

# Asahi Kasei Microcrystalline Cellulose (MCC)

for Oral Solid Dosage Forms of Pharmaceuticals and Nutraceuticals

High Performance MCC

**CEOLUS**<sup>TM</sup>  
*Just Pure Performance*

MCC Sphere

**CELPHERE**<sup>TM</sup>  
*Reliability At The Core*

## Asahi Kasei Functional Additives Division

Asahi Kasei is a leading manufacturer of microcrystalline cellulose which has been continuously developing high performance MCC products steaming from innovative particle morphology.

Our first plant started its production in 1970 in Nobeoka, Miyazaki, Japan which has been the cradle of Asahi Kasei and has been supplying MCC products in the Japanese pharmaceutical market for over 50 years.

We have leveraged our expertise in the science and technology of developing standard and premium grades of microcrystalline cellulose which have caused our products to now hold a majority share in this market because of their reliability.


From 2023, we will operate a second manufacturing site in Kurashiki-shi, Okayama, Japan to meet the increase in demand and to achieve a stable supply through multiple production sites.

The most important value proposition of our MCC products is their ability to facilitate challenging and/or innovative formulations of pharmaceuticals and nutraceuticals that customers are bringing to market.


## About Asahi Kasei

Asahi Kasei is a diversified Japanese chemical company with over a century of history.

We operate in the three business sectors of Material, Homes, and Health Care.

 **Material**  
Environmental Solutions  
Mobility & Industrial  
Life Innovation

 **Homes**  
Homes  
Construction Materials

 **Health Care**  
Pharmaceuticals  
Medical Care  
Acute Critical Care

## Creating for Tomorrow

The commitment of the Asahi Kasei Group:

To do all that we can in every era to help the people of the world make the most of life and attain fulfillment in living.

Since our founding, we have always been deeply committed to contributing to the development of society, boldly anticipating the emergence of new needs.

This is what we mean by "Creating for Tomorrow."

## Make The Smart Choice

There are a number of MCC products to choose from, but Asahi Kasei MCC products bring a key difference: they reflect the principle of what we call "Property Optimization." We at Asahi Kasei Functional Additives Division have adopted this concept to frame how our MCC products can help our customers achieve their intended product development objectives at a number of levels.

We define "property" as not only the physical attributes and performance standards of our MCC product, but also how it can affect development, approval and production issues our customers face as they bring their product to market. Our idea of "optimization" is to provide the MCC product that can best enable and enhance this process of developing the right formulation, facilitating regulatory approvals, implementing efficient production, and providing a quality product as a business deliverable for all of our customers' stakeholders.

## Why are Asahi Kasei MCCs **The Smart Choice** for you?

### Facilitating formulations

Our MCC products facilitate challenging formulations, solve tableting issues and enable unique and patient-friendly dosage forms.

### The base for quality

Less black particles, less impurities and high-quality consistency of our MCC products directly contribute to the quality improvement of your formulations.

### Production efficiency

Our MCC products contribute to your production efficiency by enabling high-speed tableting and reducing production problems.

High Performance MCC

MCC Sphere

 **CEOLUS**<sup>TM</sup>  
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# Grade lineup

Product Name

## High Performance MCC

Binder for oral solid dosage forms of pharmaceuticals and nutraceuticals



### Ceolus™ KG

Grades

**KG-1000**  
**KG-802**

Features

Ceolus™ KG is a highly compactible MCC with fibrous particles. It enables poorly compactible and/or high dose formulations. It solves tableting issues such as insufficient hardness, sticking or capping.

### Ceolus™ UF

**UF-702**  
**UF-711**

Ceolus™ UF is a porous MCC with balance of compactibility and flowability. It enables a balance of tablet hardness and tablet disintegration. It solves tableting issues such as insufficient API content uniformity or over-lubrication.

### Ceolus™ PH

**PH-101, 102**  
**PH-200**  
**PH-301, 302**  
**PH-F20JP**

Ceolus™ PH covers every standard grade with high quality.

## MCC Sphere

Seed core for oral solid dosage forms of pharmaceuticals



### Celphere™

**CP-102**  
**CP-203**  
**CP-305**  
**CP-507**  
**CP-708**

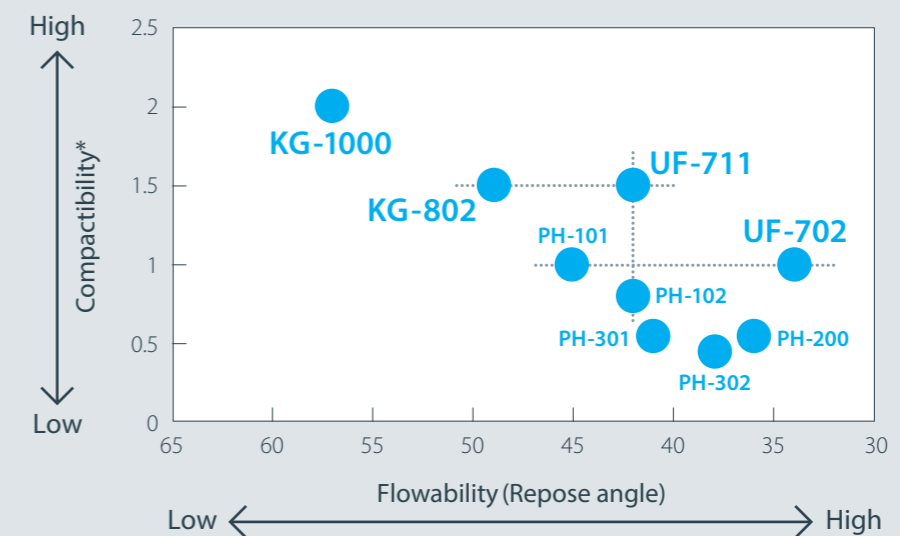
A 100 % MCC sphere, Celphere™ facilitates precise dissolution profiles of controlled release formulations by it's high sphericity and narrow particle size distribution.

## General properties of Ceolus™

Grade	Average particle size (µm)	Bulk density (g/cm³)	Repose angle (°)	Flowability	Compactibility	Disintegration
<b>KG-1000</b>	50	0.12	57		**	
<b>KG-802</b>	50	0.21	49		*	
<b>UF-702</b>	90	0.29	34	**		*
<b>UF-711</b>	50	0.22	42	*	*	*
<b>PH-101</b>	50	0.29	45	Standard	Standard	Standard
<b>PH-102</b>	90	0.30	42	*		
<b>PH-200</b>	170	0.35	36	*		
<b>PH-301</b>	50	0.41	41	*		*
<b>PH-302</b>	90	0.43	38	*		*
<b>PH-F20JP</b>	20	0.23	≥ 60	-	-	-

All values presented here are solely for the purpose of basic reference and should not be regarded as specifications.  
\* : Superior to Standard \*\* : Very Superior to Standard Blank : Same as or Inferior to Standard - : No Data

## Map of Ceolus™ Compactibility vs. Flowability



\* Comparison of tablet hardness, with the formulation of PH-101 = 1 set as the index point  
Formulation: Acetaminophen/MCC = 70/30

Ceolus™ KG is a highly compactible MCC with fibrous particles. It enables poorly compactible and/or high dose formulations. It solves tableting issues such as insufficient hardness, sticking or capping.

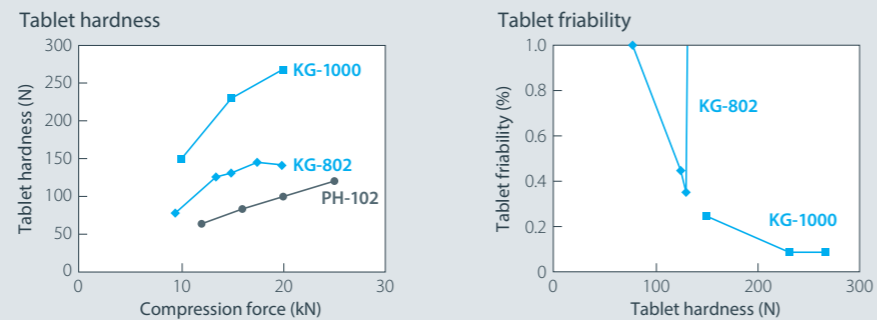
### Functional benefits

- Enables poorly compactible and/or high dose formulations
- Solves tableting issues  
Insufficient hardness, sticking, capping, high friability
- Enables unique and patient-friendly dosage forms  
MUPS, ODT, multiple-layer tablets, multiple-API-combination tablets, small tablets, mini tablets
- Enables low-pressure tableting  
Applicable for pressure-sensitive API tablets and coated granules

### Function & features

- High compactibility
- High oil absorption
- Fibrous particles

### Experimental example



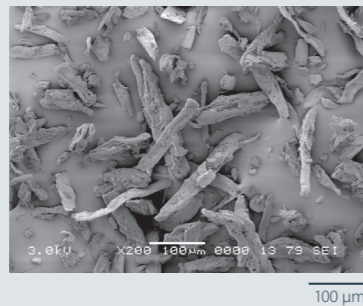
\* All tablets with PH-102 were broken during the friability test due to inherent capping tendency.  
Metformin HCl/MCC/CCS/SiO<sub>2</sub>/Mg-St=70.8/26.1/2.1/0.5/0.5(%)  
Direct compression (Rotary Press), Tablet size: 760 mg, Φ12.0 mm -16 R

### Grade lineup

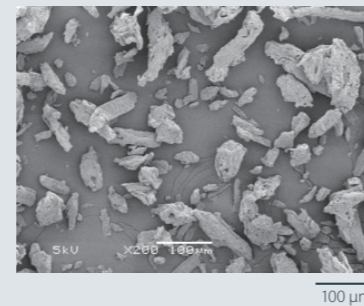
#### KG-1000



#### KG-802



#### Subject of comparison PH-101



### General properties

Grade	Average particle size (μm)	Bulk density (g/cm <sup>3</sup> )	Repose angle (°)	Loss on drying (%)	Water absorption (%)	Oil absorption (%)
KG-1000	50	0.12	57	2.0-6.0	290	210
KG-802	50	0.21	49	2.0-6.0	230	160

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### Pharmacopoeia listings

JP : Microcrystalline Cellulose  
USP/NF : Microcrystalline Cellulose  
Ph. Eur. : CELLULOSE, MICROCRYSTALLINE

### Packaging information

Grade	Net weight	Packaging type
KG-1000	10 kg	Polyethylene bag in kraft paper bag
KG-802	15 kg	Polyethylene bag in kraft paper bag

Ceolus™ UF is a porous MCC with balance of compactibility and flowability. It enables a balance of tablet hardness and tablet disintegration. It solves tableting issues such as insufficient API content uniformity or over-lubrication.

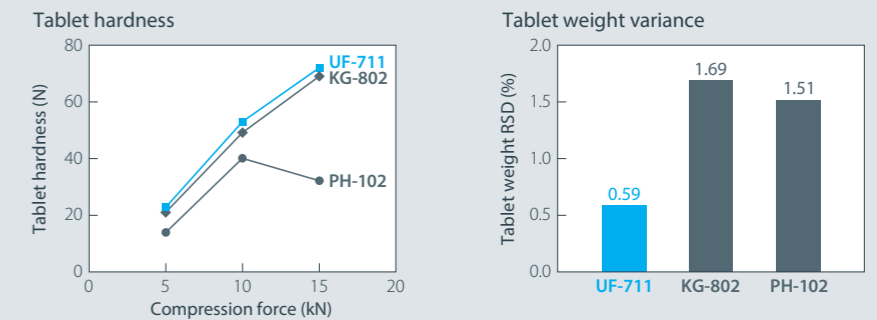
### Functional benefits

- Enables a balance of tablet hardness and tablet disintegration
- Solves tableting issues (Insufficient API content uniformity, over-lubrication)
- Enables poorly flowable and/or low dose formulations
- Enables high speed tableting

### Function & features

- Balance of compactibility and flowability
- High swellability
- Low sensitivity to lubricant
- Porous particles

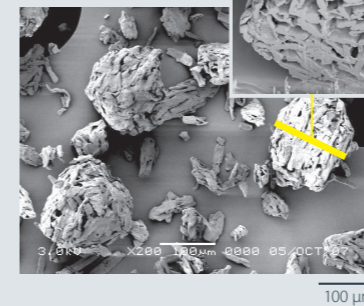
### Experimental example



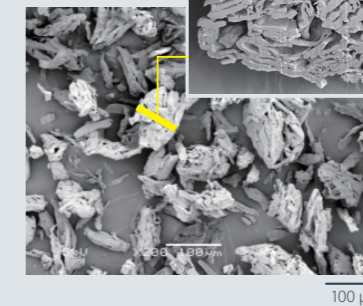
Ascorbic acid/MCC/Spray dried lactose/CCS/Mg-St=75/20/3/2/1.5 (extra) (%),  
Direct compression (Rotary press), Tablet size: 180 mg, Φ8 mm -12 R

### Grade lineup

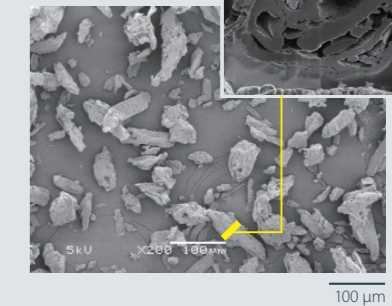
#### UF-702



#### UF-711



#### Subject of comparison PH-101



### General properties

Grade	Average particle size (μm)	Bulk density (g/cm <sup>3</sup> )	Repose angle (°)	Loss on drying (%)	Water absorption (%)	Oil absorption (%)
UF-702	90	0.29	34	2.0-6.0	240	160
UF-711	50	0.22	42	2.0-6.0	240	150

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### Pharmacopoeia listings

JP : Microcrystalline Cellulose  
USP/NF : Microcrystalline Cellulose  
Ph. Eur. : CELLULOSE, MICROCRYSTALLINE

### Packaging information

Grade	Net weight	Packaging type
UF-702	15 kg	Polyethylene bag in kraft paper bag
UF-711	15 kg	Polyethylene bag in kraft paper bag



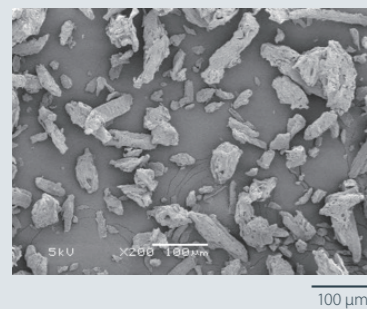
Ceolus™ PH covers every standard grade with high quality.

## Grade lineup

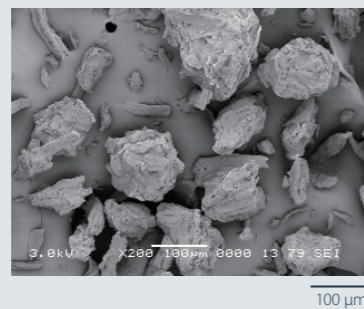
**PH-101, PH-102, PH-200, PH-301, PH-302, PH-F20JP**

## SEM images of particles

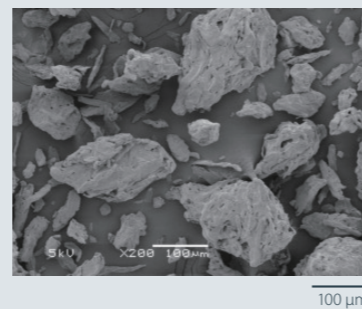
### PH-101



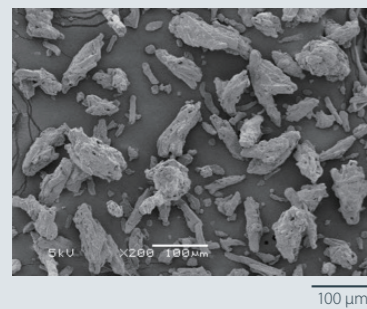
### PH-102



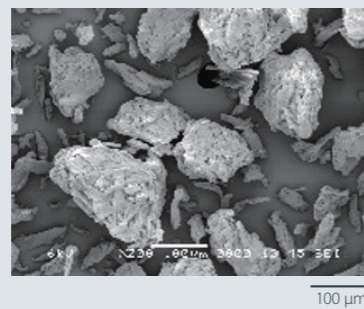
### PH-200



### PH-301



### PH-302



## General properties

Grade	Average particle size (µm)	Bulk density (g/cm <sup>3</sup> )	Repose angle (°)	Loss on drying (%)	Water absorption (%)	Oil absorption (%)
<b>PH-101</b>	50	0.29	45	2.0-6.0	200	120
<b>PH-102</b>	90	0.30	42	2.0-6.0	200	140
<b>PH-200</b>	170	0.35	36	2.0-6.0	200	140
<b>PH-301</b>	50	0.41	41	2.0-6.0	150	90
<b>PH-302</b>	90	0.43	38	2.0-6.0	170	100
<b>PH-F20JP</b>	20	0.23	≥ 60	≤ 7.0	220	100

All values presented here are solely for the purpose of basic reference and should not be regarded as specifications.

## Pharmacopoeia listings

JP : Microcrystalline Cellulose  
 USP/NF : Microcrystalline Cellulose  
 Ph. Eur. : CELLULOSE, MICROCRYSTALLINE

## Packaging information

Grade	Net weight	Packaging type
<b>PH-101</b>	20 kg	Polyethylene bag in kraft paper bag
<b>PH-102</b>	20 kg	Polyethylene bag in kraft paper bag
<b>PH-200</b>	20 kg	Polyethylene bag in kraft paper bag
<b>PH-301</b>	25 kg	Polyethylene bag in kraft paper bag
<b>PH-302</b>	25 kg	Polyethylene bag in kraft paper bag
<b>PH-F20JP</b>	20 kg	Polyethylene bag in carton box

A 100% MCC sphere, Celphere™ facilitates precise dissolution profiles of controlled release formulations by its high sphericity and narrow particle size distribution.

## Functional benefits

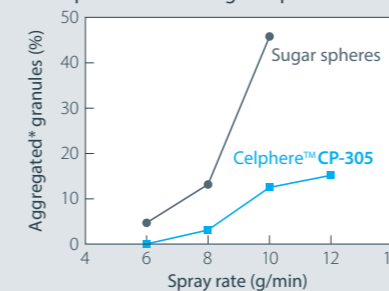
- Facilitates precise dissolution profile of controlled released formulation
- Yield improvement  
Reduces agglomeration, tolerance with high stress and coating machine varieties

## Function & features

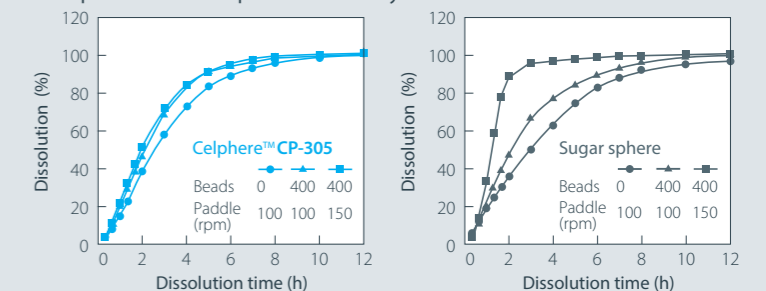
- High sphericity
- Narrow particle size distribution
- High mechanical strength

## Experimental example

Example 1: Film coating in aqueous coating system



Example 2: Dissolution profile affected by shear stress



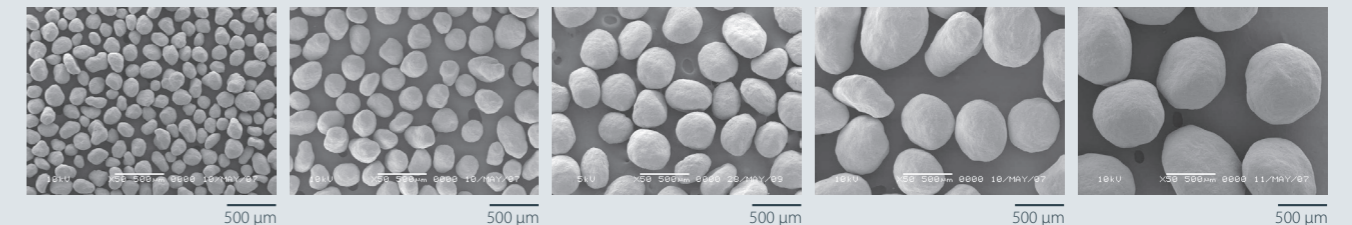
\*Percentage of particles with particle size larger than 500 µm

Base granules : Vitamin B2 (2%) layered on Celphere™ or sugar sphere  
 Film coating : Ethylcellulose aqueous dispersion/Triethyl citrate/HPMC/Water= 10.9/2.7/1.4/85 (up to 10% against base granules)  
 Equipment : Wurster fluid bed coater

Drug layering : Theophylline/Corn starch/Sucrose=10/10/20 + HPC-L aq. (3 wt%)  
 Film coating : Ethylcellulose aqueous dispersion/Acetylated monoglycerides/Talc=100/33/57  
 Equipment : CF-Granulator

## Grade lineup

**CP-102 CP-203 CP-305 CP-507 CP-708**



## General properties

Grade	Particle size range (µm)	Sphericity	Bulk density (g/cm <sup>3</sup> )	Water absorption (%)
<b>CP-102</b>	106-212	1.2	0.83	100
<b>CP-203</b>	150-300	1.1	0.87	100
<b>CP-305</b>	300-500	1.1	0.97	110
<b>CP-507</b>	500-710	1.2	0.97	70
<b>CP-708</b>	710-850	1.2	0.93	65

All values presented here are solely for the purpose of basic reference and should not be regarded as specifications.

## Pharmacopoeia listings

JPE : Microcrystalline Cellulose Spheres  
 USP/NF : Microcrystalline Cellulose  
 Ph. Eur. : CELLULOSE, MICROCRYSTALLINE

## Packaging information

Net weight	Packaging type
20 kg	Polyethylene bag in carton box

## Worldwide locations of Functional Additives Division



### ● Head office

#### Tokyo

##### Asahi Kasei Corporation

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Chiyoda-ku, Tokyo 100-0006, Japan  
Phone: +81-(0)3-6699-3361  
E-mail: ceolus\_2@om.asahi-kasei.co.jp

### ● Manufacturing sites

#### Nobeoka

1st Manufacturing site  
Asahi Kasei Corporation  
304 Mizushiri-machi,  
Nobeoka-shi, Miyazaki 882-0015, Japan

#### Kurashiki

2nd Manufacturing site  
Asahi Kasei Corporation  
3-13 Ushiodori,  
Kurashiki-shi, Okayama 712-8054, Japan

### ● Marketing offices

#### Mumbai

##### Asahi Kasei India Pvt. Ltd.

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Mumbai 400051, India  
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#### Shanghai

##### Asahi Kasei (China) Co., Ltd.

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Shanghai 200031, China  
Phone: +86-(0)21-6391-6111

## Membership registration on the Asahi Kasei Functional Additives website

### Benefits of membership:

- Download technical data sheets by specific applications
- Download quality assurance documents (e.g., SDSs, specifications, statements)
- News updates regarding Asahi Kasei MCC products (e.g., New technical data sheets)

### To register, simply follow these steps:

1. Scan the QR code below to open the registration form.
2. Fill in your information as indicated on the web page.
3. Confirm the invitation e-mail that will be sent to your email address to complete your registration.



[www.ceolus.com/en/members/signin/](http://www.ceolus.com/en/members/signin/)

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