The accumulation of deposits on tube surfaces in the superheater regions of biomass boilers is a concern as it affects boiler efficiency and leads to unscheduled maintenance. This work examines the effect of alkali salts (mainly potassium chloride, KCl) on ash deposition on tube surfaces in biomass boilers through a systematic study using an Entrained Flow Reactor (EFR) at the University of Toronto. The effect of KCl mixed with silica, fly ash, and other oxides on deposition is studied. The deposition is found to increase with an increase in molten phase and the particles do not accumulate on the probe surface if there is no molten phase. These results are different compared to those obtained for recovery boilers. The carryover ash in recovery boilers requires a liquid content of 15 - 20% for the particles to deposit on the heat transfer surfaces. In the biomass boiler scenario, however, the deposition increases almost linearly with increasing liquid content. A preliminary deposit removability study was also conducted for the removal of KCl-silica deposits. The peak impact pressure (PIP) required to remove the KCl-silica deposits is found to increase slightly with increasing KCl concentration in the feed.