The present invention regards a refiner plate segment (1) for a disc-type refiner apparatus (30), adapted to grind a saturated cellulosic material (M) in a refining gap (17) defined by opposed discs (20) during use of the apparatus (30), the material being moved from a refiner inlet opening (21) towards an outer edge (7) of the segment (1). The outer edge (7) of the segment (1) comprises a barrier arrangement (15) to increase the pressure in the refining gap (17) for retaining the liquid phase out to said outer edge (7). The present invention also regards a method of refining a saturated cellulosic material (M) in a refining gap (17) defined by two opposed discs (20) of a disc arrangement.