Multicomponent solid forms of the BCS class IV drug furosemide (FSM) were obtained upon liquid assisted grinding with coformers anthranilamide (ANT), 4-toluamide (TOL), 2-picolinamide (PCM), piperazine (PPZ), 2,3,5,6-tetramethylpyrazine (TMPZ), pyrazine (PYZ), 2-picolinic acid (PIC), isoniazid (INZ), and theophylline (THP), and identified with powder X-ray diffraction. Cocrystals/salts with higher solubility show higher values of initial diffusion/flux. Solid forms FSM-TMPZ (2:1), FSM-ANT (1:1), FSM-PPZ (1:1), and FSM-TOL ethanol solvate (1:1:1) were further characterized with single crystal X-ray diffraction and differential scanning calorimetry; a sesquihydrate structure for FSM-PCM (1:1:1.5) was additionally confirmed with thermogravimetric analysis. The solubilities of FSM-TMPZ and FSM-ANT are comparable to FSM, and this could be linked to coformer solubility.