



IFPRI BRIEF TEMPLATE

Check One: Project Review Collaboration
 Workshop Other

Descriptive Title	Survey of the state-of-the-art of dynamic flowsheet modeling tools for solids processing
Working Title¹	Dynamic flowsheeting for solids processing - review
Technical Area²	Systems Engineering
Date	26 th June 2019
Short Description	Review of the state of the art of dynamic flowsheet modeling tools for solids processing and a survey of current applications
Objectives	<p>The objectives of the review can be broken into several sections:</p> <ul style="list-style-type: none"> • Summary and review of the available dynamic flowsheet software packages for solids processing <ul style="list-style-type: none"> ○ Existing models and model methodologies ○ Identification of limitations of available unit operation models, critical missing unit operation models and the level of integration between the unit operation models ○ Review of workflow features available in the software that are required to enable the application of integrated flowsheet models e.g. GSA, optimization • Survey of the use of dynamic flowsheet modeling tools for industrial applications <ul style="list-style-type: none"> ○ Review of published literature from industry case studies ○ Data requirements for flowsheet model creation and validation including measurement techniques e.g. NIR, FBRM, material characterization ○ Summary of a common, general workflow based on the published work • Identification of future opportunities/requirements of dynamic flowsheeting to enable systems engineering approaches <ul style="list-style-type: none"> ○ From learnings from the review and a round table with IFPRI members, an exploration of: <ul style="list-style-type: none"> ▪ Current hurdles to adoption in industry and shortcomings in the state-of-the-art workflow

¹ Title used in meeting agendas and file archives

² One or more from the following list: W = wet systems; D = dry systems; F = particle formation; SR = size reduction; M = modeling; SE = systems engineering

	<ul style="list-style-type: none"> ▪ Suggestions for future developments to enable the forward looking objectives of industry with regards to system engineering
Scope	<ul style="list-style-type: none"> • The study should be limited to dynamic flowsheeting tools that have been updated within the last 12 months. Steady state tools are out of scope • Populations balance models that are formulated on the conservation of mass/volume not on number • To cover a wide range of particulate processes including wet granulation, dry granulation, direct compression, spray drying

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Other comments:

Flowsheet models are integral to adopting a systems engineering approach to solids processing yet there is often a lack of knowledge in industry of the software packages available and how they can be applied. Several commercial tools are available for the development and deployment of dynamic flowsheets for particulate processes as well as other academic led, open source developments. This review will survey the available tools and methods that are available to industry, describing the state-of-the-art of the technology, the workflows for application and the obstacles preventing such a holistic approaches being adopted across solids processing industries.