KEY RESIN COMPANY

KEY 9800 FLEXIBLE PUMMA

DESCRIPTION

KEY 9800 FLEXIBLE PUMMA is a higher viscosity, 100% reactive, flexible methyl methacrylate polyurethane hybrid resin used as a crack isolation or waterproofing membrane under various **KEY MMA Systems**, or as a resilient mortar or joint filler for numerous applications**. KEY 9800 FLEXIBLE PUMMA** resists cracking caused by horizontal substrate movement, providing a crack resistant, resilient surface with superior performance in cold temperature environments. **KEY 9800 FLEXIBLE PUMMA** offers stress relieving properties for floor slabs showing movement and/or vibration. Excellent for use as an intermediate membrane layer or patching mortar in loading docks and ramps, equipment rooms, large animal rooms, activity rooms, automotive and tooling industry, freezers, coolers, bridge decks, roof decks, pedestrian walkways, parking garages, ship decks, pool liners, pool decks, joint repair, food industry, dairies, beverage industry, and numerous other industries and applications.

KEY ADVANTAGES

- Crack Resistant and Waterproofing Flexibility
- Elongation of 300%
- Reduces Noise Created by Mechanical Vibrations
- May be Applied in Thickness of 1/16”-1/4”
- VOC Compliant (100% Solids), Meets USGBC LEED Requirements

KEY CONSIDERATIONS

- For proper performance, follow recommended mixing/application guidelines.
- Concrete must be dry, free of dirt, waxes, curing agents and other foreign materials.
- Do not store outside in direct sunlight, storage temperature must be < 80^{o}F.
- On or below grade installation must have an efficient vapor barrier under the slab (minimum 10-15 mil).
- Moisture vapor transmission must be less than 3 lbs per ASTM-F-1869 and less than 80% RH per ASTM F-2170 unless Key Resin moisture mitigation system is used.

COMPOSITION

KEY 9800 FLEXIBLE PUMMA is a 100% reactive methyl methacrylate polyurethane hybrid resin.

COLOR SELECTION

KEY 9800 FLEXIBLE PUMMA is supplied clear (slight haze). Color packs are available for selected colors. Color pack mix ratio is 1 quart pigment per 5 gallons resin. See **Key Resin MMA Color Card**.

SURFACE PREPARATION

Surface preparation is the most critical portion of any successful resinous flooring system. All substrates must be properly prepared as outlined in **Key Resin Company’s Technical Bulletin #1**. In addition, **All Key MMA Flooring Systems require a minimum surface profile of CSP 4-5**, as outlined in ICRI Guideline 310.2-1997, formerly named G-03732 (available from www.ICRI.org). Work must be performed by trained or experienced contractors or maintenance personnel.

MIXING AND INSTALLATION

KEY 9800 FLEXIBLE PUMMA is typically used in conjunction with fillers and aggregate and requires the addition of **KEY 9000 MMA HARDENER** to start the hardening process. The amount of hardener must be adjusted to the respective surface temperature (see table). At temperatures below 40°F, **KEY 9101 MMA COLD TEMPERATURE ACCELERATOR** must be used in addition to the amount of hardener used at the 40°F or 30°F level.

KEY 9800 FLEXIBLE PUMMA Resin
Mix Ratios, Pot Life and Hardening/Temperature

Temp. (°F) of Resin, Air & Floor Surface	Hardener by Volume (oz.) Per Gallon of 9800 Resin	Pot Life (min.)	Hardening Time (min.)
+30°F	10 vol. oz.	Approx. 25	Approx. 75
+40°F	9-10 vol. oz.	Approx. 25	Approx. 70
+50°F	8-9 vol. oz.	Approx. 25	Approx. 65
+60°F	6-7 vol. oz.	Approx. 20	Approx. 60
+70°F	5-6 vol. oz.	Approx. 20	Approx. 50
+80°F - 90°F	5* vol. oz.	Approx. 15	Approx. 45

*Do not use less than 5 oz. Key 9000 MMA Hardener by volume.
Consult with Key Resin Technical Services if performing mix ratio by weight instead of by volume.

KEY 9101 MMA COLD TEMPERATURE ACCELERATOR: At temperatures below 40°F, Key 9101 MMA Cold Temperature Accelerator must be used in addition to the amount of hardener used at the 40°F or 30°F level. As a rule of thumb, add about ½ oz by volume per gallon of resin @ 39° to 32°F, up to 2.0 oz by volume per gallon @ -20°F, increasing the quantity gradually in a consistent linear progression as the temperature decreases. **VERY IMPORTANT: KEY 9101 MMA COLD TEMPERATURE ACCELERATOR** MUST be added to the MMA resin and thoroughly blended BEFORE adding the **KEY 9000 MMA HARDENER**, or hazardous decomposition may occur (i.e., violent foaming). **KEY 9101 MMA COLD TEMPERATURE ACCELERATOR** will cause yellowing, it is advised to use pigmented MMA resin versus clear to reduce the appearance of yellowing, darker colors will be less affected than lighter colors.

KEY 9800 PUMMA MEMBRANE SYSTEMS

KEY 9800 FLEXIBLE PUMMA MEMBRANE SYSTEMS are used for elastomeric decking, waterproofing, roof decks, freezer floors, etc. **KEY 9800 FLEXIBLE PUMMA** can be mixed in various formulations using Key Self-Leveling Filler, Key PET Filler, or Filler Sand, depending on the applied thickness and intended use. Refer to Formulas 9800/1-4. Consult with Key Resin Technical Service for recommendations on the best formula, thickness and system design to use for any particular project.

FORMULATION GUIDE – MEMBRANE SLURRY

Typical Slurry Formula for 40 mil – 125 mil Basecoat Membrane (Formula 9800/1)

Material	**Weight**	**Volume**
Key 9800 PUMMA	8.4 lbs.	1.0 gallon
Key Self Leveling Filler	4-5 lbs.	0.25-0.33 gallons
Pigment Pack (optional)	N/A	6.4 vol. oz.
Key 9000 MMA Hardener	Follow chart	Follow Chart

Add hardener to the clear resin and blend; add dry filler powder and mix thoroughly with jiffy mixer. Blend pigment and mix for 1-2 minutes until no lumps are present. Apply mix to the primed surface using a gauge rake or notched trowel. The above mixture will yield approximately 1.15 gallons of slurry. Coverage per batch is:

Yield*	1.15 gallons slurry
Coverage: 1/16”	28-30 ft^2
1/8”	13-15 ft^2

*Note: Yield of mixed slurry will vary depending on mix design used.

Typical Slurry Formula for 125-195 mil Basecoat Membrane (Formula 9800/2)

Material	**Weight**	**Volume**
Key 9800 PUMMA	8.4 lbs.	1.0 gallon
Key Self Leveling Filler	7-8 lbs.	0.5 gallons
Silica Sand 30-50 mesh	6-7 lbs.	0.5 gallons
Pigment Pack	N/A	6.4 vol. oz.
Key 9000 MMA Hardener	Follow chart	Follow Chart

Add hardener to the clear resin and blend; add dry filler powder and filler sand and mix thoroughly with jiffy mixer. Blend pigment and mix for 1-2 minutes until no lumps are present. Apply mix to the primed surface using a gauge rake or notched trowel. The above mixture will yield approximately 1.5 gallons of slurry. Coverage per batch is:

Yield*	1.5 gallons slurry
Coverage: 1/16"	36-38 ft^2
1/8"	17-18 ft^2
3/16"	13-14 ft^2

*Note: Yield of mixed slurry will vary depending on mix design used.

Typical Formula for Use as Joint Filler (Formula 9800/3)

Material	Weight	Volume
Key 9800 PUMMA	8.4 lbs.	1.0 gallon
Key Self Leveling Filler	4-5 lbs.	0.25-0.33 gallons
Pigment Pack	N/A	6.4 vol. oz.
Key 9000 MMA Hardener	Follow chart	Follow Chart

Yield = 1.15 gallons of mixed slurry

Add hardener to the clear resin and blend; add pigment pack and filler powder and mix thoroughly with jiffy mixer. Blend for 1-2 minutes until pigment is thoroughly mixed and no lumps from filler are present. For joint filling, transfer mixed resin to a pourable container or caulk gun. One gallon of **KEY 9800 PUMMA** slurry will yield 231 cubic inches, or fill an expansion/isolation joint with dimensions of ½ inch x ½ inch x 77 lineal feet. Closed cell backer rod should be used to support bottom of **KEY 9800 PUMMA** joint filler.

Typical PET Slurry Formula for 40 mil – 125 mil Basecoat Membrane (Formula 9800/4)

Material	**Weight**	**Volume**
Key 9800 PUMMA	8.4 lbs.	1.0 gallon
Key PET Filler	6-8 lbs.	0.75-1.0 gallon
Pigment Pack	N/A	6.4 vol. oz.
Key 9000 MMA Hardener	Follow chart	Follow Chart

Add hardener to the clear resin and blend; add PET filler and mix thoroughly with jiffy mixer. Blend pigment and mix for 1-2 minutes until no lumps are present. Apply mix to the primed surface using a gauge rake or notched trowel. The above mixture will yield approximately 1.15 gallons of slurry. Coverage per batch is:

Yield*	1.25-1.5 gallons slurry
Coverage: 1/16"	30-38 ft^2
1/8"	15-18 ft^2

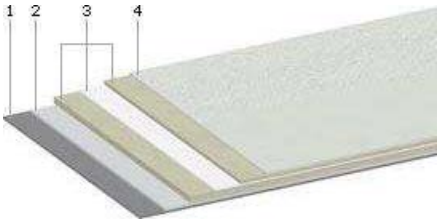
*Note: Yield of mixed slurry will vary depending on mix design used.

APPLICATION – MEMBRANE SYSTEMS

The fresh slurry coat or joint filler must be applied over substrate primed with **KEY 9112 MMA**. Formulas 9800/1, 9800/2, and 9800/4 are applied with a gauge rake or notched trowel/squeegee. When using formula 9800/1, apply in two layers, the first layer "neat" and the second layer broadcast to excess with a wearing course of 20 mesh silica or colored quartz aggregate. Formula 9800/2 may be installed in a single layer and must be broadcast to excess with a wearing course of 20 mesh silica or colored quartz aggregate. Formula 9800/4 is applied in two layers, with polyester fleece reinforcement imbedded into the first layer. Aggregate broadcast rates will vary from 0.25-1.25 lbs/ft^2 depending on type and size of aggregate, mix design, and thickness of slurry. It is recommended to broadcast 20 mesh aggregate or larger. Do not use broadcast aggregate smaller than 20 mesh or the risk of random cure problems increases. Aggregate may be natural or colored quartz, sand, aluminum oxide, emery, etc. **KEY 9800 PUMMA** must be top coated or sealed with **KEY 9528 MMA**.

Formula 9800/4 System Outline

1. Substrate
2. Key 9112 Primer
3. Key 9800 + Polyester Fleece
4. Key 9528 Sealer



KEY 9800 PUMMA TROWELED MORTAR SYSTEM

KEY 9800 PUMMA MORTAR SYSTEM is used for patching damaged concrete or asphalt in highways, bridge decks, pedestrian decks/walkways, roof decks, freezer floors, etc. **KEY 9800 PUMMA** can be mixed in various formulations using blended mortar silica aggregate and pea gravel or other large aggregate for thicker applications. **KEY 9800 PUMMA MORTAR SYSTEM** may require a sealer such as **KEY 9528** or **KEY 9526**, depending on expected service conditions. Consult with Key Resin Technical Service for recommendations on the best formula, thickness and system design to use for any particular project.

FORMULATION GUIDE – TROWELED MORTAR

Typical Batch Formula with Key Blended Mortar Aggregate

Material	% Parts by Wt.	Typical Batch Wt.	Volume
Key 9800 PUMMA	14.0	8.4 lbs.	1 gallon
Blended Mortar Aggregate	85.0	50 lbs.	3.25 gallons
Pigment Pack	N/A	N/A	6.4 vol. oz.
Hardener	Varies with temp.	Varies with temp.	Varies with temp.

Yield*: ±3.0 gallons Mortar (0.4 cu. ft.)

Yield*	± 3.0 gallons Mortar (0.4 cu.ft.)
Coverage	
1/8”	35 ft^2
3/16”	25 ft^2
1/4”	18 ft^2
1/2”	9 ft^2

*Note: Yield of mixed mortar will vary depending on mix design used.
IMPORTANT: Mortar mix design MUST yield a resin-rich mortar with pourable consistency, which has a resin-rich surface after troweling. A mortar with a resin-lean, dry consistency may have cure problems.

The above mix design formulation permits installation up to 2.5 inches in one placement. For thicknesses greater than ½ inch, additional aggregate may be added to reduce the resin content and lower the shrinkage. The addition of up to 75% additional aggregate allows for installation of up to 5 inches in one placement.

Addition of Aggregate for Greater than ½ inch thickness. Additional Aggregate per Gallon of Resin

Thickness of Placement	Aggregate Size	Added Weight %	Weight	Volume	Yield
<1/2 inch	-	-	-	-	0.4 cu.ft.
½ - 1 inch	1/8” x 1/16”	25%	12.0 lb.	0.9 gal.	0.49 cu.ft.
1 – 2 inch	1/16” x 3/8”	50%	24.0 lb.	1.8 gal.	0.57 cu.ft.
>2 inches	3/8” x 5/8”	75%	36.0 lb.	2.7 gal.	0.63 cu.ft.

APPLICATION – TROWELED MORTAR

KEY 9800 PUMMA and hardener powder are mixed and blended with the blended mortar aggregate for 3 minutes until no lumps are present. Add the additional aggregates to extend the mortar if needed.
IMPORTANT: Mortar mix design MUST yield a resin-rich mortar, pourable consistency, which has a resin-rich

surface after troweling. Apply mortar to the primed surface using a trowel. If excessive resin forms on the surface of the mortar while troweling, it is optional to lightly broadcast 20 mesh silica sand into the resin. A mortar with a resin-lean, dry consistency may have cure problems, resulting in isolated sticky areas that do not cure completely. Any areas that do not cure hard must be removed, spot primed, and replaced with resin-rich mortar before application of sealer (if used). **KEY 9800 PUMMA** mortar may require a sealer suitable for the intended application. Consult with Key Resin for recommendations.

PHYSICAL PROPERTIES – RESIN/SYSTEM

Percent Reactive	100%, zero VOC
Working Life, 50°F-70°F	15-25 minutes, will vary w/temp. & amount of Hardener
Recoat Time	55-75 minutes
Viscosity, cps	600-800 cps
Weight per Gallon	8.4 lbs.
Tensile Strength	250 psi
Elongation at Break	300%-resin, 100%-filled mortar

CLEAN-UP

Clean tools and equipment with lacquer thinner or MEK. Consult Material Safety Data Sheet for safety and health precautions.

AVAILABILITY

Key Resins are available throughout the United States, Canada, Mexico and a number of other countries. Contact the **Key Representative** in your area. Telephone (888)943-4532 or visit www.keyresin.com.

MAINTENANCE

KEY 9800 PUMMA is a basecoat resin or binder resin used with various **Key MMA Systems**, refer to specific system data sheet or sealer data sheet for recommended maintenance.

STORAGE

Store in a cool and dry place, below 80^{o}F, out of direct sunlight. Do not store near open flame or food. Shelf life is 6 months in the original unopened containers. After extended storage: Additives and fillers can separate with storage, materials should be inspected for any visible signs of settlement, polymerization, or paraffin coagulation (clumps, strands). Thoroughly mix pails or drums (use a drum mixer, do not rely on rolling drum on floor) and pour into new containers to inspect resin before use.

HELPFUL HINTS

Adequate cross ventilation should be provided. Good ventilation during the processing ensures a good cross linking and hardening. Read, understand and follow Material Safety Data Sheets and Application Instructions prior to use. Use only as directed. If substrate and/or material temperature is above 90^{o}F, DO NOT apply material.

TECHNICAL SERVICE

Key Resin Company and **KRC Associates, Inc.** provide services and consultations on material selection, specification, troubleshooting, and other information on the proper repair and protection of concrete surfaces. **Key Resin Sales/Technical Representatives** are available to assist you. Telephone (888)943-4532 or visit www.keyresin.com.

WARRANTY

Information regarding Key Resin brand MMA resins and systems is based upon extensive research and experience in the field of applied engineering by the manufacturer **Plasti-Chemie GMBH International.** By making such information available, Key Resin does not thereby assume any liability beyond express terms of our standard limited material warranty. Key Resin does not warrant the accuracy or completeness of any such information, whether conveyed orally or in writing, but to the best of our knowledge believe it to be accurate. We reserve the right at any time and without notice to update or improve our products and process and our information concerning the same. By Key Resin making this information available does not relieve the purchaser or user from his obligation to verify the suitability of our products and processes for the intended use or application. The purchaser and user likewise have the responsibility to ensure that the purchase, use or application does not infringe upon patent rights or other rights of third parties. **Key Resin Company ("Key")** warrants for a period of one (1) year that its products will be free of manufacturing defects and will be in conformity with published specifications when handled, stored, mixed, and applied in accordance with recommendations of **Key**. If any product fails to meet this warranty, the liability of **Key** will be limited to replacement of any non-conforming material if notice of such non-conformity is given to **Key** within one (1) year of delivery of materials. **Key** may in its discretion refund the price received by **Key** in lieu of replacing the material. No customer, distributor, or representative of **Key** is authorized to change or modify the published specifications of this warranty in any way. No one is authorized to make oral warranties on behalf of **Key**. In order to obtain replacement or refund the customer must provide written notice containing full details of the non-conformity. **Key** reserves the right to inspect the non-conforming material prior to replacement. EXCEPT FOR THE EXPRESSED WARRANTY STATED ABOVE, THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE. **KEY'S** OBLIGATION SHALL NOT EXTEND BEYOND THE OBLIGATIONS EXPRESSLY UNDERTAKEN ABOVE AND **KEY** SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO THE PURCHASER OR ANY THIRD PARTY FOR ANY LOSS, COST, EXPENSE, DAMAGE OR LIABILITY, WHETHER DIRECT OR INDIRECT, OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.