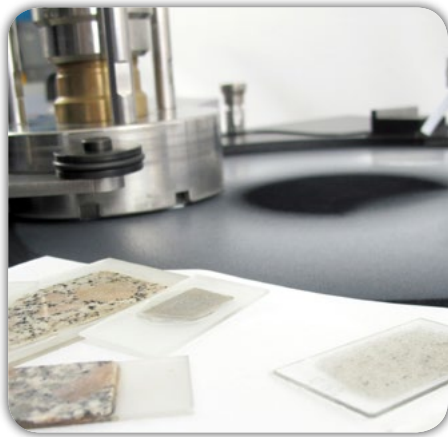


# Kemet

## PRECISION LAPPING AND POLISHING SYSTEMS



# Contents

## LAPPING MACHINES 1-10

15" to 120" Machines	1-5
Spherical Lapping	6
Super Mirror Finish Polishing	7
Geological Thin Section Lapping	8-9
Specialist Lapping Machines	10

## LAPPING CONSUMABLES 11-18

Lapping Plates	11-12
Conditioning Rings	12
Liquid Diamond	13-14
Lubricating Fluids	15
Conventional Abrasives	15
Lapping Oil	16
Abrasive Pastes & Powders	16
Lapping Film	17
Polishing Pads / Cloths	18

## LAPPING ACCESSORIES 19-24

Dispenser Systems	19-20
Lapping Machine Maintenance	20
Flatness Measuring Equipment	20-21
Portable / Hand Lapping Kits	22-23
Diamond Grinding Cloths	23
Polishing Stand with Paper	23
Workholding & Fixtures	24

## CLEANING & TECHNICAL SUPPORT 25-28

Ultrasonic Cleaners	25-26
Kemet Technical Support	27
Lapping Services	28



# Ordering Information

### Telephone:

+44(0)1622 607507

Sales Desk - Direct Line

+44(0)1622 755287

Enquiries & Technical Support

### Email:

sales@kemet.co.uk

### Website:

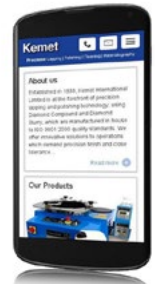
www.kemet.co.uk

### Fax:

+44(0)1622 670915

### Post

Kemet International Ltd  
Cuxton Road, Parkwood Trading Estate,  
Maidstone, Kent ME15 9NJ, UK



Precision Lapping Services at  
Great prices, even for small  
volumes





# Kemet Precision Lapping and Polishing Systems

Since 1938, Kemet has been at the forefront of precision polishing technology, producing quality diamond pastes, slurries and composite lapping/polishing materials in our purpose built facilities.

Kemet Precision Lapping and Polishing Systems offer the most efficient and reliable method of producing precise surface geometry and finish whether flat, contoured or spherical. Our machines and systems are at the forefront of today's advanced lapping technology, especially when used with Kemet Diamond products. Kemet Diamond quality and grading enables reliable precision lapping to be performed in production situations.

Now a truly international organisation, Kemet's activities span the world, spearheaded by companies in nine countries, all sharing the same commitment to customer support. This, along with more than 75 years' experience, means Kemet are here to provide you with the technical support to overcome all your lapping, polishing and cleaning challenges.



## Industries and Applications

### **Aerospace**

Pumps and Valves  
Turbine Parts  
Engine Assemblies  
Spacers

### **Technical Ceramics**

Alumina - Zirconia  
Silicon Carbide  
Piezo Ceramics  
Ferrite

### **Pumps & Valves**

Fuel Pumps  
Hydraulic Pumps  
Mechanical Seals  
Gate Valves

### **Automotive**

Diesel Injectors  
Airbag Initiators  
Piston Rings  
Fuel Pumps

### **Data Storage**

Disc Drive Heads  
CD Moulds  
Laminations  
Smart Phones

### **Medical Devices**

Fibre Scopes  
Surgical Instruments  
Hip and Knee Joints  
Pacemaker Parts

### **Tool and Die**

Moulds and Inserts  
Printing Plates  
Slitter Knives  
Extrusion Dies

### **Electro Optics**

Plano Optics  
Laser Rods and Prisms  
Fibre Optics  
Sensors  
Sapphire  
ALN



# Lapping Machines

## Kemet's Advanced Lapping Technology

Kemet offers a comprehensive range of standard lapping and polishing systems for use across all industrial sectors. Special purpose machines can also be developed for specific applications.

### Benefits:

- Faster polishing process
- One operation surface finish
- Faster material removal
- Pre set parameters
- Reduced rejections
- Semi skilled operation
- Significant reduction in lapping costs
- Reduced inspection requirements
- Optimum geometry and surface finish
- Better utilisation of machine time
- Cleaner environment conditions

## Lapping Machine Options



### Open Face

The open face machines are for use where work pieces are either large in size and can be lapped under their own weight or where pressure application by hand weights is sufficient.



### Pneumatic Lift

The pneumatic lift machines will raise and lower the weights and also apply pressure where necessary. All are fitted with mandatory safety controls.

## Kemet Lapping Machine Capacity Chart

Components per conditioning ring based on typical loading of approximately 60% ring surface area.

Machine Model (No of Rings)	Diameter of Parts (mm)																									
	6	7.5	9	10.5	12	13.5	15	18	22	26	30	34	38	42	46	50	54	60	70	80	90	100	110	120	130	140
15 (3 Rings)	275	175	118	86	60	50	40	27	18	12	10	8	6	5	4	3	2	2	2	1	1	1	1	1	1	1
20 (3 Rings)	-	-	-	-	150	114	90	63	39	33	21	17	14	10	9	7	6	5	3	3	2	2	1	1	1	1
24 (3 Rings)	-	-	-	-	210	165	132	87	57	42	33	24	18	15	13	10	9	7	5	4	3	3	2	2	1	1
24 (4 Rings)	-	-	-	-	150	114	90	63	39	33	21	17	14	10	9	7	6	5	3	3	2	2	1	1	1	1
36 (3 Rings)	-	-	-	-	-	-	-	204	93	93	69	60	42	33	29	24	21	17	12	10	7	6	5	4	3	2
36 (4 Rings)	-	-	-	-	-	-	-	156	72	72	54	39	33	25	33	20	15	12	10	8	5	5	3	2	2	2
48 (4 Rings)	-	-	-	-	-	-	-	-	132	132	99	75	60	48	39	33	29	24	17	14	12	8	7	5	5	4
56 (4 Rings)	-	-	-	-	-	-	-	-	204	204	150	117	100	76	62	52	44	35	26	20	16	12	10	8	8	6
72 (4 Rings)	-	-	-	-	-	-	-	-	-	-	-	204	164	132	108	92	78	62	44	35	26	21	18	16	14	10
84 (4 Rings)	-	-	-	-	-	-	-	-	-	-	-	-	-	185	152	129	109	88	63	47	38	30	24	20	17	15

The above data is for using standard loading procedures. It is often possible to extend the capacity of a machine utilising special workholding arrangements and fixtures.

Conditioning Ring Spec		Machine Model								
		15	20	24	36	48	56	72	84	120
Inside Diameter (mm)	3 Rings	140	191	248	368	505	578	-	-	-
	4 Rings	-	-	209	322	432	530	692	813	1016

# Kemet 15/20 Models

The bench-mounted Kemet 15 and 20 Lapping Machines have a rigid metal construction with a height-adjustable worktable. The machines incorporate a digital Process Timer and a fully automatic Liquid Diamond Dispensing System.

## Features & Benefits:

- Variable speed
- Bench mounted
- Produces optically flat surfaces with high precision surface finish
- Fully controllable Kemet Electronic Dispensing System accurately meters diamond abrasive onto the lapping plate - Reduces lapping costs
- Only small quantities of diamond abrasive and non-toxic fluids are used - Reduces waste
- Built in abrasive system for conditioning Kemet Composite Plates
- Easily transportable
- Electrical System complies with EN 60 204
- Easy to adapt for special lapping applications

## Options:

- Lift off disc system on model 15"
- Fixed speed
- Pneumatic lift on model 20"

## Other Versions:

- Col-K Chemical polishing version (see page 7)
- Clipper Blade sharpening machine



Recommended Accessories	Machine Model	
	15	20
Cast Iron Conditioning Rings - Solid - Set of 3	360204	360818
Cast Iron Conditioning Rings - Serrated - Set of 3	360203	361027
Zytel Roller Bearing Assemblies - Set of 6	360212	360212
O-rings for Zytel Bearings - Set of 6	360270	360270
Flatness Gauge	361304	

Recommended Consumables	Machine Model	
	15	20
Cast Iron Serrated Lapping Plate (Pre-lapped)	362400	362402
Cast Iron Solid Lapping Plate (Pre-lapped)	362401	362403
Kemet Copper Lapping Plate	351102	351103
Kemet Copper SP2 Lapping Plate	351159	351964
Kemet Iron Lapping Plate	351002	351081
Kemet PR3 Lapping Plate	351340	351374
Kemet Tin Lapping Plate	351305	351320
Kemet XL Lapping Plate	351356	351375
Kemet XP Lapping Plate	351202	351266

*Huge range of other accessories and consumables available for the Kemet 15 & 20 Models*

Machine Model	15	20
Lapping Plate outside Diameter	381 mm	508 mm
Lapping Plate Speed	70rpm	70rpm
No. of Conditioning Rings	3	3
Conditioning Ring inside Diameter	140 mm	191 mm
Max load per Conditioning ring	39Kg	53Kg
Height of Open Face Machine	670 mm	700 mm
Height of Pneumatic Lift Machine	N/A	965 mm
Working Height	310 mm	385 mm
Depth of Machine	620 mm	780 mm
Standard Electrical Supply	220v-1Ph-50Hz or 380v or 415v 3Ph-50Hz	
Main Drive Motor	0.37kW	0.75kW
Abrasive pump motor	0.18kW	0.18kW
Net Weight Open Face	116kg	245kg
Gross Weight Open Face	156kg	343kg
Net Weight Pneumatic	N/A	240kg
Gross Weight Pneumatic	N/A	385kg

Lift Off Disc System	Machine Model 15 Only
Kemet 15" Iron Lift Off Disc	351025
Kemet 15" Copper Lift Off Disc	351121
Kemet 15" XP Lift Off Disc	351226
Kemet 15" Tin Lift Off Disc	351314
15" Aluminium Lift Off Disc	361001
15" Aluminium Drive Plate	361002

# Kemet 24/36 Models

Both Kemet 24 and 36 machines have rigid welded tubular section steel frames, supporting the gearbox, drive motor and worktable. With the option of a diamond dispensing system they also house an integral abrasive compound feed and waste tanks behind lift-off panels. The machines incorporate soft starting features, which smoothly accelerate the Kemet Composite or cast iron lapping plate from stand still to full speed.



### Features & Benefits:

- Produces optically flat surfaces with high precision surface finish
- Fully controllable Kemet Electronic Dispensing System accurately meters diamond abrasive onto the Kemet Composite Lapping Plate, reducing lapping costs and waste
- Built in abrasive system for conditioning Kemet Composite Lapping Plates
- Suitable for large parts or large volume production
- Electrical System complies with EN 60 204

### Options:

- Variable speed
- Temperature control
- 3 or 4 conditioning rings
- Col-K chemical polishing versions
- Light curtain or full Perspex guarding available

Option	Open Face		Pneumatic Lift	
	24	36	24	36
Machine Model	24	36	24	36
Height	920 mm	960 mm	1925 mm	1960 mm
Working Height	-	-	1150 mm	1270 mm
Width	1100 mm	1350 mm	1240 mm	1490 mm
Depth	1350 mm	1640 mm	1350 mm	1640 mm
Approx. Weight	575kg	1100kg	700kg	1250kg
Lapping Plate outside Diameter	610 mm	914 mm	610 mm	914 mm
Lapping Plate Speed	58rpm	58rpm	58rpm	58rpm
N° of Conditioning Rings	3 or 4	3 or 4	3 or 4	3 or 4
Conditioning Ring inside Diameter	3 x 248 mm	3x 368 mm	3 x 248 mm	3x 368 mm
	4 x 210 mm	4 x322 mm	4 x 210 mm	4 x322 mm
Max load per Conditioning ring	3 ring 250Kg	3 ring 350Kg	3 ring 250Kg	3 ring 350Kg
	4 ring 200Kg	4 ring 300Kg	4 ring 200Kg	4 ring 300Kg
Main Drive Motor	1.5kW	4kW	1.5kW	4kW
Abrasive pump motor	0.18kW	0.18kW	0.18kW	0.18kW
Air Requirements	4 Bar min	4 Bar min	4 Bar min	4 Bar min
Standard Electrical Supply	220v or 380v or 415v 3Ph-50Hz			

Electronic Dispensing Equipment Standard on all above Models (see page 19)

Kemet 40 also available with Kemet Lapping Plate outside diameter 1016mm. Three cast iron serrated conditioning rings, inside diameter 406mm.

Recommended Accessories	Machine Model	
	24	36
Cast Iron Conditioning Rings - Solid for 3 Ring Machine - Set of 3	360679	360186
Cast Iron Conditioning Rings - Serrated for 3 Ring Machine - Set of 3	360208	360278
Cast Iron Conditioning Rings - Solid for 4 Ring Machine - Set of 4	360680	360681
Cast Iron Conditioning Rings - Serrated for 4 Ring Machine - Set of 4	360274	360682
Zytel Roller Bearing Assemblies - Set of 6	360214	-
O-rings for Zytel Bearings - Set of 6	360672	360270
Roller Bearing Assemblies - Set of 6	360213	360259
O-rings for Roller Bearings - Set of 24	-	360659
Flatness Gauge	361304	

Recommended Consumables	Machine Model	
	24	36
Cast Iron Serrated Lapping Plate (Pre-lapped)	362404	362406
Cast Iron Solid Lapping Plate (Pre-lapped)	362405	362407
Kemet Copper Lapping Plate	351106	351124
Kemet Copper SP2 Lapping Plate	351177	351965
Kemet Iron Lapping Plate	351006	351010
Kemet PR3 Lapping Plate	351357	351343
Kemet Tin Lapping Plate	351306	351315
Kemet XL Lapping Plate	351376	351377
Kemet XP Lapping Plate	351206	351227

Huge range of other accessories and consumables available for the Kemet 24 & 36 Models

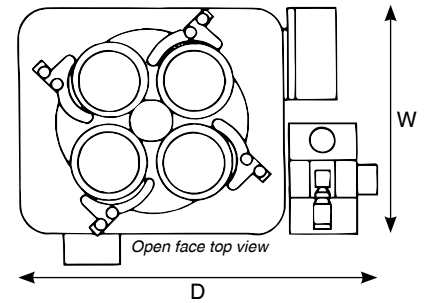
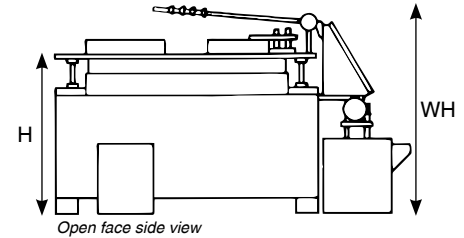
# Kemet 48/56 Models

These Precision Diamond Flat Lapping & Polishing Machines, are available as open face and pneumatic lift with a diamond dispensing system. Equipped with a serrated lapping plate consisting of 16 segments for the Kemet 48 and 24 segments for the Kemet 56, the individual cast iron segments are faced with Kemet Composite material bolted to a support plate.

## Features & Benefits:

- Higher capacity
- 3 or 4 conditioning rings
- Heavier and larger parts (up to 505 mm for Kemet 48 and 578 mm for Kemet 56)
- Water cooling option available

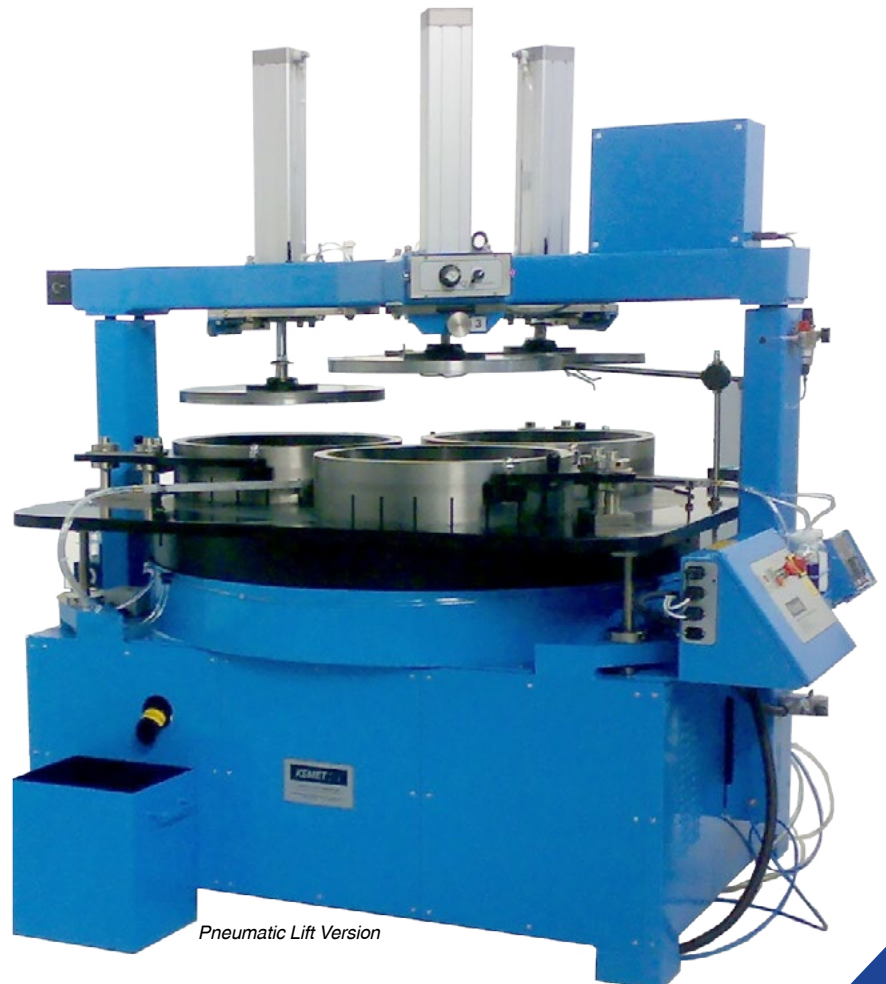
Option	Open Face		Pneumatic Lift	
	48	56	48	56
Machine Model	48	56	48	56
Height (H)	1010 mm	1030mm	2350 mm	2260 mm
Working Height (WH)	-	-	1390 mm	1400 mm
Width (W)	1510 mm	1700 mm	1510 mm	1700 mm
Depth (D)	2000 mm	2020 mm	2520 mm	2520 mm
Approx. Weight	3400kg	4100kg	4000kg	5000kg
Lapping Plate outside Diameter	1219 mm	1422 mm	1219 mm	1422 mm
Lapping Plate Speed	48 rpm	48 rpm	48 rpm	48 rpm
Conditioning Ring inside Diameter	3 x 505 mm	3 x 578 mm	3 x 505 mm	3 x 578 mm
	4 x 432 mm	4 x 530 mm	4 x 432 mm	4 x 530 mm
Max load per Conditioning ring	3 ring 375Kg	3 ring 400Kg	3 ring 375Kg	3 ring 400Kg
	4 ring 325Kg	4 ring 350Kg	4 ring 325Kg	4 ring 350Kg
Main Drive Motor	7.5kW	11kW	7.5kW	11kW
Abrasive pump motor	0.18kW	0.18kW	0.18kW	0.18kW
Abrasive Tank capacity	115 Litres	115 Litres	115 Litres	115 Litres
Waste tank capacity	37 Litres	37 Litres	37 Litres	37 Litres
Standard Electrical Supply	220V or 380V or 415V 3 Ph 50Hz			



Recommended Accessories	Machine Model	
	48	56
Cast Iron Conditioning Rings - Solid for 4 Ring Machine - Set of 4	360235	360749
Cast Iron Conditioning Rings - Solid for 3 Ring Machine - Set of 3	360662	
Cast Iron Conditioning Rings - Serrated for 4 Ring Machine - Set of 4	360642	
Cast Iron Conditioning Rings - Serrated for 3 Ring Machine - Set of 3	360833	360910
Roller Bar Bearing Assembly	360729	360869
Flatness Gauge	361304	

Recommended Consumables	Machine Model	
	48	56
Cast Iron Segments for 3 Rings - Set of 16	360265	361860
Cast Iron Segments for 4 Rings - Set of 16	360776	362216

Huge range of other accessories and consumables available for the Kemet 48 & 56 Models

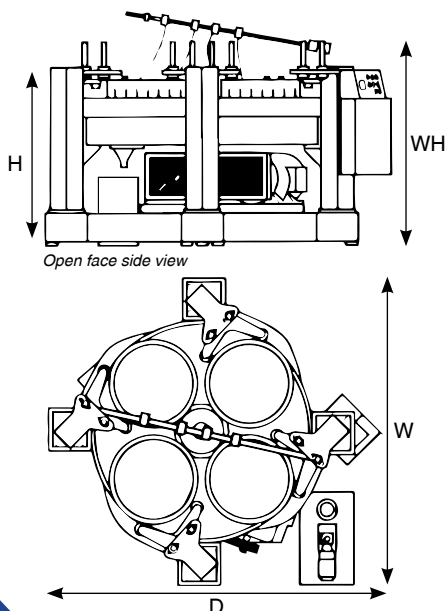


# Kemet 72/84/120 Models

For larger lapping applications Kemet offer machines with a 72", 84" or 120" plate.

## Features & Benefits:

- Set within a mesh guard, a side mounted motor transmits the drive via multiple v-belts to a mechanical reduction gearbox at the centre of a cruciform shaped steel structure.
- Four stations, the roller yokes mounted on hollow section upright columns at the end of each arm, which also support the trough around the lap plate.
- Electronic soft start to smooth accelerate the lap plate to full speed is time adjustable to suit individual process conditions.
- Suitable for use with conventional abrasive slurries or Kemet Diamond slurries.
- Free-standing conventional abrasive reservoir/stirrer/pump supplies four individually adjustable feeds to each of the stations.
- Electronic diamond dispenser and stirrer unit provides fully controlled metering of liquid diamond and lubricating fluid to each station, via dispensing bars and spray heads, to ensure even distribution and minimise consumable costs and waste.
- Water cooling option available



Option	Open Face			Pneumatic Lift		
	Machine Model	72	84	120	72	84
Approx. Height (H)	1350 mm	1500 mm	*	2764 mm	*	*
Working Height (WH)	-	-	-	*	*	*
Approx. Width (W)	3026 mm	2600 mm	*	3026 mm	2600 mm	*
Approx. Depth (D)	3073 mm	2600 mm	*	3073 mm	2600 mm	*
Approx. Weight	6000 kg	9000 kg	*	10000 kg	12000 kg	*
Lapping Plate outside Ø	1829 mm	2134 mm	3000 mm	1829 mm	2134 mm	3000 mm
Approx. Lapping Plate Speed	30 rpm	20 rpm	18 rpm	36 rpm	20 rpm	18 rpm
No. of Conditioning Rings	4	4	4	4	4	4
Conditioning Ring inside Ø	692 mm	813 mm	1025 mm	692 mm	813 mm	1025 mm
Max load per Conditioning ring	2000Kg	2250Kg	*	2000Kg	2250Kg	*
Main Drive Motor	15kW	30kW	*	15kW	30kW	*
Abrasive pump motor	0.18kW	0.18kW	0.18kW	0.18kW	0.18kW	0.18kW
Abrasive Tank capacity	117 Litres	117 Litres	132 Litres	117 Litres	117 Litres	132 Litres
Waste tank capacity	37 Litres	37 Litres	57 Litres	37 Litres	37 Litres	57 Litres
Standard Electrical Supply	220V or 380V or 415V 3 Ph 50Hz					

\* Designed to customer specification



# Kemet Spherical Lapping Machine

The Kemet Spherical Lapping Machine laps and polishes pre-machined spherical balls and cups to a mirror finish with roundness usually better than 3 microns.

## Features & Benefits:

- 6 motors all with independent variable speed to provide complete control
- Size: 1600 (W) x 820 (D) x 2500 (H) mm
- Lapping and polishing pressures applied pneumatically
- Simple change from ball to cup polishing action
- Average process time less than 5 mins
- Manual and jog facility provided for setting up
- Fully guarded with auto lifting door access
- Comes complete with initial tooling set
- Full manual and training provided
- Low running costs
- Dual process timers
- Single button process start
- Lighting provided
- Smooth and silent running
- CE marked
- Electrical supply 230V single phase-50Hz
- Air: 3 bar max



# KemiSphere - Bench Top Spherical Lapping Machine

The Kemisphere is a small single station spherical lapping and polishing machine ideal for either matching 2 spherical forms together or, with appropriate tooling, it has the ability to lap and polish spherical forms to better than 5µm roundness with a mirror finish. It's a perfect replacement for jobs currently hand lapped together, and its bench top design makes it a useful addition to any workshop involved in spherical lapping.

## Features & Benefits:

- 3 motors with independent variable speed control
- Simple tooling change
- Low running costs
- Manual and jog facility provided for setting
- Fully guarded with interlocks and safety circuit
- Single button process start
- Eye level controls
- Dimensions 400 (W) x 500 (D) x 900 (H) mm
- CE marked
- Electrical supply 230V-single phase-50Hz
- Sweep setting from 0-45 degrees fully adjustable
- Clock wise and counter clock wise rotation of yoke motor
- Digital Timer
- Product code: 359875



# KemCol 15 Super Finishing Machine

The KemCol 15 Super Finishing machine is based on the popular Kemet 15 lapping and polishing machine, but incorporates stainless steel elements in place of painted components for longer life, and contamination free polishing. It comes as standard with an integrated Kemet aKu-Disp fully programmable peristaltic pump system, and either ceramic faced, or stainless steel conditioning rings. The machine is ideal for chemo mechanical polishing and Cerium Oxide based polishing applications.



Technical Specifications	
Height	400 mm
Working Height	310 mm
Width	800 mm
Depth	650 mm
Nett Weight	90Kgs
Polishing Pad Diameter	380 mm
No of conditioning rings	3
Inside diameter of conditioning rings	140 mm
Main Motor	0.37kW
Product code	359876



Mirror Finish

### Features & Benefits:

- Stainless steel worktable surrounding polishing pad
- Polished stainless steel yokes for easier cleaning
- Stainless steel drive plate
- Aluminium lift off disc system optional
- Ceramic faced or stainless steel conditioning rings for contamination free polishing
- aKu-Disp fully programmable peristaltic pump unit fitted as standard
- Suitable for Kemet magnetic polishing pad system for easy pad change

## KemCol 15 Recommended Accessories

aKu-Disp	Code
Spare Peristaltic Head Unit with Tube	362520
aKu-Disp Feedarm	362514
Spare Tubing (1 meter)	363109

The aKu-Disp is designed to work in conjunction with the lapping machine. It links to the machines main timer system and the stirrer function operates as soon as power is on the unit and has manually operated variable speed controls for both the pump and stirrer.



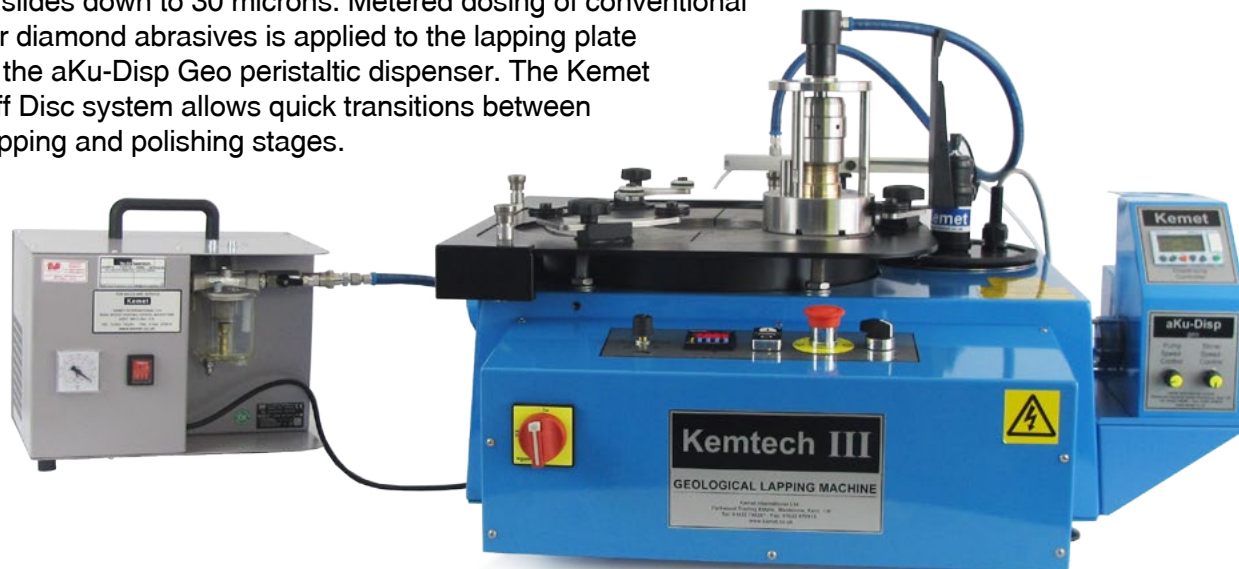
Description	Code
Set of 3 Ceramic Faced Conditioning Rings	361522
Stainless Steel Plastic Faced Conditioning Rings	362235
380 mm Stainless Steel Support Plate (For Polishing Pads)	362033
380 mm Aluminium Lift Off Disc	361001
380 mm Aluminium Drive Plate	361002
380 mm Thin Metal Disc (For use with magnetic system)	345563
380 mm Magnetic Disc	345773

Recommended Consumables	Code
380 mm CHEM-H Polyurethane Polishing Pad	341865
380 mm PSU-M Chemo-Textile Cloth for Cerium	341011
380 mm MRE Short Napped Final Polishing Pad	341715

Col-K Polishing Media	5 litres	10 litres	20 litres
Col-K	600212	600238	600204
Col-K (NC)	600199	600239	600202

# Kemtech III Geological Lapping Machine

The Kemtech III Geological lapping machine is able to accurately lap and polish thin sections mounted on glass slides down to 30 microns. Metered dosing of conventional and/or diamond abrasives is applied to the lapping plate using the aKu-Disp Geo peristaltic dispenser. The Kemet Lift Off Disc system allows quick transitions between the lapping and polishing stages.



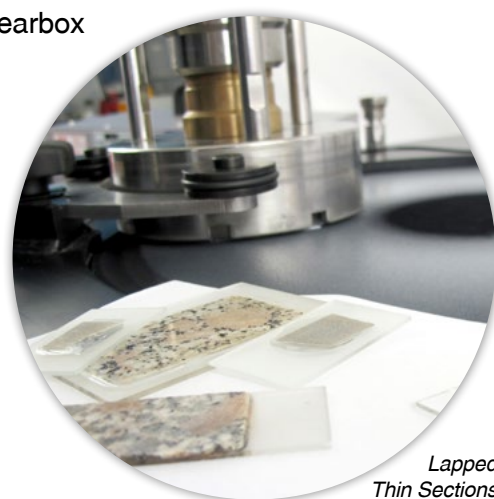
## Technical Specifications

Height	400 mm
Working Height	310 mm
Width	800 mm
Depth	650 mm
Nett Weight	90Kgs
No of jig stations	3
Main Motor	0.37kW
Product code	359975

Also available in 20" with driven rings as an option.

## Features & Benefits:

- aKu-Disp Geo accurate peristaltic dispensing system for metered dosing
- Capacity for up to 3 vacuum jigs with diamond faced stoppers
- Electronic digital timer with variable time ranges
- Sealed maintenance free reduction gearbox
- Integrated abrasive tank with stirrer
- Cast iron Serrated Lift Off Disc or Aluminium Lift Off Disc
- Variable Speed up to 70 rpm
- Water Trap and Filter
- Stand-alone vacuum pump



Lapped Thin Sections

## Kemtech III Recommended Accessories

Description	Code
Set of 3 Cast Iron Serrated Conditioning Rings	360203
Set of 3 Plastic Faced Conditioning Rings	361521
380 mm Cast Iron Serrated Lift Off Plate	362433
380 mm Aluminium Lift Off Disc	361001
380 mm Aluminium Drive Plate	361002
380 mm Thin Metal Disc (For use with magnetic system)	345563
380 mm Magnetic Disc	345773

Recommended Consumables	Code
Green Silicon Carbide Powder F600 1Kg	361513
380 mm PSU-M Chemo-Textile Cloth	341011
380 mm MRE Short Napped Final Polishing Pad	341715
9WM diamond suspension (Water based mono diamond)	219009
6WM diamond suspension (Water based mono diamond)	219008
3WM diamond suspension (Water based mono diamond)	219006
1WM diamond suspension (Water based mono diamond)	219004

aKu-Disp	Code
Spare Peristaltic Head Unit with Tube	362520
aKu-Disp Feedarm	362514
Spare Tubing (1 meter)	363109

Vacuum Jigs (to suit slides)	Code
4 x (76 x 26 mm) or 2 x (76 x 51 mm)	362072A
6 x (52 x 26 mm)	362072B
1 x (100 x 100 mm)	362072C
6 x (48 x 28 mm)	362072D
3 x (45 x 60 mm)	362072E
Rotaid rotation assist post	362895
Setting stand	361986
Cast iron setting test block (127 mm diameter)	361773



The Kemet Vacuum Jig is a precision workholding and sizing fixture. The Jig is suitable for accurately sizing Geological thin sections, wafers, crystals and any precision parts where parallelism and precision finish are required.

## Kemet 300L Models

The Kemet 300L are fitted with a serrated cast iron or Kemet Composite Plate to suit the application. A single control ring is located in a ring style holder and runs between 3 rollers. This is adjustable for both height and position.



Technical Specifications	
Lapping Plate outside Diameter	300 mm
Lapping Plate Speed	0 - 130 rpm
Conditioning Ring inside Diameter	125 mm
Conditioning Ring Outside Diameter	140 mm
Standard Electrical Supply	Electrical 220V-1 Phase-50Hz
Main Drive Motor	High Torque Motor (1 HP) 0.75kW
Dimensions	420 x 730 x 350 mm
Weight	37kg
Product code	345459

Recommended Accessories	
Hand weight	345450
Serrated Cast Iron Conditioning Ring	345434

## Kemet 300 LVAC Polishing Machine

The Kemet 300 LVAC special purpose polishing machine is a smaller alternative to the Kemtech 15 geological lapping machine for polishing geological mounted samples.



The basic machine has a 300mm diameter plate. All drive elements are mounted on a heavy duty aluminium alloy casting, giving vibration free operation and silent running. Water inlet with control valve are standard features. The control panel has a process timer, variable speed control and forward / reverse control switch and it's own vacuum pump and connectors to suit Kemet vacuum jigs, which are available as an optional extra (see page 8).

Technical Specifications	
Lapping Plate outside Diameter	300 mm
Lapping Plate Speed	0 - 130 rpm
Conditioning Ring inside Diameter	125 mm
Conditioning Ring Outside Diameter	140 mm
Standard Electrical Supply	Electrical 220V-1 Phase-50Hz
Main Drive Motor	High Torque Motor (1 HP) 0.75kW
Dimensions	420 x 730 x 350 mm
Weight	37kg
Product code	345467

## Kemet Internal Lapping Machine

The Internal Lapping Machine has been designed to accurately lap internal valve faces. This version of the reliable Kemet 15 lapping machine will process internal faces up to 300mm (3" to 16") in diameter, producing a flatness of 0.001mm. Depending on the material and the tooling, anything from a standard matt finish to a high mirror polish can be obtained.

The Kemet Internal Lapping Machine can quickly be changed to a standard lapping machine, allowing the flatness of the laps, which generate the flatness of the recessed internal face, to be maintained on the same machine. This means that a single machine can produce the required flatness on the lap tooling and then generate the same flatness on the internal faces, a bonus in terms of cost and footprint.

### Features & Benefits:

- Bespoke holding plate designed to customer/component requirements
- Includes full set of laps to suit application
- Variable Speed up to 70 rpm
- Yoke arm which can apply additional pressure when required
- Capable of processing valves from 3" - 16"
- Short Process times
- Easy to use
- Integrally mounted high torque drive unit with 0.37kW (0.5HP) motor
- Sealed maintenance free reduction gearbox
- Electronic digital timer with variable time ranges
- Electrical: 230V-single phase-50Hz
- Product code: 359706



## Special Purpose & Bespoke Machines

As well as these standard flat, spherical and internal lapping machines, Kemet also offer a bespoke machine manufacturing service for applications where an off the shelf system is not available. This can be as basic as converting a hand finishing operation to an automated process, or as complex as a conveyor fed single piece lapping system capable of producing a finished part every 9 seconds. No application is too small for consideration.



# Lapping Consumables

## Kemet Composite Lapping Plates

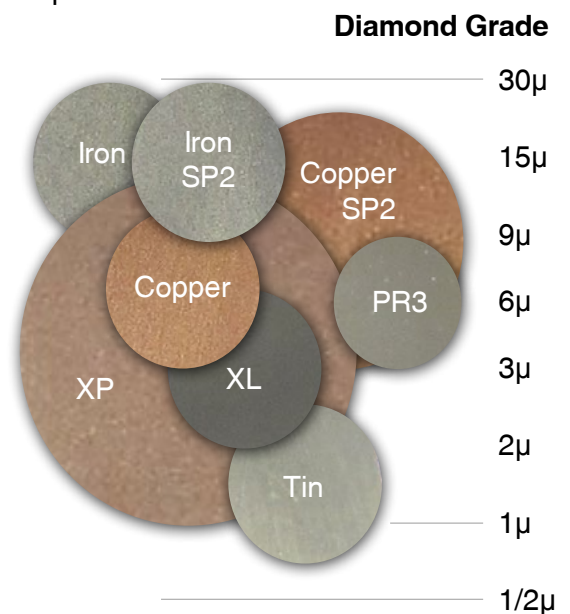
Manufactured from a homogeneous mixture of synthetic resins, metal particles and key bonding/hardening. The plates are designed for Kemet's advanced lapping technology, perfectly compatible with Kemet Liquid Diamond.

- Holds diamond particles firmly, ensuring both efficient stock removal and repetitive component surface finish.
- Ductile qualities cushion the diamond particles, preventing damage to the workpiece.
- Produced in varying hardness values so that even the softest material can be safely lapped with diamond particles without the fear of impregnation.
- Easy control for optimum flatness.
- Lapping/polishing plates available to fit all makes of lapping machines with plate diameters up to 3000mm.
- Dissipates heat and prevents laminar flow of lapped surfaces.
- Supplied with a cast iron backing plate for maximum stability.
- Recommended when high precision flatness and surface finish are required.

Composite Material	Plate Diameter (inches)			
	15	20	24	36
Kemet Copper	351102	351103	351106	351124
Kemet Copper SP2	351159	351964	351177	351965
Kemet Iron	351002	351081	351006	351010
Kemet PR3	351340	351374	351357	351343
Kemet Tin	351305	351320	351306	351315
Kemet XL	351356	351375	351376	351377
Kemet XP	351202	351266	351206	351227

*Custom sizes and grooving are available.*

Composite Material	Description
Kemet Iron	The most commonly used plate. For general purpose stock removal and lapping operations.
Kemet Iron SP2	For stock removal and lapping operations on harder and heavier components.
Kemet Copper	Used to lap softer materials where fine lapping and polishing are the primary requirements.
Kemet Copper SP2	Can be used for lapping or polishing hard and medium hardness materials.
Kemet PR3	Used to generate highly reflective surface finish. Ideal for pre-pad polishing for minimum roll off.
Kemet XL	Replacement for Lead/Tin plate, used for mirror polishing.
Kemet XP	Gives improved flat polished surfaces on many materials. Flat mirror-like surfaces can be produced on many hard materials.
Kemet Tin	One of the softest Kemet Plates used for mirror polishing with fine grades of Kemet Liquid Diamond.



## Lapping Plate Grooving

Lapping plates can be supplied grooved to suit specific applications. A cross hatched pattern is common on Cast Iron Hand Lapping plates and Dual Face Machine plates and gives increased stock removal rates due to the additional cutting edges generated on each groove. A Spiral groove pattern is used primarily when polishing parts that need to have a good surface finish and flatness, allowing contamination to be carried away from the cutting surface and making it easier to keep the lapping plate contact surface flat. The edges of the groove maintain good stock removal even through the diamond particle size may be small.

## Annular Grooved Plates

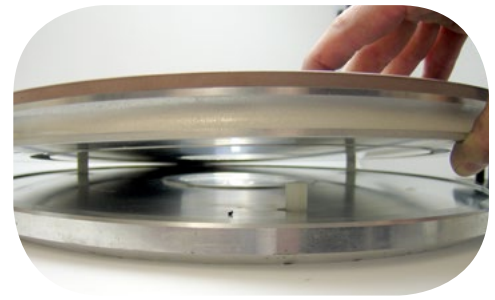
These plates are designed for precision shoulder lapping of a wide range of parts, such as fuel pump gear faces and pressure relief valve caps. These are bespoke manufactured and the groove width and depth of plates need to be specified when ordering.



## Lift Off Disc System

Suitable for multistage processing when workshop space is a premium or budget constraints only allow a single machine. Lift Off Discs, for the Kemet 15 Lapping Machine are supplied mounted on an aluminium backing plate, which locates on to an aluminium drive plate by means of three pegs. Lift Off Discs can be easily changed and are recommended for light duty work where general flatness and precision finish are required.

Description	15"
Kemet Iron Lift Off Disc	351025
Kemet Copper Lift Off Disc	351121
Kemet XP Lift Off Disc	351226
Kemet Tin Lift Off Disc	351314
Aluminium Lift Off Disc	361001
Aluminium Drive Plate	361002



## Kemet Composite Lapping Rods

For use with Kemet's diamond compounds, Kemet composite rods are manufactured from a homogeneous mix of synthetic resins, metal particles and other materials. Produced in a variety of hardness values, the softest materials can be safely lapped with Kemet Diamond compound. They are commonly used to improve the surface quality of parts previously lapped using Kemet Helilaps.

Type	Diameter Size (mm)		
	25x150	50x150	75x150
Kemet Iron	352101	352102	352103
Kemet Copper	352104	352105	352106
Kemet XP	352113	352108	352114
Kemet Tin	352107	352116	352163



## Cast Iron Lapping Plates

Kemet offer a wide range of cast iron lapping plates to suit most lapping machines. (Other sizes available on request)

Cast Iron Lapping Plates (Pre-lapped)	Plate Diameter (inches)			
	15	20	24	36
Serrated	362400	362402	362404	362406
Solid	362401	362403	362405	362407

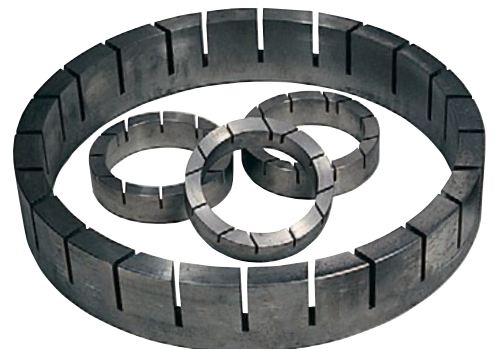


## Conditioning Rings

Cast Iron Conditioning Rings available as solid or serrated. Replacements are available to fit most flat lapping machine models. Custom built diamond plated conditioning rings available in a variety of Grit sizes, including Grit 60 and Grit 120. Plastic faced and ceramic faced conditioning rings are also available and these are used for polishing rather than lapping operations.

Lapping Machine	Solid (ci)		Serrated (ci)	
	3 Ring	4 Ring	3 Ring	4 Ring
Kemet 15	360204	-	360203	-
Kemet 20	360818	-	361027	-
Kemet 24	360679	360680	360208	360274
Kemet 36	360186	360681	360278	360682
Kemet 40	*	*	360683	*
Kemet 48	360662	360235	360833	360642

\* Available on request



**Kemet offer a refacing service when the Kemet Composite material falls below 3mm thickness.**

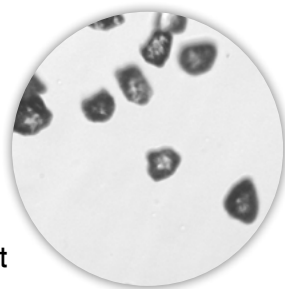
## Diamond Products

Kemet offer a wide range of standard and special Diamond Products formulated and manufactured in our quality controlled laboratories. Each is a special blend of diamond powder with a specific grading and concentration in a chemical carrier to give the optimum:

- Stock removal and surface finish.
- Ease of cleaning.
- Temperature resistance.
- Lubricity to prevent drying out.

With changing technology, new Kemet Diamond Products are continually being developed to meet specific requirements. These products may well incorporate different types of diamond to suit the application such as synthetic or natural, monocrystalline or polycrystalline powder, suspended in a wide range of chemical carriers.

Our laboratories can also help to develop formulations specific to your application.



Micron	Grade
0.1	140,000*
0.25	25,000*
1	14,000*
3	8,000*
6	3,000*
8	1,800*
14	1,200*
25	600
45	300
60	230
90	170

\*Estimated

### • Diamond Grading

The exceptionally close grading standards developed by Kemet exceed many international standards and guarantee that Kemet Diamond Products are manufactured to the closest tolerances.

### • Quality Control

Microscopic and computer analysis of the diamond powder ensures that it is exactly the correct grading and shape to maximise cutting performance.

### • Consistency of Performance

Strictly manufactured to ISO 9001:2008 quality assurance standards - our guarantee that the quality will be consistent.

### • User Friendly

Manufactured from the highest purity chemicals - safe to use and friendly to the environment.

**We use only the best quality virgin diamond powder and the highest purity chemicals in Kemet Diamond Products.**

## Diamond Compound / Paste

For hand lapping applications Kemet offer a huge range of Diamond Compounds for rapid stock removal, superfine surface finish, lapping and pre-polishing. Micron sizes ranging from 1/10 to 90, soluble in either oil (Type L), water (Type W) or both (Type KD). High thermal stability of the chemical carrier ensures that Kemet Diamond Compound resists frictional heat, remains stable, and keeps its suspension properties under operating conditions. For our full range, please view our website or tool room catalogue.



## Liquid Diamond



Our range of Kemet Liquid Diamond products are available as oil soluble, water soluble or as emulsions. The chemical composition of the carrier fluids is carefully controlled to ensure that they are compatible both with the Kemet Lapping Plate and the components being lapped.

- Precision graded diamond particles in a fluid.
- Optimum viscosity and chemical composition of each Liquid Diamond Product gives fast stock removal with the ability to produce superfine surface finishes.
- Suitable for dispensing with the Kemet Electronic Dispensing System thus eliminating wastage and reducing lapping costs.
- Specially formulated Liquid Diamond Products enable parts to be easily cleaned.

**Ultrasonic Cleaners and Fluids on pages 25-26**



## TYPE K (Oil / water emulsion) Liquid Diamond

An excellent, low viscosity oil/water emulsion suitable for all general purpose lapping.

Micron	400g			2000g			
	Standard	Strong	Extra Strong	Standard	Strong	Extra Strong	
A	1/10	211001	211021	-	211080	-	-
	1/4	211002	211022	-	211081	-	-
	1/2	211003	-	-	211083	-	-
	1	211004	211024	-	211084	211105	-
	2	211005	211025	-	-	-	-
	3	211006	211026	211046	211086	211106	211126
	4.5	211007	211027	211047	211087	211107	211127
B	6	211008	211028	211054	211088	211108	211128
	8	211009	211029	-	211089	211109	211129
	10	211010	211030	211050	211132	211110	211130
	14	211011	211031	211051	211091	211111	211131
C	25	211012	211032	211052	211092	211112	211133
	45	211013	211033	211053	-	-	-

## TYPE O (Oil based) Liquid Diamond

An excellent, general purpose, low viscosity oil based suspension suitable for heavy parts and high volumes.

Micron	400g			2000g			
	Standard	Strong	Extra Strong	Standard	Strong	Extra Strong	
A	1/10	216001	-	-	216082	-	-
	1/4	216002	-	-	216083	-	-
	1/2	216003	-	-	216084	-	-
	1	216004	216024	-	216085	216104	-
	2	216005	216025	216045	216081	216105	216136
	3	216006	216026	216046	216086	216106	216137
	4.5	216007	216027	216047	216087	216108	216138
B	6	216008	216028	216048	216088	216107	216139
	8	216009	216029	216049	216089	216109	216140
	10	216016	216030	216050	216095	216110	216141
	14	216011	216031	216051	216092	216111	216142
C	25	216012	216032	216052	216090	216112	216143
	45	216013	216033	216053	216094	216113	216144

## TYPE WA (Water based) Liquid Diamond

An excellent, general purpose, low viscosity water based slurry for general purpose lapping where oils and emulsions can not be used.

Micron	400g			2000g			
	Standard	Strong	Extra Strong	Standard	Strong	Extra Strong	
A	1/10	214001	-	214042	214071	-	214121
	1/4	214002	-	214043	214072	-	214122
	1/2	214003	-	214044	214073	-	214123
	1	214004	214024	214045	214074	214106	214124
	3	214006	214027	214047	214076	214108	214126
	4.5	214007	-	214048	214077	-	214127
	6	214008	214028	214049	214078	214080	214128
B	8	214009	214029	214050	214081	214101	214129
	10	214010	214030	214052	214082	214110	214130
	14	214011	214031	214051	214083	214079	214131
C	25	214012	214032	214053	214084	214103	214132
	45	214013	214033	214054	214085	214111	214133

**A** = Final Polishing **B** = Lapping & Pre-polishing **C** = Rapid Stock Removal



## Lubricating Fluids

- Assists Kemet Diamond Products to cut and polish more effectively by absorbing frictional heat and diluting the lapping residue.
- Lubricant performance remains stable even when under high pressure.
- Manufactured from high purity chemicals.

Type	Description	Souble in	Colour	450ml Trigger spray	2.5 Litres	25 Litres
W	Recommended for use on all Kemet Polishing Cloths as it helps to extend their life.	Water	Clear	301201	301101	301151
OS	Recommended when polishing tooling, moulds and similar components.	Oil	Blue	301203	301103	301112
W2	Developed for use with Kemet Diamond Suspension, particularly when used with Kemet Lapping Plates. (GW2 is odourless)	Water	Clear	301202	301102	301205
GW2		Water	Light green	301514	301108	-
LS	Where components need to undergo a water based cleaning operation after lapping.	Oil/Water	Blue	301204	301104	-
K	Assists smooth running of the lapping operation and helps to ensure a cleaner process.	Oil	Clear	301178	301124	301125
R OS2	For use where water is not permitted.	Oil	Red	301513	301512	-
BLUE	Improves cutting and polishing performance on clothes or plates.	Water	Blue	301200	301156	-



## Col-K

A Liquid polish used on Kemet Chem Cloth to produce the ultimate in high quality mirror polishes on polishing machines. A part abrasive, part chemical polishing action makes Col-K well suited to polishing difficult materials such as Stellite and Cobalt Chrome. Also available in non crystallising version called Kemet Col-K (NC).

Unit	Col-K	Col-K (NC)
1 Litre	600262	600261
5 Litres	600212	600199
20 Litres	600204	600202

## Kemox

Kemox is a conventional lapping abrasive that has been suspension treated so that the abrasive particles do not settle out into a hard sediment in the bottom of the abrasive tank. Kemox is available in water soluble (Kemox-W) or oil soluble (Kemox-O) formulations in 5 or 20 Litres. The abrasive concentration is always correct and eliminates the health and safety risk of adding powder to oil.



Product	Size	Code	Description
Kemox O-960	5 Litre	300101	Oil Based. Finest surface finish on soft components
Kemox O-950	5 Litre	300102	Oil Based. Finer surface finish on soft components
Kemox O-900	5 Litre	300103	
Kemox O-800	5 Litre	300104	Oil Based. General aluminium oxide lapping where a scratch free matt lap is required
Kemox O-800S	5 Litre	300112	
Kemox O-800 (Fine)	5 Litre	300107	
Kemox O-800 FHC	5 Litre	300109	Oil Based. Plate conditioning and matt lapping where good stock removal and a matt lap is required
Kemox O-400	5 Litre	300105	
Kemox O-400S	5 Litre	300111	
Kemox W-950	5 Litre	300152	Water based where oil can't be used. Finer surface finish on soft components
Kemox W-800	5 Litre	300143	Water based
Kemox W-400	5 Litre	300141	

# Universal Lapping Oil

Lubrication is necessary for a smooth running condition between the lap plate and conditioning rings and to help evenly disperse the abrasive product on the lap plate. Lapping vehicle used with any abrasive powder should be properly matched in order to give the best cutting action possible, maintain even dispersion of abrasive throughout the lapping surface, and produce uniform finishes. The proper lapping vehicle in conjunction with the right abrasive will reduce lapping time and reduce the amount of slurry needed to complete the job. A typical mix would be 1kg of abrasive to 5 Litres of lapping oil.

Size	Code
5 litres	361516
20 litres	361517
205 litres	361498



# Sabre Aluminium Oxide Paste

Specially formulated containing Aluminium Oxide Abrasive and is available in 20g syringes. It is suitable for a wide range of lapping/polishing operations, and it is particularly effective when used for smoothing soft metals such as brass, aluminium and copper. It is also effective for smoothing small areas of glass prior to polishing. Sabre Pastes are also available based on both silicon carbide and boron carbide abrasives.

Micron	Code
0.1	300206
0.5	300205
3	300204
7	300203
9	300202
23	300201



# Lapping Pastes & Powders

Kemet manufacture a wide range of abrasive lapping pastes. Our range of Silicon Carbide and Aluminium Oxide pastes have many applications but are particularly suited to the lapping of mechanical seals and valve seats. The pastes are **water soluble** and safe to use.

Product	Type	Micron	FEPA Grade	Pastes		Powders	
				1kg	5 kg	25kg	
Green Silicon Carbide	Fine	3	1200	361547	361537	361616	
		5	1000	361552	361535	361536	
	Medium	9	600	361514	361563	361631	
		17	400	361551	361512	361579	
	Coarse	23	360	361548	-	-	
		30	320	361558	-	-	
		37	280	361538	361532	361629	
Black Silicon Carbide	Medium	75	180	-	361541	361653	
		9	600	-	361562	361651	
	17	360	-	361648	361649		
	37	280	-	361646	361647		
	Coarse	53	230	-	361644	361645	
		75	180	361549	-	-	
		109	120	361689	-	-	
White Aluminium Oxide	Fine	3	1200	361544	-	-	
		5	1000	361624	-	-	
	Medium	7	800	361545	361676	361615	
		9	600	361543	361555	361614	
	Coarse	13	500	361546	-	-	
		23	360	361542	361554	361561	





## Diamond Lapping Film

Kemet precision coated diamond abrasive lapping film products are specifically engineered to meet all your ultra-fine, consistent polishing and final finishing requirements.

- Wide range of engineered, tightly-graded micron-sized particles. Ensures consistent, long-lasting polishing. Generates scratch free surfaces; achieving Ra values under 1 micro-inch on hard materials, including HVOF depositions. Improves coolant access at point of contact
- Proprietary resin system improves adhesion to substrate
- Uniform 3 mil polyester film backing, ensures film flatness and improved part geometry
- Compatible with most machinery attachments and all coolants, allowing quick film replacement
- Long life and offers high yields, reduced rework, and uses fewer steps for lowest total abrasive costs

Micron	230 x 280 mm
0.5	362901
1	362549
3	362550
6	362902
9	362903
15	362040
30	362904

*Kemet Diamond Lapping Film,  
Plain Backed*

Microns	Roll Width	Roll Length	Disc Diameter	Sheet Size
1, 3, 9	>= 12"	50' - 150'	>= 12"	>= 12" x 12"
9, 15, 30, 45, 60, 76, 100	>= 12"	50' - 150'	>= 12"	>= 12" x 12"
1, 3, 6	>= 12"	50' - 150'	>= 12"	>= 12" x 12"

*Standard roll <= widths 50, 100 and 200 mm. Other <= widths are available on request.*

## Aluminium Oxide Lapping Film

Tightly graded aluminium oxide coated onto a 0.3mm thickness polyester film backing. Available with or without PSA (pressure sensitive adhesive).

- Excellent surface finish
- Reduces overall process time
- Produces high yields
- Non-slurry processing

Micron	Colour	Code
0.3	White	361706
1	Green	361707
3	Pink	361708
5	Brown	362420
6	Blue	361709
12	Yellow	361710
30	Green	361711
40	Blue	361712
60	White	361713

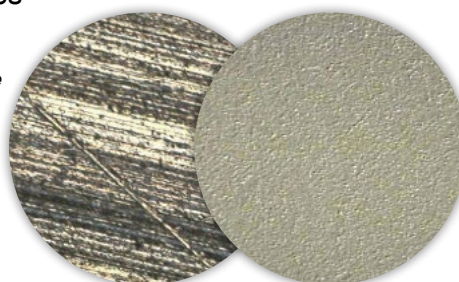
*216 x 280 mm sheet plain backed Aluminium Oxide Lapping Film - Supplied in packs of 50*

## NanoKem Diamond Lapping Film

NanoKem precision coated diamond abrasive lapping film incorporates a proprietary new particle, designed to improve the quality of polished surfaces by eliminating scratch-generating agglomerations. By polishing at nominal particle sizes it shortens polishing processes and enables increased cutting from each diamond particle. One-step NanoKem film achieves the end finish specification of as many as two or three conventional diamond film products.

- Performance quality: the most achievable fine finish using coated abrasives
- Cost savings: elimination of production process steps
- Safety/environmental improvements: elimination of dirty, messy slurries

*Carbide surface after polishing with P220 grit silicon carbide waterproof paper*



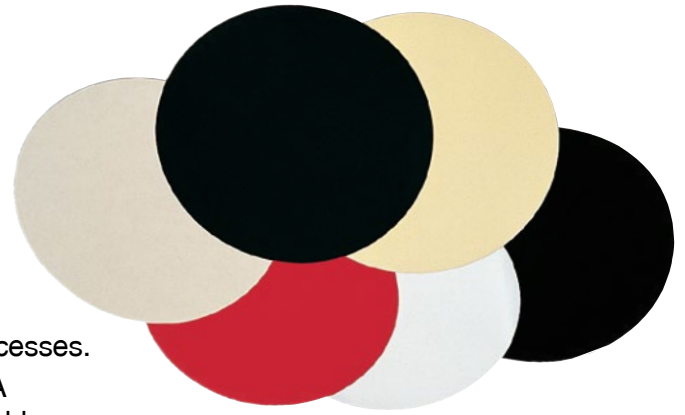
*Scratch-free finishing in one step - the previous carbide surface after polishing with 1 micron NanoKem film*

Microns	Roll Width	Roll Length	Disc Diameter	Sheet Size
1, 3, 9	<=12"	50'-150'	<=12"	<=12"x12"

*All are 3 mil (75 mic.) polyester film. Stock Sheet sizes: 9" x 11" : 9" x 13"  
Stock Roll sizes: 2" x 50' : 3" x 50' : 4" x 50' : 8" x 50'*

# Kemet Polishing Pads

Flat polished surfaces can only be produced on many softer materials with the use of polishing pads. These are available to suit most flat lapping machines. Kemet offer the widest range of self-adhesive and metallic backed polishing pads, of which there are three general types:



## Chemo-textile Cloths

Non woven pads manufactured specially for polishing processes.

**PSU** - Used with Diamond and Non Diamond abrasives. A good general purpose pad with a relatively long life. Available in medium and hard

**CHEM-H** - For use with Col-K polish for chemical mechanical polishing processes, which are required for many specialised materials, such as titanium and cobalt chrome.

## Synthetic Silk Pads

A range of synthetic silk pads with a durable woven structure that produces flat mirror surfaces on stainless steels, stellite and many other metals.

**ASFL** - For optimum flat mirror polishing of many metals. This pad is available with adhesive resistance to oil or water, to suit the polishing abrasive being used.

**MSF** - Has thick, soft adhesive backing and plastic barrier which is resistant to most fluids.

## Nap Cloths

For final polishing stages of preparation, Kemet Nap Type Cloths are available with a range of softness and nap length. They give a more gentle polish, and are ideal for softer specimens and components. All cloths are self-adhesive unless marked 'plain'.

**MRE** - Synthetic flock on a flexible waterproof carrier. A more heavy duty cloth for use with 6 micron Kemet Diamond Slurry and finer.

**NSH-B** - A short nap cloth with woven backing used for metallographic and some optical polishing operations. Commonly used with Kemet Diamond Compound 3 Micron and finer.

**NLH** - A longer, stiffer nap cloth. Commonly used with 6 micron Kemet Diamond compound or finer. Also available for high gloss spherical polishing.

**Sphericloth A & B** - General purpose, single use spherical polishing pads.

Pad Type	Disc (mm)			
	300	380	610	914
PSU-M	341010	341011	-	341035
CHEM-H	341784	341865	341786	341866
ASFL	341111	341112	341113	341140
MSF	341744	341745	341746	341767
MRE	341714	341715	-	341942
NSH-B	341203	341243	-	E05504
NLH	341206	341248	-	-

*Supplied in packs of 10. Other sizes available on request.*

Pad Type	Square (mm)
	127 x 127
Sphericloth A	341998
Sphericloth B	341966
NLH	341276

*Supplied in packs of 10*

# Magnetic Polishing Pad Systems

The Kemet magnetic disc system is suitable for Kemet's range of magnetic polishing pads, diamond grinding and fine grinding discs, and any magnetic consumable from other suppliers. Other sizes available upon request

- Easy to change and cloths last longer
- No adhesive breakdown problems
- Faster and cleaner cloth changes
- No metal disc involved so safe to use

Pad Type	Disc (mm)		
	380	610	914
ASFL-M	341178	341179	-
CHEM-HM	341854	341856	341855
MRE-M	341818	341819	341828
PSU-MM	341814	341837	341838
NSH-BM	341264	341265	341266

*Supplied in packs of 10*



# Lapping Accessories

## Electronic Dispenser System



The Kemet Electronic Dispenser distributes Liquid Diamond and Lubricating Fluid by means of touch sensitive settings. The digital display shows dispensing intervals, durations and air pressure at a glance. The dispenser achieves great accuracy, eliminating wastage and simplifying cost control.

The Kemet Liquid Diamond Stirrer Unit maintains a consistent distribution of diamond particles within the slurry by using a small non-contaminant plastic coated paddle magnet, which ensures even diamond suspension. The Kemet Dual Dispensing Bar can be positioned to dispense Liquid Diamond and Lubricating Fluid accurately on to the plate without spray bounce.

- Supplied as standard with Kemet Flat Lapping and Polishing Machines and Plates
- Easily fitted to existing conventional Flat Lapping Machines to improve productivity
- Fully controlled metering of Liquid Diamond and Lubricating Fluid using independent pressure and time settings
- Electrical system complies with EN 60 204.
- Can also be used as a standalone unit for bespoke applications that require controlled dispensing
- Dispenser Service Kit available to keep the unit in optimal use - Product Code: 362530



Electronic Dispenser				
Height	Width	Depth (exc. air filter)	Nett Weight	Code
150 mm	230 mm	150 mm	3.74kg	360499

Dispenses Kemet Liquid Diamond and Lubricating Fluid automatically at pre-set intervals in conjunction with a lapping and polishing machine cycle timer.

**Air requirements:** 1 Bar min - 5 Bar max. **Air pressure:** Dual circuit. **Air pressure display:** Bar or psi  
**Adjustable duration of spray:** 1-9 seconds. **Adjustable intervals of spray:** 1-999 seconds  
**Spray memory:** Standard. **Manual override:** Standard  
**Electrical supply:** 110V or 220V - 240V / 50Hz or 60Hz (self adjusting for supply voltage & frequency)



Liquid Diamond Stirrer Unit				
Height	Width	Depth	Power	Code
120 mm	90 mm	215 mm	50Hz or 230V	360534
			60Hz 110V	360536

Quiet electric unit has fully variable speed control and is provided with a magnetic stirrer paddle also holds the bottle for the lubricating fluid.



Single Spray Head	
Length	Code
250 mm	360514
380 mm	360512

Supplied with bottle, cap and plastic tubing.



Dual Dispensing Bar & Bottles						
Type	Length	Reach	Adjustable Height	Section of head	Bottle capacity	Code
Standard	340 mm	260 mm	100 mm	20 x 20 mm	400ml	360511
Long	495 mm	415 mm	100 mm	20 x 20 mm	400ml	360510

Supplied complete with two bottles and plastic tubing. Fully adjustable head for vertical and radial positioning.

## aKu-Disp Peristaltic Dispenser

The aKu-Disp is a peristaltic dispenser designed to work with Kemet Lapping Machines. It incorporates a stirrer and has a programmable timer. A separate purge button will return any solution in the pipework and sprayhead to the receptacle.

The aKu-Disp can be programmed to pump slurries for specific durations and frequencies enabling metered dispensing. This allows a user to accurately control consumable usage.

When integrated onto a Kemet Lapping Machine, the aKu-Disp will start and stop with the host machine timer. This means an operator can leave a machine to concentrate on other tasks, safe in the knowledge that the aKu-Disp will switch off unattended

The aKu-Disp is easily serviceable with all rotating parts fitted to the exterior.

Product	Code
aKu-Disp	345751



## Lapping Machine Maintenance Kit

This Kit is used for the general maintenance of the Kemet 36 (and larger) Diamond Lapping machines.

### The Kit comprises of:

- 1 Grease gun (compatible with the grease cartridge)
- 1 Oil gun with end fitting compatible with the male fitting found on the Lapping machine.
- 1 Litre of gearbox oil
- 1 EP2 grease cartridge

Product	Code
Lapping Machine Maintenance Kit	362220



## Flatness Gauges

The Kemet 9" Flatness Gauge is used to monitor a lapping plate's flatness and to give an indication of the flatness the plate will produce on a given part size. The gauge comes with a calibrated double-sided master setting block and is supplied complete with instructions in a fitted case.

- Suitable for lapping plates 15" to 36" diameter
- Span of Gauge: 9.29" (236mm)
- 1 Micron Accuracy
- Recalibration service available

Product	Code
9" Flatness Gauge	361304



## Straight Edges to Measure Plate Flatness

Kemet offer wide range of steel straight edges to measure plate flatness. Manufactured to DIN 874.

Description	Lapping Machine Model				
	15	20	24	36	48
Length	500mm	500mm	750mm	1000mm	1500mm
Cross section	40mm x 8mm	40mm x 8mm	50mm x 10mm	50mm x 10mm	60mm x 12mm
Accuracy	Grade 1	Grade 1	Grade 1	Grade 1	Grade 1
Code	361501	360864	361502	360239	360861





## Monochromatic Light Source

Produces clear flatness readings when used with Kemet Optical Flats. The compact designed light is easily transportable and uses a sodium long-life light source. Supplied with a flatness reading interpretation chart.

- Detachable power lead with on / off switch at the side
- Supplied with compliance certificate and instructions
- CE marked

Description	Code
Monochromatic Light - 230v	361201
Monochromatic Light - 110v	361211
18 W Sodium lamp	361204



## Optical Flats

Produced from Quartz, Kemet Optical Flats are available in single and double sided, 1/4\* light band accuracy, in sizes from 25mm up to 400mm diameter\*\*. They are supplied with Certificate of Conformity with full traceability to international standards. Special optical flats are available on request. Kemet offers an optical flat reconditioning and calibration service.

1/4 light band			
Single Sided		Double Sided	
Size	Code	Size	Code
25mm	361220	25mm	361237
50mm	361222	50mm	361215
75mm	361224	75mm	361705
100mm	361226	100mm	361210
125mm	361228	125mm	361242
150mm	361123	150mm	361216
200mm	361232	200mm	361219
250mm	361234	250mm	361217
300mm	361218	300mm	361246

\* Higher accuracy available on request.  
 \*\* Larger sizes made to order with configurations such as squares, rectangles and donut shapes and custom thickness are available.



## Optical Flat Stands

Large optical flats (250mm diameter and above) are heavy. If they are placed directly onto a thin component such as mechanical seals, they can cause distortion of the component and incorrect light band readings. Kemet Optical Flat Stands allow the part to be placed onto the optical flat surface meaning there is no distortion. They also allow a single large optical flat to be used on a wide range of part sizes.



## Optical Flat Cleaning and Care Kit

This Kit is used for cleaning Kemet Optical Flats. Taking special care of these will ensure accuracy and long service.

### The Kit comprises of:

- 1 Soft Optical Lens Brush
  - 1 Kemet Lens Klean Fluid 250ml
  - 1 pack of Kemet Sphericloths (Containing 25)
  - 1 pack of Kemet Moist Lens Wipes (Containing 20)
  - 1 pack of Kemet Dry Lens Wipes (Containing 20)
- Full Instructions included.

Product	Code
Optical Flat Cleaning and Care Kit	362555



## Kemet Portable Hand Lap Kit

Suited for flat lapping and polishing by hand. It contains three lapping plates, each with its own grade of Kemet Diamond Compound. This makes it possible to process many components in three stages, from lapping through to polishing. Each lapping plate is backed with anti-slip matting.



Description & Contents	Code
Kemet Iron Lap Plate (for lapping) 150mm diameter on an aluminium backing plate. Kemet XP Lap Plate (for smoothing), 150mm diameter on an aluminium backing plate. Kemet Tin Lap Plate (for polishing), 150mm diameter on an aluminium backing plate. 1 x 10g Kemet Diamond Compound Applikation Stick - 25 Micron. 1 x 10g Kemet Diamond Compound Applikation Stick - 8 Micron. 1 x 10g Kemet Diamond Compound Applikation Stick - 3 Micron. 1 x Kemet OS Lubricating Fluid. 1 x Polished Wooden Box with Operating Instructions.	352206

## Kemet Carbon Seal Lapping Kit

Kemet have developed a portable kit for dry lapping of carbon mechanical seals. The kit consists of a special Kemet Lapping Plate mounted onto an aluminium backing plate. The specially textured plate allows carbon seals to be lapped without the need for any added loose abrasive. This alleviates loose abrasive impregnation into the carbon face.



Description & Contents	Code
350mm diameter Kemet lapping plate. Kemet portable case for ease of transport. Consumables to maintain the condition of the lapping plate	352564

## Kemet Hand Lap Kits

Components lapped and/or polished by hand in minutes rather than hours. Ideal for components manufactured from ceramics, tungsten carbide, ni-resist etc. Kemet portable hand lapping kits are also ideally suitable for low volume production, when optimum surface finish is required, and where it is not economical to purchase a lapping or polishing machine.



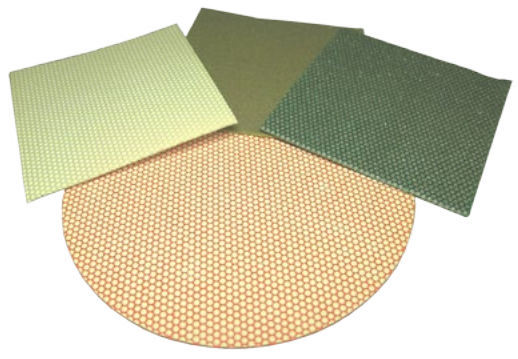
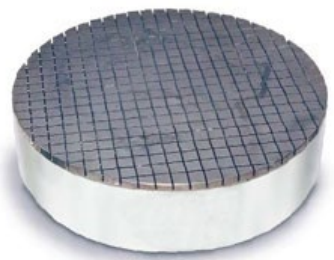
Type	Plate	Contents	Applikation Stick	Code
Type L Kit (Lapping)	Kemet Iron (348mm dia)	1 x 10g Kemet Diamond Compound Applikation Stick. 1 x Kemet OS Lubricating Fluid.	25 Micron	352216
Type P Kit (Polishing)	Kemet XP (348mm dia)	1 x Polished Wooden Box with Operating Instructions.	3 micron	352208

## Pressure Relief Valve Lapping Kit

Kemet have produced a lapping kit that can be used on Tyco, Crosby, and Anderson Greenwood pressure relief valves.

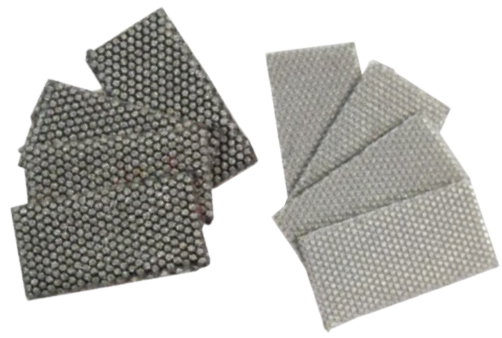
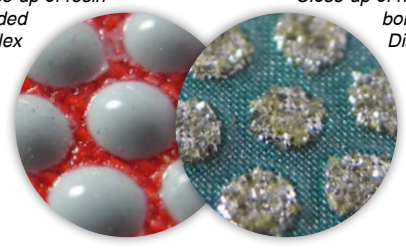


Description & Contents	Code
15 Lapping / Polishing blocks, double sided (D through T2 orifice sizes) 1 x Applikator of 3 Micron Kemet Diamond Compound. 1 x Applikator of 14 Micron Kemet Diamond Compound. Bramet Silicon Carbide self adhesive papers. Grades 60, 120, 180, 320 Grit. Housed in aluminium case (Weight approx 11.5 Kg).	352900



Close-up of resin bonded Diaflex

Close-up of nickel bonded Diaflex



## Cast Iron Hand Lapping Plates

The Cast Iron plates are made from high quality, low porosity grey cast iron (Grade 300 to BS1452). These are used with an abrasive grit, applied in paste form to give a uniform dull matt finish on a wide variety of metallic and non-metallic materials.

Description	6"	8"	12"	18"
Hand Lap Plate c/hatch grooves	361021	360835	360198	360707
Hand Lap Plate solid	361738	361739	360264	360762

## Soft Metal Hand Lapping Plates

The Soft Metal plates are made of Tin.

Description	6"	12"
Hand Lap Plate SOFT METAL	361049	361046

## Diaflex - Diamond Grinding

Kemet Diaflex is a self adhesive, flexible diamond material which combines the long life and aggressive cutting action of diamond with the flexibility of cloth. It is supplied in either discs or squares, and a wide range of grit sizes. The diamond is either nickel bonded (N) or resin bonded (R). It is suitable as a grinding step in either metallographic sample preparation or flat lapping. Diaflex can be supplied as plain backed.

Grade	Grit / Micron Size	Disc (mm)					Square (mm)		
		150	200	230	250	300	100 x 100	150 x 150	300 x 300
Green (N)	60 / 250	342074	342025	342075	342076	342068	342011	342013	342048
Black (N)	120 / 125	342001	342002	342077	342026	342027	342014	342070	342049
Red (N)	200 / 74	342004	342005	342067	342028	342029	342016	342036	342050
Yellow (N)	400 / 40-50	342006	342007	342071	342030	342031	342018	342066	342051
White (N)	800 / 20-30	342032	342008	342072	342033	342034	342020	342037	342053
Yellow / White (R)	800 / 20-30	342078	342035	342079	342080	342047	342038	342044	342053
Blue (R)	1800 / 6-12	342042	342009	342073	342081	342084	342043	342021	342054
Orange (R)	12000 / 1-3	342069	342010	342082	342083	342085	342022	342023	342055

## Dressing Pads

Kemet Diamond Dressing Pads come in two different varieties - coarse and fine. They are self adhesive and are fixed to the bottom of cast iron conditioning ring for rapid plate flatness correction on Kemet Lapping Machines.

Grade	Unit	Code
Fine	Pack of 8	361524
Coarse	Pack of 8	361525
Fine	Pack of 12	361526
Coarse	Pack of 12	361527

## Polishing Stand with Paper

Recommended for polishing workpieces to produce reflection needed for viewing under monochromatic light sources. The heavy-duty polishing table is provided with a tensioning mechanism for smooth pulling of the polishing paper. Table dimensions 350 x 280 mm.

Hand Polishing Paper (Grit 2000)	Code
10 m x 305 mm	300206
50 m x 305 mm	300205

Product	Code
Polishing Stand	361560

## Dressing Kit

Kemet has developed the next generation of Dressing Ring for rapid correction of plates that have gone out of flat. Up to 10 times faster than conventional methods, the Kemet Dressing Ring can correct plate flatness problems in minutes rather than hours.

Lapping Machine	Code
Kemet 15	360752
Kemet 24	360746
Kemet 36 (3 ring)	360755
Kemet 36 (4 ring)	360754
Reface kit (8 stones, adhesive, instructions)	360759



## Workholding and Holders

Workholding is one of the most important factors when carrying out a lapping operation. The flatness of a part can be adversely affected by incorrect workholding.

Non skid pads for all machines can be supplied, together with blank workholding discs. This is placed directly on top of the parts which have been positioned inside the conditioning ring.

Lapping Machine	Diameter	Thickness	Code
Kemet 15	138mm	3mm	360206
Kemet 15	138mm	6mm	360678
Kemet 20	189mm	3mm	
Kemet 24 (3 ring)	246mm	3mm	360269
Kemet 24 (3 ring)	246mm	6mm	360232
Kemet 36 (3 ring)	366mm	3mm	360280
Kemet 36 (3 ring)	366mm	6mm	360285
Kemet 48 (3 ring)	503mm	6mm	360248
Kemet 56 (3 ring)	576mm	6mm	362498



## Kemet Facing kit

The Kemet facing kit consists of a non-skid rubber pad. This pad can be fixed to the bottom surface of the hand weight. The hand weight with the pad is then placed directly on top of the parts which have been positioned inside the conditioning ring. Lapping can occur and the parts will not skid out of position.

Lapping Machine	Code
Kemet 15	360752
Kemet 24	360746
Kemet 36	360755



## Dycem

The Non-slip material has a protective film on both sides, which will keep the material clean until ready to use.

Dimensions: 406 mm x 9 m

Product	Code
Dycem	361505



## Foam Tape

Double sided self-adhesive foam tape. Dimensions: 3 mm thick, 50 mm wide and 25 m long.

Product	Code
Foam Tape	361506



# Ultrasonic Cleaning & Fluids

Although they are useful processes, lapping and polishing will always leave contaminants (abrasives, liquids, particles of the component material) on the parts when the process has finished.

Experience tells us that aqueous ultrasonic cleaning is the best solution for removing contamination from lapped and polished parts because the ultrasonic action is "searching" enough for complex parts, whilst at the same time gentle enough to not damage the flat lapped/polished surface. Even mirror polished surfaces can be cleaned in this way without degrading the polished finish.

Kemet have a full range of the most advanced ultrasonic cleaning equipment with new technology that assures maximum cleaning results whatever the condition within the tank. Ideal for multiple part cleaning, or validated part cleaning along with spray cleaning solutions for single part inspection.



For a full list of ultrasonic cleaners & cleaning fluids visit [www.kemet-cleaning.co.uk](http://www.kemet-cleaning.co.uk)

Kemet also have a programme of over 400 aqueous cleaning detergents (see page 26). No solvents are used, making the process kinder to the environment and to personnel. Rinsing, dewatering and hot air drying units can be supplied to complete and complement the cleaning process.

For high volume production we can supply multi stage washing rinsing and drying systems, with or without handling systems, and fully enclosed, if required.

## Dasty Industrial Degreaser

For hand cleaning, this product is extremely effective for thoroughly degreasing all mechanical parts as well as large surfaces and perfect for cleaning off lapping residue. Thanks to its ultra-concentrated formula, Dasty easily removes grease, mineral oil, scale, etc. and is biodegradable, safe for shipping and contains no ozone depleting chemicals.

- Dasty can be used in diluted form in ultrasonic cleaning machines - contact Kemet for more information.

Size	Code
1 Litre	362936
Box of 12	362962

Kemet offer the finest in biodegradable cleaning fluids. These are specialist formulated concentrated detergents available in neutral, alkaline and acid types. Kemet are a distributor of NGL Cleaning Technology with more than 400 high performance formulations providing a solution to most cleaning challenges.



Type	Package Size	Product Code	Alkaline or Acid	PH approx	Dilution % Suggested	Temp °C Suggested	Suggested Use	Comments
Helit Plus	5-litre	362963	Alkaline	7.8	3-5%	40-70°C	Universal, neutral for Jewellery, Watch parts, Luxury items.	Non tarnishing will brighten, removes oils buffing compounds.
	25-litre	362964						
Galvex SU 737 (Kemet S8)	5-litre	362988	Alkaline	8	3-5%	50-75°C	Universal, neutral for all metals, Watch parts, etc.	Removes polishing compounds, good in hard / soft water
	25-litre	362989						
Galvex SU 747	5 -litre	362938	Alkaline	10	1-3%	50-80°C	Slightly stronger version of 737. IE: Watch cases, straps etc. S.Steel & Gold	Removes polishing compounds, good in hard / soft water
	25-litre	362989						
Galvex 17:30N	25-litre	362942	Alkaline	10	3-5%	50-80°C	Suitable for most metals but test first. Adds corrosion protection to steels	Removes oil & polishing compounds and general contamination
Galvex 18:01	25-litre	362944	Alkaline	9.5	3-5%	50-75°C	General purpose on all Metals. Also on Plastic machine cases	Removes polishing compounds and general contamination. Free Rinsing.
Galvex 17:30	25-litre	362940	Alkaline	10	1-2%	50-80°C	General purpose on all Metals. Cleaning prior to plating /coating	Removes oil & polishing compounds and general contamination
	200-litre	362941						
Rodaclean Supra	25-litre	363010	Alkaline	12.5	3-5%	60-70°C	Surface preparation on: Ceramics, titanium, steel HSS & hard metal prior to P.V.D.	Removes grinding & lapping paste. Might need Rodastel 30 to neutralise and assist rinsing.
Rodaweg	25-litre	363007	Alkaline	12.7	2-4%	30-75°C	Metal surfaces prior to Vacuum Coating. Can be used at 30° C	Removes oil & polishing compounds from steel & hard surfaces
Decoclean 440	25-litre	362945	Alkaline	13	5-15%	50-80°C	Heavy contamination on Ferrous metals only. Ultrasonic or Spray	Do not use on Non-ferrous metals. Rinse well.
Rodastel 30	25-litre	362947	Acidic	2	3-5%	Ambient to 60°C	Deoxidation, neutralise prior to Vacuum Metallisation.	Low acidic not classed as hazardous. Will shine copper alloys
Solvit 3	25-litre	362946	Acidic	2	3-10% Ultrasonic 10-30% Dip	Ambient to 45°C	Oxide, oils, carbon and polishing compounds from all metals.	Strong acidic action. Rinse well or, neutralise after use.

## Hand Cleaning Solutions

### C70 Solvent Cleaning Fluid

A versatile and highly efficient cleaning and degreasing fluid with a fast evaporation rate for removing grease, oil and residues from all metals and ceramics. Supplied in a pressurised container, complete with detachable extended spray tube for reaching into the most difficult areas, C70 contains NO ozone depleting substances.

Size	Container	Code
500ml	Aerosol	302114
500ml	Aerosols (Pk 12)	302115



### CO - 42 Cleaning Fluid

Designed for cold use and applied by spray, brush, cloth or full immersion, CO42 is a highly efficient degreasing fluid similar in performance to 1.1.1 Trichloroethane, but without the ozone depleting properties.

Size	Container	Code
450ml	Trigger Spray	302103
5 Litres	Metal	302102
25 Litres	Metal	302101
200 Litres	Metal	302105



- C70 and CO-42 are **NOT** approved for use at elevated temperatures or in ultrasonic cleaning machines.

# Kemet Technical Centre



## Process Development

We regularly assist customers by developing new products and processes, utilising the very latest in precision flat lapping technology. Customers' samples are evaluated, free-of-charge. Comprehensive reports are issued covering all aspects of the process, including details of abrasive, lapping plate, workholding, inspection, cleaning and the likely consumable costs involved. We are able to process the following materials:

Acrylic	Chrome Plate	Inconel (Cobalt/Nickel)	Silicon Carbide
Alloys	Cobalt Chrome	Internal Seal	Sintered Materials
Alumina	Compact Disc	Keronite (ceramic)	Spherical valve
Aluminium	Concrete Cement	Match lapping	Stainless steel
Aluminium Nitride	Copper	Molybdenum	Steel
Anodised Aluminium	Diamond Tools	Mould insert or cavity	Steel (Hard)
Beryllium Copper	Epoxy Resin	Neumonic Steel	Titanium
Bone	Ferrite	Nickel	Tool Steel
Boron Carbide	Fibre Optic	Piston Rings	Toughened Steel
Brass	Film Guide	Plastic	Tungsten carbide
Bronze	Gallium Arsenide	Polyetherimide	Tungsten Copper
Carbon	Germanium	Quartz	Ultrasonic Cleaning Trials
Carbon Fibre	Glass	Sapphire	Vulcanised Fibre
Cast iron	Gold	Silicon	Zinc Selenide
Ceramic	Graphite	Silicon Aluminium Alloy	Zirconate (Lead) Titanate

If a material does not appear in the list, please contact Kemet on **+44 (0)1622 755287**. All processed samples are returned with detailed technical process reports including detailed surface finishing measurements, free of charge.



## Training

Tailor-made training courses are delivered regularly in our Technical Centre or at customers' premises. Typical subjects are:

- Theory of lapping and polishing
- Setting up and operating machines
- Flatness control and measurement
- Product cleaning and inspection.
- Types of abrasive
- Lapping plate types
- Workholding methods
- Surface finish measurement

On completion of a course, participants are awarded a certificate.

# High Precision Lapping Service



## High Precision Lapping and Polishing Services

If your components require optimum flatness to perform to specification, if they are difficult to lap, or you have a particularly tight deadline to meet, Kemet's Sub Contract Service is the answer. We're renowned for our service, reliability and quality, and we specialise in fast turnaround times.

Our expertise is wide and varied: it includes the lapping and polishing of mechanical seals, valves, compact disc mirror blocks, flat plastic mould inserts, comparator stages, spacers, cutter discs, and aircraft pump components.

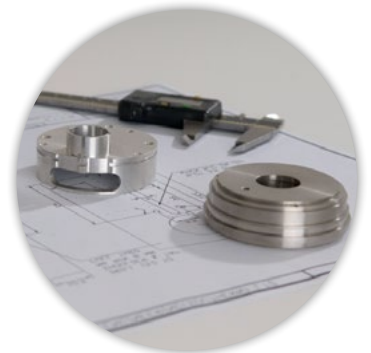
Our machines are equipped with both standard and special lapping plates to enable us to process most types of components. We are able to lap and/or polish components up to 530mm diameter (approx 21").

We can process most materials to a specific surface finish or flatness. Shouldered components such as those with a raised centre or shaft, are also able to be lapped.

All work is returned with a Certificate of Conformity covering the generated surface finish and flatness, relative to the customer's drawing or specification. Our reputation has been built on service, reliability and quality. Fast turnaround times are our speciality.

Imagine being able to source all your high precision component requirements with just a single order. No more having to chase up numerous companies within the supply chain. Getting regular updates and a single certificate of conformance to the specification you need. All within the timeframe promised.

Kemet's precision manufacturing and surface finishing service offers just this. Whether for prototype fabrication or high volume production quantities, they can manufacture components that have a requirement for lapped or polished faces from start to finish, all fully ISO 9001 compliant.



## Kemet After Sales Service and Support

Our expertise is available to you through our in-house technical specialists, a team of 5 Technical Representatives in the UK, and an extensive network of overseas Subsidiary Companies and Distributors.

Kemet provide continuous technical support for both prospective and current customers, and to ensure that any problems are correctly and quickly resolved.



# Kemet



## Kemet International Ltd. Subsidiary Companies

**Netherlands**  
Kemet Europe B.V

**Singapore**  
Kemet Far East Pte Ltd

**Japan / Korea**  
Kemet Japan / Kemet Korea

**China**  
Kemet China Ltd

**Malaysia**  
Kemet Precision (M) SDN BHD

**Australia**  
Kemet Australia Pty Ltd

**Kemet Products are available through a worldwide Network of Authorised Distributors in**

Europe  
Asia

Africa  
U.S.A

Middle East  
Australasia