**Table 1.** Mass balance equations for four models

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| **Model** | **Governing Equations** | **Remarks** |
| PFM |  | Continuous phase mass balance |
|  |  | Dispersed phase mass balance |
|  |  | Boundary Conditions at top of column (z=0) |
|  |  | Boundary Conditions at bottem of column (z=H) |
| BFM |  | Continuous phase mass balance |
|  | Dispersed phase mass balance |
|  | Boundary Conditions at top of column (z=0) |
|  | Boundary Conditions at bottem of column (z=H) |
| ADM |  | Continuous phase mass balance |
|  | Dispersed phase mass balance |
|  | Boundary Conditions at top of column (z=0) |
|  | Boundary Conditions at bottem of column (z=H) |
| FMM |  | Continuous phase mass balance |
|  | Dispersed phase mass balance |
|  | Boundary Conditions at top of column (z=0) |
|  | Boundary Conditions at bottem of column (z=H) |
|  | Dynamic drop size distribution |
|  | Drop velocity |
|  |  |
|  | Volumetric drop size distribution |
|  | Drop specific surface area |
|  | Drop holdup |