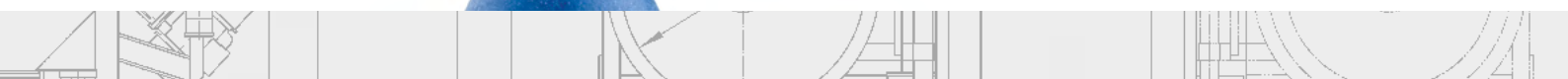




TROWAL MASS FINISHING TECHNOLOGY

Media and compounds

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SURFACE FINISHING TECHNOLOGIES FROM THE INVENTOR OF THE “TROWALIZING” PROCESS

Walther Trowal is truly the inventor of the modern mass finishing technology: Since 1931 we have been producing surface finishing equipment and the respective consumables. Today, the term “Trowalizing” – derived from the company's old cablegram address “Trommel Walther” – is synonymous with the mass finishing technology.

“Trowalizing” portrays not only the deburring and surface grinding of work pieces. But it also describes a broad spectrum of possibilities to improve surfaces. Our range of products and services covers all surface refinement methods, be it cleaning and degreasing, deburring, edge radiusing, surface grinding or high gloss polishing and drying of the finished work pieces.

MACHINERY AND CONSUMABLES FROM ONE SINGLE SOURCE

We are one of the few suppliers, who develop and produce all their mass finishing components in-house! Only the optimal combination of finishing equipment, process water cleaning & recycling and consumables, exactly tuned to the respective finishing task, produces the best and most economical results.

Since we are not only manufacturing our equipment but also produce the grinding & polishing media and compounds in our plants in Haan (Germany) and Stoke-on-Trent (UK), we are able to offer perfectly adapted solutions along the entire chain of the finishing process.

The result: Excellent surface finishes and a high cost-efficiency.





GRINDING AND POLISHING MEDIA

Since the company was founded more than 90 years ago, our experts have developed a sophisticated portfolio of grinding and polishing media. From rough cut-down to the creation of pre-plate surface finishes, Walther Trowal can always offer the optimal media, made in-house.

Depending on the finishing application, we choose the most suitable material, the right abrasivity and the ideal media shape: Some media types are better suited for intensive cut-down, whereas others are used for polishing. Of particular importance is the media shape and size. This helps prevent the media from getting lodged in the work pieces.

An extremely important media selection criterion is the material. Ceramic media generally require short cycle times and create a bright surface finish on work pieces made from steel. Plastic media are mostly used for finishing work pieces made from relatively soft non-ferrous metals. They tend to produce dark and mat finishes.

The media shape has a decisive influence on how the media acts on the work piece surface. For example, the shape determines, if a media is better suited for surface grinding or deburring. Another important consideration regarding shape is that the media must reach tight corners in a work piece.

Finally, another important selection consideration is, how the media can be separated from the finished work pieces – preferably without any manual intervention whatsoever!

Our experts will be pleased to assist you in selecting the right media and to run processing trials with your work pieces in our test lab in Haan.

COMPOUNDS

Compounds are an essential part of any mass finishing process. They are not only a key factor for achieving optimal finishing results, but they also have a cleaning and degreasing/de-oiling function and even provide a temporary corrosion protection of the work pieces. Moreover, they keep the media clean and, thus, guarantee that it maintains its abrasivity.

PROCESS WATER CLEANERS

The trowalpur cleaning additives are effectively cleaning the process water. For example, in recycling systems they ensure that the process water remains functional for a long time, before it must be replaced. And in cases, where the waste water must go to drain, the cleaning additives make sure that the cleaned water is in full compliance with all legal requirements.

DRYING MEDIA

For drying the work pieces after the finishing process we supply granular drying media with different grain sizes. These media have not only an intensive drying but also a light polishing effect.



TRADITION AND INNOVATION

Our compounds have proven themselves in thousands of finishing applications. But, at the same time, we take our responsibility to protect our resources very seriously. And we recognize that our customers are constantly changing their production methods.

For this reason, our team of experienced chemists is continuously adapting our compound recipes to the latest environmental requirements and customer demands. Of course, if market conditions demand it, we also develop new products. Our activities are always guided by increasing the effectiveness and efficiency of the finishing process, a sustainable handling of the raw materials and our goal to produce eco-friendly finishing compounds.

CLOSE PROXIMITY TO OUR CUSTOMERS

We have developed many of our new compounds in close cooperation with our customers. For example, this motivated us creating compounds that allow the recycling of the process water. Recycling compounds help not only to drastically reduce the water consumption but also protect the environment.

Another example is the field of additive manufacturing: 3D printed components have frequently a bionic shape and an above average initial surface roughness. For this challenging finishing task we specifically developed the AM Post Process method.

And since the compounds are a key factor for the success of any surface finishing process, the colleagues from our chemical lab

are always included in the processing trials we run in our test lab in Haan.

PROVEN QUALITY

All Trowal compounds are regularly subjected to a rigorous quality control by our chemical lab. Our consumables division is certified in line with DIN ISO 9001:2008.

A HIGH LEVEL OF OCCUPATIONAL AND ENVIRONMENTAL SAFETY

We apply the most stringent quality standards for our plastic media not only for their use at our customers but also in our own production: A thermal post-combustion system, working by the principle of regenerative thermal oxidation (RTO), cleans the exhaust air from our plastic media production, another contribution towards an environmentally sustainable manufacturing operation.





trowalit CERAMIC MEDIA

EFFICIENCY COMES IN MANY SHAPES

Ceramic media can be used for a wide variety of finishing applications: Because of their high bulk density they exert a high pressure on the work pieces and, therefore, remove even pronounced burs quickly and efficiently. Ceramic media generally create a bright surface finish.



MEDIA TYPE	TRIANGLE (TRI) (a x b)	TRIANGLE ANGLE CUT (A/C TRI) (a x b)	TRISTAR (A/C T/S) (a x b x c)	ELLIPSE (ELI) (a x b x c)	CYLINDER (CYL) (a x b)	CYLINDER ANGLE CUT (A/C CYL) (a x b)
WXC						
MAC						
Z	4 x 4 6 x 6	4 x 10 6 x 12 10 x 15			2,5 x 5 3 x 10	3 x 10 4 x 11
F	10 x 10 13 x 13	10 x 20 13 x 26	4 x 4 x 5 6 x 6 x 6	14 x 14 x 5 20 x 20 x 8	6 x 7 6 x 14	6 x 10 6 x 14
PI	16 x 16 20 x 20	15 x 15 15 x 30	10 x 10 x 10 20 x 20 x 20		7 x 13 10 x 19 20 x 40	7 x 15 8 x 20 10 x 20
BA	26 x 26 30 x 30	25 x 25 33 x 23				8 x 20 15 x 25
WV						
FSG						
DK						
MHS					1,7 x 5 2,5 x 8 3 x 10 4 x 14	
MHC						
GP	4 x 4 6 x 6 8 x 6 8 x 8 10 x 10			14 x 14 x 5 20 x 20 x 8	1,7 x 5 2,5 x 8 3 x 10 4 x 6 4 x 10 4 x 14	4 x 10 6 x 14

INCREASING GRINDING PERFORMANCE





Because of their high bulk density the ceramic grinding and polishing media allow short cycle times. On work pieces made from steel they create bright surface finishes.



MEDIA TYPE	QUINTO (QUI) (a x b)	STAR (STE) (a x b x c)	PYRAMID (PYR) (a)	ARROWHEAD (PFG) (a x b)	RHOMBUS (RHO) (a x b x c)	SPHERE (KUG) (a)
WXC						
MAC						6
Z						
F	10 (13 x 10) 15 (18 x 15)	22 x 10 x 8	15	14 x 14		
PI	25 (28 x 25) 30 (33 x 30)	35 x 17 x 12 40 x 20 x 15	25 35	19 x 19 24 x 24	50 x 30 x 30	
BA	35 (38 x 35)		45			
WV						
FSG						4 6 8
DK						
MHS						
MHC						
GP						4 6 8

INCREASING GRINDING PERFORMANCE

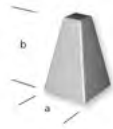




trowalplast PLASTIC MEDIA

FOR GENTLE PROCESSING

Plastic media have a lower weight (bulk density) than ceramic. Therefore, they are ideal for finishing work pieces made from soft metals, such as aluminum die-castings. Plastic media allow a highly gentle processing. An added benefit is that they do not chip.



QUALITÄT	PYRAMID (PYR) (a)	WEDGE (PQ) (a x b)	TRISTAR (TRI) (a)	CONE (KEG) (a)
HSC				8 12 16 19 24 29 39 49 59
HDC	10 15 20 25 30 40		22 32 42	8 12 16 19 29 39
ET		11 (11 X 16)		8 12 16 19 24 29 39 49 59
SP	10 15 20 25 30 40 50 60		22 32 42 52	
NG	10 15 20			12 16 19
XS	10 15 20 25 30 40 50 60		22 32 42 52	8 12 16 19 24 29 39 49 59
HDM	10 15 20 25 30 40		22 32 42	8 12 16 19 29 39
V 2030-NC	10 15 20 25 30 40 50 60	11 (11 x 16)	22 32 42 52	8 12 16 19 24 29 39 49 59
HDP	10		22 32 42	8 12 16 19
AF	10 15 20 25 30 40 50 60		22 32 42 52	8 12 16 19 24 29 39 49 59
CX				
PP	15			19

INCREASING GRINDING PERFORMANCE





Plastic media are preferably used for soft and non-ferrous metals. Depending on the finishing process, the surface tends to have a mat finish.



QUALITÄT	PARABOLOID (PA) (a x b x c)	KITE (DRAE) (a x b x c)	KITE (DRAR) (a x b x c)	LENS (LIN) (a)	NIPPLE (NIP) (a x b)
HSC	28 (28 x 16 x 28) 41 (41 x 23 x 41) 51 (51 x 27 x 51) 61 (61 x 33 x 61)				
HDC	28 (28 x 16 x 28) 41 (41 x 23 x 41)				
ET	28 (28 x 16 x 28) 41 (41 x 23 x 41)				
SP	51 (51 x 27 x 51)	63 (63 x 32 x 22)	75 (75 x 61 x 37)		
NG	28 (28 x 16 x 28)				
XS	28 (28 x 16 x 28) 41 (41 x 23 x 41) 51 (51 x 27 x 51)	63 (63 x 32 x 22)	75 (75 x 61 x 37)		
HDM	28 (28 x 16 x 28) 41 (41 x 23 x 41)				
V 2030-NC	28 (28 x 16 x 28) 41 (41 x 23 x 41) 51 (51 x 27 x 51)	63 (63 x 32 x 22)	75 (75 x 61 x 37)	14	
HDP	28 (28 x 16 x 28) 41 (41 x 23 x 41)				
AF	28 (28 x 16 x 28) 41 (41 x 23 x 41) 51 (51 x 27 x 51)	63 (63 x 32 x 22)	75 (75 x 61 x 37)		
CX					53 (40 x 51) 62 (50 x 60)
PP					

INCREASING GRINDING PERFORMANCE





trowal LIQUID COMPOUNDS – FLOW-THROUGH PROCESSING MODE

Special compounds for applications, where the process water is not recycled.

› Suitable for treating work pieces made from steel, stainless steel, non-ferrous metals, ceramic and plastic

TYPE	pH RANGE	CHARACTERISTICS			WATER CONDITIONS	REMARKS
		CORROSION PROTECTION	CLEANING / DEGREASING	BRIGHTENING		
trowal ARF-5	Alkaline	++	+	++	Complete hardness range	Extensive foaming
trowal S 70	Alkaline	++	+	0	10 – 15	
trowal KH65	Slightly alkaline	++	0	+	10 – 15	
trowal KTI	pH neutral	++	++	++	Complete hardness range	Minor foaming, for titanium
trowal M 10	Slightly alkaline	+	+	++	Complete hardness range	Extensive foaming

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)



trowal LIQUID COMPOUNDS – RECYCLING MODE

For process water recycling systems utilizing a centrifuge we supply process water cleaning compounds that produce very little foam.

› Suitable for treating work pieces made from steel, stainless steel, non-ferrous metals, ceramic and plastic

TYPE	pH RANGE	CHARACTERISTICS			WATER CONDITIONS	REMARKS
		CORROSION PROTECTION	CLEANING /DEGREASING	BRIGHTENING		
trowal KFL	Slightly alkaline	+	+	++	10 – 15	Universally usable
trowal DE 97	Alkaline	++	++	+	10 – 15	Degreasing compound
trowal KR 50	Alkaline	++	+	+	10 – 15	Very good corrosion protection

Compounds containing no soap and not affected by the hardness of the process water

TYPE	pH RANGE	CHARACTERISTICS			WATER CONDITIONS	REMARKS
		CORROSION PROTECTION	CLEANING /DEGREASING	BRIGHTENING		
trowal KRA	Slightly alkaline	+	++	+	Complete hardness range	Universally usable
trowal SGK	Alkaline	+	++	+	Complete hardness range	Good corrosion protection on non-ferrous metals, degreasing compound, high surface energy on aluminum and zinc die-castings
trowal KRS	Alkaline	++	+	+	Complete hardness range	Very good corrosion protection
trowal OS 30	Alkaline	++	++	0	Complete hardness range	Good corrosion protection on steel, excellent degreasing compound – demulsifying effect
trowal AL 01	pH neutral	++	+	++	Complete hardness range	Particularly effective on non-ferrous metals

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)



trowal POWDER COMPOUNDS – GRINDING SUPPORT

Compounds in powder form enhance the grinding performance and support the degreasing function

› Suitable for treating work pieces made from steel, stainless steel, non-ferrous metals, ceramic and plastic

TYPE	pH RANGE	CHARACTERISTICS			RECYCLING MODE	REMARKS
		GRINDING PERFORMANCE	CLEANING /DEGREASING	CORROSION PROTECTION		
trowal VS	pH neutral	++	-	-	++	Very little foam
trowal 9 A	pH neutral	++	-	-	++	Very little foam
trowal HG	Alkaline	+	+	-	+	Very little foam
trowal K 10	Highly alkaline	-	++	++	0	Minor foaming
trowal K 15	Highly alkaline	-	++	++	-	Extensive foaming
trowal K 25	Highly alkaline	-	++	++	-	Extensive foaming
trowal B 2	Alkaline	-	++	++	++	Very little foam

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)



trowal LIQUID COMPOUNDS – PICKLING AND BALL BURNISHING

Special compounds for pickling and ball burnishing. Commonly used in flow-through processing mode.

› Suitable for treating work pieces made from steel, stainless steel, non-ferrous metals, ceramic and plastic

TYPE	pH RANGE	CHARACTERISTICS			FOAM	REMARKS
		PICKLING EFFECT	CLEANING	DEGREASING		
						ESPECIALLY SUITABLE FOR ...
trowal AG 26	Acidic	+	++	++	Extensive foaming	Finishing of silver
trowal KP 12	Acidic	+	++	++	Minor foaming	
trowal FMV	Acidic	+	++	++	Extensive foaming	Smoothing and polishing of automotive wheels
trowal LZ 11	Highly acidic	++	0	0	Minor foaming	Finishing of copper and brass

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)





trowapast PASTES FOR SURFACE GRINDING AND POLISHING

The trowapast grinding and polishing pastes generate high-gloss surface finishes. They are primarily acting on the work piece surfaces but do not affect the edges. For example, they are used for finishing knife blades. The trowapast pastes are mainly used in flow-through processing mode.

› Suitable for treating work pieces made from steel, stainless steel, non-ferrous metals, ceramic and plastic

TYPE	pH RANGE	CHARACTERISTICS				REMARKS
		GRINDING EFFECT	POLISHING EFFECT	CORROSION PROTECTION	APPLICATION	
trowapast PKR	Alkaline	++	+*)	++	Pre-grinding – polishing*)	Especially for hard materials
trowapast PKS	Alkaline	++	0	++	Grinding – fine grinding	
trowapast PKZ	Alkaline	++	+	++	Grinding – fine grinding	
trowapast PKV	Alkaline	+	++	++	Fine grinding – polishing	
trowapast PKC	Alkaline	++	++*	++	Grinding – polishing*)	Also suitable for ceramic materials
trowapast PKP	Alkaline	-	++	++	Polishing	
trowapast PKM	Alkaline	-	++	++	Polishing	Especially for brass

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)

*) Cycle time more than 24 hours



trowalpur LIQUID WATER CLEANERS

The trowalpur water cleaners are used for cleaning the process water, going either to drain or being recycled back to the mass finishing process. After the mass finishing operation the process water is contaminated with the fines from the work pieces and media and, frequently, contains oil. With the trowalpur cleaners our customers make sure that the cleaned water going to drain is in full compliance with all legal regulations.

TYPE	pH RANGE	CHARACTERISTICS			RECYCLING MODE	REMARKS
		MEDIA WEAR	METAL FINES	SURFACTANTS / OIL		
trowalpur LAC	Highly acidic	++	++	++	-	In combination with a neutralization agent for waste water flocculation systems
trowalpur F	pH neutral	+	0	+	-	
trowalpur C	Slightly acidic	++	+	-	++	Special applications
trowalpur R	Slightly acidic	++	+	0	++	Universal use
trowalpur S	Slightly acidic	++	+	0	++	Natural ingredients, no chlorides
trowalpur T	Slightly acidic	++	+	+	++	Universal use, overdosing must be prevented
trowalpur E	Slightly acidic	++	+	+	++	Natural ingredients, low chloride content

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)





trowalpur POWDER WATER CLEANERS

The trowalpur water cleaners are used for cleaning the process water, going either to drain or being recycled back to the mass finishing process. After the mass finishing operation the process water is contaminated with the fines from the work pieces and media and, frequently, contains oil. With the trowalpur water cleaners our customers make sure that the clear water going to drain is in full compliance with all legal regulations. Powder water cleaners can be added to the process water manually or automatically.

TYPE	pH RANGE	CHARACTERISTICS			RECYCLING MODE	REMARKS
		MEDIA WEAR	METAL FINES	SURFACTANTS / OIL		
trowalpur ESM	Slightly alkaline	++	++	++	++	Also used as a flocculant
trowalpur ESB	Slightly alkaline	++	++	++	+	Also used as a flocculant
trowalpur ESZ	Alkaline	++	++	++	++	Maintains the alkaline pH value, removes oil
trowalpur ESO	pH neutral	+	-	++	++	In combination with liquid flocculants for removal of oil

trowal PROCESS WATER STABILIZERS

Auxiliary compounds are used for adjusting the process water parameters such as pH value, water hardness or foaming conditions.

TYPE	pH RANGE	CHARACTERISTICS			RECYCLING MODE	REMARKS
		FOAM	CLEANING	CORROSION PROTECTION		
trowal PH PLUS	Alkaline	-	-	-	++	Increases the pH value of the process water
trowal SBW	Slightly alkaline	-	-	-	++	Increases the water hardness
trowal SB 93	pH neutral	0	+	-	+	De-foaming agent
trowal CL 21	Alkaline	0	++	++	++	General process water cleaning compound

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)



trowapol DRYING AND POLISHING MEDIA

After the finishing process the work pieces are still wet. They can be dried in a heated vibratory drier filled with a granular drying material. This ensures that the work pieces are completely dry and free of water stains. The granular material also removes residual media and metal fines from the work pieces and has a light polishing effect.

The granular drying media consists of organic materials.

- Shredded corn cob has excellent drying characteristics with a light polishing effect. In addition, it removes loose contaminants like media and metal fines from the work pieces
- Crushed nut shells have a relatively high density and, therefore, a high dimensional stability

› Suitable for all surfaces

TYPE	pH RANGE	CHARACTERISTICS			REMARKS
		GRAIN SIZE	DRYING EFFECT	POLISHING EFFECT	
trowapol GRAN 2	pH neutral	0.50 – 1.18 mm	++	+	Corn cob granules
trowapol GRAN 3	pH neutral	0.75 – 1.60 mm	++	+	Corn cob granules
trowapol GRAN 4	pH neutral	1.18 – 3.15 mm	++	+	Corn cob granules
trowapol GRAN 6	pH neutral	3.15 – 4.5 mm	++	+	Corn cob granules
trowapol NUSS 1	pH neutral	0.20 – 0.45 mm	+	++	Crushed nut shells
trowapol NUSS 4	pH neutral	1.70 – 2.40 mm	+	++	Crushed nut shells
trowapol NUSS 5	pH neutral	2.40 – 4.00 mm	+	++	Crushed nut shells

++ = Very good suitability (high) | + = Good suitability (medium) | 0 = Limited suitability (low) | - = No suitability (none)



TROWAL AUXILIARY MEDIA

PRESSURE DEBURRING AND BALL BURNISHING

The most popular media for pressure deburring and ball burnishing are steel balls with diameters between 2.5 and 5.0 mm, satellites and pins. Depending on the finishing process, these steel media are available in different stainless steel grades.

REMOVAL OF LIGHT BURS

Glass beads are generally used for the removal of light burs on work pieces with complex shapes. Because of their small size – 2.0 to 10.0 mm – the risk of the glass beads getting lodged in the work pieces is minimal!

PREVENTING FLAT, THIN WORK PIECES FROM STICKING TOGETHER

ATK and KLS anti adhesion beads ensure that flat and thin work pieces (for example, washers) are not sticking together during the finishing process and receive an all-around treatment. For challenging applications the beads can be supplied in sizes between 100 and 300 µm.

TYPE	pH RANGE	CHARACTERISTICS		REMARKS
		BEAD SIZE		
trowal ATK	pH neutral	0.3 – 0.9 mm	Maintains its shape up to a temperature of 85°C	Anti-adhesion media for work pieces that tend to stick together
trowal KLS	pH neutral	0.1 – 0.3 mm		
trowal GLK 2 – 12	pH neutral	2 – 12 mm	Round beads	Glass media for fine grinding, generates a mat finish



TECHNICAL SUPPORT – MORE THAN JUST MEDIA AND COMPOUNDS

We provide technical support that goes well beyond the supply of equipment and consumables. This includes help in selecting the optimal finishing equipment and consumables, assistance with approval procedures and work place safety, support with REACH conformity issues or cradle-to-cradle certification.

TESTS ENSURE CERTAINTY

With processing trials in our test lab we determine which machinery, media and compound will be most suitable for new work pieces our customers must process. For these trials we are taking advantage of the experience and knowhow of our colleagues working in different departments and coming from different technical backgrounds.

THE RIGHT CHEMISTRY IS ESSENTIAL

Our colleagues in the chemical lab make sure that our products are always in compliance with all current legal requirements. Of course, they are also involved in the processing trials and help select the most suitable compounds.

If needed, they analyze the process water samples from our customers and make certain that all legal limits are met.

DOCUMENTS CREATE TRUST

Since we are producing our machinery and consumables in-house, we can provide our customers with complete documentations that are required for the safe operation of their finishing processes. For example, this includes proof that our consumables do not contain any animal substances or forbidden minerals; or that they are in full compliance with explosion protection regulations.

All our safety data sheets are available in the required languages.

AND WHY ARE WE ABLE TO DO ALL THIS?

We have a deep knowledge of the equipment and the consumables used in mass finishing operations. And we have comprehensive experience with a multitude of different mass finishing applications.



WAL THER
TROWAL !

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