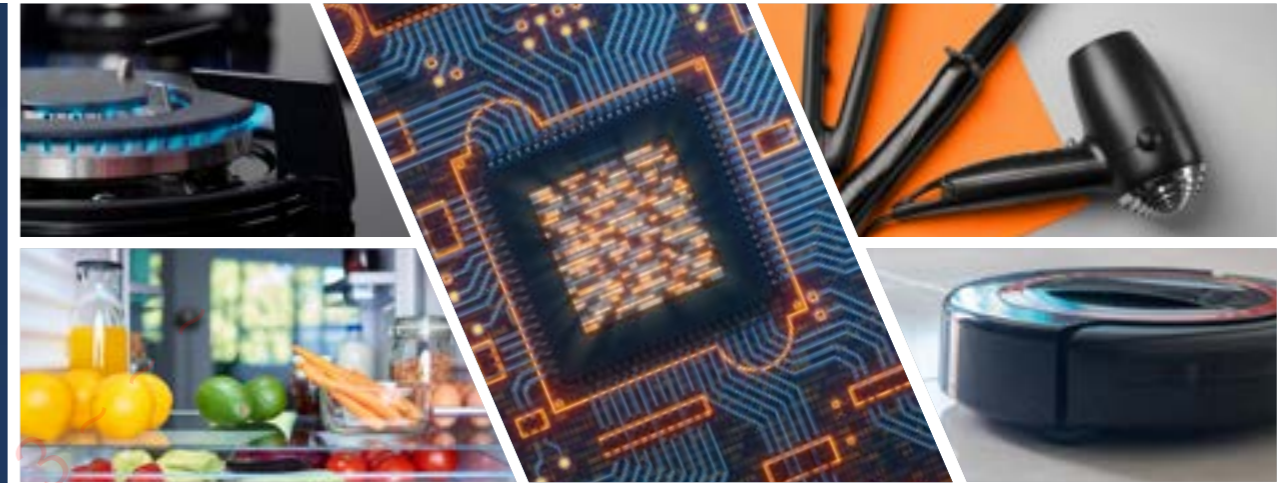




# **SILICONES FOR ELECTRONICS**

APPLIANCE APPLICATIONS



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## SILICONES FOR APPLIANCES

From PCB protection and thermal management, to temperature resistant adhesives and to general bonding.

**Momentive offers an array of electronic silicone materials for home appliance applications.**

Our materials can help improve the reliability and performance of appliances as well as enable design flexibility.

- Conformal coatings for PCB protection
- Encapsulants for component protection and assembly
- Thermally conductive greases and potting compounds
- Heat resistant adhesives and sealants
- Optically clear potting materials
- Structural bonding adhesives

## TYPICAL APPLICATIONS

Our silicones are suitable for a range of household appliances.



- Conformal coatings: Outdoor / indoor unit, inverter PCB protection
- Encapsulants for component protection and assembly
- Thermally conductive greases and potting compounds



- Heat resistant sealants: Oven door sealing, oven chamber seam seals
- Conformal coating: Control panel, motor control unit moisture protection



- Encapsulants for component protection and assembly
- Thermally conductive greases and potting compounds



- Conformal coatings
- Encapsulants for component protection and assembly



- PCB board assembly adhesives
- DC/DC, AD/DC converter potting
- Thermally conductive compounds
- Conformal coatings



- Lens cap bonding adhesives
- Driver thermal potting
- LED array transparent potting



- Conformal coating: Control panel, motor control unit moisture protection
- Thermally conductive greases: Motor control unit thermal management
- Thermally conductive potting compounds: Rotor position sensor moisture protection and heat dissipation



- Conformal coating: Motor control unit moisture protection
- Seam sealing, structural bonding adhesives



- Sole plate sealing
- Heating element sealing



- Glass stove top bonding

# SILCOOL™ THERMAL MANAGEMENT SILICONES



Thermally conductive greases and potting compounds in the 1~2 W/m.K level are frequently used in a wide array of appliances to help reduce operating temperatures and extend product life.

## POTENTIAL APPLICATIONS

- LED lighting
- Air conditioning
- Washing machines
- Home entertainment
- Power supplies

## TYPICAL PHYSICAL PROPERTIES

Properties	SilCool TIG2000	SilCool TIG1500	SilCool TIA225GF	SilCool TIA222G	SilCool TIA208R
Type	Thermally Conductive Grease	Thermally Conductive Grease	Thermally Conductive Gap Filler	Thermally Conductive Potting	Thermally Conductive Potting
Features	General purpose thermal grease with high thermal conductivity	General purpose thermal grease. Dry-out resistant	High thermal conductivity, fast heat & R/T cure, repairable	High thermal conductivity, tacky adhesion, fast heat & R/T cure	Low viscosity, primerless adhesion, fast heat & R/T cure
Components	1 Part	1 Part	2 Part	2 Part	2 Part
Property (uncured)	Paste	Semi-flowable	Paste	Flowable	Flowable
Color	Pale Blue	White	Gray	Gray	Black
Mixing Ratio ((A):(B) by weight)	-	-	100:100	100:100	100:100
Workable Life (23°C) h	-	-	4	4	1.5
Viscosity (23°C) Pa.s	130	110	100	20	4.2
Penetration (23°C)	400	275	-	-	-
Cure Condition (heat) °C/h	-	-	70 / 0.5	70 / 0.5	70 / 0.5
Cure Condition (room temp) h	-	-	24	24	24
Thermal Conductivity W/m.K	2.0	1.6	2.5	2.2	0.7
Density (g/cm <sup>3</sup> )	2.8	2.6	2.9	2.81	1.6
Hardness (Type E)	-	-	50	45	40 (type A)
Adhesion Strength (AI) MPa	-	-	-	-	1.5
Adhesion Strength (PC) MPa	-	-	-	-	0.9
CTE ppm/K	-	-	120	140	210
Volume Resistivity MΩ.m	1.0x10 <sup>6</sup>	7.7x10 <sup>6</sup>	6.0x10 <sup>6</sup>	4.8x10 <sup>6</sup>	8.0x10 <sup>6</sup>
Dielectric Strength kV/mm	-	2.8 (kV0.25mm)	20	20	25
Volatile Siloxane (D <sub>4</sub> -D <sub>10</sub> ) ppm	<100	<100	<200	<200	-
Flame Retardancy	-	-	UL94 V-0	UL94 V-0	UL94 V-0

Typical properties are average data and are not to be used as or to develop specifications.



For applications such as ovens, stoves cookers or other heating devices, Momentive offers adhesives and sealants that can help enhance retention of performance at elevated temperatures. Both room temperature and heat cure formulations are available.

# HEAT RESISTANCE ADHESIVES & SEALANTS

## POTENTIAL APPLICATIONS

- Oven door, chamber seam sealing
- Cooking range bonding and sealing
- Steam iron sole plate sealing
- Ceramic heaters

## TYPICAL PHYSICAL PROPERTIES

Properties	TSE3826	TSE3877-B	TSE3976-B	RTV116	TSE326	TSE3260
Type	1 Part Room Temperature Cure	1 Part Room Temperature Cure	1 Part Room Temperature Cure	1 Part Room Temperature Cure	1 Part Heat Cure	1 Part Heat Cure
Features	High temperature resistant paste adhesive. RTI 200	Heat resistant adhesive	High temperature resistant, low volatile flowable adhesive	High temperature resistant, self-leveling adhesive. RTI 200	High temperature resistant flowable adhesive	High temperature resistant flowable adhesive. RTI 190
Color	Red	Black	Black	Red	Red	Red
Viscosity (23°C) Pa.s	Paste	300	70	25	28	23
Tack Free Time (23°C) min	10	20	5	30	-	-
Cure Condition °C/h	-	-	-	-	150 / 1	150 / 1
Density (g/cm <sup>3</sup> )	1.04	1.09	1.06	1.09	1.45	1.34
Hardness (Type A)	29	25	30	20	43	20
Tensile Strength MPa	2.0	2.0	1.7	2.5	3.4	1.7
Elongation %	400	440	210	350	170	250
Adhesion Strength MPa	1.4	2.0	1.3	0.9	2.0	0.5
Thermal Conductivity W/m.K	0.18	0.18	0.18	-	0.41	0.18
Volume Resistivity MΩ.m	1.0x10 <sup>7</sup>	1.0x10 <sup>7</sup>	1.0x10 <sup>7</sup>	6.0x10 <sup>6</sup>	2.0x10 <sup>7</sup>	1.0x10 <sup>7</sup>
Dielectric Strength kV/mm	23	20	27	16	22	25
Dielectric Constant (60Hz)	2.9	3.5	3.0	2.8	3.3	3.1
Flame Retardancy	-	-	HB	-	HB	HB

Typical properties are average data and are not to be used as or to develop specifications.

# CONFORMAL COATING MATERIALS

Conformal Coating Materials Momentive's ECC conformal coatings are used to protect PCBs against particles, moisture, gases and other potentially contaminating materials. In particular, ECC3011 and ECC3051S conformal coatings employ a distinct formulation that offers inherent resistance against elements that cause corrosion on vital PCB components.

## POTENTIAL APPLICATIONS

- Washing machines
- Personal and home hygiene
- Air conditioners
- Microwave ovens
- Power supplies

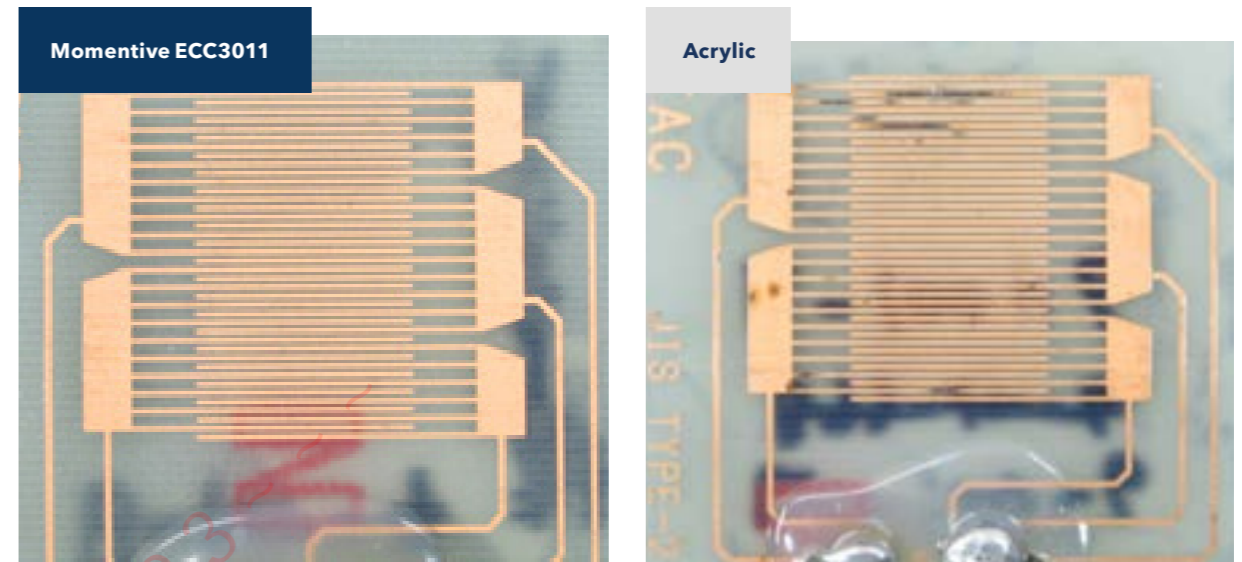
## TYPICAL PHYSICAL PROPERTIES

Properties	ECC3011	ECC3051S	ECC4865
Type	Room Temperature Cure, Solvent-less	Room Temperature Cure, Solvent-less	Heat Cure, Solvent-less
Appearance	Translucent	Translucent	Translucent
Viscosity (23°C) mPa.s	110	550	210
Tack-Free Time min	3	5	N/A
Cure Time (23°C) min	10	30	15 (105°C)
Density g/cm <sup>3</sup>	0.99	0.98	0.98
Hardness (Type A)	35	22	35
Volume Resistivity MΩ.m	1.0x10 <sup>7</sup>	1.0x10 <sup>7</sup>	5.0x10 <sup>6</sup>
Dielectric Strength kV/mm	20	20	20
Flame Retardancy	V-0	V-0	V-0

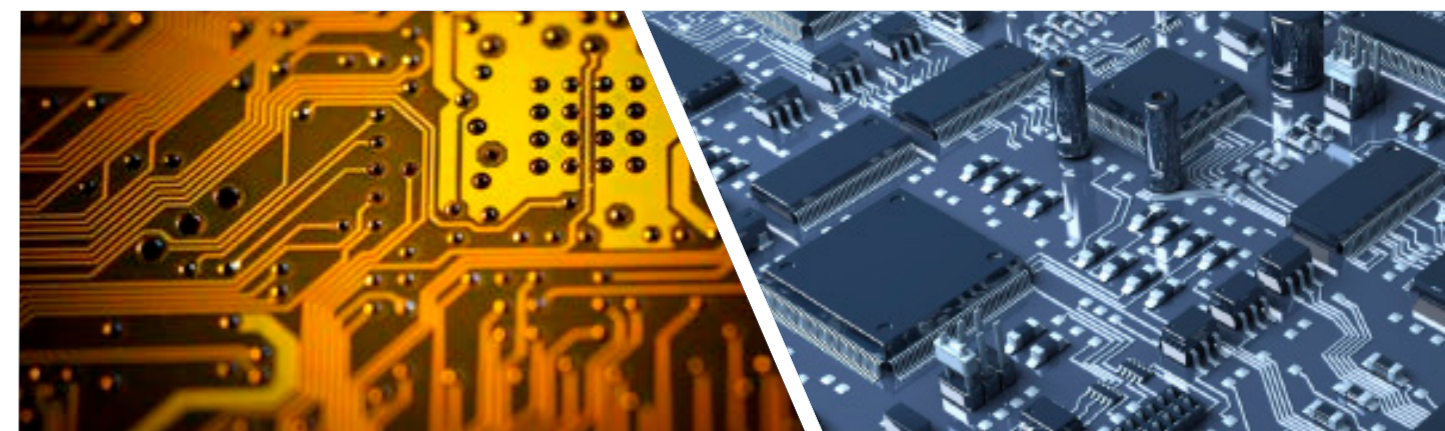
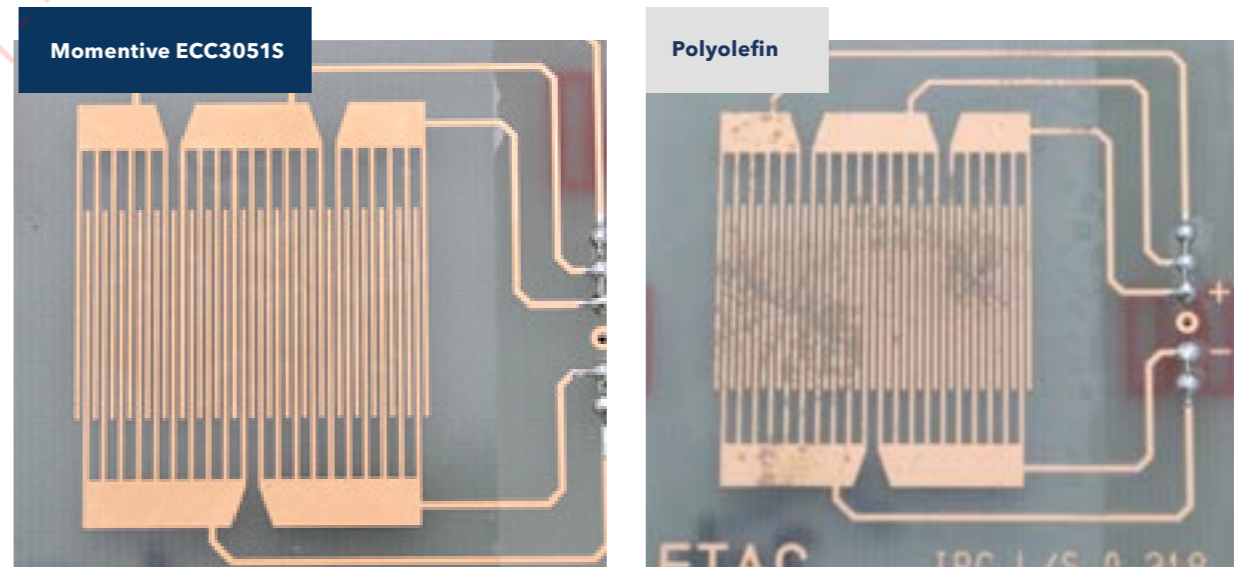
Typical properties are average data and are not to be used as or to develop specifications.

ECC3011 and ECC3051S conformal coatings employ a distinct formulation that offers inherent resistance against elements that cause corrosion on vital PCB components. In tests performed by Momentive in accordance with IEC standards, our silicone formulations out-performed other conformal coating materials for corrosion prevention including acrylics, polyurethane, polyolefin and competitor silicone formulations.

## Salt Spray Corrosion Test (IEC60068-2-52 Severity 5)



## Mixed Gas Corrosion Test (IEC60068-2-60 Method 4)





## ROOM TEMPERATURE CURE ADHESIVES & ENCAPSULANTS

Momentive offers a wide range of adhesives and dielectric encapsulants that are used for structural bonding, to provide mechanical strength to PCB components, insulate and protect against corrosion, and provide mild thermal conductivity.

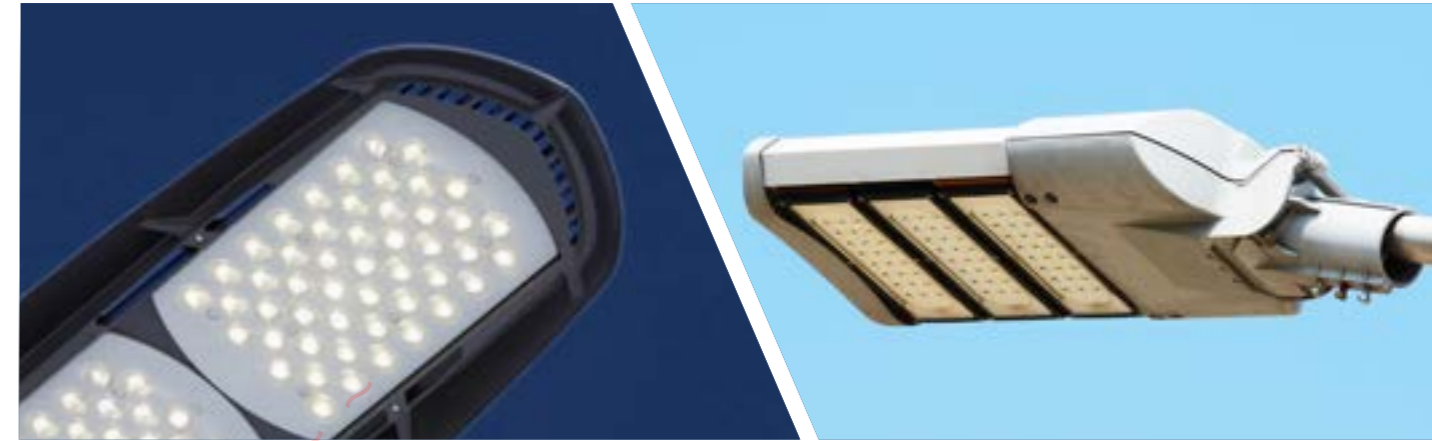
### POTENTIAL APPLICATIONS

- LED lighting; lens cap bonding
- Air conditioning; PCB assembly, encapsulation
- Home entertainment: component encapsulation
- Refrigerator: Seam seals, structural bonding
- Power supplies: PCB assembly
- Cooking range: Glass stove top bonding
- Personal and home hygiene

### TYPICAL PHYSICAL PROPERTIES

Properties	SnapSil™ TN3085	SnapSil TN3005	SnapSil TN8000	RTV133	TSE392LS-C	TN3305
Type	1 Part Room Temperature Cure Adhesive	1 Part Room Temperature Cure Adhesive	1 Part Room Temperature Cure Adhesive	1 Part Room Temperature Cure Adhesive	1 Part Room Temperature Cure Adhesive	1 Part Room Temperature Cure Encapsulant
Features	Thermally conductive paste adhesive. Low Volatile	General purpose paste adhesive. Low Volatile	High strength, good adhesion general purpose bonding	General purpose paste adhesive. V-0 certified	Low bleed paste adhesive	Flowable dielectric encapsulant. Low Volatile
Color	White	Translucent, White, Black	White	Black	Translucent	Clear, White, Black
Viscosity (23°C) Pa.s	Paste	Paste	Paste	Paste	-	47
Tack Free Time (23°C) min	7	7	20	60	10	9
Density g/cm <sup>3</sup>	1.63	1.04	1.41	1.23	1.01	1.04
Hardness (Type A)	46	22	33	46	22	14
Tensile Strength MPa	2.3	1.8	2.2	4.5	1.2	1.5
Elongation %	150	330	620	250	380	400
Adhesion Strength MPa	1.3	1.2	1.8	1.2	1.1	1.0
Thermal Conductivity W/m-K	0.7	0.18	0.38	0.28	0.18	0.18
Volume Resistivity MΩ-m	4.0x10 <sup>6</sup>	2.0x10 <sup>7</sup>	7.0x10 <sup>6</sup>	7.0x10 <sup>7</sup>	-	2.0x10 <sup>7</sup>
Dielectric Strength kV/mm	23	26	21	20	-	26
Dielectric Constant (60Hz)	4.0	2.7	3.9	2.8 (100Hz)	-	2.7
Volatile Siloxane (D <sub>4</sub> -D <sub>10</sub> ) ppm	100	100	-	-	-	100
Flame Retardancy	V-0	HB	HB	V-0	-	HB

Typical properties are average data and are not to be used as or to develop specifications.



## TRANSPARENT POTTING MATERIALS

Momentive's optically clear potting materials are used to encapsulate LED arrays or strips to help provide protection against a number of elements and enable components to withstand temperature extremes. These low viscosity materials cure with exposure to heat, and can also provide adhesion when used in conjunction with primers.

### POTENTIAL APPLICATIONS

- LED Lighting arrays
- Transparent PCB potting

### TYPICAL PHYSICAL PROPERTIES

Properties	RTV615	TSE3033
Type	2 Part Heat Cure	2 Part Heat Cure
Appearance	Transparent	Transparent
Mixing Ratio (A:B by weight)	100:10	100:100
Viscosity (23°C) Pa.s	4	0.9
Cure Condition	100°C x 60 min	150°C x 30 min
Density g/cm <sup>3</sup>	1.02	1.01
Hardness	44 (shore A)	30 (type A)
Elongation %	120	130
Volume Resistivity MΩ-m	1.8x10 <sup>7</sup>	2.0x10 <sup>7</sup>
Refractive Index	1.406	1.407

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