

Title	PPOOLEX Experiments on Wall Condensation
Author(s)	Jani Laine, Markku Puustinen
Affiliation(s)	Lappeenranta University of Technology, Finland Nuclear Safety Research Unit
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Abstract This report summarizes the results of the wall condensation experiments carried out in December 2008 and January 2009 with the scaled down PPOOLEX test facility designed and constructed at Lappeenranta University of Technology. Steam was blown into the dry well compartment and from there through a DN200 blowdown pipe to the condensation pool. Altogether five experiments, each consisting of several blows, were carried out.

The main purpose of the experiment series was to study wall condensation phenomenon inside the dry well compartment while steam is discharged through it into the condensation pool and to produce comparison data for CFD calculations at VTT.

The PPOOLEX test facility is a closed stainless steel vessel divided into two compartments, dry well and wet well. For the wall condensation experiments the test facility was equipped with a system for collecting and measuring the amount of condensate from four different wall segments of the dry well compartment. A thermo graphic camera was used in a couple of experiments for filming the outside surface of the dry well wall.

The effect of the initial temperature level of the dry well structures and of the steam flow rate for the accumulation of condensate was studied. The initial temperature level of the dry well structures varied from 23 to 99 °C. The steam flow rate varied from 90 to 690 g/s and the temperature of incoming steam from 115 to 160 °C.

During the initial phase of steam discharge the accumulation of condensate was strongly controlled by the temperature level of the dry well structures; the lower the initial temperature level was the more condensate was accumulated. As the dry well structural temperatures increased the condensation process slowed down. Most of the condensate usually accumulated during the first 200 seconds of the discharge. However, the condensation process never completely stopped because a small temperature difference remained between the dry well atmosphere and inner wall even in the case of an extended steam discharge period.

More condensate was collected from the two upper wall segments than from the two lower segments. In addition, more condensate was collected from the segments opposite to the inlet plenum than from the segment on the same side as the inlet plenum.

Key words condensation pool, steam/air blowdown, wall condensation

Available on request from the NKS Secretariat, P.O.Box 49, DK-4000 Roskilde, Denmark.
Phone (+45) 4677 4045, fax (+45) 4677 4046, e-mail nks@nks.org, www.nks.org