

Forane[®]
BLOWING AGENTS

BLOWING AGENTS FOR A CHANGING WORLD



 **ARKEMA**



A world driven by different regulations resulting from the Montreal protocole

ARKEMA Fluorinated chemicals is today a major supplier of HCFC 142b, 22 and 141b, HFC 365mfc/227ea and 134a, and **Transcend®**.

NORTH AMERICA

01/2003 HCFC-141b ban (USA)

- ☞ HCFC-142b/22
- ☞ HFC-134a, HFC-245fa

EUROPEAN UNION

01/2004 HCFCs ban

- ☞ HFC-134a, HFC-365mfc

EASTERN EUROPE

☑ CFC-11

- ☞ HCFC-141b
- ☞ HFC-134a, HFC-365mfc

JAPAN

01/2004 HCFC-141b ban

- ☞ HFC-134a, HFC-245fa

CENTRAL & SOUTH AMERICA

CFC-11

- ☞ HCFC-141b

AFRICA & MID EAST

☑ CFC-11

- ☞ HCFC-141b

ASIA

☑ CFC-11

- ☞ HCFC-141b
- ☞ HFC-134a, HFC-365mfc

AUSTRALIA & NEW ZEALAND

HCFCs quotas

- ☞ HFC-134a, HFC-365mfc, HFC-245fa



From HCFC to third generation zero ODP blowing agent, Transcend® is a key formulation additive for the future

Pure HCFC 142b or HCFC 142b/HCFC 22 blend alternatives

Pure HFC 134a

2 grades of HFC 365mfc/HFC 227ea
Pure HFC 134a

HCFC 141b alternatives

Pure Transcend®

Transcend® is a 0 ODP, low GWP additive being SNAP/EPA approved in the US. It helps in improving both foam fire properties and blowing agent processing in polyols.

Customised blends of **HFC134a** and **Transcend®** will also be available.

Crossfertilisation between the four applications in which we are already a key player — Refrigeration, Blowing agents, Solvents and Aerosols —, allows ARKEMA to think about next generation foaming agents.

Our R&D centers formulation expertise in fluorinated products makes ARKEMA a Customised Solvents supplier on the market.

Transcend®, a product exclusively from ARKEMA, is the key additive which allows us to optimise HFC's based thermoset foam blowing systems formulation.



Physical properties of Forane[®] blowing agents

PHYSICAL PROPERTIES	HCFC-141b	HCFC-142b	HCFC-22	HFC-365mfc / HFC-227ea		HFC-134a	TRANS-1,2 DICHLORO ETHYLENE TRANSCEND [®]
				93/7	87/13		
Formula	CH ₃ -CCl ₂ F	C ₂ H ₃ -ClF ₂	CH-ClF ₂	$\begin{matrix} \text{CF}_3\text{-CH}_2\text{-CF}_2\text{-CH}_3 \\ \text{CF}_3\text{CHF-CF}_3 \end{matrix}$		C ₂ H ₂ -F ₄	C ₂ H ₂ -Cl ₂
Molecular weight (g/mol)	117	100.5	86.5	149.4	150.5	102	97
Boiling point under 1.013 bar (°C) (starting)	32	-8.1	-39.9	30	23	-25.4	48
Density of liquid at 25°C (kg/dm ³)	1.236	1.02	1.05	1.256	1.263	1.04	1.26
Vapour pressure at 25°C (bar)	0.81	3.33	10.39	0.85	1.08	6.66	0.45
Saturated vapour density at the boiling point (kg/m ³)	5.02	4.77	4.65	6.54	6.91	5.18	Not available
Critical temperature (°C)	205.7	137.1	96.2	184.4	179.7	101.2	235
Critical pressure (bar)	43.4	41.2	49.7	30.8	30.7	40.6	51.9
Critical density, (kg/dm ³)	0.46	0.44	0.52	0.47	0.47	0.51	0.43
Latent heat of vaporisation at the boiling point (kJ/kg)	206.8	226	211.7	183.5	181.7	205.5	291
Surface tension of the liquid at 25°C, mN/n	18.4	12.12	8.09	14.5	14.1	8.18	27.5
Thermal conductivity (gas) at 25°C, mW/m. °C	9.8	11.94	13.06	10.7	11.2	14.16	10.6 (at 50°C)
Flash point (iso1516/1523)	None	Not applicable	Not applicable	None	None	None	-12°C (ASTMD3828)
Ozone Depletion Potential (ODP)	0.11	0.043	0.034	0	0	0	0
Global Warming Potential (GWP)	630	2,400	1,700	1,030	1,150	1,300	< 11

All toxicity and HSE data are available upon request on each product MSDS
Material compatibility tables are available too.



Quality and customer service

ARKEMA is committed to provide high quality products and services to its customers, particularly the SBU Derivatives of Fluorine, including the FORANE® and Transcend® products. Our production plants in Europe have the ISO 9002 accreditation as well as the ISO 14001.

CONTACTS

ARKEMA offers its customers all the necessary support:

→ **Worldwide sales network**
with local agencies or sales offices
and a central department
ARKEMA - Fluorochemicals SBU
4-8, cours Michelet
92800 Puteaux - France
Fax: 33-1-49 00 53 12

→ **Technical service and R & D**
This department based in the
company's Pierre-Bénite Research
Centre (CRRA, ISO 9001 accredited)
is dedicated to provide all the necessary
support to ARKEMA's customers
through specific technical brochures
or direct contact.
ARKEMA CRRA - OFA Department
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A global chemical player, Arkema consists of 3 coherent and balanced business segments: Vinyl Products, Industrial Chemicals, and Performance Products. Present in over 40 countries with 18,600 employees, Arkema achieves sales of 5.2 billion euros. With its 6 research centers in France, the United States and Japan, and internationally recognized brands, Arkema holds leadership positions in its principal markets.

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