

### Design, Supply & Support

One Stop Solution to your Filters Production

# **PLM FILTER SOLUTION** Automotive Air Filter

Hebei Leiman Filter Material Co., Ltd Hebei Luman Filter Parts Co., Ltd





#### To start a new factory, you may want to know:

- How much profit can I get from producing filters?
- How much money do I need to invest to build a complete filter line?
- What kinds of machinery and raw materials do I need to purchase?
- If I don't know how to operate the machinery or have questions about the filter production flow, how can I solve these problems?
- How can I train my workers to operate the machines smoothly?
   More...

### What You Need is Exactly What We Can Supply.

Founded in 1990, PLM was specialized in filter element manufacturing. After years of development, PLM has become a filter production solution designer. So far, our solutions cover car and heavy-duty air filters, cabin filters, oil & fuel filters, primary/ middle/high efficiency filters. We supply a complete line of filters production, from filter materials, production machines, testing machine to production line configuration and production process optimization to eliminate our customers free from worries. Today we have more than 200 kinds of machines and models fulfilling industry's devise requirements. We have gained the ISO, CE and CO certifications.





### **SOMETHING WE CAN DO**

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### **Process & Machine Solution**

- Process Guidance
- Production Machine
- Multiple Choice of Machine Configuration

### **Material Solution**

- Division of High/Middle/Normal grade, Multi-level Raw Material
- More Cost-effective Options

### **Technical Support**

- Production cost and profit calculation
- Extendable upgradable production line and reasonable layout
- Worker training
- Machine installation, maintenance and guidance
- Technological improvement, optimized production flow
- Machine & mold customization
- Professional team after-sales support



Design, Supply & Support One Stop Solution to your Filters Production





Design, Supply & Support

### Machine Solutions – Pu Air Filter Line



### Filter Paper Pleating











#### **PLM-350A**

Full-Auto Filter Paper Pleating Production Line



### Filter Paper Cutting

2.







PLLZ-II

Filter Paper Press Cutting Machine



### Special Shaped Filter Cutting (optional)







PLHL-1

Special-Shaped Filter Trimming Machine



### PU Frame Molding & Air Filter Assembly

4.







PU-20F

Air Filter PU Glue Injection Machine



### Air Filter Middle Line Gluing













Panel Air Filter Gluing Machine



## 6. PU Adhesive Heating/Drying





PLBL-60 Best choice

Station Automatic U Type Rotary Oven Production Line



Design, Supply & Support One Stop Solution to your Filters Production





#### PLTK-16

Full-Auto 16-Station HDAF Turntable Curing Production Line



### PU Adhesive Frame Trimming



8.

7.

### Printing





**PLPM-1210** 

Fully Automatic Printing Machine



### Film Shrinking





## 10.

### Convey







## Packing

11.







#### PLM-DB5060

Automatic Sealing and Strapping Machine



### Material Solutions – Pu Air Filter Line

**Filter Paper** 



Filter paper is processed by mixing plant fiber pulp and a little cotton pulp. Because of its fiber structure, leaving numerous tiny holes for liquid particles passing through and leaving solid particles out, which is the basic principle of solid and liquid separation.

Leiman Code	Basic Weight	Thickness	Volatile	Air Permeability	Burst Strength	Stiffness	Max Pore Size
	g/m <sup>2</sup>	mm		L/m²/s (∆P=200 Pa)	kPa	mg	um
LMCA3028	130±5	0.45±0.05	3.5±0.5	260–280	> 260	> 4.2	< 85
LMCA2040	120±5	0.35±0.05	3.5±0.5	400–450	> 240	> 4.0	< 65

Note: As for the color, size and specification parameter can be changed as per the customer"s requirement.

#### PU adhesive





PU adhesive is widely used in the full automatic PU pouring machine, semi automatic PU casting machine and manual pouring process. PU adhesives are often used to be molded to form PU air filter frames to replace the traditional metal end caps.

PU Glue Type		LM1252	LM1335	
PU Glue Type		LM1252	LM1335	
Shore Hardness		22±5	22/50±5	
Total Density (kg/m3)		400+150	400/850+150	
Tensile Strength (MPa)		P≥0.8	P≥0.8	
Elongation (%)		≥180	≥180	
Compression Permanent Deformation	า (%)	≤20	≤20	
Falling Ball Resilience (%)		≥50	≥50	
Mixed Mass Ratio=A:B		100:25	100:33	
Liquid Color	А	Orange	Orange	
	В	Khaki	Khaki	
Donoity (g/ml)	А	1.02±0.05	1.02±0.05	
Density (g/IIIL)	В	1.22±0.05	1.22±0.05	
Viegosity (MPs s At 25 °C)	A	800-1000	800-1000	
VISCUSILY (IVIFA'S AL 20 C)	В	170–250	170–250	

Note: As for the color, size and specification parameter can be changed as per the customer"s requirement.





#### Hot Melt Glue



Hot melt glue, also called hot melt adhesive is widely used in air filters and oil filters for bonding, shaping and assembling in the production process. Because hot melt glue is environmental protection and fast curing, which can increase production efficiency.

For Pleating Stabilization



For Pleating Paper Bonding



Glue Model	LMHM180	LMHP232	
Application	For Pleating Stabilization of Air Filter	For Pleating Paper Bonding of Car Air Filter	
Appearance	Yellow transparent particle	Milky white particles	
Density	0.879 g/cm <sup>3</sup>	-	
Contents	PO (Polyolefin)	EVA	
odor	Odourless	Odourless	
Melt Condition	Yellow transparent	Yellow transparent	
Melt Speed	Moderate	3–5 s	
High Temperature Resistance	100 °C	100±5 °C	
Low Temperature Resistant	-20 °C	-	
Viscosity	6000–10000 cP (180 °C)	5500–8500 cP (180 °C)	
Softening Point	110±10 °C	110±5 °C	
Glue performance	Even & smooth	Even & smooth	
Recommended Operating Temperature	110–120 °C	160–180 °C	
Advantage	Low density, good low temperature resistance, not brittle, good fluidity.	Good viscosity, fast curing speed, high temperature resistance, high cost performance.	

Note: As for the color, size and specification parameter can be changed as per the customer"s requirement.



#### **Plastic Molds**

Plastic molds are widely used for PU frame molding in the PU air filter production. We have several standard plastic molds for you to produce popular PU air filters at the market, special molds can be customized according to your requirements or original part number.

Plastic Molds	Applicable Brands	
	LMR Type	<ul> <li>BMW</li> <li>FORD</li> <li>GM</li> <li>HYUNDAI/KIA</li> <li>ISUZU</li> <li>MAZDA</li> <li>MERCEDES BENZ</li> <li>MITSUBISHI</li> <li>NISSAN</li> <li>OPEL</li> <li>PEUGEOT</li> <li>RENAULT</li> <li>VOLVO</li> <li>VOLKSWAGEN</li> </ul>
	LMT Туре	<ul><li>RENAULT</li><li>PEUGEOT</li></ul>
800	LMO Туре	<ul> <li>BMW</li> <li>GM</li> <li>MAZDA</li> <li>MERCEDES BENZ</li> <li>NISSAN</li> <li>RENAULT</li> <li>SUZUKI</li> <li>TOYOTA</li> </ul>
	LMI Type	• Mazda • Mitsubishi • Hummer

Note: As for the color, size and specification parameter can be changed as per the customer"s requirement.







Design, Supply & Support

### Machine solutions – Truck Air Filter

### **1.** Filter Paper Pleating





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PLM-ZZ-700 PLM-ZZ-800

Drum Type Air Filter Folding Machine

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Drum Type Air Filter Folding Machine



PIm-ZZ-1000 \* Drum Type Air Filter Folding Machine







#### PLM-ZZ-1000A

Drum Type Air Filter Folding Machine



### Inner & Outer Mesh Rolling







#### PLJY350-1000

HDAF Mesh Cutting & Rolling Machine



### Inner & Outer Mesh Slitting







### Inner & Outer Mesh Hooking & Pressing







**PLGY-500** 

HDAF Mesh Hooking And Pressing Machine



### Inner & Outer Mesh Seam Welding







#### PLM-GH-660

Automatic Roll Welding and Forming Machine



### Mesh Spot Welding





### Inner & Outer Mesh Spiral Rolling











### Filter Paper And Inner & Outer Mesh Assembly





### Metal Caps And Gluing







### Pu Injection







PU-20F

Air Filter PU Glue Injection Machine







PLM-PU-1 Best choice

Single Station PU Glue Injection Machine





PLM-PU-2

Double Station PU Glue Injection Machine



### **Oven Heating**



Full-Auto 16-Station HDAF Turntable Curing Production Line



### Filter Gluing Inside And Outside&Wire Wrapping







12.



**PLWS-950** 

HDAF Horizontal Gluing Machine



**PLRX-1000** 

HDAF Hot Melt Threading Machine





### **Rubber Seal Sticks**




### Printing

14.







PLPM-1210

Fully Automatic Printing Machine



Design, Supply & Support

**Filter Paper** 





Filter paper is processed by mixing plant fiber pulp and a little cotton pulp. Because of its fiber structure, leaving numerous tiny holes for liquid particles passing through and leaving solid particles out, which is the basic principle of solid and liquid separation.

Leiman Code	Туре	Basic Weight (Before Cured)	Basic Weight (After Cured)	Air Permeability	Max. Pore Size	Average Pore Size	Thickness	Corrugated Depth	Stiffness (Before Cured)	Stiffness (After Cured)	Burst Strength (Before Cured)	Burst Strength (After Cured)	Usage
-	-	g/m²	g/m²	L/m²/s (∆P=200 Pa)	um	um	mm	mm	mN/m	mN/m	kPa	kPa	-
LM115-165AC	Uncured	115±5	-	165±30	< 55	< 45	$0.65 \pm 0.05$	$0.45 \pm 0.05$	>5	-	> 260	-	For air filtration
LM115-120AC	Uncured	115±5	-	120±30	< 43	< 35	0.65±0.05	0.45±0.05	> 5	-	> 260	-	For air filtration
LM210-3500C	Uncured	210±10	-	350±50	< 75	< 60	1.0±0.1	0.35±0.05	> 15	-	> 450	-	For oil filtration
LM130-280AS	Cured	130±5	-	280±30	< 65	< 55	$0.55 \pm 0.05$	-	> 5	-	> 400	-	For air filtration
LM135-250AC	Uncured	135±5	-	250±30	< 60	< 50	$0.55 \pm 0.06$	$0.30 \pm 0.05$	> 4.5	-	> 270	-	For light duty air filtration
LM195-160AC	Uncured	195±10	-	160±20	< 60	< 50	0.75±0.05	$0.35 \pm 0.05$	> 10	-	> 550	-	For light duty air filtration
LM125-380LAS	Uncured	125±5	-	380±30	< 80	< 65	0.5±0.05	-	> 3.0	-	> 200	-	For light duty air filtration
LM125-330AS	Uncured	125±5	-	330±30	< 75	< 60	0.5±0.05	-	> 3.5	-	> 300	-	For light duty air filtration
LM135-550AS	Uncured	135±5	-	550±50	< 85	< 70	0.5±0.05	-	> 4.0	-	> 300	-	For light duty air filtration
LM135-130AC	Uncured	135±5	-	130±20	< 50	< 40	0.65±0.05	0.45±0.05	> 6	-	> 350	-	For gas turbin/ industry air filtration
LM120-245AC	Uncured	120±5	-	245±20	< 60	< 50	0.6±0.05	0.35±0.05	> 4	-	> 220	-	For gas turbin/ industry air filtration
LM90-5LOS	Uncured	90±5	-	5±2	< 35	< 25	$0.25 \pm 0.05$	-	-	-	> 500	-	For light car oil filtration
LM90-35FS	Uncured	90±5	-	35±5	< 45	< 30	0.4±0.03	-	-	-	> 230	-	For light car fuel filtration
LM460-200S	Uncured	460±15	-	20±5	< 35	< 25	1.0±0.1	-	> 20	-	> 600	-	For oil by pass filtration
LM280-200S	Uncured	280±7	-	20±10	< 35	< 25	0.7±0.1	-	> 20	-	> 450	-	For oil by pass filtration
LM245-20		245±10	-	20±3	< 20	< 15	0.75±0.05	-	> 8	-	> 500	-	Composite
LM295-400AS	Cured	295±10	285±10	400±50	< 85	< 70	1.5±0.1	-	> 50	> 70	> 450	> 600	For air filtration
LM208-5000C	Cured	208±10	198±10	500±50	< 85	< 75	1.1±0.1	$0.35 \pm 0.05$	> 6	> 10	> 400	> 500	For oil filtration
LM135-5500C	Cured	135±5	125±5	550±50	< 80	< 65	0.65±0.05	$0.35 \pm 0.05$	> 3	> 4	> 200	> 380	For oil filtration
LM205-3000C	Cured	205±10	195±10	300±30	< 60	< 50	1.0±0.1	$0.35 \pm 0.05$	>9	> 12	> 280	> 450	For oil filtration
LM190-3000C	Cured	190±8	185±8	300±30	< 70	< 60	0.9±0.09	0.35±0.05	> 4	> 8	> 300	> 400	For oil filtration
LM180-3500C	Cured	180±8	170±8	350±50	< 75	< 65	0.9±0.09	0.35±0.05	-	> 10	> 300	> 400	For oil filtration
LM180-4500C	Cured	180±7	167±7	450±50	< 75	< 60	0.9±0.1	0.35±0.05	> 6	>7	> 280	> 400	For oil filtration
LM175-3300C	Cured	175±8	165±8	330±30	< 70	< 55	0.65±0.05	0.35±0.05	> 6	> 8	> 400	> 550	For oil filtration



Leiman Code	Туре	Basic Weight (Before Cured)	Basic Weight (After Cured)	Air Permeability	Max. Pore Size	Average Pore Size	Thickness	Corrugated Depth	Stiffness (Before Cured)	Stiffness (After Cured)	Burst Strength ( Before Cured)	Burst Strength (After Cured)	Usage
-	-	g/m <sup>2</sup>	g/m <sup>2</sup>	L/m²/s (∆P=200 Pa)	um	um	mm	mm	mN/m	mN/m	kPa	kPa	-
LM165-4000C	Cured	165±8	155±8	400±50	< 75	< 65	0.65±0.05	0.35±0.05	> 3	> 5	> 150	> 350	For oil filtration
LM140-4500C	Cured	140±5	135±5	450±50	< 80	< 70	0.75±0.05	0.35±0.05	> 3	> 5	> 250	> 300	For oil filtration
LM125-8000C	Cured	125±5	120±5	800±80	< 90	< 75	0.70±0.05	0.35±0.05	> 3	> 4	> 180	> 250	For oil filtration
LM240-90FC	Cured	240±10	230±10	90±30	< 45	< 35	0.78±0.05	0.35±0.05	> 12	> 14	> 300	> 450	For fuel filtration
LM150-100FC	Cured	150±8	140±8	100±30	< 50	< 35	0.6±0.05	0.35±0.05	> 4	> 6	> 300	> 450	For fuel filtration
LM140-150FC	Cured	140±5	130±5	150±30	< 50	< 40	0.6±0.05	$0.35 \pm 0.05$	> 4	> 5	> 250	> 400	For fuel filtration
LM208-4800S	Cured	208±10	198±10	480±80	< 85	< 70	1.0±0.1		> 12	> 15	> 400	> 500	For oil filtration
LM180-80FC	Cured	180±7	165±7	80±10	< 45	< 35	0.65±0.05	0.35±0.05	> 6	> 10	> 350	> 500	For Fuel filtration
LM90-35CF	-	90±5	-	35±5	< 40	< 28	0.4±0.03	-	0.1	-	> 230	-	-

#### **Filter Mesh**



Perforated metal mesh is made of galvanized or stainless steel plates, which has excellent corrosion resistance performance for long term use. Perforated metal mesh has rigid structure and long service life to protect filters from transformation. It is widely used as inner support mesh or outer protective mesh of truck air filter, car air filter, eco fuel and oil filters and hydraulic filters.

Aperture (mm)	Pitch (mm)	Thickness (mm)	Dimension (m)
4	2		
6	2	0.4/0.5/0.6	1 × 20
8	3		

#### **Inner Filter Media**



Inner filter media is mainly applicable to heavy duty truck or engineering vehicle air filters, gear oil filters and oil filters, featuring good elasticity, firm structure and repeated cleaning.



#### End Cap





Metal end caps are mainly used for the end closure of paper (filter cloth) and filter screens of heavy-duty vehicle air filter. The two ends of the filter paper and the filter screen are sealed to ensure that all the gas passes through the filter paper (filter cloth) without short circuit.

Brand	Original Part Number	Filter Element Dimension (mm) OD $\times$ ID1 $\times$ H	Bottom End Cap Inner Diameter ID2 (mm)
Mercedes BENZ	0030944204	327 × 161 × 259	10.5
Mercedes BENZ	0020942404	327 × 167 × 353	11
Mercedes BENZ	0040940204	279 × 125 × 409	-
Mercedes BENZ	0030945004	302 × 192 × 475	11
Mercedes BENZ	0030941504	303 × 192 × 475	10
Mercedes BENZ	0030949604	279 × 125 × 349	_
Mercedes BENZ	0030941604	180 × 152 × 451	17
Mercedes BENZ	0010948304	327 × 167 × 259	11
Mercedes BENZ	0010949304	276 × 133 × 257	11
Mercedes BENZ	0010947304	264 × 132 × 231	11
Mercedes BENZ	0030947004	327 × 192 × 482	11
Mercedes BENZ	0010949404	209 × 103 × 219	8.5
Mercedes BENZ	0010944204	197 × 103 × 376	8.5
Mercedes BENZ	0030949104	420 × 254 × 318	10.5
Mercedes BENZ	0030949204	420 × 254 × 261	10.5
Mercedes BENZ	4192494A	163 × 86 × 350	8.5
Mercedes BENZ	41272212	327 × 217 × 618	10.5
Mercedes BENZ	0010941004	227 × 117 × 381	10.5
VOLVO	8149961	333 × 199 × 417	-
VOLVO	475755	270 × 177 × 577	11
VOLVO	8149064	305 × 150 × 414	-
VOLVO	1544449	350 × 211 × 366	10.5
VOLVO	1660903	197 × 166 × 320	10.5
VOLVO	475386	310 × 200 × 368	10.5
VOLVO	1080918	271 × 160 × 600	-
VOLVO	0010944704	228 × 116 × 383	10.5
VOLVO	1660376	270 × 177 × 577	10.5
VOLVO	1665563	259 × 184 × 545	-
SCANIA	0030945004	302 × 192 × 475	10.5
IVECO	370754	301 × 191 × 475	10.5
IVECO	395773	$302 \times 192 \times 379$	11
IVECO	197946201	310 × 132 × 496	11
IVECO	P117437	$280 \times 170 \times 418$	17
IVECO	107029	306 × 196 × 521	17
IVECO	2992374	327 × 217 × 482	10.5
IVECO	P150706	173 × 88 × 368	17
IVECO	41272212	327 × 217 × 618	10.5
IVECO	1904581	150 × 71 × 336	8.5
IVECO	1905983	243 × 132 × 286	10.5
IVECO	41272515	327 × 217 × 515	10.5



Brand	Original Part Number	Filter Element Dimension (mm) OD $\times$ ID1 $\times$ H	Bottom End Cap Inner Diameter ID2 (mm)
RENAULT	70660360	234 × 123 × 345	17
RENAULT	AZ39761	306 × 196 × 423	17
RENAULT	5010066304	307 × 194 × 472	17
RENAULT	0003564135	324 × 212 × 533	4.5
RENAULT	P117797	264 × 153 × 568	4.5
RENAULT	5010094146 5000751674	281 × 171 × 391	17
RENAULT	70662471 70662477	164 × 135 × 408	17
RENAULT	7411394	$306 \times 195 \times 398$	17
RENAULT	5010064372	162 × 134 × 381	17
RENAULT	P117437	281 × 171 × 421	17
RENAULT	219517	$242 \times 132 \times 496$	10.5
RENAULT	0010944704	228 × 116 × 381	10.5
RENAULT	5000559401 5001860615	166 × 76 × 321	-
RENAULT	17801-A0108	$190 \times 102 \times 243$	22
HINO	17801-2410	$190 \times 104 \times 243$	22
HINO	17801-2490	$306 \times 196 \times 495$	23
HINO	17801-2550	$306 \times 196 \times 469$	17
HINO	17801-2900	$160 \times 132 \times 312$	17
HINO	17801-1020	306 × 196 × 469	17
HINO	17801-2290	306 × 196 × 418	23
HINO	17801-2910	277 × 165 × 367	23
MANN	C23440/1	228 × 116 × 381	10.5
MANN	2165044	$163 \times 86 \times 350$	8.5
MANN	C20325/2	$198 \times 132 \times 376$	8.5
MANN	219517	$242 \times 132 \times 496$	10.5
MANN	0030945004	$303 \times 192 \times 475$	10.5
MANN	0030941504	$303 \times 192 \times 475$	10.5
MANN	P778441	$243 \times 132 \times 376$	10.5
DAF	197946201	$242 \times 126 \times 420$	10.5
DAF	395773	302 × 191 × 381	10.5
DAF	218989	$197 \times 103 \times 376$	8.5
DAF	0010944704	227 × 117 × 381	10.5
DAF	219517	$242 \times 132 \times 496$	10.5
DAF	16546-T3401	155 × 79 × 201	13.5



#### **Plastic Molds**



Plastic molds are widely used for PU frame molding in the PU air filter production. It can increase production efficiency and is flexible to match almost all of PU air filter models.

We have several standard plastic molds for you to produce popular PU air filters at the market, special molds can be customized according to your requirements or original part number.

Brand	Original Part Number	Dimension $OD \times ID \times H$ (mm)
BMW	13721257764	315 × 242 × 51
	25040929	$247 \times 207 \times 77$
GM	25062419	$265 \times 202 \times 53$
	93152533	237 × 184 × 50
	F80123603	$282 \times 215 \times 57$
IVIAZDA	B30113Z40	214 × 157 × 45
MERCEDES BENZ	0020948704	407 × 326 × 84
	0020948804	$407 \times 326 \times 64$
	1654689W00	$250 \times 200 \times 71$
NISSAN	16546S0100	262 × 200 × 61
	16546U6710	$286 \times 232 \times 60$
	7701349026	257 × 193 × 60
RENAULT	7701034872	$265 \times 208 \times 64$
	7701047655	257 × 199 × 92
SUZUKI	1378078100	203 × 155 × 47
ΤΟΥΟΤΛ	1780187701	230 × 174 × 51
IUYUIA	1780113010	188 × 110 × 57

#### PU adhesive





PU adhesive is widely used in the full automatic PU pouring machine, semi automatic PU casting machine and manual pouring process.

PU Glue Type		LM1252	LM1335		
PU Glue Type		22±5	22/50±5		
Shore Hardness		400+150	400/850+150		
Total Density (kg/m3)		P≥0.8	P≥0.8		
Tensile Strength (MPa)		≥180	≥180		
Elongation (%)		≤20	≤20		
Compression Permanent Deform	mation (%)	≥50	≥50		
Falling Ball Resilience (%)		100:25	100:33		
Mixed Mass Ratio=A:B		Orange	Orange		
Liquid Color	А	Khaki	Khaki		
	В	1.02±0.05	1.02±0.05		
Donoity (a/ml.)	А	1.22±0.05	1.22±0.05		
Density (g/IIIL)	В	800-1000	800-1000		
Vincenty (MDa a At 25 °C)	А	170–250	170–250		
VISCUSILY (IVIPA-S AL 25 °C)	В	170–250	170–250		





#### Hot Melt Glue



Hot melt glue, also called hot melt adhesive is widely used in air filters and oil filters for bonding, shaping and assembling in the production process. Because hot melt glue is environmental protection and fast curing, which can increase production efficiency.

Glue Model	LMHM180	LMHP232		
Application	For Pleating Stabilization of Air Filter	For Pleating Paper Bonding of Car Air Filter		
Appearance	Yellow transparent particle	Milky white particles		
Density	0.879 g/cm <sup>3</sup>	-		
Contents	PO (Polyolefin)	EVA		
odor	Odourless	Odourless		
Melt Condition	Yellow transparent	Yellow transparent		
Melt Speed	Moderate	3–5 s		
High Temperature Resistance	100 °C	100±5 °C		
Low Temperature Resistant	-20 °C	-		
Viscosity	6000–10000 cP (180 °C)	5500–8500 cP (180 °C)		
Softening Point	110±10 °C	110±5 °C		
Glue performance	Even & smooth	Even & smooth		
Recommended Operating Temperature	110–120 °C	160–180 °C		
Advantage	Low density, good low temperature resistance, not brittle, good fluidity.	Good viscosity, fast curing speed, high temperature resistance, high cost performance.		



Hot glue applied along the filter paper



Hot glue applied along the expanded metal mesh



#### **Rubber Sealing Ring**



The rubber sealing ring is made of silica gel. It is used for spin-on filters and heavy duty air filters to ensure that the filter and the engine body are tightly connected. It can help filters resist changing pressure, mechanical loads and ensure that will not cause leakage even under extreme temperatures.

Sealing ring shape	square and triangle				
Color	red, light green, yellow, black, or customized according to customer requirements				
Square type rubber sealing ring	8 × 8. 10 × 10, 12 × 12, 10 × 12				
Triangle type rubber sealing ring	8 × 10, 10 × 12				
Weight/Net Content	1000 g				
Viscosity	2–5 mPa⋅s				
Tensile Shear Strength	≥10 MPa				

#### **Rubber Pad Glue**



Rubber pad glue is applicable to metal and rubber adhesive, especially suitable for filter rubber pad and the end cover of the adhesive.

The rubber pad glue is a quick-drying glue. After applying the glue to the rubber pad, press the end cap quickly, and then evenly apply pressure. It will stick firmly in 10 seconds, and use it after placing it for 24 hours.

Sealing Glue Model	LM1011	LM1012
Appearance	colorless transparent liquid	colorless transparent liquid
Cure Time	1 minute	10 seconds
Storage Period	12 months	6 months
Weight/Net Content	1000 g	750 mL
Viscosity	2–5 mPa∙s	2–5 mPa⋅s
Tensile Shear Strength	≥10 MPa	≥10 MPa





Design, Supply & Support One Stop Solution to your Filters Production









### Machine Solutions – Cabin Filter Line

1.

### Non-Woven Filter Cloth Pleating













Best choice PLCZ55-600-II

Full-Auto Knife

Paper Pleating

**Production Line** 



PLCZ55-800-II

Full-Auto Knife

Paper Pleating

Machine





Full-Auto Knife Paper Pleating Machine



PLCZ55-1250-II

Full-Auto Knife

Paper Pleating

Machine



#### PLCZ55-2050-II

Full-Auto Knife Paper Pleating Machine

### 47



### Non-Woven Filter Cloth Cutting







PLPW-1

Horizontal Multilayers Mesh Cutting Machine

З.

2.

### Special-Shaped Filter Element Cutting







PLHL-1

Special-Shaped Filter Trimming Machine



# 4.

### Cabin Filter Edge Material Cutting







PLHK-50

Cabin Filter Non-woven Piece Slitting Machine











Design, Supply & Support One Stop Solution to your Filters Production







## **5**.

### Cabin Filter Edge Bonding & Trimming









#### PLCB-500

Automatic Double-Side Automatic Bonding Machine

#### PLCB-500-4

Full-Auto Cabin Air Filter Bonding Machine









PLHX-1 Cabin Filter Trimming Machine



# 7.

### **Quality Inspection** (Visual)

## Printing





Fully Automatic **Printing Machine** 

## 8.

6.

### Film Shrinking





### Inner Box Packaging



Conveyor Belt

9.



#### Turntable table



Automatic labeling machine

Automatic Labeling Machine

PLTB-1





# 10.

### Packing







#### PLM-DB5060

Automatic Sealing and Strapping Machine



### Material Solutions – Cabin Filter Line

#### Non-Woven Filter Cloth



Non-woven filter cloth can be divided into standard non-woven cloth, thermoforming non-woven cloth, activated carbon non-woven and antibacterial non-woven cloth. Non-woven filter cloth are basic and important material in filter production. They are suitable for car air filters, cabin filters, household air purification filters, fuel filters, hydraulic system filters and dust filters.

Model	Weight	Thickness	Air permeability	Filtration Efficiency	Heat Resistance	Flame Retardancy	Pore Size	Dust Holding Capacity
unit	g/m <sup>2</sup>	mm	L/m <sup>2</sup> /s	%	°C		μm	g/m <sup>2</sup>
AC301 (White)	240±10%	2.7±0.3	≥ 1000	≥ 97	≥ 150		120–150	≥ 500
AC307A (beige)	260±10%	2.8±0.3	≥ 800	≥ 97	≥ 150		110–140	≥ 700
ACH240 (white)	240±10%	2.6±0.3	≥ 800	≥ 98.5	≥ 150	F1	80–110	≥ 700
ACH250-OEM (white)	250±10%	2.7±0.3	800–1300	≥ 98.5	≥ 150	F1	120–150	≥ 700
A0E609	260±10%	2.8±0.3	600–1200	≥ 98.5	≥ 150		120–150	120–150
AOE909 (white)	280±10%	3.6±0.3	800–1300	≥ 98.5	≥ 150		100–130	≥ 700
AC301-B3	240±10%	2.7±0.3	≥ 1000	≥ 97	≥ 150		120–150	≥ 500
AF250-P1	250±10%	2.0±0.3	≥ 1000	≥ 97	≥ 150		130–180	≥ 400
AF250-G2	250±10%	2.0±0.3	≥ 800	≥ 97	≥ 150		120–150	≥ 400
AF250-C-Y2	250±10%	1.8±0.2	≥ 800	≥ 97	≥ 150		120–150	≥ 400
GF250 (white)	250±10%	2.2±0.3	≥ 1000	≥ 96	≥ 150	F1	110–150	≥ 400



#### Hot Melt Glue





Hot melt glue, also called hot melt adhesive is widely used in air filters and oil filters for bonding, shaping and assembling in the production process. Because hot melt glue is environmental protection and fast curing, which can increase production efficiency. Different filter applications have different requirements for the characteristics and materials of filter hot melt glue. Commonly used filter hot melt glue include EVA, PO (Polyolefin), PA (Polyamide), etc. And PA hot melt glue is especially used for oil-resistant and high-temperature filtration.



Application	For Edge Bonding of Cabin Air Filter			
Appearance	White particle			
Density	-			
Contents	EVA			
odor	Odourless			
Melt Condition	Colorless and transparent			
Melt Speed	5–8 s			
High Temperature Resistance	0° 08			
Low Temperature Resistant	-			
Viscosity	5500-8500 cP (180 °C)			
Softening Point	95±5 °C			
Glue performance	Even & smooth			
*Recommended Operating Temperature	150–170 °C			
Advantage	Good initial tack, fast curing speed, high bonding strength, no glue opening.			







# 1.

### 3D View of Automatic Cabin Filter Element Production Line

Recently, we developed a new production line of cabin filters, which has less equipment and higher efficiency. Besides, the operation is more convenience than the traditional production lines.

This automatic cabin filter production line mainly consists of 3 parts: Pleating machine, automatic side bonding machine and automatic cutting machine.

The production process is origami forming  $\rightarrow$  automatic interval division and automatic edge side bonding  $\rightarrow$  automatic cutting  $\rightarrow$  automatic blanking.





### 2. Production line front view



### **3.** Production line top view



## 4. Equipment Introduction - Pleating Machine

- This origami glue injection equipment mainly consists of 3 parts: roll material rack, pre-cutting, origami machine;
- Action flow:
- unwinding of roll material  $\rightarrow$  pre-cutting according to the product  $\rightarrow$  automatic folding according to the height of the product.
- Electrical: total power of origami machine: 15 kW, 380 V / 50 Hz; air pressure: 0.6 MPa





### 5. Equipment Introduction - Automatic Side Bonding Machine

- This side bonding machine mainly consists of 3 parts: feeding line, automatic partition and side bonding mechanism, cooling line;
- Action flow: Automatically divide the interval  $\rightarrow$  automatically paste the edge.
- Electrical: Total power of side bonding machine: 15 kW, 220 V / 50 Hz; Air pressure: 0.6 MPa



### 6. Equipment Introduction - Automatic Cutting MachineMachine

- This automatic cutting machine mainly consists of 3 parts: cutting module, product positioning module, chasing cutting module;
- Action process: automatically cut to the set length according to the previous data → automatic chasing cutting automatic discharge.
- Electrical: Total power of three-axis machine: 6 kW, 220 V / 50 Hz; Air pressure: 0.6 MPa



#### cutting mechanism structure





Design, Supply & Support One Stop Solution to your Filters Production





## Machine Solutions – PP Air Filter Line

### 1.

### Car Air Filter Media Pleating











### PLCZ55-600-II

Full-Auto Knife Paper Pleating Production Line



#### PLCZ55-800-II

Full-Auto Knife Paper Pleating Machine



#### PLCZ55-1050-II

Full-Auto Knife Paper Pleating Machine

#### PLCZ55-1250-II

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Full-Auto Knife Paper Pleating Machine

#### PLCZ55-2050-II

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Full-Auto Knife Paper Pleating Machine

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# 2.

### Injection Molding & Assembly







Design, Supply & Support One Stop Solution to your Filters Production



#### PLLN-1

Full-Auto Feeding Machine





PLPM-1

Full-Auto Feeding Machine



## З.

### **Quality Control**



## Marking/Printing

4.





Fully Automatic Printing Machine

5.

### Full-Auto Shrinking Film Machine





Full-auto Shrinking Film Sealing Machine



### Inner Package Line



PLYS-1 Belt Conveyor

#### Inner Package Line

6.



#### Turntable table



Automatic labeling machine

Automatic Labeling Machine

PLTB-1





### Packing

7.







#### PLM-DB5060

Automatic Sealing and Strapping Machine



## Material Solutions – PP Air Filter Line

#### High-grade non-woven fabric



Non-woven filter cloth can be divided into standard non-woven cloth, thermoforming non-woven cloth, activated carbon non-woven and antibacterial non-woven cloth. Non-woven filter cloth are basic and important material in filter production. They are suitable for car air filters, cabin filters, household air purification filters, fuel filters, hydraulic system filters and dust filters.



Model	Weight	Thickness	Air permeability	Filtration Efficiency	Heat Resistance	Flame Retardancy	Pore Size	Dust Holding Capacity
unit	g/m <sup>2</sup>	mm	L/m²/s	%	°C		μm	g/m <sup>2</sup>
AC301 (White)	240±10%	2.7±0.3	≥ 1000	≥ 97	≥ 150		120–150	≥ 500
AC307A (beige)	260±10%	2.8±0.3	≥ 800	≥ 97	≥ 150		110–140	≥ 700
ACH240 (white)	240±10%	2.6±0.3	≥ 800	≥ 98.5	≥ 150	F1	80–110	≥ 700
ACH250-OEM (white)	250±10%	2.7±0.3	800–1300	≥ 98.5	≥ 150	F1	120–150	≥ 700
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unit	g/m <sup>2</sup>	mm	L/m <sup>2</sup> /s	%	°C		μm	g/m <sup>2</sup>
AC301-B3	240±10%	2.7±0.3	≥ 1000	≥ 97	≥ 150		120–150	≥ 500
AF250-P1								
	250±10%	2.0±0.3	≥ 1000	≥ 97	≥ 150		130–180	≥ 400
AF250-G2								
	250±10%	2.0±0.3	≥ 800	≥ 97	≥ 150		120–150	≥ 400
AF250-C-Y2								
	250±10%	1.8±0.2	≥ 800	≥ 97	≥ 150		120–150	≥ 400
GF250 (white)								
	250±10%	2.2±0.3	≥ 1000	≥ 96	≥ 150	F1	110–150	≥ 400

#### PP

PP (polypropylene) is a thermoplastic resin obtained by the polymerization of polypropylene. Polypropylene is a non-toxic, odorless and tasteless milky white high crystalline polymer. It is one of the lightest varieties of all plastics. Propylene has excellent mechanical properties and good chemical resistance.



Colour	Black
Form	Particles
Specification	25kg/bag
Packing	woven bag


#### Hot Melt Glue





Hot melt glue, also called hot melt adhesive is widely used in air filters and oil filters for bonding, shaping and assembling in the production process. Because hot melt glue is environmental protection and fast curing, which can increase production efficiency. Different filter applications have different requirements for the characteristics and materials of filter hot melt glue. Commonly used filter hot melt glue include EVA, PO (Polyolefin), PA (Polyamide), etc. And PA hot melt glue is especially used for oil-resistant and high-temperature filtration.



Glue Model	LMHM180	LMHP232	
Application	For Pleating Stabilization of Air Filter	For Pleating Paper Bonding of Car Air Filter	
Appearance	Yellow transparent particle	Milky white particles	
Density	0.879 g/cm <sup>3</sup>	-	
Contents	PO (Polyolefin)	EVA	
odor	Odourless	Odourless	
Melt Condition	Yellow transparent	Yellow transparent	
Melt Speed	Moderate	3–5 s	
High Temperature Resistance	100 °C	100±5 °C	
Low Temperature Resistant	-20 °C	-	
Viscosity	6000–10000 cP (180 °C)	5500–8500 cP (180 °C)	
Softening Point	110±10 °C	110±5 °C	
Glue performance	Even & smooth	Even & smooth	
Recommended Operating Temperature	110–120 °C	160–180 °C	
Advantage	Low density, good low temperature resistance, not brittle, good fluidity.	Good viscosity, fast curing speed, high temperature resistance, high cost performance.	

Note: As for the color, size and specification parameter can be changed as per the customer"s requirement.



### Toyota Air Filter Line Process Guidance





## Machine Solutions – Toyota Air Filter Line

1.

### Non-Woven Fabric Pleating







## Filter Element Heat Jointing

2.





Design, Supply & Support One Stop Solution to your Filters Production

## Filter Forming Trimming Machine







Heat Sealing Filter Cutting Machine



## Quality Control

4.



## Marking/Printing

5.





PLPM-1210 Fully Automatic Printing Machine

6.

### Full-Auto Shrinking Film Machine





### Inner Package Line



PLYS-1 Belt Conveyor

### Conveyor Belt

7.



### Turntable table



Automatic labeling machine

Automatic Labeling Machine

PLTB-1





## Packing

8.







### PLM-DB5060

Automatic Sealing and Strapping Machine



## Material Solutions – Toyota Air Filter Line

#### High-grade non-woven fabric



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AF250-G2	250±10%	2.0±0.3	≥ 800	≥ 97	≥ 150		120–150	≥ 400
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# **Technical Support**



#### **Production Cost & Profit Calculation**

According to your needs and requirements, we will calculate the budget you need and supply an optimal solution to help you get the best equipment within your limited budget.







### Extendable Upgradable Production Line & Reasonable Layout

We will design extendable, upgradable production line and calculate the most reasonable footprint of the production line according to your requirements.



### Worker Training

We have create rich training documents and videos for your fast learning and training. You can come to our factory for actual operation instruction.







#### Machine Installation & Maintenance Guidance

Before delivery, we have debug and test machine to achieve the best performance. Besides, we will deliver the installation guidance and maintenance guidance along with machines.



### Technological Improvements & Production Flow Optimization

We will evaluate your machines and production flow based on the production state of your production lines and put forward our suggestions for improvements.





### Machine & Mold Customization

We will customize machine to match your local market needs. Besides, various molds customization service are accepted for your efficient and easy production.



#### Professional team after-sales support

We have a commitment of "4, 8, 36" which means respond to your requirements within 4 hours, give the pre-solution within 8 hours and complete within 36 hours.





Design, Supply & Support

## Our Global Partners









One Stop Solution to your Filters Production

### PLM FILTER SOLUTION GROUP Hebei Leiman Filter Material Co., Ltd Hebei Luman Filter Parts Co., Ltd

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