



## IFPRI BRIEF TEMPLATE

Check One:    **Project**                       **Review**                       **Collaboration**  
                    **Workshop**                       **Other**

<b>Descriptive Title</b>	Developing an Experimental Model to Test Material Stickiness upon Impact with Various Surfaces
<b>Working Title<sup>1</sup></b>	Experimental Methods for Stickiness
<b>Technical Area<sup>2</sup></b>	W, D
<b>Date</b>	June 14, 2023
<b>Short Description</b>	Caking and solid material build up in industrial equipment is a critical problem that industrial leaders face. An intuitive and easy to execute experimental method should be developed to test the relationship between material caking on different surfaces at different conditions.
<b>Objectives</b>	Develop an experimental method that tests the relationship between material feed stickiness/ rheology to surface properties (surface roughness, surface material of construction i.e. rubber, metals, etc) at specific state properties (temperature of both feed material and the surface, humidity of the system, etc). Consider material that exists in the twilight zone between wet and dry to test how moisture content of the material affects “stickiness”.
<b>Scope</b>	<p>An experimental method should be developed to test the effect of various material and state properties on “stickiness”. Scope is on material/solid build up in equipment or cohesion/agglomeration. The surfaces should range from bare metal to caking on already-deposited products. This should be a method based on kinetic collisions (i.e. dynamic) and not solely based on standard glass transition or static adhesion tests.</p> <p><b>Potential Materials to Test</b></p> <ul style="list-style-type: none"> <li>- Coffee wet cake</li> <li>- Milk powders</li> <li>- Sugars &amp; Dextrin in various degrees of dissolution</li> <li>- Mixture of Cocoa and Sugar in a wet cake</li> <li>- Anhydrous phosphoric acid dissolved in water</li> <li>- Minerals (e.g. kaolin, calcium carbonate, ceramic slips, can be provided in a variety of PSDs) - benefit from being fairly inert, stable and non-combustible/non-explosive</li> </ul>

<sup>1</sup> Title used in meeting agendas and file archives

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

	<p><b>Potential surfaces to test:</b></p> <ul style="list-style-type: none"> <li>- Stainless steel (316; 304)</li> <li>- Mild steel</li> <li>- others can be proposed later</li> <li>- ...with different finishes or different nucleation points (etching/scoring/tbc)</li> </ul>
--	---

<b>Recommended Contractors (2 or 3)</b>		
<b>Name</b>	<b>Institution</b>	<b>Email Address</b>
Victor Francia	Heriot-Watt University	<a href="mailto:V.Francia@hw.ac.uk">V.Francia@hw.ac.uk</a>
Meng Wai Woo	University of Auckland – New Zealand	<a href="mailto:Wai.woo@auckland.ac.nz">Wai.woo@auckland.ac.nz</a>
Irmgard Bischofsberger	Massachusetts Institute of Technology	<a href="mailto:irmgard@mit.edu">irmgard@mit.edu</a>

<b>Submitted By:</b>	
<b>Name</b>	<b>Organization</b>
Alexander Findeisen	Novozymes
Martijn van der Hoeven	Danone
Jarrold Hart	Imerys
John Hecht	P&G
Patrick Thoennissen	Origin Materials
Pasha, Mehrdad	Janssen Pharmaceuticals

-