



# The Association of Postconsumer Plastic Recyclers

## PET Dissolution Test PET-R-03

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***This protocol may involve hazardous materials, operations and/or equipment and does not purport to address all of the safety issues, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.***

### Equipment/Supplies List

- Heat resistant gloves
- Apron; full length that covers torso, arms and legs
- Faceshield (hood sash if available)
- Metal beaker with handle, at least 700 ml capacity
- Fiberglass matting for setting hot beaker on while heating and cooling
- Thermometer with metal armor casing
- Safety glasses
- Vented Hood
- Hot Plate
- 1000 ml filtering flask
- Buchner funnel
- Filter Paper (Whatman #1, 11 micron, VWR Catalog #28450-128)
- Ring stand and clamp
- Timer
- Aspirator or vacuum pump and hose
- Glass beads to act as boiling chips
- Watch glass to cover the metal beaker
- Disposal can for waste DEG
- Analytical balance
  
- Reagent grade 2,2'-OXYDIETHANOL (DEG, or diethylene glycol)
- Reagent grade ACETONE

**Be sure to read all Material Safety Data Sheets.**



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## PET Sample Preparation Procedure

*Be sure to use appropriate laboratory safety procedures / Gloves, safety glasses, etc.*

1. Using a well lighted, ventilated laboratory hood, conduct the following test.
2. Weigh 100 grams of PET PCR flake sample into a clean metal beaker.
3. Add 500 ml of DEG to the beaker.
4. Add 2 glass beads to the beaker. Set beaker onto a fiberglass mat which is on the hot plate. Cover the beaker with a watch glass and bring the DEG to a boil.  
**Caution: Boiling DEG is very hot, about 244°C**  
**Avoid breathing any fumes**
5. Run controlled boil for 60 minutes. PET will dissolve during this procedure.
6. After 60 minutes, carefully place beaker on a fiberglass mat to cool. Allow the solution to cool to about 200°C. Remove watch glass. Use metal armor cased thermometer to monitor temperature.
7. Obtain clean filter paper and place filter paper in a clean Buchner funnel and tighten funnel to filtering flask. **Make sure filtering flask is empty of acetone or other volatile organic chemicals!**
8. Turn on water for aspirator or vacuum pump so air is being pulled through the Buchner funnel.
9. Check temperature of solution, when it is about 200°C, pour solution slowly onto the filter paper so as to wet the filter paper evenly.
10. Filter all DEG solution through the filter paper.
11. After filtration is finished, temporarily remove the Buchner funnel and take hose off of the flask and stop water flow or vacuum pump operation. Carefully, POUR DEG SOLUTION FROM THE VACUUM FLASK INTO AN EMPTY WASTE JUG. Properly dispose of waste DEG solution when it cools to room temperature. Put no other solutions or any solids with the DEG as it cools. Replace the Buchner funnel to the vacuum flask.
12. Allow the recently emptied beaker to cool for at least 15 minutes. Allow vacuum flask and funnel to also cool to approximately room temperature. Do not touch the filter paper in the Buchner funnel. Then add ~ 50 ml of acetone to rinse the sides of the beaker. Turn water for the aspirator or vacuum pump back on and reconnect the hose to funnel apparatus. Pour ~ 25 ml of acetone from beaker through the filter slowly (this keeps the paper from bubbling if funnel is still too hot). Then cover the filter paper with the remaining acetone to displace the DEG from the filter paper.
13. Let water or pump run till filter is visually dry.
14. Compare paper to the rating chart and assign rating.
15. Record sample identification and all results.



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### PET Evaluation Procedure

1. Compare the appearance of the test filter paper to the visual standards and assign a comparable value to the test filter paper.
2. Ratings of 3 or less on a scale of 1-5 on the filter rating test comparator can be acceptable for many applications.



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