GE
Advanced Materials

Silicone Solutions for Mold Making

GE imagination at work

Mold Making Applications

Rapid Prototyping / Precision Molding

GE - Advanced Materials, Silicones offers a line-up of addition cure Mold Making silicones for prototyping applications and molds for complex precision parts. These addition cure products offer tear strength, tensile strength, and elongation properties that help provide dimensional stability while contributing to durability and handling of the mold.

The addition type curing mechanism, which relies on temperature exposure to facilitate the curing process, helps to control shrinkage during cure which is important for parts with intricate and complex design characteristics. The family of addition cure silicones also includes oil-bleeding grades that help improve the demolding process.

Products are available in a variety of colors and appearances, ranging from solids to translucent and transparent grades. The translucent and transparent grades are candidates for split molds that are cut after cure, and require optical clarity of the molded part.

Art Reproduction, Craft, Figurines and Furniture

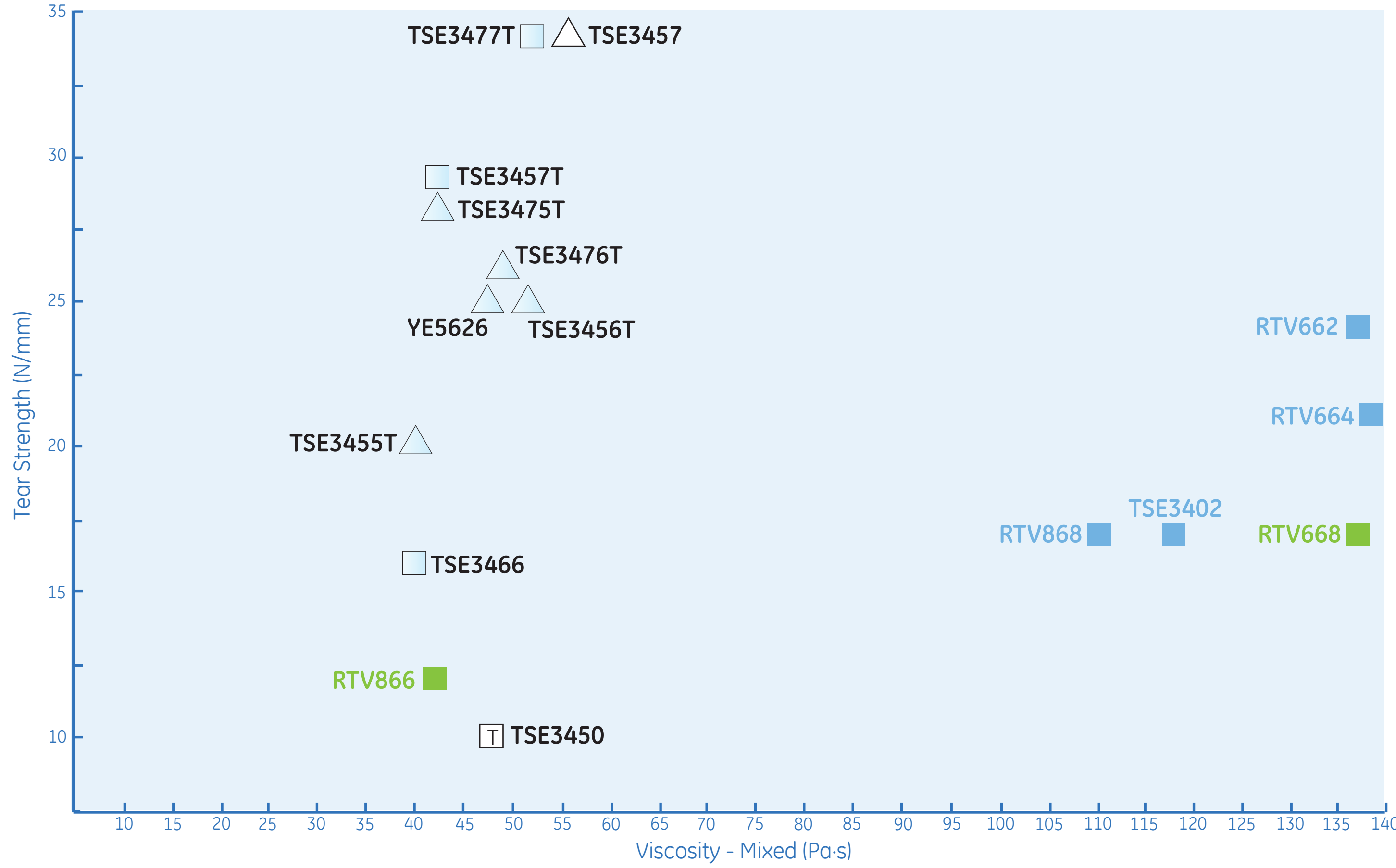
A portfolio of condensation cure molding making silicones, which cure in reaction to exposure to atmospheric moisture, is offered for a variety of applications.

General purpose grades such as TSE350, TSE3502 and TSE3504 are available in low viscosities and provide ease of handling and use for basic Mold Making requirements.

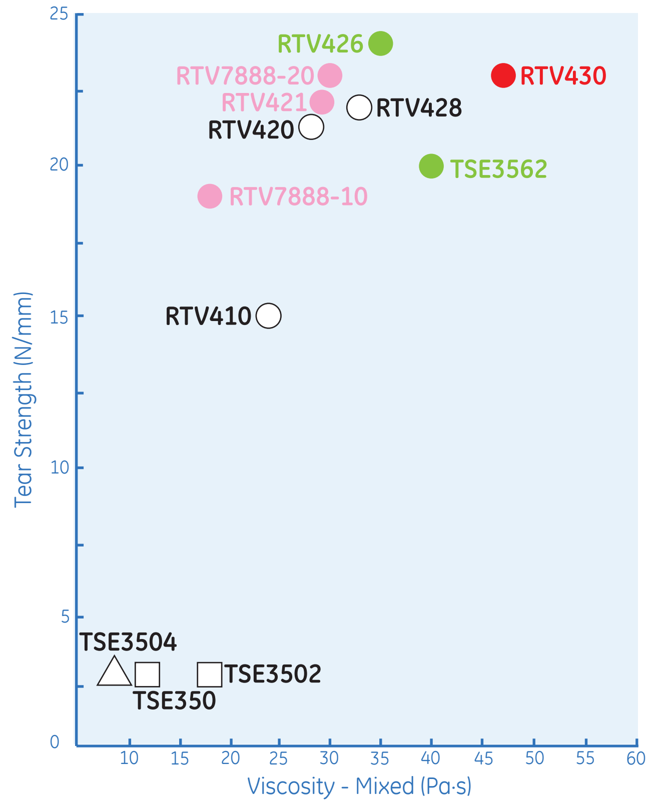
For applications involving intricate objects or requiring increase mold durability, a range of high tensile and tear strength condensation cure grades is also available in an array of viscosities.

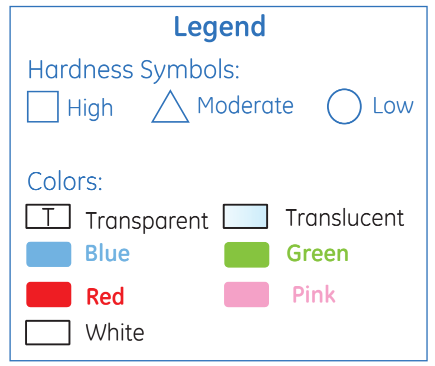
Product Selector Guide

Addition Cure Grades



Condensation Cure Grades





Addition Cure Product Details

	Properties	High Hardness																			
		RTV662		RTV668		RTV664[1]		TSE3466		RTV868		TSE3402		RTV866		TSE3457T		TSE3477T		TSE3450	
	Features and Benefits	Highest hardness grade. Dimensional stability and extended worklife.		High hardness grade with dimensional stability. Demonstrates sulfur resistance.		High hardness grade. Dimensional stability, long worklife, and chemical & abrasion resistance.		High hardness and strength with low viscosity. Low shrinkage performance.		High hardness, extra-fast cure grade. Inhiibition resistant.		High hardness and strength. Low shrinkage performance.		Low viscosity, fast cure grade. Inhiibition resistant. Low shrinkage performance		High hardness and dimensional stability with good tear strength. Low shrinkage performance		High tear strength & dimensional stability. Oil-Bleed assisted release performance. Low shrinkage		High transparency grade. High hardness and dimensional stability. Low shrinkage	
	Oil Bleed Type																	●			
Uncured Properties	Components	RTV662 (A)	RTV662 (B)	RTV668 (A)	RTV668 (B)	RTV664 (A)	RTV664 (B)	TSE3466 (A)	TSE3466 (B)	RTV868 (A)	RTV868 (B)	TSE3402 (A)	TSE3402 (B)	RTV866(A)	RTV866(B)	TSE3457T(A)	TSE3457T(C)	TSE3477T(A)	TSE3477(C)	TSE3450(A)	TSE3450(B)
Uncured Properties	Appearance	Beige	Blue	Beige	Green	Beige	Blue	Translucent	Transparent	Beige	Blue	Light Blue	Blue	Beige	Green	Translucent	Transparent	Translucent	Transparent	Transparent	Transparent
Uncured Properties	Viscosity Pa·s	150	5	151	3.8	153	6	55	0.3	160	5.5	130	1.2	150	5	56	2.5	62	3.0	70	1.5
Uncured Properties	Mixing Ratio (by weight)	10 : 1		10 : 1		10 : 1		10 : 1		10 : 1		10 : 1		10 : 1		10 : 1		10 : 1		10 : 1	
Uncured Properties	Viscosity (mixed) (23°C) Pa·s	137		137		139		40		110		118		42		42		52		48	
Uncured Properties	Pot Life (23°C) h	5		2.5		3		1.5		3		2		2		1.5		1		2	
Uncured Properties	Demold Time (23°C) h	24		24		18		24		12		24		16		24		24		24	
Cured Properties	Appearance	Blue		Green		Blue		Translucent		Blue		Light Blue		Green		Translucent		Translucent		Transparent	
Cured Properties	Specific Gravity (23°C)	1.26		1.26		1.26		1.10		1.26		1.25		1.19		1.10		1.10		1.02	
Cured Properties	Hardness	68		62		62		60		60		60		50		47		45		45	
Cured Properties	Tensile Strength MPa (psi)	7.0 (1015)		7.1 (1030)		6.4 (930)		7.4 (1075)		5.5 (800)		5.4 (785)		7.6 (1100)		6.7 (970)		6.3 (915)		4.5 (650)	
Cured Properties	Elongation %	235		240		245		350		200		220		190		350		320		350	
Cured Properties	Tear Strength N/mm (ppi)	24 (136)		17 (100)		21 (122)		16 (90)		17 (100)		17 (100)		12 (69)		29 (165)		34 (194)		10 (57)	
Cured Properties	Linear Shrinkage (23°C, 24h) %	<0.2		<0.2		<0.2		<0.1		<0.2		<0.1		<0.1		<0.1		<0.1		<0.1	
Packaging	1 lbs. (454g) kit	●		●																	
Packaging	11 lbs. (5kg) kit					●				●				●							
Packaging	44 lbs. (20kg) kit	●		●		●															
Packaging	495 lbs. (225kg) kit	●		●		●				●				●							
Packaging	100g bottle								●				●				●		●		●
Packaging	600g bottle												●								
Packaging	1kg can							●	●			●				●	●	●	●	●	●
Packaging	1.8kg can																				
Packaging	10kg pail															●	●	●	●	●	●
Packaging	18kg pail								●			●									
Packaging	20kg pail							●								●		●	●	●	
Packaging	180kg drum							●													
Packaging	200kg drum																	●		●	
	Catalyst Alternatives															TSE3457T(D) (machine mixing)		TSE3477T(D) (machine mixing)			

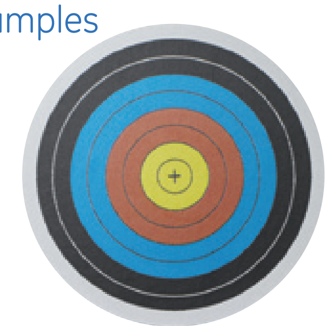
	Properties	Moderate Hardness											
		TSE3457		TSE3455T		YE5626		TSE3456T		TSE3475T		TSE3476T	
	Features and Benefits	High tear strength and dimensional stability. Low shrinkage performance		Low viscosity and good tear strength. Low shrinkage performance		Good tear strength. Low shrinkage performance		Good tear and tensile strength. Low shrinkage performance		High tear strength. Oil-Bleed assisted release performance. Low shrinkage		Good tear strength. Oil-Bleed assisted release performance.	
	Oil Bleed Type									●		●	
Uncured Properties	Components	TSE3457(A)	TSE3457(C)	TSE3455T(A)	TSE3455T(B)	YE5626(A)	YE5626(B)	TSE3456T(A)	TSE3456(C)	TSE3475T(A)	TSE3475(C)	TSE3476T(A)	TSE3476(C)
Uncured Properties	Appearance	White	Transparent	Translucent	Transparent	Translucent	Transparent	Translucent	Transparent	Translucent	Transparent	Translucent	Transparent
Uncured Properties	Viscosity Pa·s	65	2.5	45	1.5	60	1.0	88	3	68	1.0	70	1.4
Uncured Properties	Mixing Ratio (by weight)	10 : 1		10 : 1		10 : 1		10 : 1		10 : 1		10 : 1	
Uncured Properties	Viscosity (mixed) (23°C) Pa·s	50		40		48		50		42		48	
Uncured Properties	Pot Life (23°C) h	1		1.5		1.5		1		1		1.5	
Uncured Properties	Demold Time (23°C) h	24		24		24		24		24		24	
Cured Properties	Appearance	White		Translucent		Translucent		Translucent		Translucent		Translucent	
Cured Properties	Specific Gravity (23°C)	1.10		1.10		1.09		1.09		1.09		1.08	
Cured Properties	Hardness	44		41		40		39		37		37	
Cured Properties	Tensile Strength MPa (psi)	7.7 (1115)		6.4 (930)		6.0 (870)		6.9 (1000)		5.7 (825)		6.0 (870)	
Cured Properties	Elongation %	400		360		420		420		400		380	
Cured Properties	Tear Strength N/mm (ppi)	34 (194)		20 (114)		25 (142)		25 (142)		29 (165)		26 (148)	
Cured Properties	Linear Shrinkage (23°C, 24h) %	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	
Packaging	1 lbs. (454g) kit												
Packaging	11 lbs. (5kg) kit												
Packaging	44 lbs. (20kg) kit												
Packaging	495 lbs. (225kg) kit												
Packaging	100g bottle				●		●						
Packaging	600g bottle						●						
Packaging	1kg can		●	●	●	●		●	●	●	●		●
Packaging	1.8kg can						●						
Packaging	10kg pail			●	●			●				●	
Packaging	18kg pail					●							
Packaging	20kg pail	●		●				●		●			
Packaging	180kg drum												
Packaging	200kg drum			●									
	Catalyst Alternatives							TSE3456T(D) (machine mixing)				TSE3476T(D) (machine mixing)	

Product availability may vary for some markets. Contact a sales representative for more information.

[1] RTV664-J in Asia Pacific markets

Typical property data values should not be used as specifications

Transparency Examples



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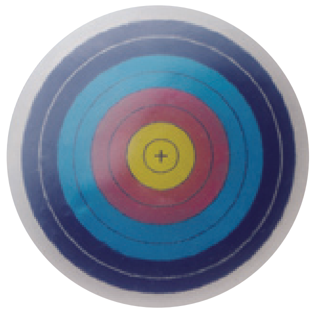

Translucent (TSE3455T) 10mm thickness

Transparent (TSE3450) 10mm thickness

Condensation Cure Product Details

		High Hardness				Moderate Hardness		Low Hardness																	
	Properties	TSE3502		TSE350		TSE3504		RTV430		RTV428		TSE3562		RTV426		RTV7888-20		RTV420		RTV421		RTV7888-10		RTV410	
	Features and Benefits	General purpose material with low viscosity and good release properties.		General purpose material with low viscosity and good release properties.		General purpose material with low viscosity and good release properties. Fast demold performance.		High tear strength, dimensional stability, and thermal resistance.		High tear strength, high elongation material.		Good tear strengh and material durability.		High tear strength material, with fast demold performance.		High tear strength and extended mold life against polyester.		High tear strength material with extremely high elongation.		High tear strength. Good material flexibility. Fast demold performance.		Low viscosity material with good tear strength and extended mold life against polyester.		Low viscosity and hardness material with high flexibility.	
Uncured Properties	Components	TSE3502	CE62	TSE350	CE62	TSE3504	CE62	RTV430	Beta 5	RTV428	Beta 7	TSE3562 (A)	TSE3562 (B)	RTV426	Beta 26	RTV7888-20	Beta 16	RTV420	Beta 7	RTV421	Beta 16	RTV7888-10	Beta 16	RTV410	Beta 7
	Appearance	White	Red	White	Red	White	Red	White	Red	White	Translucent	White	Green	Beige	Green	White	Red	White	Translucent	Beige	Red	White	Red	White	Translucent
	Viscosity Pa.s	20	-	12	-	10	-	55	0.05	35	0.028	45	-	40	0.021	42	0.03	30	0.028	40	0.03	29	0.03	25	0.028
	Mixing Ratio (by weight)	10 : 0.5		10 : 0.5		10 : 0.5		10 : 1		10 : 0.5		10 : 1		10 : 0.5		10 : 1		10 : 0.5		10 : 1		10 : 1		10 : 0.5	
	Viscosity (mixed) (23°C) Pa.s	18		10		10		47		33		40		35		30		28		29		18		24	
	Pot Life (23°C) h	1		1		0.5		3		1.25		1		2		1.5		1.25		1.5		1.5		1.25	
	Demold Time (23°C) h	24		24		8		12		24		24		4.6		24		24		12		24		24	
Cured Properties	Appearance	Stone White		Stone White		White		Pink		White		Light Green		Green		Pink		White		Pink		Pink		White	
	Specific Gravity (23°C)	1.48		1.18		1.22		1.09		1.28		1.09		1.11		1.22		1.23		1.23		1.22		1.26	
	Hardness	60		47		40		30		28		28		25		20		20		18		12		10	
	Tensile Strength MPa (psi)	4.9 (710)		2.5 (365)		2.5 (365)		3.1 (450)		3.2 (465)		4.2 (610)		3.3 (485)		3.4 (500)		3.3 (480)		3.6 (530)		2.75 (400)		2.6 (380)	
	Elongation %	130		170		170		300		450		400		310		350		600		400		450		750	
	Tear Strength N/mm (ppi)	3 (17)		3 (17)		3 (17)		23 (130)		22 (125)		20 (114)		24 (137)		23 (130)		22 (125)		23 (130)		19 (110)		15 (85)	
	Linear Shrinkage (23°C, 24h) %	<0.1		<0.1		<0.1		<0.5		<0.6		<0.3		<0.05		<0.14		<0.6		<0.2		<0.17		<0.6	
Packaging	10g bottle		●		●																				
	50ml bottle						●				●								●						●
	100g bottle		●		●								●												
	250ml bottle						●				●								●						●
	1 pint (568ml) bottle														●		●				●		●		
	900g can												●												
	1kg can	●		●		●					●	●							●						●
	2 quart (2.3ltr) bottle								●						●		●				●		●		
	2 quart (2.3ltr) can																●				●		●		
	5kg can									●								●						●	
	1 gal (3.8ltr) pail							●						●		●				●					
	10kg can										●								●						●
	18kg pail											●													
	5 gal (19ltr) pail							●						●	●					●					
	20 kg pail	●		●		●				●								●						●	
	6 gal (22.8ltr) pail															●						●			
	180kg drum											●													
	200kg drum									●								●						●	
	55 gal (209ltr) drum							●						●		●				●		●			
	Catalyst Alternatives	CE60 (red) Fast cure		CE60 (red) Fast Cure		CE60 (red) Fast Cure		Beta 11 (blue) High-flexibility		Beta 8 (translucent) Fast demolding		TSE3562(F) Fast demolding				Beta 17 (clear) Fast demolding		Beta 8 (translucent) Fast demolding				Beta 17 (clear) Fast demolding		Beta 8 (translucent) Fast demolding	
		CE61 (red-brown) Slow cure		CE61 (red-brown) Slow Cure		CE61 (red-brown) Slow Cure										Beta 18 (red) Low hardness						Beta 18 (red) Low hardness			

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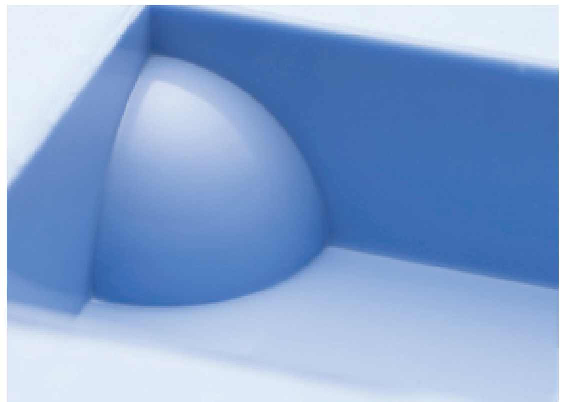


Accessory Products

Inhibitors

Inhibitors serve to increase the working time of mixed Mold Making silicones by delaying the rate of cure. However, high inhibitor concentrations can affect post-cure material properties, making a preliminary test essential.

Inhibitor Grade		ME75	ME70
Compatible Silicone Type		Addition Cure	Condensation Cure
Appearance		Colorless, Transparent	Colorless, Transparent
Typical Concentration	wt%	0.01 - 0.5	0.1 - 1.0
Pkg	100g bottle	●	
Pkg	1kg bottle	●	●

Performance Examples

ME75 (Addition Cure)		Ratio 1	Ratio 2	Ratio 3
YE5626 (A)	wt.	100	100	100
YE5626 (B)	wt.	10	10	10
ME75	wt.	0	0.2	0.4
Viscosity (120 min. at 25°C)	Pa·s	120	85	65

ME70 (Condensation Cure)		Ratio 1	Ratio 2	Ratio 3
TSE3562 (A)	wt.	100	100	100
TSE3562 (B)	wt.	10	10	10
ME70	wt.	0	0.5	1.0
Viscosity (60 min. at 25°C)	Pa·s	100	90	55
Viscosity (70 min. at 25°C)	Pa·s	190	125	60

Thinners

Thinners are dilution additives that reduce the viscosity of Mold Making silicones, and also lower post-cure hardness and modulus.

Thinner Grade		ME91	ME90
Compatible Silicone Type		Addition Cure	Condensation Cure
Appearance		Colorless, Transparent	Colorless, Transparent
Typical Concentration	wt%	0.1 - 20.0	0.1 - 20.0
Pkg	1kg bottle		●
Pkg	15kg	●	

Performance Example

ME90 (Condensation Cure)		Ratio 1	Ratio 2	Ratio 3	Ratio 4
TSE3562 (A)	wt.	100	100	100	100
TSE3562 (B)	wt.	10	10	10	10
ME90	wt.	0	5	10	20
Viscosity (25°C)	Pa·s	40	32	24	15
Hardness		30	27	24	20
Tensile Strength	MPa (psi)	4.2 (610)	4.0 (580)	3.4 (495)	2.9 (420)
Elongation	%	400	420	390	390
Tear Strength	N/mm (ppi)	20 (114)	20 (114)	4 (23)	3 (17)

Color Master

Color Master Grade		ME50-B	ME50-G	ME50-M	ME50-R2	ME50-Y
Color		Black	Gray	Blue	Reddish Brown	Yellow
Viscosity (25°C)	Pa·s	200	150	800	250	800
Typical Concentration	wt%	2.0	2.0	2.0	2.0	2.0
Pkg	1kg can	●	●	●	●	●

Model Sealer / Barrier-Coat

Model sealers help minimize cure inhibition of addition cure Mold Making material, and is applied as a thin layer (0.01 - 0.02mm) to the master containing the offending substrate. Model sealers can also be used as a parting agent to aid mold release in addition cure two-part molds.

Model Sealer		SS4171	SS4171P
Color		Blue	Blue
Specific Gravity (25°C)		0.84	0.84
Non-Volatile Content	%	14	14
Dry Time	min	30	30
Solvents		Acetone, Isopropanol, Toluene	Acetone, Isopropanol, Xylene
Pkg	1.0lb (454g) bottle	●	●

Cure Inhibition

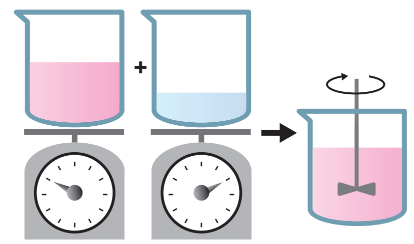
Cure inhibition may occur with addition cure Mold Making silicone, depending on the materials that come into contact with the silicone during cure. Surfaces containing water, sulphur, nitrogen compounds, organic metal compounds or phosphate compounds may inhibit cure.

Cure inhibition is characterized by a gummy or sticky appearance of the silicone at the interface between the silicone and the offending substrate. Inhibition can be prevented by application of a barrier coat, cleaning of the offending material prior to application of silicone, or selection of a condensation cure Mold Making grade.

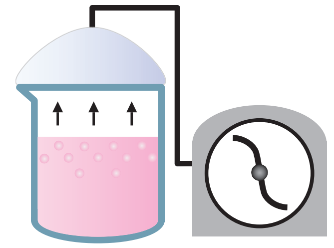
Molding Processes

Seamless Simple Mold

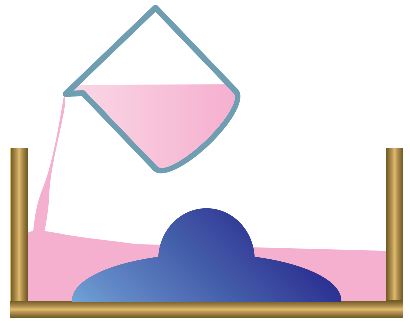
Step 1:
Place the master model on the mold board, and enclose on all four sides with a frame. Clay may be applied on the bottom of the master to securely attach it to the mold board.



Step 2:
Measure the base material and catalyst by weight as specified for the silicone grade selected. Thoroughly mix the components.

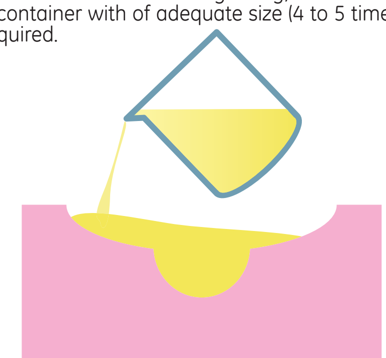


Step 3:
Vacuum-degass the silicone mixture to remove air that became entrapped during mixing. The mixture will rise while de-gassing, and therefore, a container with of adequate size (4 to 5 times) is required.



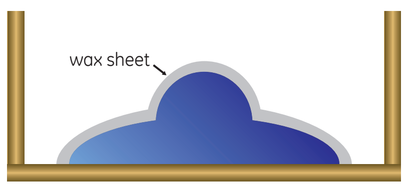
Step 4:
Begin pouring the matereial, starting first at a low point in the mold. Allow the silicone to cure for the specified time.

Step 5:
After the silicone has cured, remove the mold walls, and gently release the mold from the mold board. Release the master model from the silicone mold, and remove any flash that may have developed on the edges of the mold.

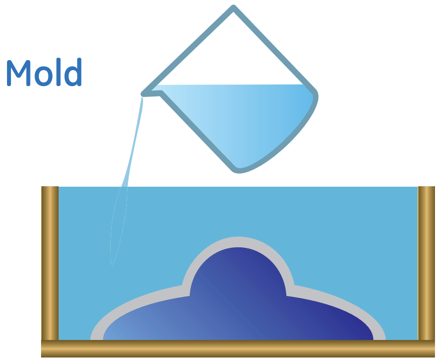


Step 6:
Prepare the casting resin as specified by the manufacturer, pour into the silicone mold, and allow to cure.

Seamless Lost Wax Back-Up Mold

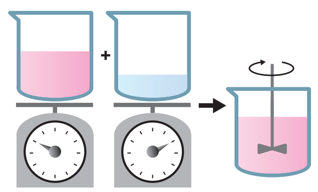


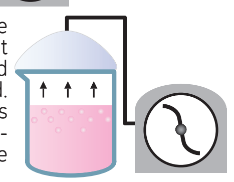
Step 1:
Place the master model on the mold board, and enclose on all four sides with a frame. Apply a wax sheet on the master model surface (thickness 0.5-1.0cm). Avoid using wax containing sulfur.



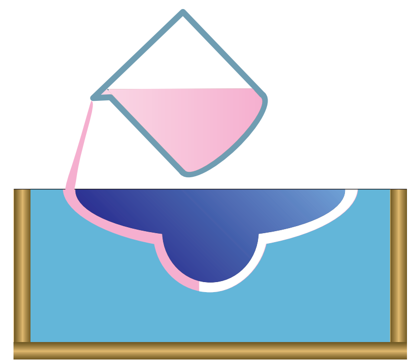
Step 2:
Pour a base material (plaster, polyester, etc.) and allow to harden.

Step 3:
Flip the mold and remove the wax layer and master model.

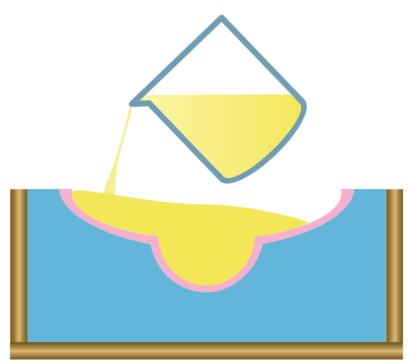




Step 4:
Measure the base material and catalyst by weight as specified for the grade selected. Mix the components thoroughly. Vacuum-degass the silicone mixture to remove air that became entrapped during mixing. The mixture will rise while de-gassing, and therefore, a container of adequate size (4 to 5 times) is required.



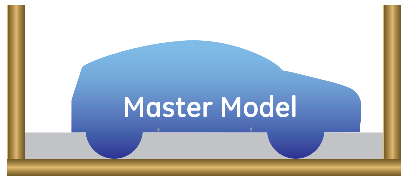
Step 5:
Secure the master model to the mold so the base is flush with the base material. Pour silicone into the cavity between the base and master model. Cure the silicone according to the specified conditions.



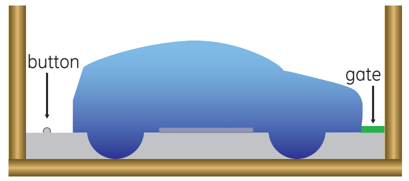
Step 6:
Remove the master model. Prepare the casting resin as specified by the manufacturer, pour into the silicone mold, and allow to cure.

Mass-Cast Seam Line Mold

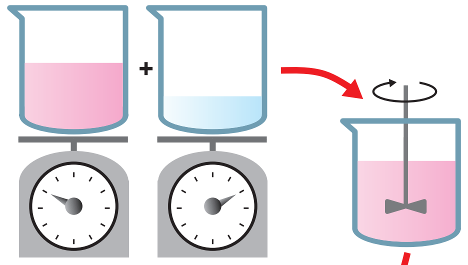
Mass casting a 3-dimensional part that does not have a flat side involves the creation of a part line in a split mold configuration. A split mold avoids "locking" the master model inside the silicone mold by pouring and curing the silicone Mold Making material in two steps. The ideal location for placing a part line depends upon the shape of the master part.

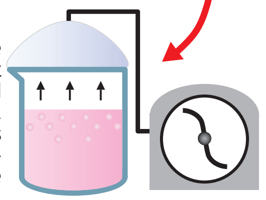


Step 1:
Place the master model in the mold frame, and 2 parting line. The flat surface can be created by either milling a cavity in the mold board to the appropriate depth and shape, or by embedding the bottom of the master in clay.

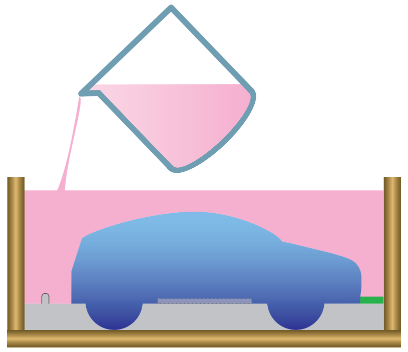


Step 2:
Use a non-reactive and easy to use material, such as pattern wax, to create button indentations that will be used to allow the 2 halves to mechanically inter-lock and align. Using similar material, create a gate from the model to the frame. The gate will later be used to pour casting resin into the mold.

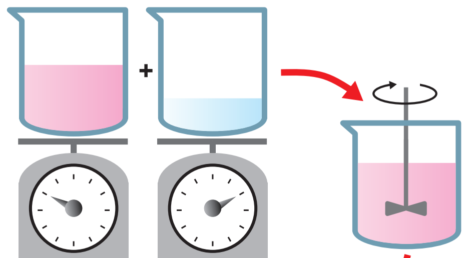


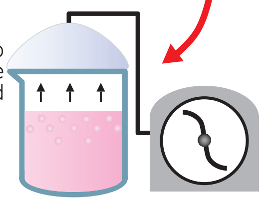


Step 3:
Measure the base material and catalyst by weight as specified for the grade selected. Mix the components thoroughly. Vacuum-degass the silicone mixture to remove air that became entrapped during mixing. The mixture will rise while de-gassing, and therefore, a container of adequate size (4 to 5 times) is required.

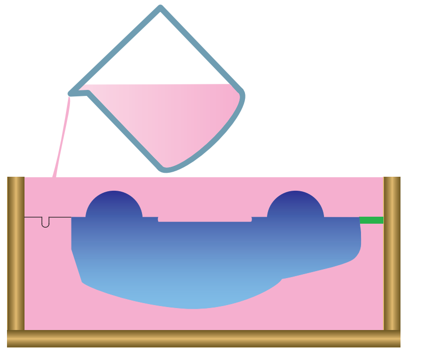


Step 4:
Pour the silicone mixture, and allow to fully cure as secified. It is advisable to vacuum degass once again after pouring, as some air will enter the silicone while pouring. After the silicone has fully cured, remove the frame from the base, and flip the mold to reveal the underside of the mold. Clean the parting line by removing clay that was used to create the parting line and any flash that developed. Also remove the wax material for the alignment mechanism.



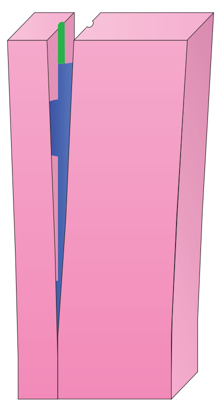


Step 5:
Repeat step 3 to prepare the silicone material for the 2nd half of the mold.

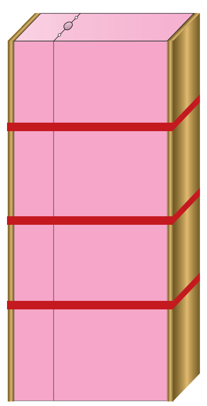


Step 6:
Pour the mixed and degassed silicone to create the 2nd half. It is advisable to vacuum degass once again after pouring, as some air will enter the silicone while pouring. Allow to fully cure as specified.

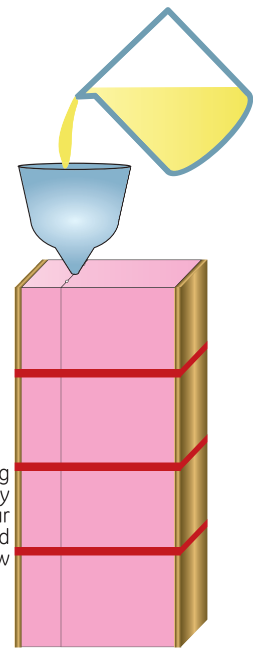
Step 7:
Remove the frame and base, and gently pull apart the 2 halves to expose the model. Remove the model and clean as necessary. If air vents were not cast-in, cut vents into one of the halves.



Step 8:
Place the two halves together, using the alignment mechanism for precise positioning. Place boards on either side to avoid excess localization of pressure, and securely tape the mold.

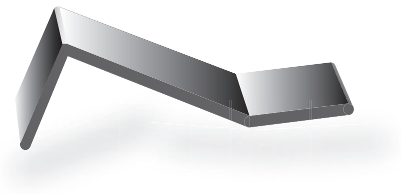


Step 9:
Prepare the casting resin as specified by the manufacturer, pour into the silicone mold via the gate, and allow to cure.

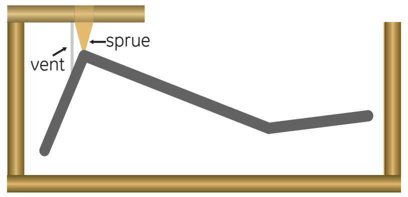


Mass-Cast Seam Line Cut Mold

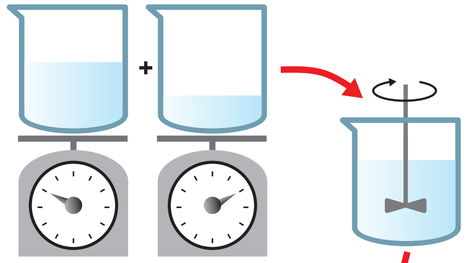
Mass casting a 3-dimensional part can also be accomplished by a single pour mold whose parting line is cut, rather than being created through two pouring processes. Parts that have a natural part line that is conducive to cutting, are candidates for this process. The benefit of a cut mold is the reduction in cure time associated with the elimination of a 2nd pouring and curing process. Optical clarity of translucent or transparent molding making grades aids the cutting process.

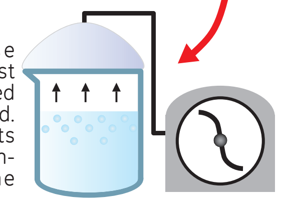


Step 1:
Parts with a prominent natural parting line are candidates for mass-molding with a seam line and cut process.

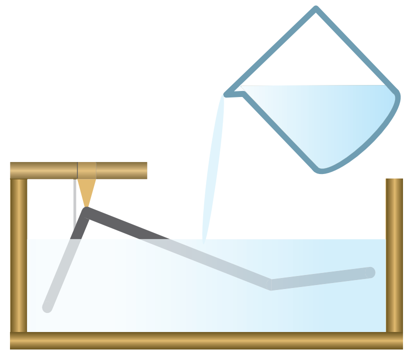


Step 2:
Enclose the part in a frame. The part can be suspended by attaching a sprue, which will also serve as the gate for pouring resin in the completed mold. Cast air vents can be created by attaching physical connections such as wires, which will also help to stabilize the part while pouring.

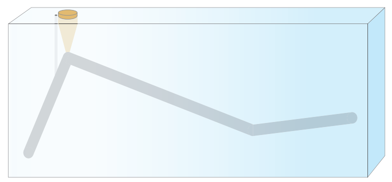




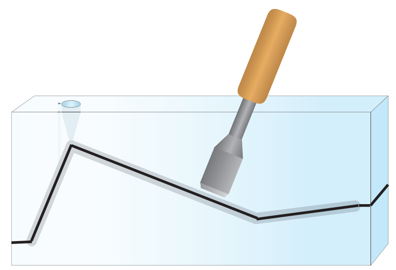
Step 3:
Measure the base material and catalyst by weight as specified for the grade selected. Mix the components thoroughly. Vacuum-degass the silicone mixture to remove air that became entrapped during mixing. The mixture will rise while de-gassing, and therefore, a container of adequate size (4 to 5 times) is required.



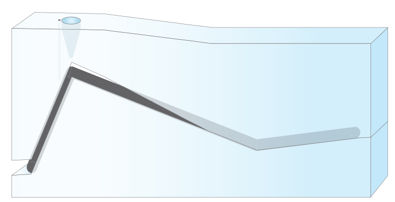
Step 4:
Begin pouring the matereial, starting first at a low point in the mold. It is advisable to vaccum degass once again after pouring, as some air will enter the silicone while pouring. Allow the silicone to cure for the specified time and conditions.



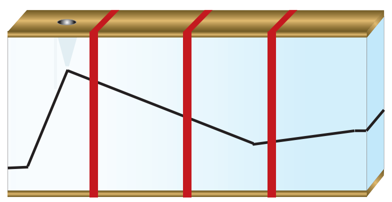
Step 5:
After the silicone has cured, remove the frame and supporting structure. Remove any flash that may have developed along the edges.



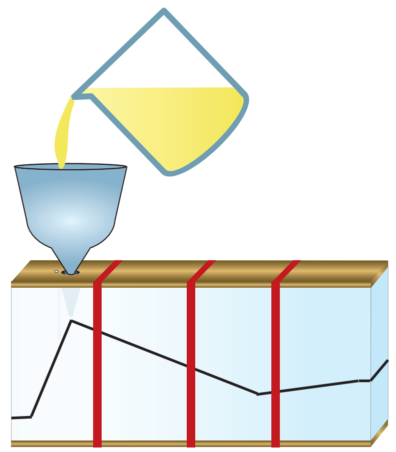
Step 6:
Use a knife to cut along the part line. It is preferrable that the cut is made in 2 to 3 passes, rather than attempting to cut to the part in a single cut. The pattern of the cut will create a natural alignment that will help when preparing the two halves for pouring resin.



Step 7:
Gently separate the 2 halves to expose the part. Remove the part, the sprue, cast-in air vent material, and any flash that may have developed around the gate and air vents.



Step 8:
Place the two halves together, using the cut parting line for alignment. Place boards on either side to avoid excess localization of pressure, and securely tape the mold.



Step 9:
Prepare the casting resin as specified by the manufacturer, pour into the silicone mold via the gate, and allow to cure.

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