**Check One: ☒Project ☐Review ☐Collaboration**

 **☐Workshop ☐Other**

| **Descriptive Title** | Triboelectric charging: fundamental mechanisms, mitigation control and preventative strategies  |
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| **Working Title[[1]](#footnote-0)** | Triboelectric charging workshop 2027 |
| **Technical Area[[2]](#footnote-1)** | Characterization & Formation  |
| **Date** | 16th June 2025  |
| **Short Description** | How can we predict the generation of triboelectric charges and discharge them before we see process issues?Commonly, triboelectric charges build up during processing of powders, granules, pellets and mini-tablets, which cause significant process issues for example: Issues include:Discharging, mixing, coating, filling capsules (encapsulation), filling stickpacks – e.g. where particles stick to each other or are repelled so that further processing is difficult. Rarely charge build up can cause the risk of explosions. Sensors are available, but foreseen to be used for dust emission measurement, have been described in SAR-29-14, however their applicability for other particles needs to be evaluated. [reference, IFPRI Critical Review of Tribology, Friction, and Contact Mechanics in Wet Systems, 2024. SAR-46-13][reference, In-Line Sensors for Real-Time Measurement and Analysis of Bulk Dry Powder, 2017. SAR-29-14] |
| **Objectives** | The aim of the project is to understand the fundamental mechanisms of the process, environmental and material conditions that are necessary for the initiation and build up of charges in particle products. Measurement techniques should be reviewed and evaluated against the applicability of use in an industrial environment. What is the industry benchmark? [also see related review request]Discharge methods should be proposed that can effectively make the particle products processable and safe. Mitigation strategies should be identified and provided that may become part of control strategies and/or integrated into automation alarm systems. Suggestions on implementable industrial solutions, including off the shelf devices should be evaluated.Development of reliable models to predict behavior  |
| **Scope** | Dry Systems Powders, granules, pellets, mini-tablets Clarify materials in scope: Pharmaceutical particle products, food particle products, battery powders Processes in scope: blending, fluid bed drying, encapsulation, Wurster coating, perforated pan coating, Measurement systems: in line, at line, off line Discharge methods in scope: chemical addition e.g. addition of GRAS excipients, engineering solutions e.g. probe, non product contact, PAT measurement solutions etc. Out of scope:Wet systems, colloid systems  |

| **Recommended Contractors (2 or 3)** |
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1. Title used in meeting agendas and file archives [↑](#footnote-ref-0)
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 [↑](#footnote-ref-1)