

UNICELL-ECO Friendly Foaming Agents

Description

The combination of **UNICELL-D600LF** (foaming agent) and **UNICELL-LFP** (promoter) reduces formamide emissions to below 100 ppm. **UNICELL-LFP** shows optimal effectiveness when used together with **UNICELL-D600LF**.

Promoter **UNICELL-SLFP** is compatible with **UNICELL** foaming agents and other conventional ADCA foaming agents. It effectively reduces the formamide content to below 100 ppm.

For footwear applications, the combination of **UNICELL-EF115** (foaming agent) and **UNICELL-EFP1** (promoter) can reduce formamide emissions to below 100 ppm. **UNICELL-EFP1** is a promoter that enhances mechanical properties when used in combination with **UNICELL-EF115**.

UNICELL-DX19MT can reduce ammonia emissions by more than 80% compared with conventional foaming agents used for shoe soles. The evolved ammonia gas concentration is less than 20 ppm.

Properties of UNICELL-ECO-Friendly Foaming Agents

Low Formamide Foaming Agents & Promoter

Item	Specification			
	Combination of Foaming Agent and Promoter			
	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

*The decomposition temperature and gas volume were measured using a mixture of **UNICELL-D600LF** and **UNICELL-LFP** at a ratio of 5.0:2.0.

◆ EVA is foamed by a compression molding process.

Low Formamide Promoter (master batch type)

Item	Specification		
	SLFP		
Appearance	Light Blue Pellet		
Decomposition Temperature (°C)	174~178*		
Evolved Gas Volume (ml/g)	100~120*		
Contents of Promoter (%)	60		
Carrier Resin	EVA (VA contents 22%)		
Formamide Content Analysis Result	Foaming Agent	D600	D600 & SLFP
	Formamide (ppm)	1,200~1,500	<100

*The decomposition temperature and gas volume were measured using a mixture of **UNICELL-D600MT** (or general ADCA) and **UNICELL-SLFP** at a ratio of 5.0:2.0.

◆ EVA is foamed by a compression molding process.

UNICELL-ECO Friendly Foaming Agents

Low Formamide Promoter

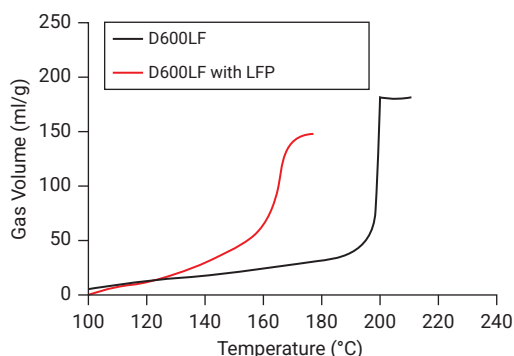


Fig 1. The decomposition temperature of UNICELL-D600LF and UNICELL-D600LF with UNICELL-LFP.

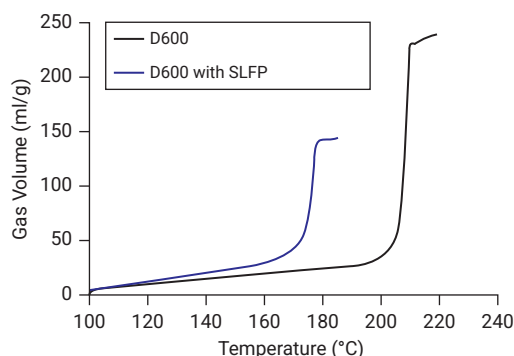


Fig 2. The decomposition temperature of UNICELL-D600 and UNICELL-D600 with UNICELL-SLFP.

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

Item	Combination of Foaming Agent and Promoter		
	EF115		EFP1
Appearance	Yellow Pellet		Light Blue Pellet
Decomposition Temperature (°C)	156~160*		
Evolved Gas Volume (ml/g)	80~100*		
Contents of Promoter (%)	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

*The decomposition temperature and gas volume were measured using a mixture of UNICELL-EF115 and UNICELL-EFP1 at a ratio of 5.0:2.0.

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

Low Ammonia Foaming Agents

Item	Specification
	DX19MT
Appearance	Pale Yellow Pellet
Decomposition Temperature (°C)	148~154
Evolved Gas Volume (ml/g)	90~100
Contents of Promoter (%)	60
Carrier Resin	EVA (VA contents 22%)
Gas Content Analysis Result	EVA foam using UNICELL-DX3MT : 200ppm EVA foam using UNICELL-DX19MT : 20 ppm under *Remarks : when ZnO is additionally used, ammonia evolution may increase

Applications

UNICELL-LFP and UNICELL-SLFP are suitable for general-purpose compression molding. UNICELL-EF115, in combination with UNICELL-EFP1 and UNICELL-DX19MT are recommended for injection phylon processing of EVA or EVA blended with natural or synthetic rubbers, especially for fitness and children's mats, shoe soles, and phylon sponges, providing enhanced safety by reducing hazardous gases such as formamide and ammonia.