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Silicone Surfactant Guide

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RUIJIANG GROAUP

HANGZHOU RUIJIANG CHEMICAL CO., LTD

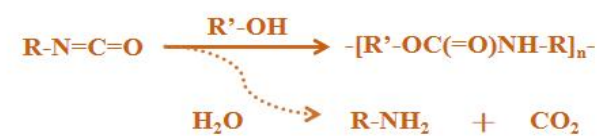
Hangzhou Ruijiang Chemical Co. Ltd, branded as RUISiL, is a technology-based chemical company focusing on research and application of new silicone material and technology.

RUISiL provides a wide range of silicone surfactants for polyurethane applications in flexible foam, rigid foam, etc. Effectively improving the comfort of flexible foams such as furniture & car seats, enhancing the insulation of PIR/PUR & appliance and minimizing energy loss. Moreover, a broad portfolio of high-quality foam stabilizers and additives packages offer better performance and benefit.





Polyurethane Foam



CONVENTIONAL/FLAME RETARDANT

Mattress, Sofa cushion, Cleaning sponge...

HIGH RESILIENCE/VISCOELASTIC

Car seat, Pillow, Stress relief toy, Back cushion...

RIGID PUR&PIR/COLD CHAIN

Insulation sandwich panel, Roof panel, Refrigerator...

SPRAY/OCF

External wall insulation, Pipe insulation, Gap filler...

SHOE/ARTIFICIAL LEATHER

Shoe out-sole, Polyurethane synthetic leather...

LNG Pipeline 01

Ultra-low temperature transportation



02



Anti-static Foam 03

Electronic and equipment's transportation

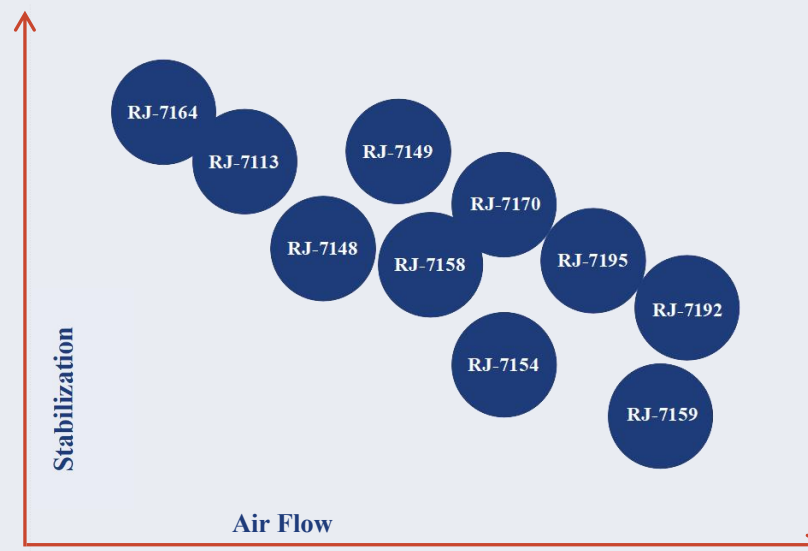


Conventional Flexible Silicone Surfactant

All of our silicone surfactants for Conventional, Flame Retardant, Viscoelastic foams can be provided in a low emission version (D4, D5 and D6 content < 0.1wt%), to meet the environmental protection requirements.

RUISiL	Density Range (kg/m ³)	Cell Structure	Air Flow	CO ₂ Blown Foam	Good Processing Latitude	Description
RJ-7113	4-25	++	++		√	End-capped silicone for low/ultra low density foam.
RJ-7148	8-40	+++	++	√	√	Good foaming stability and breath-ability.
RJ-7149	8-30	+++	++			High frothing height and fine cell structure.
RJ-7154	8-40	+++	++	√		General purpose, and wide processing latitude.
RJ-7158	10-50	++	++	√		General purpose, wide processing latitude, and medium-high potency.
RJ-7159	12-50	+++	++	√	√	Good breath-ability and uniform cell structure.
RJ-7164	10-50	+++	++			High stable for Recycling/Bio-polyols system.
RJ-7170	15-60	+++	+++	√	√	Si-O-C chemical structure, good density distribution.
RJ-7192	12-50	+++	+++	√	√	Improved surface and good density distribution.
RJ-7195	10-40	+++	++	√	√	Fine and uniform cell structure.

+ Middle ++ Good +++ Excellent

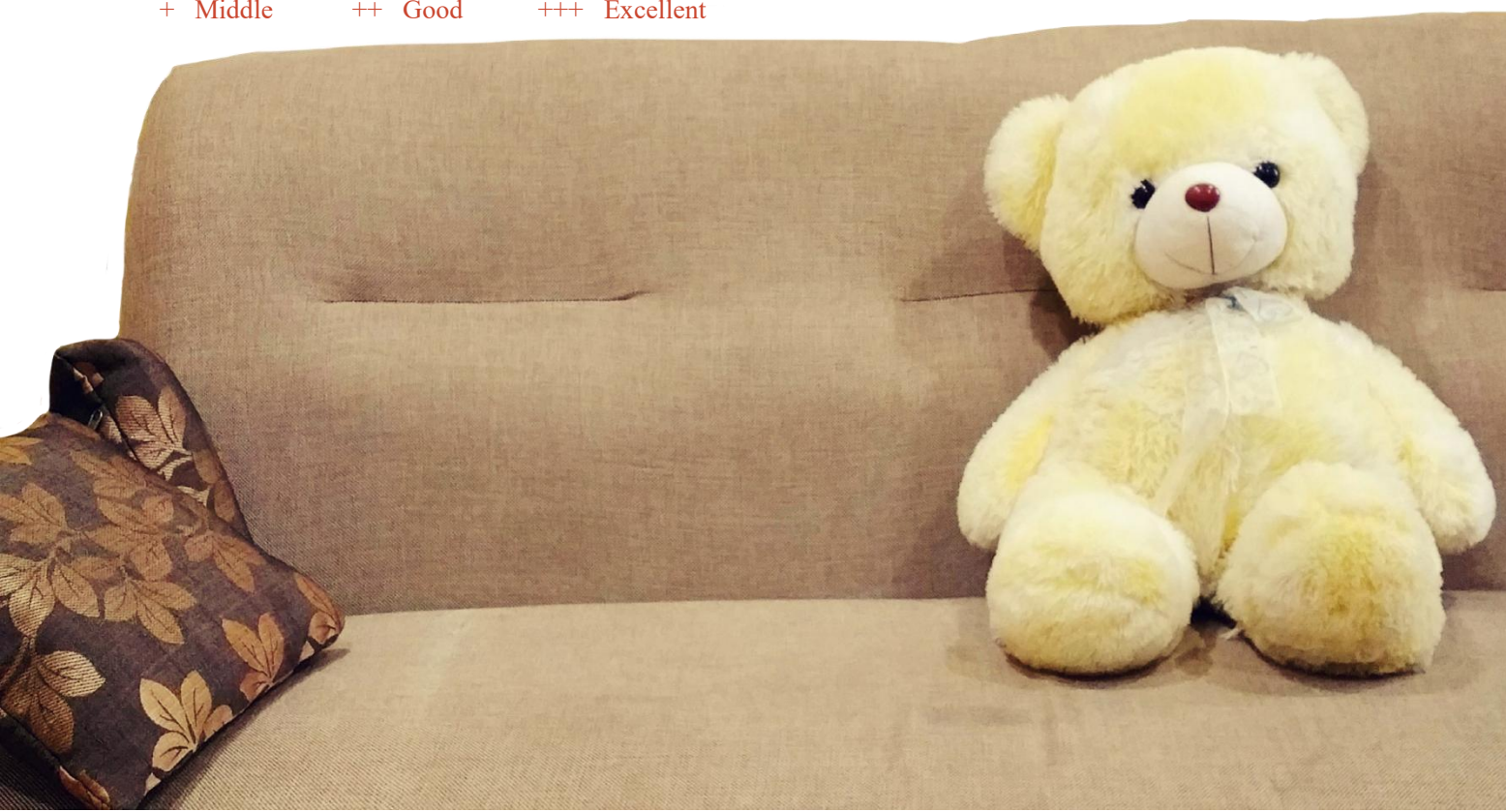


FR Foam Silicone Surfactant

Flame retardant silicone surfactants are designed for CAL TB-117, Crib 5, etc., to improve the flame retardant grades of polyurethane foams.

RUISiL	Density Range (kg/m ³)	Cell Structure	Air Flow	Flammability	CO ₂ Blown Foam	Good Processing Latitude	Description
RJ-7217	>15	+++	++	++		√	Excellent cell structure and wide processing latitude.
RJ-7218	>15	+++	++	++		√	Wide processing latitude with medium FR.
RJ-7221	15-50	+++	+	+++	√		Fine cell structure for Crib 5 formulation.
RJ-7224A	20-50	++	++	++		√	Low emission, and comprehensive property.
RJ-7228A	20-50	++	+++	++			Low emission, fine cells and breath-ability.
RJ-7252	>12	+++	++	++		√	General purpose with medium FR.
RJ-7255	15-40	++	++	+++	√	√	High FR, and comprehensive property.

+ Middle ++ Good +++ Excellent



VE Foam Silicone Surfactant

RUISiL	Potency	Cell Structure	MDI	TDI	Pneumatic	Low Emission	Description
RJ-7346	M-H	+++	++++	-	++		Medium pneumatic and FR property.
RJ-7348	H	+++	++++	-	+++	√	Low emission, fine cells for MDI based.
RJ-7382A	L-M	++	+	+++	-	√	General purpose for TDI or TM slab-stock foam.
RJ-7389	H	++	++++	-	+	√	MDI based, improved air flow and cell structure.

+ Middle ++ Good +++ Excellent ++++ Extreme

VE foam reacts to temperature and pressure, allowing it to mold to the contours of the body when pressure is applied and then slowly return to its original shape when pressure is removed.

Chemical viscoelastic foams: Based on the polymer chain relaxation effect to provide cell structures.

Pneumatic viscoelastic foams: Based on Inflation Effect (Tire Effect) to provide very fine and tight cell structures.

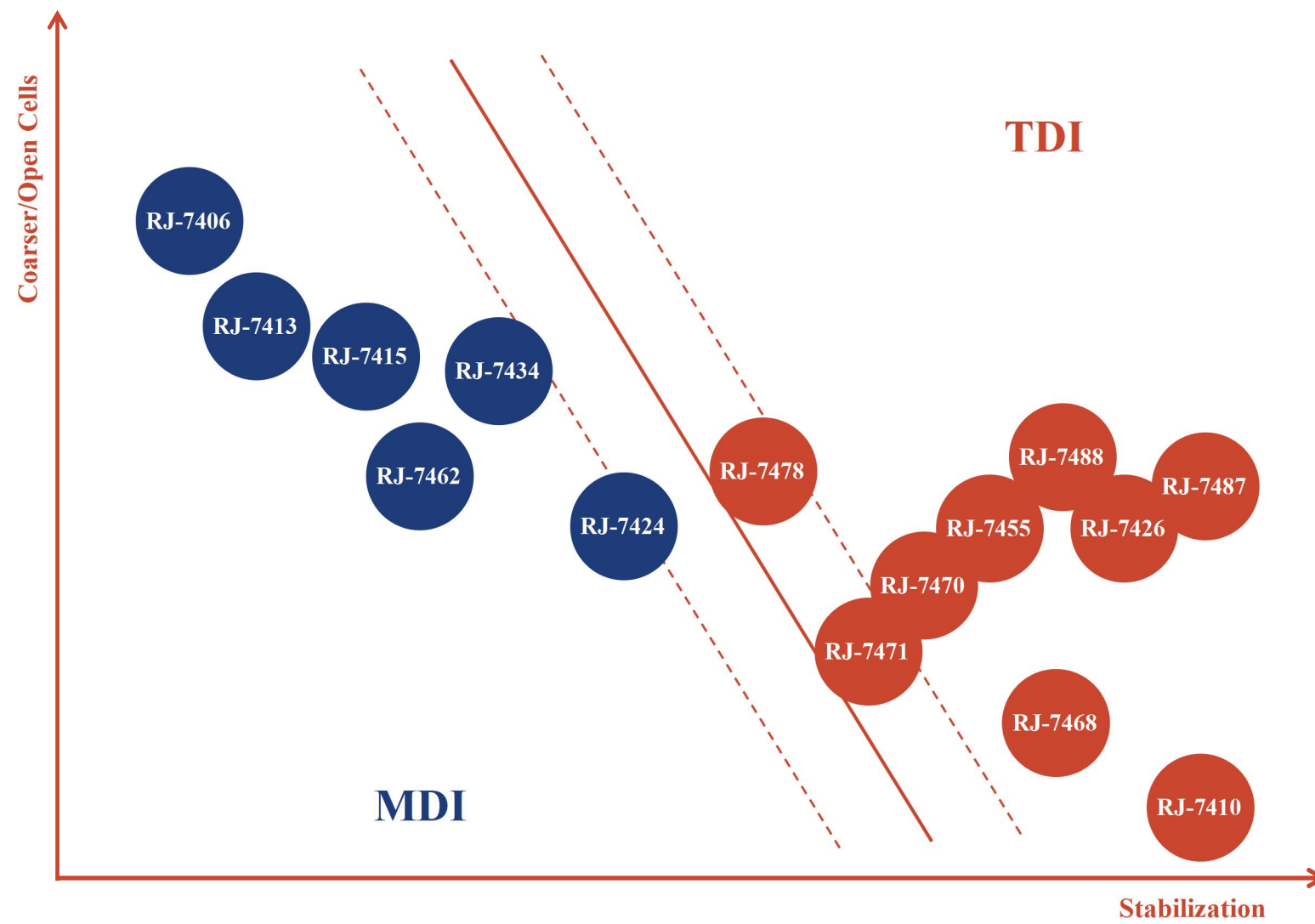


HR Foam Silicone Surfactant

All our surfactants for High Resilience are low emission (D4, D5 and D6 content < 0.1wt%), some treated with special odor treatment to make our surfactants virtually odorless and meet the requirement in car industry while producing good foams.

RUISiL	Potency	MDI	TDI	Low Emission	Low Odor	Description
RJ-7406	EL	++++	-	√	√	All MDI formulation, better coarse cells.
RJ-7415	L	++++	+	√		Low potency silicone with wide latitude.
RJ-7462	L	+++	+	√		General purpose for all MDI and MT formulation.
RJ-7434	L-M	+++	+	√	√	Ultra low emission and odor for all MDI or MT.
RJ-7471	H	++	++	√		Balance openness and stabilization.
RJ-7478	L-M	++	++	√		Mixture system suitable, better for TM mixture system..
RJ-7455	H	++	+++	√		General purpose for TDI or TM formulation.
RJ-7470	M	++	+++	√	√	General purpose for TDI or TM formulation.
RJ-7488	H	+	+++	√	√	Ultra low emission and odor for TDI slab-stock foam.
RJ-7410	H	-	++++	√	√	High potency with higher stabilization.

+ Middle ++ Good +++ Excellent ++++ Extreme



RUISiL

Standard specifications do not represent the final index.

Silicone Surfactant

PIR-Polyisocyanurate Foam									
Blowing Agent System	PUR Suitable				Block Foam	Appliance	Pipe(Tube)		
	Continuous		Discontinuous						
HFO	RJ-7546 RJ-7551 RJ-7560 RJ-7574B RJ-7575 RJ-75441 RJ-75479	RJ-75666	RJ-7546 RJ-7551 RJ-7560 RJ-7574B RJ-75441 RJ-75479 RJ-75666		RJ-7551 RJ-7560 RJ-7574B RJ-7575 RJ-75441 RJ-75479 RJ-75666	RJ-7546 RJ-7560 RJ-7574B RJ-7575 RJ-75441	RJ-7546		
Water	RJ-7544 RJ-7546 RJ-7549 RJ-7579 RJ-75168		RJ-7544 RJ-7546 RJ-7549 RJ-7579 RJ-75168		RJ-7544 RJ-75168	RJ-7549 RJ-75168	RJ-7544 RJ-7546	RJ-7544 RJ-7546	
Pentane	RJ-7537 RJ-7542 RJ-7546 RJ-7549 RJ-7551 RJ-7560 RJ-7571 RJ-7574B RJ-7575	RJ-7579 RJ-75168 RJ-75441 RJ-75466 RJ-75479 RJ-75666	RJ-7536 RJ-7542 RJ-7546 RJ-7549 RJ-7551 RJ-7560 RJ-7571 RJ-7574B	RJ-7579 RJ-75168 RJ-75441 RJ-75466 RJ-75479 RJ-75666	RJ-7536 RJ-7537 RJ-7542 RJ-7551 RJ-7560 RJ-7574B RJ-7575 RJ-75168 RJ-75441	RJ-75479 RJ-75666	RJ-7542 RJ-7549 RJ-75168 RJ-75666	RJ-7536 RJ-7546 RJ-7560 RJ-7571 RJ-7574B RJ-7575 RJ-75441	RJ-7537 RJ-7546
HFC	RJ-7542 RJ-7544 RJ-7560 RJ-7566 RJ-7571 RJ-7579 RJ-75168 RJ-75441	RJ-75466 RJ-75479 RJ-75666	RJ-7536 RJ-7542 RJ-7544 RJ-7560 RJ-7566 RJ-7571 RJ-7579 RJ-75168	RJ-75441 RJ-75466 RJ-75479 RJ-75666	RJ-7536 RJ-7542 RJ-7544 RJ-7560 RJ-7566 RJ-75168 RJ-75441 RJ-75479	RJ-75666	RJ-7542 RJ-75168 RJ-75666	RJ-7536 RJ-7544 RJ-7560 RJ-7571 RJ-75168 RJ-75441	RJ-7544
MF	RJ-7551		RJ-7551		RJ-7551				

Silicone Surfactant

RUISiL	Compatibility	Nucleation	Flow-ability	Surface	Insulation Effect	Blowing Agent	Description	Application						
								Sandwich Panels(PIR)		Block Foam	Appliance	Pipe(Tube)	PUR Suitable	
								Continuous	Discontinuous					
RJ-7536	+++	+++	++	++	++	HFC, Pentane	Excellent comprehensive performance, provide good surface quality.		√		√			√
RJ-7537	+++	+++	+++	+++	++	Pentane	Better flow ability and improving surface appearance.	√					√	√
RJ-7542	+++	++	++++	+++	++	HFC, Pentane	Good adhesion to metal layer, provide excellent flow-ability and surface appearance.	√	√	√				√
RJ-7544	+++	++	+++	++	++	HFC, Water	Reduce levels of auxiliary blowing agent and provide excellent dimensional stability.	√	√		√	√		√
RJ-7546	+++	+++	++	++	+++	HFO, Pentane, Water	Uniform fine cells, density distribution, and high close cells rate for a better mechanical property.	√	√		√	√		
RJ-7549	+++	++	++	+++	++	Water, Pentane	Good compatibility and surface quality.	√	√	√				
RJ-7551	++++	++	+++	++	++	LBA, Pentane, MF	Better adhesive strength and well stability in LBA blend system.	√	√					√
RJ-7560	++	++	++	++	++	HFC, LBA, Pentane	Fine cells and good surface appearance.	√	√		√			√
RJ-7566	++++	++	++	++	+++	HFC, HC	Excellent compatibility and improved surface quality.	√	√					√
RJ-7569	++	++	+++	++	++	Wide	Used in general applications, providing fine and regular foam structures.	√	√	√	√	√	√	√
RJ-7571	+++	+++	++++	++	+++	HFC, Pentane	Low thermal conductivity, improved surface quality and compatibility for pentane systems.	√	√		√			
RJ-7574B	+++	++	++	+++	+++	LBA, Pentane	Low cyclic silicone, improve flow-ability, low thermal conductivity.	√	√		√			√
RJ-7575	++	++++	+++	+++	++	HFO, Pentane	Good cell structure and density distribution, dimensional stability.	√			√			√
RJ-7579	++	+++	+++	+++	++	HFC, Pentane, Water	Good foam flow-ability, regular density distribution.	√	√					
RJ-75168	++++	+++	+++	+++	++	HFC, Pentane, Water	Excellent compatibility especially for pentane system reduce the coalescence on metal sheets.	√	√	√				√
RJ-75441	+++	++++	+++	+++	++++	HFC, HFO, Pentane	Excellent low thermal conductivity, reduce the surface voids.	√	√		√			√
RJ-75466	+++	+++	+++	++++	+++	HFC, Pentane	Excellent surface for metal or flexible sheets.	√	√					
RJ-75479	+++	+++	+++	+++	+++	HFC, HFO, Pentane	Excellent comprehensive performance for PUR/PIR panels, low cyclic silicone.	√	√					√
RJ-75666	++	++	+++	++++	++	HFC, HFO, Pentane	Excellent surface, and good comprehensive performance.	√	√	√				√

+ Middle ++ Good +++ Excellent ++++ Extreme
 √ Suitable

Spray Foam(SPF) Silicone Surfactant

RUISiL	System	Application	Emulsification	Cell Structure	Description
RJ-7558	HC, LBA	Closed	++	+++	Provide excellent nucleation, improve flow-ability and density distribution.
RJ-7589	Water	Open	+++	++	Reduce shrinkage, better open cells.
RJ-7593	HFC	Closed	+++	+++	Excellent emulsification and strong nucleation.
RJ-7599A	HFO, Water	Closed	+++	+++	Provide good flow-ability, well density distribution, low freezing point.
RJ-75811	Water	Open	+++	+++	Excellent openness and compatibility, improve shrinkage and flow-ability.
RJ-75812	Water	Open	+++	+++	Provide excellent nucleation and foam flow-ability, improve foaming efficiency and shrinkage.
RJ-75902	Water	Open	++	+++	For low-density in the pure-water system.

+ Middle ++ Good +++ Excellent

One-compound(OCF) Silicone Surfactant

RUISiL	Application	Yield	Cell Structure	Dimensional Stability	Gun Type	Tube Type	Description
RJ-7529	Winter	++	+++	++	√		Excellent nucleation with regular cells.
RJ-7539	Summer	++	++	+++	√	√	Excellent dimensional stability and cell opening performance.
RJ-7561	Summer	+++	++	+++	√	√	Well-suit in non-chlorinated paraffin high index formulation.

+ Middle ++ Good +++ Excellent
√ Suitable



HFO

The Fourth Generation Blowing System

Zero ODP
Ultra-low GWP

Improved flow-ability and insulation performance

PU Shoe & Microcellular Elastomer Silicone Surfactant

RUISiL	Density Range	System	Description
RJ-7593	Medium-high	Universal	Fine and uniform cells, improved the compatibility of raw materials and elongation.
RJ-7610	Low-medium	Polyester	Good compatibility for wide formulation.
RJ-7614	Low-medium	Universal	Improve the surface, reduce peeling and pinholes.
RJ-7616	Medium-high	Universal	Fine cells and structure.
RJ-7618	Medium	Universal	Excellent fine cells, improved surface and openness.



Standard specifications do not represent the final index.

Processing Additives

RUISiL	Type	Description
RJ-T500	Cell-opener	General cell opener for flexible foam.
RJ-T501	Cell-opener	High open cell rate in rigid formulation and highly selective for polymer.
RJ-EL2	Tear Resistant Agent	10% improved, especially for CaCO ₃ filler and VE/HR formulation.
RJ-EL3	Tear Resistant Agent	Less impact of foam's performance, better for Bio-polyol's system.
RJ-S24	Property Improve Agent	Improve mechanical and insulation properties. Significant improvement in poor thermal conductivity foams.
RJ-AT3	Anti-static Agent	Offer anti-static property, can not be premixed with water/amine catalyst.
RJ-F30	Flame lamination Agent	Low viscosity, low odor and no phenol to improve adhesion property.
RJ-AR	Wear-resistant Agent	Improve the wear-resistant property of shoe sole and elastomer.
RJ-P40	Solid Powder Stabilizer	Improve solubility, like CaCO ₃ , BaSO ₄ etc, prevent filler from sinking.

Specialty additives are designed to improve the performance of polyurethane foam or provide special properties, such as tear resistance, anti-static, antibacterial, etc., to provide more unique foam types and a wider range of foam applications. For more properties demand, please consult RUISiL.

Catalyst

RUISiL	Main Compound	CAS No.	Description
RJ-AM4	33% TEDA	280-57-9	A delayed amine catalyst modified from RJ-SA33, provide about 5-10 secs delayed time.
RJ-AM7	70% 1,2-dimethylimidazole	1739-84-0	A special low odor amine catalyst for improving surface curing and adhesion to rigid panels.
RJ-BDMA	N,N-Dimethylbenzylamine	103-83-3	A gel catalyst to reduce surface friability of rigid foams.
RJ-BDMAEE	Bis(2-dimethylaminoethyl)ether	3033-62-3	A very strong blowing catalyst, suitable for flexible foams, including HR foams.
RJ-DMAEE	2-(2-(dimethylamino)ethoxy)ethanol	1704-62-7	Reactive low odor catalyst with a obvious effect of surface curing.
RJ-DMDEE	2,2-dimorpholinodiethylether	6425-39-4	A strong blowing catalyst, elongate the stock of -NCO, mainly used for OCF with water system.
RJ-K15	75% Potassium Octoate	3164-85-0	Standard trimerization catalyst used in PU rigid foams.
RJ-T9	Tin(II) bis(2-ethylhexanoate)	301-10-0	Stannous octoate, a high potency metal catalyst widely used in continuous slab-stock PU foams.
RJ-NT9	Tin(2+) neodecanoate, 2-EHA free	49556-16-3	An alternative of T-9, the same usage level and similar performance.
RJ-T12	DBTDL [Dibutyltin dilaurate]	77-58-7	Strong gel catalyst used in rigid or flexible PU foams with a good hydrolytic stability.
RJ-PC5	PMDETA [N,N,N',N'',N'''-Pentamethyldiethylenetriamine]	3030-47-5	A tertiary amine-based blowing catalyst as an industry standard catalyst.
RJ-PC8	DMCHA [N,N-Dimethylcyclohexylamine]	98-94-2	A tertiary amine-based catalyst, offers good stability for insulation rigid foam.
RJ-PC15	TMBPA [N,N,N',N'-tetramethyldipropylenetriamine]	6711-48-4	A non-emission balanced amine catalyst to improve surface curing.
RJ-PC41	1,3,5-Tris[3-(dimethylamino)propyl]hexahydro-1,3,5-triazine	15875-13-5	A medium potency trimerization catalyst with good blowing performance.
RJ-PC77	N-[3-(dimethylamino)propyl]-N,N',N'-trimethylpropane-1,3-diamine	3855-32-1	A blowing and gelling balanced catalyst, and stable rising curve.
RJ-SA1	70% BDMAEE [Bis(2-dimethylaminoethyl)ether]	3033-62-3	Standard blowing catalyst, provide a strong reaction between water and -NCO.
RJ-SA33	33% TEDA [Triethylenediamine]	280-57-9	Standard gel amine catalyst, DPG or DEG as solvent.
RJ-SA33M	33% TEDA [Triethylenediamine]	280-57-9	Standard gel amine catalyst, MEG as solvent.
RJ-TEDA	Triethylenediamine	280-57-9	A gel tertiary amine-based catalyst, widely used in flexible, rigid and semi-rigid foams.
RJ-TMEDA	N,N,N',N'-tetramethylethylenediamine	110-18-9	A medium potency blow catalyst, can assist RJ-SA33.
RJ-TMR2	1-Propanaminium-2-hydroxy-N,N,N-trimethylformate	62314-25-4	A gel tertiary amine-based catalyst, widely used in flexible, rigid and semi-rigid foams.

1. CAS No. just reflects the main compound/content. Regarding other catalysts you demand, please consult RUISiL for the details and matching.
2. Low emission and Bismuth/Zinc eco-friendly catalysts can be provided if needed.



Ruijiang Other Products

Silicone Oil

Silicone Emulsion

Silicone Surfactant

Silicone & Siloxane

Silicone Waterproof Agent

Silicone Softener

Silicone Elastomer

Silicone Rubber(HTV&RTV&LSR)

Silicone Gum Blends

Silicone Resin

Other Silicone Material

Buliding & Construction

Sealant & Adhesive

Coating & Painting

Chemical Manufacturing

Personal Care

Car Care & Household Care

Textile & Detergent

Rubber & Plastic

Agriculture

Pulp & Paper

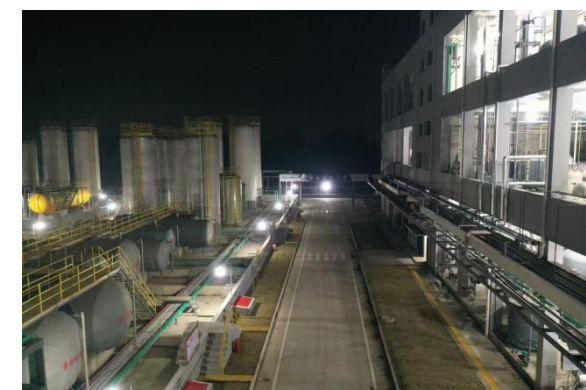


R&D Center Warehouse & Factory



Ruijiang Chemical R&D Center has more than 30 R&D and QA/QC engineers, having established long-term cooperative relations with multiple colleges and scientific research institutions, and hired experts as company consultants to help guarantee products and technical services.

RUISiL products have passed the standard of SGS, ISO9001(QMS), and ISO14001(EMS), passed the Ecovadis certification.



Warehouse in Turnhout, Belgium, EU

Warehouse in TX, CA and GA, USA