Waste-derived fuels, such as solid recovered fuel (SRF), are increasingly being used in, e.g., the cement industry as a means to reduce cost. The inhomogeneous nature of SRF makes it difficult to combust, and many problems may arise within, e.g., combustion control, feeding of fuel, deposit formation, or accumulation of impurities. The combustion of polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), wood, and SRF were studied in a rotary drum furnace. The combustion was recorded on a camera (60 frames per second), so that any agglomeration or deposition of fuel or ash could be monitored. PE and PP pose no significant risk of forming deposits in a combustion environment (T > 800 °C) as a result of a rapid devolatilization, while PET may cause deposits as a result of a sticky char residue. The deposition tendency of the investigated SRF is low, and it may be managed by a careful combustion control. The ash from SRF or wood does not pose a significant risk of melting and deposits at temperatures up to 1000 °C, but the presence of glass impurities in some SRF may limit operation temperatures to 900 °C as a result of ash melting.