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Experimental considerations

1. When the system is operating, the operator should stay until finish the experiment.
2. $8 \text{ ml} \leq \text{Total volume} \leq 50 \text{ ml}$
3. $\text{NO. of vessel} \geq 3 \cdot \text{weigh of sample} \leq 0.5\text{g}$.
4. The vessel used for temperature control must be used as a standard vessel , therefore the same acid volume/mixture and the same sample type/amount must be placed into it.
5. The components of the reference vessel assembly (cover, vessel, and shield) be handled as a set. Please check the no. of reference vessel, do not mix reference components with others.
6. Clean the cavity with paper towels before and after experiment.
7. Before each use, the operator should examine the entire length of the thermowell, the adapter plate, and the spring by looking for cracks.
8. The wall surfaces of the HTC protection shield, Teflon vessel, must be dry and clean. Damages may occur otherwise.
9. HTC-test: A spring that is still good does not pass through the slot in the spring gauge.



10. Clean test: put the vessel and cover in cavity and use the following program.

No. of vessel	Time	Power	T1
< 6	00:00:45	350W	0
6-10	00:00:45	600W	0

※After run · if it is warm · put in 150-180°C oven for 3hrs

11. The way to clean is to process a blank (using the same process acid) under the same process conditions. Or use the process below:

Time	T1(°C)
00:18:00	180
00:05:00	180

Operate Procedure

	<p>1. Tare the vessel and directly weigh the sample by placing it inside the vessel.</p> <p>※ Weigh of sample $\leq 0.5\text{g}$. ※ If your sample is too complicated, please start from 0.25g.</p>
	<p>2. Introduce the Teflon vessel into the HTC protection shield.</p> <p> WARNING The wall surfaces of the HTC protection shield, as well as the outer wall of the Teflon vessel, must be dry and clean. Damages may occur otherwise.</p>
	<p>3. Add suitable reagents to the sample. When part of the sample is left on the inner wall, try to wet it by adding acids drop by drop.</p> <p>8 ml \leq Total volume \leq 50 ml</p> <p>※ Any sample material that sticks to the sides of the vessel should be washed down into the pool to avoid potential vessel damage.</p>
	<p>4. Place the Teflon cover on the Teflon vessel; push it firmly to end and check that the cover fits well onto the vessel.</p>



5. Place the adapter plate on the Teflon cover, with the flat part of it facing downwards, to have the space for the HTC safety spring on the top side.



Spring test

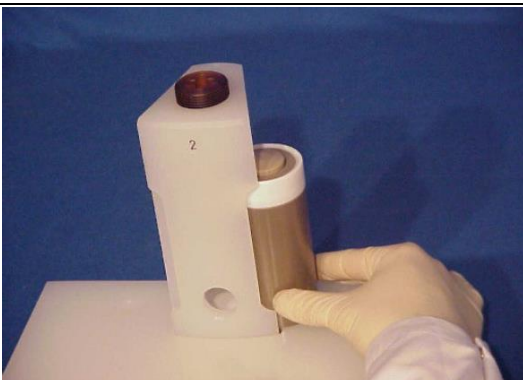


6. Place the HTC safety spring onto the HTC adapter plate.

※ Spring test
If the spring does not pass through the slot in the gauge, then it is still good and can be used.



7. Place the TFM Teflon indicator ring on the cover and push it down completely.



8. Introduce the vessel into the polypropylene rotor segment.

※ Center vessel on the white insulation plate.



9. Take the torque wrench and set the indicator to the "close" position.





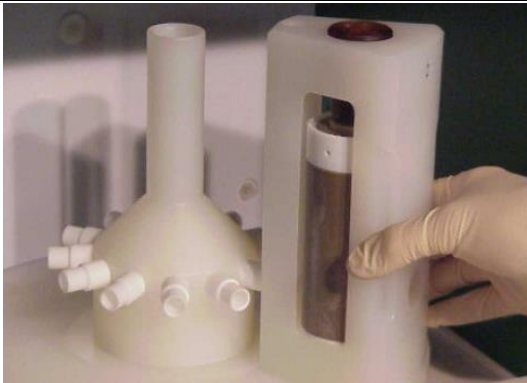
10. Put the segment complete with the vessel onto the workstation. The opening of the apex is pointed away from the user
Tighten the HTC screw in the upper part of the segment using the torque wrench.



WARNING

Stop turning the torque wrench when a click is heard. The torque wrench may overload the HTC safety springs if further rotation is applied.

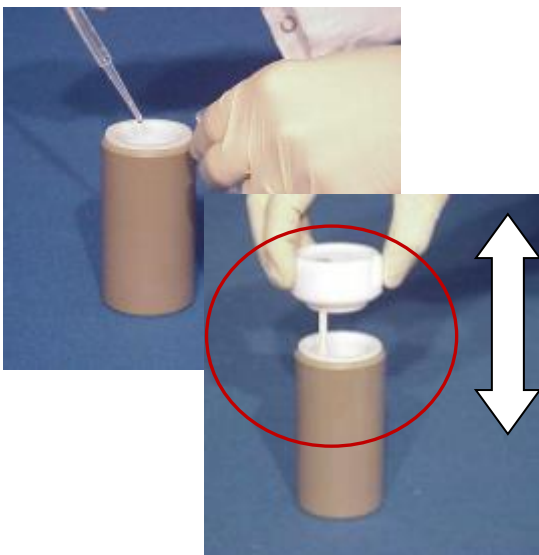
※Make long rotations instead of short ones and do proceed slowly until you hear a clicking sound informing that the vessel is properly closed.



11. Slide in the segment in to the rotor bottom plate.



12. Repeat the same procedure for all the remaining standard vessels.



13. Reference vessel must be used as a standard vessel, therefore the same acid volume/mixture and the same sample type/amount must be placed into it.



WARNING

When closing and opening the reference cover, be sure to lift the cover straight up to avoid cracking the thermowell. Careful inspection of the thermowell should be carried out before each use.

Cracked thermowells must not be used!



14. The special HTC adapter plate goes onto the reference TFM Teflon cover.



15. Put the special HTC adapter plate and safety spring. The reference HTC spring differs from the others; it has a smaller diameter to allow the introduction of the thermocouple into the vessel.



16. Introduce the reference vessel just assembled into the reference polypropylene segment.



17. Tighten the reference vessel in the same way as the other vessels.



18. Introduce the thermocouple into the reference vessel, simply sliding-in the sensor through the hole in the HTC screw of the reference segment.

※ **Insert the temperature probe into the rotor before placing the segment rotor into the cavity.**



19. Fully introduce the temperature probe into the thermowell

- ※ Give a gentle twist of the knob to snug it into the top of the rotor.
- ※ Notice the temperature probe should be able to rotate freely inside the knob.

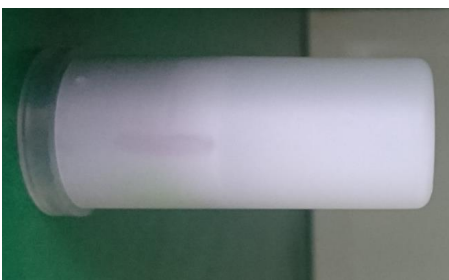


20. Introduce the segmented rotor top plate; the plate is fixed by the connectors to each individual polypropylene segment.



21. Lift up one side of the top plate to facilitate the introduction of the reference segment; then relocate back the top plate in its position.


- ※ Reference segment' s position is no.1.



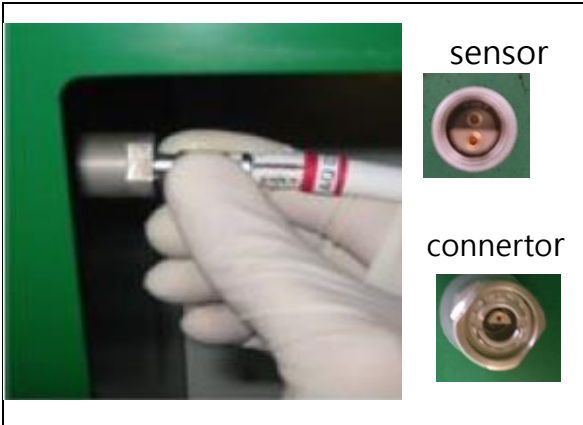
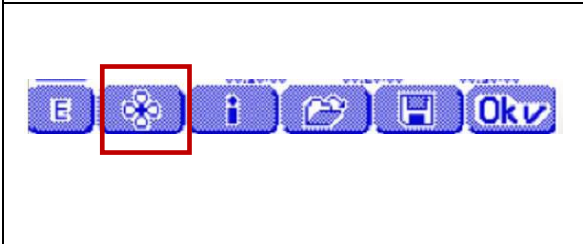
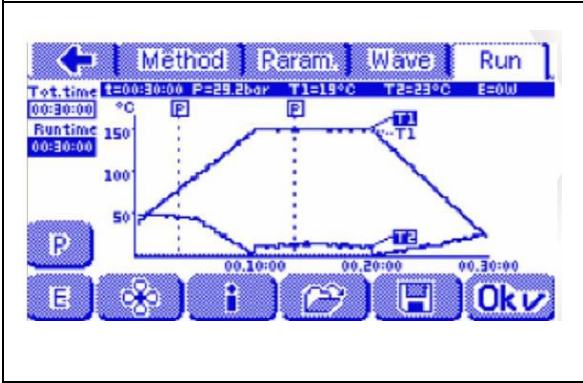
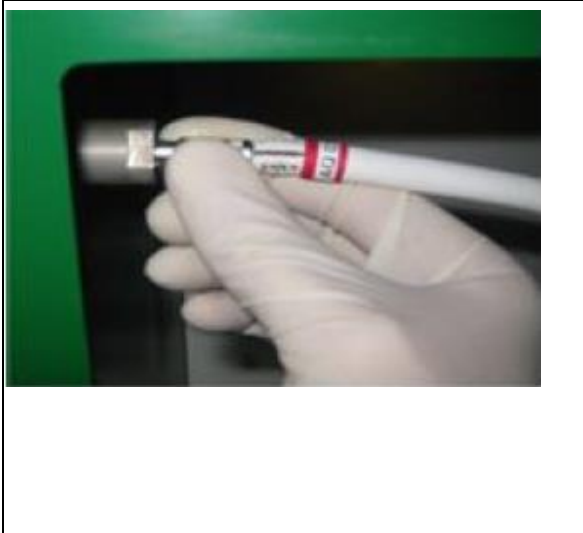
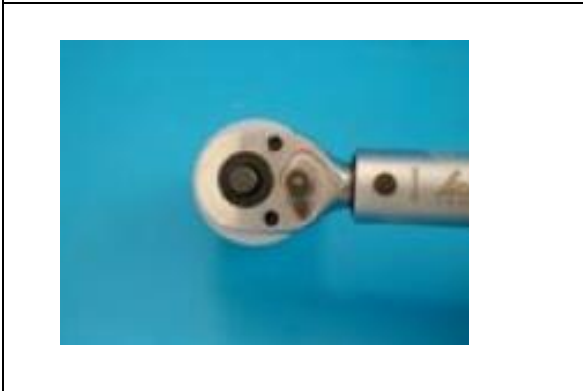
22. pull out the safety holder.

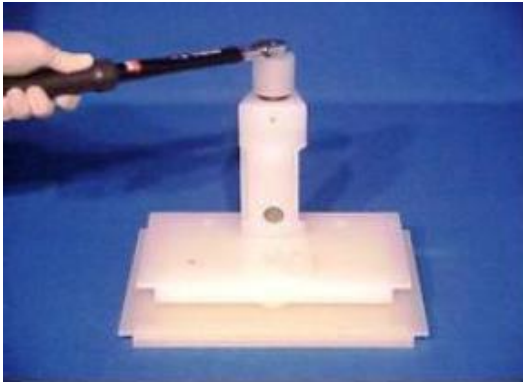
- ※ Please store the safety holder carefully, and plug in back after experiment.



23. Use the rotate icon  to rotate the rotor to let reference rotor toward the back of the cavity.

- ※ Plugging the free end of the probe in the position can reduce mechanical stress along the length of the probe.

	<p>24. Plug-in the temperature sensor, again touching only the metal plug.</p> <p>✘ The electrical connector has a definite shape and only one orientation of the connector will result in a positive connection.</p>
	<p>25. Activate the Turntable function from the software and observe the smooth movement of the rotor, without hesitation or binding.</p>
	<p>26. Stay around keep checking program.</p> <p>After the heating cycle has been completed, leave the vessels into the microwave cavity for the cooling time.</p>
	<p>27. Disconnect the temperature probe from the cavity wall by touching only the metal plug</p> <p>✘ Never pull along the length of the probe. Do not use a twisting motion to disconnect the probe because it can damage the connector</p> <p>WARNING Do not pull free the sensor by using the cable! Be sure that the line on the white protection is facing out of the microwave cavity to ensure proper connection.</p>
	<p>28. Take the torque wrench and set the indicator to the "open" position</p> <p>✘ Vessels should never be opened before they have been sufficiently cooled.</p>



29. Place the work station under a fume hood, and carefully loosen the screw in the upper part of each individual segment, by using the torque wrench.
Open the vessels very slowly, since a certain pressure may still be present.



30. Remove the vessel from the polypropylene segment.



31. Carefully lift up the vessel cover, together with the TFM Teflon indicator ring.



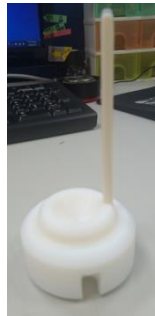
32. Rinse the lower part of the TFM Teflon cover with distilled water, collecting the same inside the vessel.



33. Slide the TFM Teflon vessel out of the HTC protection shield.

(or you can use the work station to slide the vessel out)

Warning



When closing and opening the reference cover, be sure to lift the cover **straight up** to avoid cracking the thermowell.

※Cracked thermowells must not be used!



Must use protection shield



Be careful!!!



Introduce the thermocouple into the reference vessel, simply sliding-in the sensor through the hole in the HTC screw of the reference segment.



Fully introduce the temperature sensor into the thermowell, until the snap connector is fixed.



Plug-in and unplug the temperature sensor, again touching only the metal plug.