Adhesives and Bonding Tools

To obtain good measurement results, the strain gage must be bonded firmly to the measuring object. Thus, it is important to select an adhesive suitable for the materials of both the object being measured and the gage base, as well as for the measuring conditions.

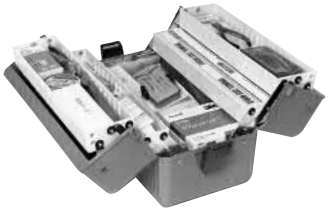
					
Models	**CC-33A**	**CC-35**	**CC-36**	**EP-270**	
Types	Instantaneous adhesive cured at normal temperature	Instantaneous adhesive cured at normal temperature	Instantaneous adhesive cured at normal temperature	Cured at normal temperature	
Operating Temperature (°C)	-196 to 120 (Regular temperature: 20 to 80)	-30 to 120 (Regular temperature: 20 to 80)	-30 to 100 (Regular temperature: 20 to 80)	-269 to 30	
Major Applicable Materials	•Metals (Steel, stainless steel, copper, aluminum alloys A1050, A2024, etc.) •Plastics (Acrylate, PVC, nylon, etc.) •Composite materials (CFRP, GFRP, PCB, etc.) •Rubber	•Concrete •Mortar •Wood	•Metals (Steel, stainless steel, copper, aluminum alloys A1050, A2024, A7075, magnesium alloy, etc.) •Plastics (Acrylate, PVC, nylon, polypropylene, etc.) •Composite materials (CFRP, GFRP, PCB, etc.) •Concrete •Mortar •Wood •Rubber	•Metals (Steel, stainless steel, aluminum alloy, etc.)	
Curing Requirements	•Apply finger pressure (100 to 300 kPa) for 15 to 60 seconds. (Then, leave the gage for 1 hour.) *The finger pressure application time differs depending on temperature and humidity conditions. The lower the temperature and humidity, the longer the finger pressure application time required.	•Apply finger pressure (100 to 300 kPa) for 30 to 180 seconds. (After curing, leave the gage for 1 hour or more.) *The finger pressure application time differs depending on temperature and humidity conditions. The lower the temperature and humidity, the longer the finger pressure application time required.	•Apply finger pressure (100 to 300 kPa) for 30 to 60 seconds. (After curing, leave the gage for 1 hour or more.) *The finger pressure application time differs depending on temperature and humidity conditions. The lower the temperature and humidity, the longer the finger pressure application time required.	•Apply pressure (50 ±20 kPa) for 24 hours at approx. 25°C.	
Category	1 type of cyanoacrylate liquid	1 type of cyanoacrylate liquid	1 type of cyanoacrylate liquid	2 types of epoxy liquid mixed	
Capacity	2 g×1 or 2 g×5	2 g×1 or 2 g×5	2 g×1 or 2 g×5	50 g (Main agent: 25 g, Curing agent: 25 g)	
Features	•Suitable for bonding general-purpose gages which are used for general stress measurement at normal temperature. •Quick curing ensures smooth bonding workability. •Enables measurement in approximately 1 hour from bonding.	•High viscosity makes it suitable for bonding to porous materials such lumber and concrete. •Suitable for bonding general-purpose gages which are used for general stress measurement at normal temperature.	•Suitable for bonding a high-elongation gage (such as KFEM and KFEL) at normal temperature. •Suitable for bonding to non-adhesive materials such as aluminum alloy (A7075) and magnesium alloy. •High peeling resistance, high impact resistance and less aging deterioration of bonding strength	•Suitable for bonding gages for strain measurement at very low temperature.	
Major Applicable Gages	KFGS, KFGT, KFR, KFWB, KFWS, KFRP, KFRS, KFP, KSPB, KSN (Excl. E5) KSPH, KSPL, KFL, KFN, KFS, KFF, KCH, KV	KFGS, KFGT, KFR, KC, KFRP, KFP	KFEM, KFEL, KFGS, KFGT, KFR, KFWB, KFWS, KFRP, KFRS, KFP, KSPB, KSN (Excl. E5), KSPH, KSPL, KFF, KV	KFL	

Note: The stated operating temperature range is for the adhesive only, and may differ depending on combinations with gages. When using the adhesives and gages together, read the attached instruction manual carefully.

	EP-340	EP-34B	EP-370	PC-600	PI-32
	Cured at normal temperature or by heating	Cured at normal temperature or by heating	Cured by normal temperature + heating	Cured by heating	Cured by heating
	-55 to 150	-55 to 200	Normal temp. to 50	-269 to 250	-269 to 350
	•Metals (Steel, stainless steel, aluminum alloy, etc.)	•Metals (Steel, stainless steel, copper, aluminum alloy, etc.) •Plastics (Acrylate, PVC, etc.) •Composite materials (CFRP, GFRP, PCB, etc.)	•Metals (Steel, stainless steel, copper, aluminum alloy, etc.) •Plastics (Acrylate, PVC, etc.)	•Metals (Steel, stainless steel, copper, aluminum alloy, etc.)	•Metals (Steel, stainless steel, copper, aluminum alloy, etc.)
	•Apply pressure (100 ±50 kPa) for 24 hours at approx. 25°C or for 2 hours at 80°C. •Pressing is possible with tape.	•Apply pressure (30 to 50 kPa) for 24 hours at approx. 25°C or for 2 hours at 80°C. •Pressing is possible with tape.	•Keep at normal temperature for 24 hours and heat it for 5 hours at 80 °C.	•Apply pressure (150 to 300 kPa) for 1 hour at 80°C →2 hours at 130°C →2 hours at 150°C.	•Apply pressure (200 to 500 kPa) for 1 hour at 100°C →2 hours at 200°C →2 hours at the operating temperature with the pressure removed. *If it is difficult to heat at 200°C, 2 h at 200°C may be changed to 5 h at 160°C with all other conditions followed.
	2 types of epoxy liquid mixed	2 types of epoxy liquid mixed	2 types of epoxy liquid mixed	1 heating type of phenol liquid	1 heating type of polyimide liquid
	30 g (Main agent: 6 g x 4 Curing agent: 1.5 g x 4	30.8 g (Main agent: 5.6 g x 4 Curing agent: 2.1 g x 4	40 g (Main agent: 30 g Curing agent: 10 g	100 g	20 g
	•Suitable for bonding gages for strain measurement at mid temperature.	•Suitable for bonding gages for strain measurement at mid temperature and for bonding gages for transducers.	•Low viscosity makes it suitable for bonding gages (KFG-C20) in bolts.	•Suitable for bonding gages for strain measurement at low, mid and high temperatures and for bonding gages for transducers.	•Suitable for bonding gages for strain measurement at high temperature.
	KFGS, KFR, KFWB, KFGT, KFF, KFS	KFRP, KFP, KFH	KFG (C20)	KFGS, KFR, KFH, KFL, KFN, KFS	KFU, KFH

■Gage Bonding Tool Kit

Note: Cleaner, strain gages and adhesives are not included. Please prepare them separately.



●GTK-77 Tool Kit

This kit includes almost all tools, gage terminals, solder and other expendables required for gage bonding work.

Contents
Tool box, screwdriver set, tweezers (2 PC.), nippers, radio pliers, tape measure (2 m), stainless steel scale, protractor, sandpaper (#100, #320, 3 PC. each), soldering iron tip cleaner, knife, utility knife, scriber, soldering iron (40 W), compass, marking pencil, mending tape, pencils (4H, 6H, 2 PC. each), scissors, cotton swabs, clean paper, high-temperature solder, flux for high-temperature solder, heat-resistant glass tube, gage terminals (T-P1, T-P4, T-P5, T-P6, T-P7, T-P8, T-P9, T-P10, T-F2B, T-F3B, T-F7B, T-F8B, T-F10B, T-F13B, T-F17B, T-F25, T-F28), hair dryer (1200 W), insulation vinyl tape, table tap (2.5 m), soldering iron (ANTEX), silicon rubber (10 PC.), fluoroplastic sheets (10 PC.), gage presser (G-MATE-B, 1 PC.)

Note: The power supply of the electric goods is set to 100 VAC, as per Japanese specifications.

●GTK-55K Tool Kit NEW

This portable kit includes almost all items required for gage bonding work.

Contents
Tool box, tweezers (2 PC.), nippers, radio pliers, stainless steel scale, sandpaper (#180, #320, #600, and #1000, 4 PC. each), utility knife, scriber, pencils (4H, 3PC.), tape, scissors, small scissors, cotton swabs, clean paper, gage terminals (T-F7B, T-F17B), vinyl tape, silicone rubber (10 PC.), fluoroplastic sheets (10 PC.), polyethylene sheets (SKF-28284, 100 PC.), gage presser (G-MATE-B, 1 PC.)

■Gage Presser

●Gage Presser G-MATE

The G-MATE applies pressure to a bonded strain gage continuously until the adhesive is cured. It consists of a frame equipped with a strong ferrite magnet to firmly fix the object under testing and a pressure disk equipped with silicon sponge rubber and a coil spring to apply constant pressure to the strain gage.

G-MATE-B

Name	Models	Applications
Gage Mate	G-MATE-B	For normal temperature (Up to approx. 80 °C)
High-temperature Gage Mate	G-MATE-H	For high temperature (Up to approx. 150 °C)

6 pc/pkg

■Compact Spot Welder

●GW-3C Compact Spot Welder

Developed to install encapsulated gages such as the KHCX, KHCS and KHCD and to fix high-temperature lead wires and thermocouples, the GW-3C is an easy-to-use welder allowing continuously variable setting of welding energy.

CE

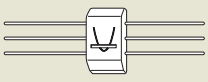
Specifications	
Welding Energy	LOW: 0 to 25 Ws, continuously variable HIGH: 0 to 50 Ws, continuously variable
Welding Speed	1 Ws: 150 times/min., 5 Ws: 120 times/min., 10 Ws: 80 times/min., 20 Ws: 60 times/min., 50 Ws: 30 times/min.
Power Supply	AC line
Dimensions and Weight	183 W x 153 H x 313 D mm (Excluding protrusions), approx. 9 kg (Main body)
EMC Directive	EN61326-1 (Class A)
Low Voltage Directive	EN61010-1, EN61010-2-030 (Installation Category Ⅱ, Pollution Degree 2, Measurement Category O)
Accessories	Square welding head, grounding clip (With 1.3-m long cable), 2 electrodes (GW-02), metal file, fuse (5 A), hexagon wrench, instruction manual
Options	Aluminum trunk (GW-01)

*Products corresponding to welding speed 50 W・s, approx. 180 times/minute can also be manufactured. (Note: Does not comply with overseas laws and regulations. For use in Japan only.) Please contact us for details.

Gage Terminals and Other Accessories

●T-type Gage Terminals

A gage terminal is for connecting a strain gage and lead wires to protect the gage leads. It prevents the strain gage from receiving force and the gage leads from breaking or peeling off if the lead wires are pulled to some extent.

	Models		Dimensions (mm) (W x L x T)	Base Materials	Conductor Materials	Qty per Pack	Operating Temperature (°C)	Recommended Adhesives	Remarks
Foil types		T-F2B NEW CE	5-pole 14×55×0.1 1-pole 14×11×0.1	Glass epoxy	Copper foil	20 sheets (5 poles/ sheet)	-196 to 120	CC-33A EP-34B	
		T-F3B NEW CE	5-pole 14×65×0.1 1-pole 14×13×0.1	Glass epoxy	Copper foil	20 sheets (5 poles/ sheet)	-196 to 120	CC-33A EP-34B	For 3-wire system
		T-F13B NEW CE	5-pole 14×65×0.15 1-pole 14×13×0.15	Glass epoxy + double-sided adhesive tape			-30 to 50	Not required	Self-bonding
		T-F7B NEW CE	5-pole 6×25×0.1 1-pole 6×5×0.1	Glass epoxy	Copper foil	20 sheets (5 poles/ sheet)	-196 to 120	CC-33A EP-34B	
		T-F17B NEW CE	5-pole 6×25×0.15 1-pole 6×5×0.15	Glass epoxy + double-sided adhesive tape			-30 to 50	Not required	Self-bonding
		T-F8B NEW CE	5-pole 4×30×0.1 1-pole 4×6×0.1	Glass epoxy	Copper foil	20 sheets (5 poles/ sheet)	-196 to 120	CC-33A EP-34B	
		T-F10B NEW CE	15×50×0.1	Glass epoxy	Copper foil	10 sheets	-196 to 120	CC-33A EP-34B	Mainly for 5-element gages
		T-F23 CE	5-pole 14×55×0.1 1-pole 14×11×0.1	Polyimide	Copper foil	20 sheets (5 poles/ sheet)	–196 to 200, –196 to 120 with CC-33A	CC-33A EP-34B	For high temperature
		T-F24 CE	5-pole 9×40×0.1 1-pole 9×8×0.1						
		T-F25 CE	5-pole 6×25×0.1 1-pole 6×5×0.1						
		T-F26 CE	5-pole 14×55×0.1 1-pole 14×11×0.1	Polyimide	Copper foil	20 sheets (5 poles/ sheet)	-196 to 350	PI-32	For high temperature
		T-F27 CE	5-pole 9×40×0.1 1-pole 9×8×0.1						
		T-F28 CE	5-pole 6×25×0.1 1-pole 6×5×0.1						
		T-F29 NEW CE	Outer: ϕ6 Inner: ϕ2.5	Glass epoxy	Copper foil	20 sheets	-196 to 120	EP-340, 370 CC-33A	For measuring axial tension of bolts
Mold types		T-P1	14×10×4	Styrol	Tin-plated copper wire	20 PC.	-30 to 80	CC-33A	Self-bonding
		T-P4	14×10×4.5	Styrol + double-sided adhesive tape			-30 to 50	Not required	Self-bonding
		T-P5	6×6×2	ABS	Tin-plated copper wire	20 PC.	-30 to 120	CC-33A	
		T-P6	6×6×2.5	ABS + double-sided adhesive tape			-30 to 50	Not required	Self-bonding
		T-P7	15×10×4	ABS	Tin-plated copper wire	20 PC.	-30 to 80	CC-33A	For 3-wire system
		T-P8	15×10×4.5	ABS + double-sided adhesive tape			-30 to 50	Not required	Self-bonding
		T-P9	6×5×4	Heat-resistant styrol	Tin-plated copper wire	40 PC.	-30 to 90	CC-33A	
		T-P10	6×5×6	Heat-resistant styrol + rubber					Rubber on the rear face

■Coating Agents

Coating agents are applied to gages and gage terminals to prevent gages from adsorbing moisture in outdoor or long-term measurements.

C-1B

C-4


C-5


VMTAPE

ARALDITE-C

HAMATITE Y-500-L

KE-4898-W

Models	C-1B	C-4	C-5	AK22	VMTAPE	ARALDITE	HAMATITE Y-500-L	KE-4898-W
Types	Hot-melt type	Hot-melt type	Rubber solvent type	Special clay	Press-fitting rubber type	2-liquid type (1:1)	Rubber solvent type	Silicon solvent type
Operating Temperature	–30 to 40°C	–50 to 60°C	–269 to 60°C	–30 to 120°C	–30 to 80°C	–50 to 100°C	–20 to 70°C	–50 to 200°C
Curing Requirements	Heat-melted & cured at normal temp.	Heat-melted & cured at normal temp.	Cured at normal temp.	Press-fitted	Press-fitted	24 h at normal temp.	Cured at normal temp.	Cured at normal temp.
Moisture & Water-proofness	◎	◎	◎	◎	○	△	○	△
Mechanical Protection	△	△	△	△	△	◎	△	△
Oil Resistance	△	△	△	△	△	○	△	△
Alcohol Resistance	○	○	○	○	○	○	○	○
Toluene Resistance	×	×	×	×	×	○	×	×
Alkalescent Resistance	○	○	○	○	○	○	△	△
Weak-acid Resistance	○	○	○	○	○	○	△	△
Contents	500 g	500 g	100 g	1 kg	38mm×6m	1.8 kg	1.5 kg	100 g
Materials	Paraffin wax	Microcrystalline wax	Butyl rubber	Butyl rubber + inorganic additive	Butyl rubber	Epoxy	Chloroprene rubber	Silicon
Color	White	White	Light yellow	Dark green	Black	Main agent: Light milk white Curing agent: Light yellow	Black	Milk white
Features	To be applied with a brush after heat melting. Suitable as an underlayer of multilayer coating.	Excellent cohe-siveness makes it suitable for application to wall surfaces.	Minimal restriction in ultra-low temperature applications. Tube type	The clay-like shape ensures easy coating work.	The tape shape facilitates coating work.	Highly effective mechanical protection makes it suitable as an upper layer of multilayer coating.	Suitable as a final finish of multi-layer coating.	Highly heat-resistant coating agent. Tube type
Kyowa Models	C-1B	C-4	C-5	AK22	VMTAP	ARALDITE-C	HAMATITE Y-500-L	KE-4898W

◎: Excellent
○: Rather excellent
△: Rather inferior
×: Inferior

*When using, read the attached instruction manual carefully.

■Accessories for High-temperature Gages

●HTG Series Accessories for High-temperature Gages

Name	Models	Specifications	Qty
High-temperature solder	HTG-S-B	Fusion temperature: 309°C Maximum operating temperature: 300°C	40 cm long bar x 2
Flux for high-temperature solder	HTG-S-F	Ingredients: Inorganic acid + alcohol	20 g
Heat-resistant glass tube	HTG-G-TUBE	Inner diameter: 1.5 mm Length: 1 m	10 PC.
Heat-resistant teflon tape	HTG-T-TAPE	Heat resistance: 200°C Width: 12.7 mm	32.9 m long
Heat-resistant glass tape	HTG-G-TAPE	Heat resistance: 350°C Width: 25 mm	33 m long

*The heat resistance of 350°C for the heat-resistant glass tape is the specification for a short-term operation.