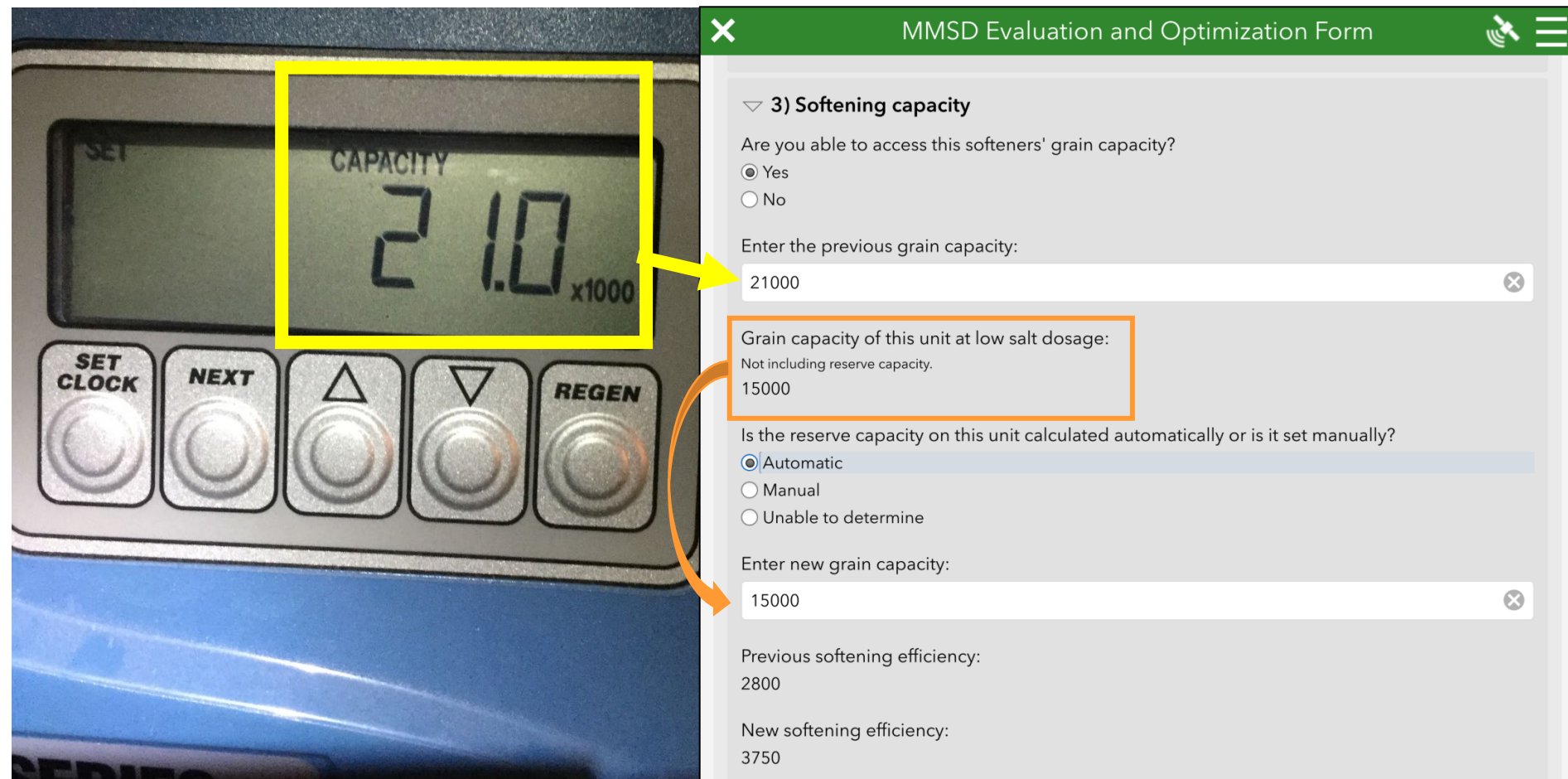
Truing up hardness  
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The grain capacity on this unit can also be changed with the Up and Down arrows, and is changed in tandem with the salt dosage. For units for which the information is available, the low grain capacity appears in the app.



**MMSD Evaluation and Optimization Form**

3) Softening capacity

Are you able to access this softeners' grain capacity?

☒ Yes  
☐ No

Enter the previous grain capacity:

21000

Grain capacity of this unit at low salt dosage:  
Not including reserve capacity.  
15000

Is the reserve capacity on this unit calculated automatically or is it set manually?

☒ Automatic  
☐ Manual  
☐ Unable to determine

Enter new grain capacity:

15000

Previous softening efficiency:  
2800

New softening efficiency:  
3750



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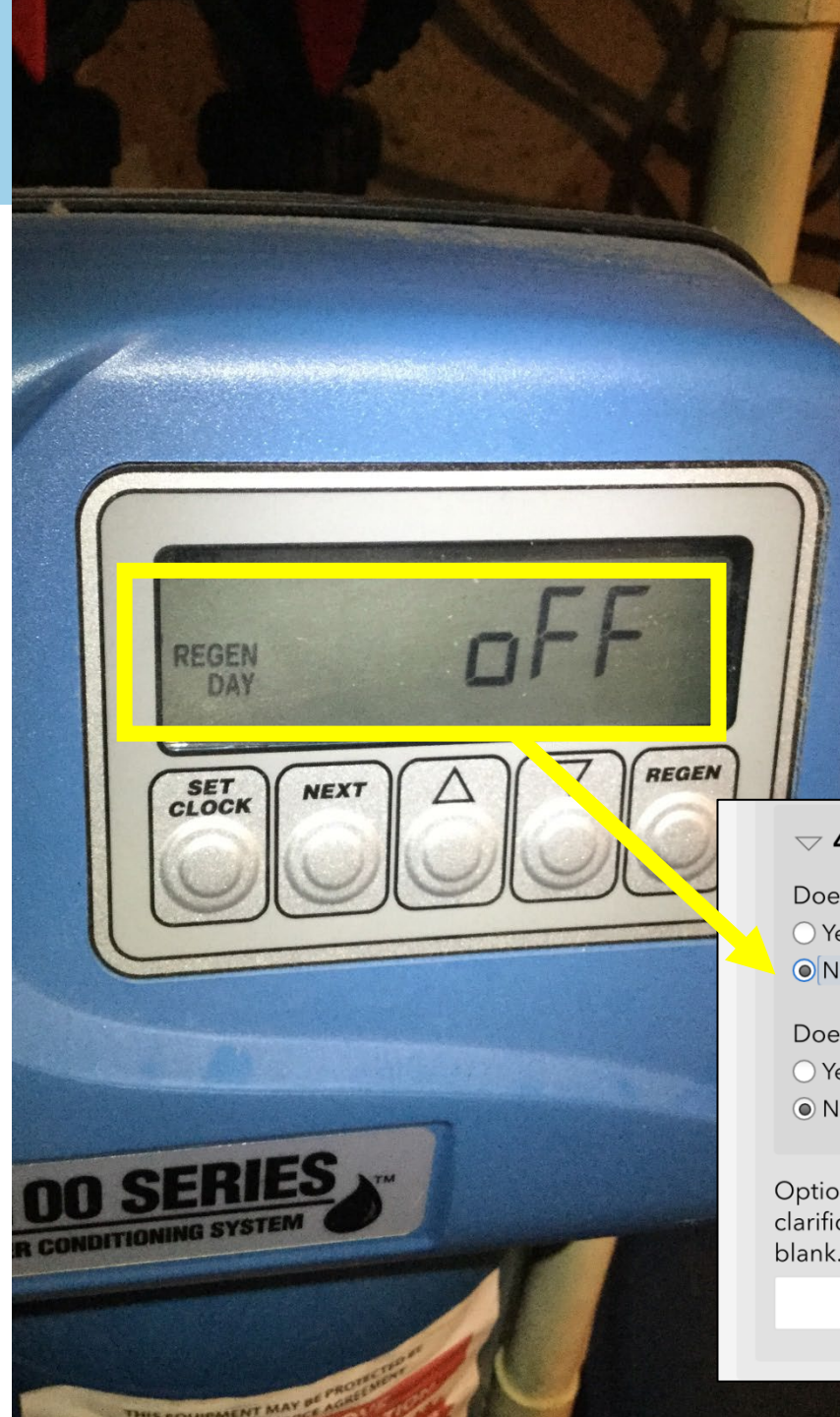
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If you find that the unit has a time-clock override setting, make sure that it is not set to an overly restrictive setting. You can turn it off, or set it to a high number of days (>14) to prevent premature regenerations.

#### 4) Other settings

Does this softener have a time-clock override on?

☐ Yes

☒ No

Does this softener have a "salt efficiency" mode?

☐ Yes

☒ No

Optional: If you were not able to optimize any aspects of this softener, or if you have clarification for this optimization, please add comments here. Otherwise, you can leave this field blank.

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# Walk-through of optimization in app



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# Walk-through of installation in app



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# More exercises

- Work through example app scenarios on pages 15-17 of workbook



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# After today

- Continue practicing using the app
- Confirm with MMSD if you want to participate as a provider in the Salt Savers pilot project
- Visit [www.madsewer.org/SaltSavers](http://www.madsewer.org/SaltSavers) for additional information

Reducing our  
salt use will  
help protect  
our waters and  
the wildlife that  
live in them.

