CPC field-specific training

F26B: Drying solid materials or objects by removing liquid therefrom
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- Criteria for including/excluding documents
- Overview of F26B
- Detailed structure of groups with examples
Criteria for including/excluding documents

F26B covers:
Processes and apparatuses for drying ...
- (solid) objects (e.g. vehicle bodies, ceramic articles)
- solid materials (e.g. sand, manure, tea leaves)
- fluent materials containing solids (e.g. sludges)
... by removing water or other liquids therefrom.

F26B does not cover:
- Drying gases and vapours B01D. Reason: Not solid
- Evaporating of liquids B01D1/00. Reason: Not solid
- Machines/processes for drying specific materials and which are not of general interest, i.e. which are limited to a specific solid material or object. E.g.: Drying of semiconductor substrates, drying in a dishwasher.
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Overview of F26B

Three categories

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- **Drying apparatus (movement of material)**
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  - F26B2210

Not mutually exclusive
Overview of F26B

Three categories

F26B3
F26B5
F26B7

Drying processes (physical mechanisms)

F26B9
F26B11
F26B13
F26B15
F26B17
F26B19
F26B20

Drying apparatus (movement of material)

The terms "processes" and "apparatus" can be confusing ...
... so let’s use the following two questions instead:
Overview of F26B
Three categories

F26B3
F26B5
F26B7

Drying processes (physical mechanisms)

"What is the physical mechanism that causes the drying effect?"
Examples: convection, conduction, radiation, centrifugal force, reduced pressure, sorption, etc.

F26B9
F26B11
F26B13
F26B15
F26B17
F26B19
F26B20

Drying apparatus (movement of material)

"What is the movement of the material during the drying process?"
Examples: at rest, progressive movement, non-progressive

Whenever possible, give at least:
- one group for physical mechanism (often one is enough)
- AND one group for movement (typically more)
Table of contents

- Criteria for including/excluding documents
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- Detailed structure of groups with examples
Detailed structure of groups
"What is the physical mechanism that causes the drying effect?"

Physical mechanisms...

... involving heat \(\rightarrow\) F26B3

\{ convection
    conduction
    radiation
    heat within \}

... not involving heat \(\rightarrow\) F26B5

\{ reduced pressure
    freeze-drying
    centrifugal force
    sorption \}
Detailed structure of groups
F26B3: Physical mechanisms involving heat

- F26B3/02 by convection
  - F26B3/04: gas along surface
  - F26B3/06: gas through material
  - F26B3/08: fluidised beds

- F26B3/10: gas carrying the materials
  - F26B3/12: the material is sprayed in the gas
Detailed structure of groups
F26B3: Physical mechanisms involving heat

- F26B3/18 by **conduction**

  - F26B3/20 the heat source being a heated surface (without motion relative to materials)

  - F26B3/22 with relative motion between materials and heat source

Is there relative motion between heat source and objects/materials?
Detailed structure of groups
F26B5: Physical mechanisms not involving heat

- F26B5/04 by evaporation of moisture under reduced pressure (i.e. vacuum)

 oo F26B5/06 freeze-drying (first frozen, then sublimated due to low pressure)

We do not treat F26B3 and F26B5 as mutually exclusive
## Detailed structure of groups
### Movement of the material

<table>
<thead>
<tr>
<th>At rest</th>
<th>F26B9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive movement</td>
<td>F26B13, F26B15, F26B17</td>
</tr>
<tr>
<td>Non-progressive movement</td>
<td>F26B11</td>
</tr>
</tbody>
</table>
Detailed structure of groups

**Progressive movement:**
consists mainly (but not necessarily only) of a forward motion along a definite path (main movement from A to B)

**Non-progressive movement:**
mainly not for transport; often random movement for agitating the material
Detailed structure of groups

Progressive movement

What is the type of material/object being dried?

- F26B13: materials having a long length (webs, ribbons)
- F26B15: objects or compact batches of materials
- F26B17: loose materials

Reminder
- Objects: processed as separate articles (counted in units)
- Materials: processed in bulk (measured in kg or m$^3$)
Detailed structure of groups

F26B13: Drying materials in *long lengths* with progressive movement

- 00 F26B13/14: rollers (a.k.a. drums, cylinders)
- 000 13/16: perforated
- 000 13/18: heated or cooled
- 000 13/145: non perforated

Often the material has the form of a web.
Detailed structure of groups
F26B15: Drying *objects* or *compact batches* of material with *progressive movement*

<table>
<thead>
<tr>
<th>15/02</th>
<th>15/10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>circular lines</strong></td>
<td><strong>straight lines</strong></td>
</tr>
<tr>
<td>15/04: horizontal</td>
<td>15/12: horizontal</td>
</tr>
<tr>
<td>15/08: vertical</td>
<td>15/20: vertical</td>
</tr>
</tbody>
</table>

What is the shape of the path?
- Circular or straight lines?
- Horizontal or vertical plane?
Detailed structure of groups
F26B17: Drying materials in loose, plastic or fluidised form with progressive movement

- F26B17/02 superimposed belts carrying the materials
- F26B17/10 movement performed by fluid currents
- F26B17/18 rotary helical blades in stationary chambers (a.k.a. screw conveyors)

Reminder about screw conveyors: the main purpose of the movement is transporting the material from A to B (like any conveyor). Therefore, they fit into "progressive movement".
Detailed structure of groups
F26B11: Drying solids with movement which is non-progressive

- Is the receptacle moving or stationary?
- Is it closed or open?

- F26B11/02 moving and mainly-closed
- F26B11/12 stationary and mainly-closed
- F26B11/18 moving and mainly-open
- F26B11/22 stationary and mainly-open
Detailed structure of groups
Details of general application

F26B21: Arrangements for supplying and controlling gases for drying.
E.g. air knives, nozzles, gas temperature & pressure control

F26B23: Heating arrangements.
E.g. waste heat, combustion heating, electric heating

F26B25: Other.
E.g. (un)loading devices, seals, safety systems, stirrers, walls, doors, control of drying process
Detailed structure of groups
F26B21: Arrangements for supplying and controlling drying gases

- F26B21/001: drying-air generating units
- F26B21/004 nozzle assemblies, air knives, blow boxes
- F26B21/006 controlling parameters of gas
  - F26B21/08 humidity
  - F26B21/10 temp., pressure
  - F26B21/12 velocity, quantity
Detailed structure of groups
F26B23: Heating arrangements

- F26B23/001 waste heat (energy efficiency)
- F26B23/02 combustion heating
- F26B23/04 electric heating
Detailed structure of groups
F26B25: Other details of general application

- F26B25/001 handling (e.g. loading and unloading)
- F26B25/005 treatment of exhaust gases
- F26B25/008 seals & locks
- F26B25/22 control
Detailed structure of groups
How to classify in F26B

1. "What is the **physical mechanism** that causes the drying effect?"
   - One code for physical mechanism (often one is enough)
   - AND one code for movement (typically more)
   - Avoid F26B7 and F26B20: too vague
   - F26B3, F26B5, F26B7

2. "What is the **movement** of the material during the drying process?"
   - F26B9, F26B11, F26B13, F26B15, F26B17, F26B19, F26B20

Whenever possible, give at least:
- One code for physical mechanism (often one is enough)
- AND one code for movement (typically more)
- Avoid F26B7 and F26B20: too vague

3. **Always check** the "miscellaneous" groups for classifying relevant information that has not been covered by the previous groups
   - In total: usually 3 to 5 codes per document
   - F26B1, F26B21, F26B23, F26B25, F26B2200, F26B2210
Thank you for your attention!