

TANNIN TESTING Lovibond MD100 Colorimeter (430 nm)

PROC-EN-T116

Lovibond MD100 – 430 nm For Steam Boilers and Closed Loops using (TG 3124, TG 3106, TG 3304, TG 3304 PM2)

Although previous tannin testing has been and continues to be done at 420 nm, the discontinuation of the Hach single wavelength Pocket Colorimeter required a replacement instrument. The Lovibond MD100 – 430 nm has the following characteristics:

- Validated replacement for the Hach instruments (within 2%)
- Similar price point
- Good linearity
- Uses a 1 cm cuvette
- The instrument gives an absorbance reading only
- AquaPhoenix has an appropriate kit (Product code SVT001)





COMPARISON OF TANNINS MEASURED AT 420 AND 430 NM FOR VARIOUS SYSTEMS							
	Abs - Boiler A	Abs - Boiler B	Abs - Boiler C	Multiplier	Tannins - Boiler A	Tannins - Boiler B	Tannins - Boiler C
DR6000 @ 420 nm cuvette 2.24 cm	2.23	2.62	1.70	65.57	146.36	171.61	111.21
MD 100 @ 430 cuvette 1 cm	0.88	1.06	0.67	163.00	143.77	172.13	108.88
Ratio	2.53	2.48	2.54		1.02	1.00	1.02



TANNIN TESTING PROCEDURE Lovibond MD100 Colorimeter (430 nm)

PROC-EN-T117

How to Measure the Residual Tannin for Steam Boilers Using TG 3124 and TG 3106

Note: The Lovibond MD 100 Colorimeter is not programmable and will give absorbance readings only.

- 1) Turn on the Lovibond MD100 430 nm colorimeter by pressing the "On/Off" button.
- 2) The display should show "A430" if it is in the correct absorbance mode. If it shows "t", the device is in transmittance mode and you must press the "Mode" button to switch it back to absorbance mode.
- 3) Prepare a 5 ml blank (tap water, soft water, or DI water) in the plastic Lovibond flat cell. Place the cap on. (See picture.)
- 4) Insert the blank cell into the colorimeter. Make sure that the rear protrusion of the cell slides into the rear notch. There is an embossed triangle on the front of the cell that you can align with the embossed triangle on the device to help you position it properly. (It helps to mark this triangle with ink to see it more clearly. Please note that the bottom flat part of the cell goes in slanted and not parallel to the sides of the device.)
- 5) Make sure that the cap is well pressed down and flush with the colorimeter in order to prevent extraneous light from entering.
- 6) Press the "Zero/Test" button. The display will flash and show a reading of "0.0.0".
- 7) Remove the cell and discard the blank sample.
- 8) Filter boiler water with a 0.22 μ filter to prepare a 5 ml sample.
- 9) Insert the sample cell into the colorimeter, well aligned and with the cap on as previously described.
- 10) Press the "Zero/Test" button. You will get an absorbance reading.
- 11) For a clean boiler the number should be between 1043 and 1166. For a dirty, scaled-up boiler, you should be between 1288 and 1411.
- 12) Remove, empty and rinse the Tannin sample cells well.
- 13) Press the "On/Off" button to turn off the colorimeter.

Repeat steps 8 to 12 for each boiler sample.

If the Tannin value from any boiler sample is lower than the targeted range, increase the dosing pump setting. If the value is higher, decrease the dosing pump setting.

Residual Tannin Target Range

For clean, well maintained boiler: Readings between 1043 and 1166 (corresponding to 170-190 mg/l) Target: 1104 (corresponding to 180 mg/l) For FW hardness or scaled boiler: Readings between 1288 and 1411 (corresponding to 210-230 mg/l) Target: 1350 (corresponding to 220 mg/l)



TANNIN TESTING PROCEDURE Lovibond MD100 Colorimeter (430 nm)

PROC-EN-T118

How to Measure the Residual Tannin for Closed Loops Using TG 3304 and TG 3304 PM2

Note: The Lovibond MD 100 Colorimeter is not programmable and will give absorbance readings only.

- 1) Turn on the Lovibond MD100 430 nm colorimeter by pressing the "On/Off" button.
- 2) The display should show "A430" if it is in the correct absorbance mode. If it shows "t", the device is in transmittance mode and you must press the "Mode" button to switch it back to absorbance mode.
- 3) Prepare a 5 ml blank (tap water, soft water, or DI water) in the plastic Lovibond flat cell. Place the cap on. (See picture.)
- 4) Insert the blank cell into the colorimeter. Make sure that the rear protrusion of the cell slides into the rear notch. There is an embossed triangle on the front of the cell that you can align with the embossed triangle on the device to help you position it properly. (It helps to mark this triangle with ink to see it more clearly. Please note that the bottom flat part of the cell goes in slanted and not parallel to the sides of the device.)
- 5) Make sure that the cap is well pressed down and flush with the colorimeter in order to prevent extraneous light from entering.
- 6) Press the "Zero/Test" button. The display will flash and show a reading of "0.0.0".
- 7) Remove the cell and discard the blank sample.
- 8) Filter enough closed loop water with a 0.22 μ filter to prepare a 5 ml sample.
- 9) Add 3 drops of 2N NaOH to increase the pH, close the cap, shake, and wait 5 minutes.
- 10) Insert the sample cell into the colorimeter, well aligned and with the cap on as previously described.
- 11) Press the "Zero/Test" button. You will get an absorbance reading.
- 12) Remove , empty and rinse the Tannin sample cells well.
- 13) Press the "On/Off" button to turn off the colorimeter.

Repeat steps 8 to 12 for each closed loop sample.

If the Tannin value for any closed loop is lower than the targeted range, add product accordingly and allow to mix then recheck.

If the values are higher simply record data point and leave as is.

Aluminum boilers: Readings between 614 and 736 (corresponding to 100-120 mg/l)

Residual Tannin Target Range

Closed Loops: Readings between 614 and 860 (corresponding to 100-140 mg/l)