

Title: Continuous Processing in Pharmaceutical Process Development

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As an alternate technology in pharmaceutical process development, continuous processing is applied to various syntheses of pharmaceutical intermediates or active ingredients to address some challenges often found in conventional batch processing. Typically, the issues encountered are related to safety, quality or economics and may be magnified upon scale-up. In particular, three processes will be highlighted that include: (1) controlling reaction purity profiles, (2) managing a reaction exotherm and reagent stability, and (3) converting a cryogenic synthesis to an energy-efficient non-cryogenic operation. Continuous processing approaches were implemented successfully to resolve or mitigate these process issues and enable on-scale deliveries to glass plant and pilot plant production campaigns.