UNICELL-D Series

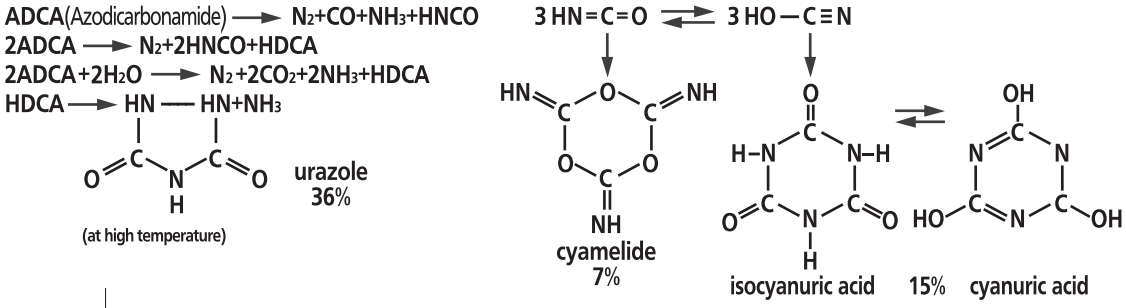
• Azodicarbonamide (Azobisformamide)
• General purpose foaming agents

Description

UNICELL-D series is well known as the most widely used and effective foaming agent for plastics and rubbers, such as PVC, PP, PE, EVA, ABS, PS, EPDM, SBR, NBR and TPR. **UNICELL-D** series can be modified to be suitable to almost all of the rubbers and plastics by additives like activators. **UNICELL-D** series is non-toxic and self-extinguishing material and has relatively high decomposition temperature and evolves a large gas volume. Therefore, it can be used more safely than any other colorless foaming agents and it can produce white, micro-cellular structures.

Decomposition of UNICELL-D series

Decomposition mechanism of **UNICELL-D** series (ADCA) is complex and depends on the heating range and the process condition.



By these reactions, **UNICELL-D** series is decomposed and evolves several kinds of gases as follows.

Table 1. The volume ratio of evolved gases depending on temperature and the ratio of gases & residues after decomposition.

Gas \ Temp		181~198	210~220	250~280
Evolved gas Volume (ml/g)		185~218	263~322	355~454
Residue after decomposition (%)		72.5~76.7	61.3~68.0	46.9~56.5
Gaseous product after decomposition (%)		23.3~27.5	32.0~38.7	43.5~53.1
Evolved Gases	N_2 (%)	70.8~72.9	53.9~58.8	42.6~48.9
	CO (%)	26.0~26.5	32.9~33.1	36.2~40.8
	NH_3 (%)	0~0.9	7.4~12.0	8.2~19.1
	CO_2 (%)	1.0~1.8	0.7~1.2	2.1~2.2

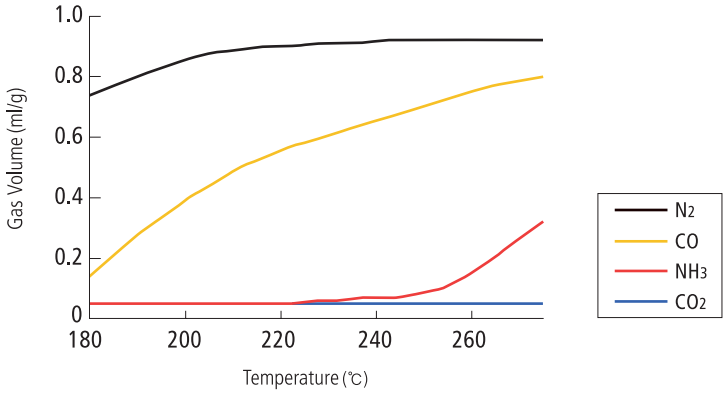


Fig 1. The change of gas components depending on temperature

Properties of UNICELL-D series

Table 2. The physical Properties of **UNICELL-D** series

Item		Specification										
Grade Name		D200A	D300L	D330	D400	D600	D800	D900	D1100	D1300	D1500	D2500
Chemical Name		Azodicarbonamide (Azobisformamide)										
Appearance		Fine Yellow Powder										
Decomposition Temperature (℃)		202~208										
Gas Volume (ml/gr)		225~250										
Average Particle Size (㎛)	Laser	4.8~5.8	5.0~6.0	5.0~5.5	6.2~7.2	8.2~9.0	10.8~11.8	12.0~13.0	14.0~15.0	17.0~19.0	19.0~21.0	27.0~30.0
	Fisher	2.5~2.8	2.6~2.9	2.7~3.0	3.6~3.9	5.7~6.1	7.6~8.0	8.0~8.3	9.6~10.0	12.6~13.0	14.0~17.0	24.0~26.0
Moisture Content (%)		0.3 max.										
Chemical Formula		$H_2N-CO-N=N-CO-NH_2$										
Molecular Weight		116.08										
Specific Gravity (g/㎤ at 25℃)		1.65										
Specific Heat		0.26										
Decomposition heat (kcal/mole)		10										
Solubility (g sample/ 100ml solvent)		in Water 0.020 DMSO 4.300 MEK 0.015 Acetone 0.016 DMF 5.000 Toluene 0.012 Benzene 0.014										
CAS No.		123 - 77 - 3										

Particle size of UNICELL-D series

Particle size is a significant factor in determining the speed of decomposition of **UNICELL-D** series.
As the particle diameter decreases, the surface area increases. Thus the heat transfer to the **UNICELL-D** series is more effective and faster, and this influences on decomposition speed of **UNICELL-D** series.
The particle size is selected to provide the proper balance between the curing speed and the decomposition speed of **UNICELL-D** series.

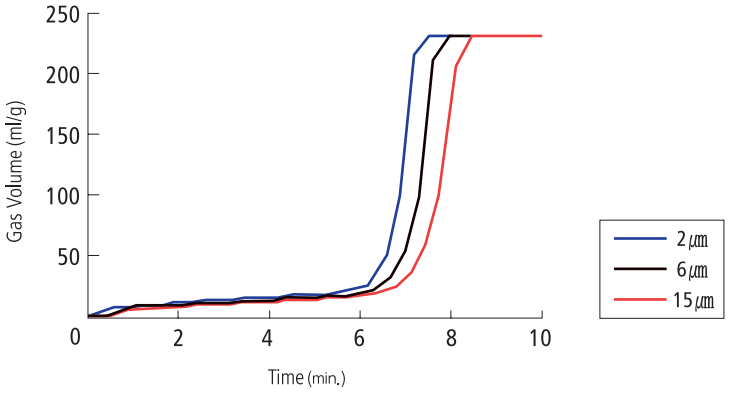


Fig 2. The decomposition behavior of **UNICELL-D** series at the constant temperature of 200℃