

ECO-Friendly Foaming agents

Description

- The combination of **UNICELL-D600LF** (Foaming agent) and **UNICELL-LFP** (Promotor) can reduce formamide emissions below 100 ppm. (**UNICELL-LFP** is a promotor that is effective when used with **UNICELL-D600LF**.)
- Promotor **UNICELL-SLFP** is compatible not only with **UNICELL** foaming agents but also with other conventional ADCA foaming agents. It effectively reduces formamide content to below 100 ppm.
- For footwear use, **UNICELL-EF115** (Foaming agent) with **UNICELL-EFP1** (Promotor) can reduce formamide emissions below 100 ppm. (**UNICELL-EFP1** is a promotor which has an effect on the mechanical properties in combination with **UNICELL-EF115**)
- UNICELL-DX19MT** can reduce ammonia emissions by more than 80% compared to conventional foaming agent used for shoe sole. The evolved ammonia gas concentration is less than 20 ppm.

Properties of Eco-Friendly Foaming Agents

Low Formamide Foaming Agents & Promotor

Item	Specification			
	Combination of Foaming Agent and Promotor			
	D600LF	LFP		
Appearance	Yellow powder	White powder		
Average particle size (μm)	5.7 ~ 6.1	4.0 ~ 7.0		
Moisture content (%)	0.5 max.	0.5 max.		
Decomposition Temperature (°C)	196 ~ 202	164 ~ 168*		
Evolved Gas Volume (ml/g)	180 ~ 200	150 ~ 170*		
Formamide content analysis result	FOAMING AGENT	D600	D600LF	D600LF & LFP
	Formamide (ppm)	1,200 ~ 1,500	<300	<100

* Decomposition temperature and Gas volume are measured when mixed with UNICELL-D600LF and UNICELL-LFP in the ratio of 5.0 : 2.0.

◆ EVA is foamed by using a compression molding process.

Low Formamide Promotor (master batch type)

Item	Specification		
	SLFP		
Appearance	Light blue pellet		
Decomposition Temperature (°C)	174 ~ 178*		
Evolved Gas Volume (ml/g)	100 ~ 120*		
Contents of Promotor (%)	60		
Carrier Resin	EVA (VA contents 22 %)		
Formamide content analysis result	FOAMING AGENT	D600	D600 & SLFP
	Formamide (ppm)	1,200 ~ 1,500	<100

* Decomposition temperature and Gas volume are measured when mixed with UNICELL-D600MT(or general ADCA) and UNICELL-SLFP in the ratio of 5.0 : 2.0.

◆ EVA is foamed by using a compression molding process.

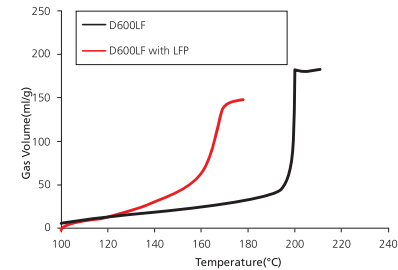


Fig 1. The decomposition temperature of **UNICELL-D600LF** and **UNICELL-D600LF with UNICELL-LFP**.

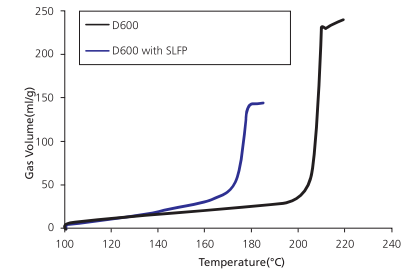


Fig 2. The decomposition temperature of **UNICELL-D600** and **UNICELL-D600 with UNICELL-SLFP**.

Low Formamide, Low Ammonia Foaming Agents & Promotor (master batch type)

Item	Combination of Foaming Agent and Promotor		
	EF115	EFP1	
Appearance	Yellow pellet	Light blue pellet	
Decomposition Temperature (℃)	156 ~ 160*		
Evolved Gas Volume (ml/g)	80 ~ 100*		
Contents of Promotor (%)	60		
Carrier Resin	EVA (VA contents 22 %)		
Gas content analysis result	FOAMING AGENT	normal ADCA	EF115 with EFP1
	Formamide (ppm)	>800	<100
	Ammonia (ppm)	>500	<30

* Decomposition temperature and Gas volume are measured when mixed with UNICELL-EF115 and UNICELL-EFP1 in the ratio of 5.0 : 2.0.

◆ EVA (slab) is foamed by using an injection molding process.

Low Ammonia Foaming Agents

Item	Specification
	DX19MT
Appearance	Pale yellow pellet
Decomposition Temperature (℃)	148 ~ 154
Evolved Gas Volume (ml/g)	90 ~ 100
Contents of Promotor (%)	60
Carrier Resin	EVA (VA contents 22 %)
Ammonia content analysis result	EVA foam using UNICELL – DX3MT : 200 ppm
	EVA foam using UNICELL – DX19MT : 20 ppm under
	*Remarks : in the case of additional use of ZnO, It can increase ammonia evolution.

Applications

■ **UNICELL-LFP** and **UNICELL-SLFP** can be used for general purpose compression molding. **UNICELL-DX19MT**, **UNICELL-EF115** with **UNICELL-EFP1** can be used for injection phylon of EVA or blended EVA with natural/synthesis rubbers, especially in manufacturing mat for fitness and kids, shoe soles, phylon sponges which is just right for ensuring safety from hazardous gases such as formamide and ammonia.