

BOPP **ACOUSTIC MESHES**



www.bopp.com

«THE ART OF SWISS PRECISION»

BOPP – World leaders in high tech meshes

G BOPP + Co AG, based in Switzerland, is one of the world's leading producers of precision woven steel mesh used in the



Head Office in Zurich

most diverse applications. Established in 1881, we have developed from manufacturers of coarser meshes to producers of high tech fine meshes, some with wire diameters of less than 0.015mm, around a quarter of the diameter of a human hair.

As manufacturers of steel meshes used for noise suppression in jet engines and drive systems for space travel, BOPP has more than half a century of experience in highly sensitive sectors using Rayl-specific meshes. For some time, we have been applying our wide-ranging wealth of knowledge to the science of audio applications. Many renowned manufacturers are already using our professional acoustic meshes.

BOPP Meshes – Perfect sound and optimum protection

Perfect sound can only be achieved when all components in an assembly are of the highest quality. One of the most relevant specialist fields in this respect is materials science. Working in close cooperation with renowned acoustics specialists, BOPP has developed the versatile AM product range, which due to its acoustic dampening properties contributes to high performance sound technology.

The AM LR range has expanded this product portfolio. Low Rayl meshes are acoustically transparent and therefore provide optimum protection against external influences, preventing damage to sensitive acoustic components.

In contrast to other manufacturers, BOPP meshes are produced exclusively using high grade stainless steel and are

therefore more stable, more precise in terms of specification, more durable and also easier to fabricate for further processing.



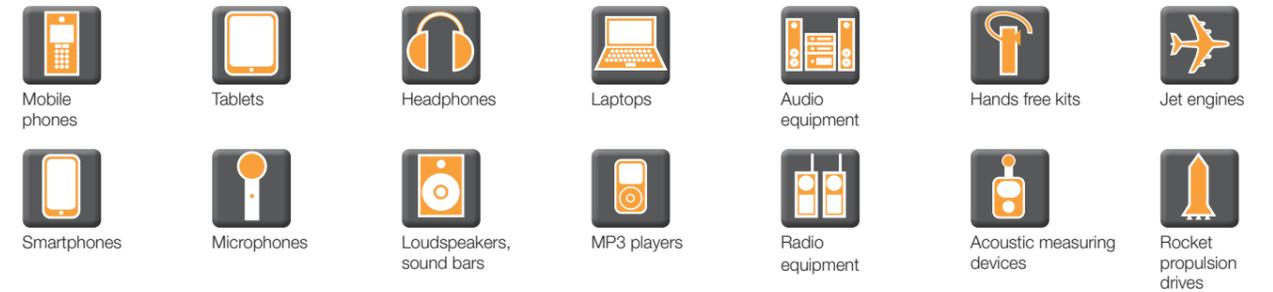
Focus on applications



Our experience working closely with globally renowned manufacturers of premium acoustic products means we understand the constantly evolving and fast-changing challenges of these high tech markets. We know how important it is not just to continue to develop great products, but also to use innovative concepts to develop new methods. From the optimisation of acoustic performance, new approaches and other design elements through to particular protection for the surrounding components, we are the right partners with the innovative ideas.

Key acoustic applications at a glance

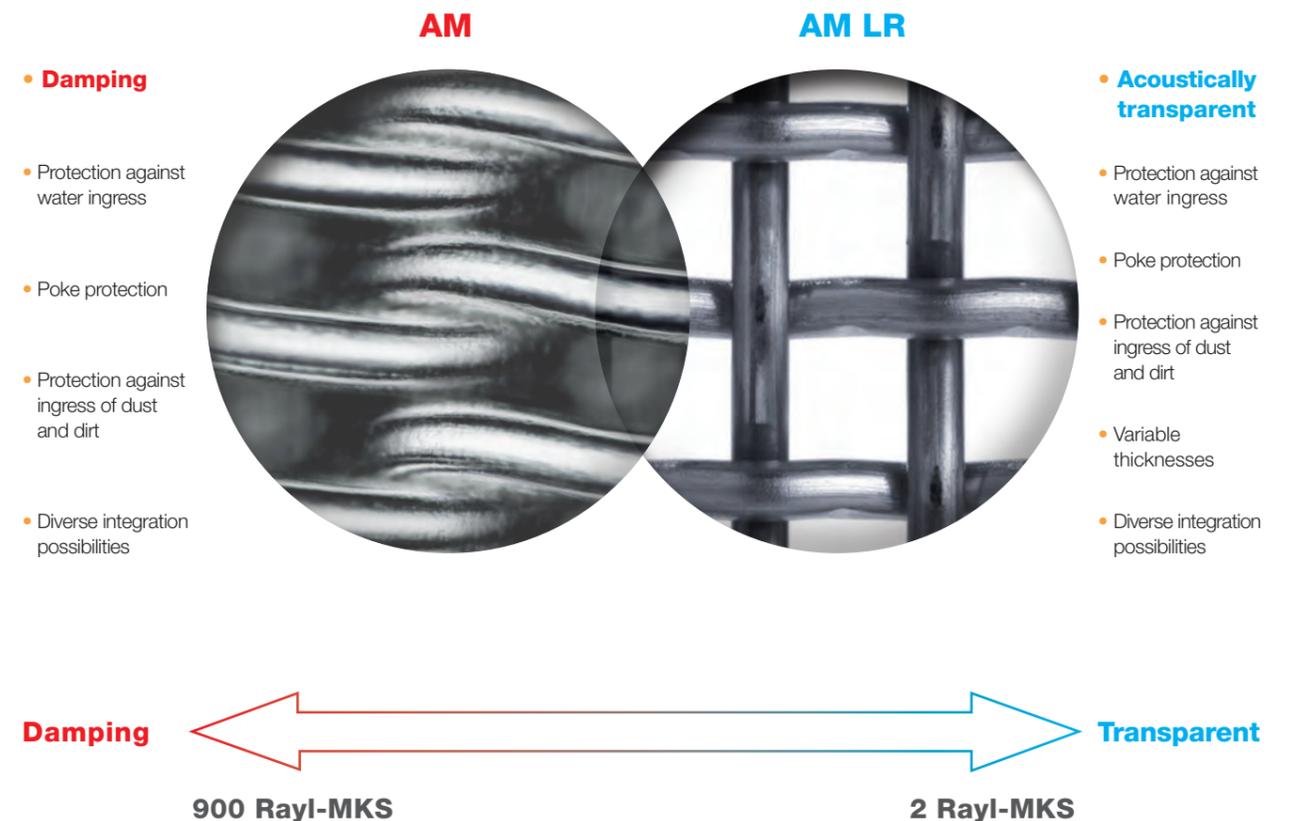
We deliver the right solution for every application, from acoustically transparent meshes providing first line protection for other components through to acoustic dampening meshes providing the highest Rayl values.



In comparison

Acoustic meshes AM – Acoustic meshes AM LR

With a range of sound dampening as well as acoustically transparent meshes, BOPP covers a comprehensive bandwidth from low to high MKS Rayl values.



BOPP – The advantages of our meshes

Acoustic meshes manufactured by BOPP bring together numerous advantages in comparison with other solutions. Find out for yourself and order samples; our Sales Managers are available to assist you on request.

Optimum buzzing and flapping reduction:

Our steel meshes eliminate unwanted interference triggered by vibrating materials within the speaker.

Precise:

Optimal accuracy and guaranteed reproducibility.

Reliable:

Minimal tolerances ensure total compliance with specific airflow resistance across the full surface of the mesh.

Stable:

Particularly high levels of robustness against external mechanical influences.

Durable:

Our stainless steel meshes are characterised by an extremely slow degradation process, especially when compared with other materials.

Weather resistant:

The alloys we use are all weather and corrosion resistant.

Electrostatic:

Unlike synthetic meshes, our steel mesh will not build up electrostatic charge, which simplifies further processing.

Documented:

Where required, every acoustic mesh specification can be supplied with the appropriate Rayl certification.

Varied Choice:

Incremental steps between individual specifications are extremely small, ensuring we have the right product for every application.

Flexible:

If you cannot find the right solution within our extensive portfolio, we can manufacture to individual customer specifications.



Microphone cover
Original size

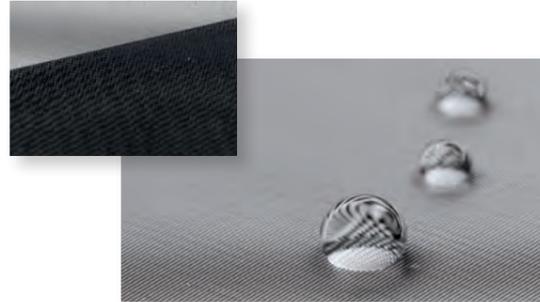
BOPP – Additional Services

As well as enjoying an international reputation for the highest quality mesh products, BOPP also specialises in further processing its materials. Mesh is fabricated into finished components to individual customer specifications, which can then be integrated directly into your own manufacturing processes.

Coatings

Our coatings are designed to enhance performance whilst protecting against other external influences without altering the acoustic properties.

- Hydrophobic and oleophobic with HC8
 - Angle of contact up to 145°
 - Temperature resistance up to 200° C
- PVD-black



Thermal Treatments

Using the processes listed below, mechanical material characteristics such as hardness, elasticity and formability can be optimised for further processing.

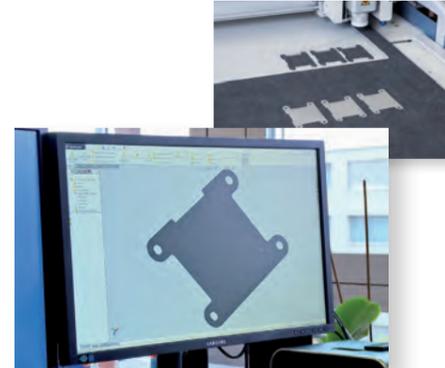
- Optimised processability
- Variable degrees of hardness and formability
- No loose wires
- Stress relieved annealing



Engineering

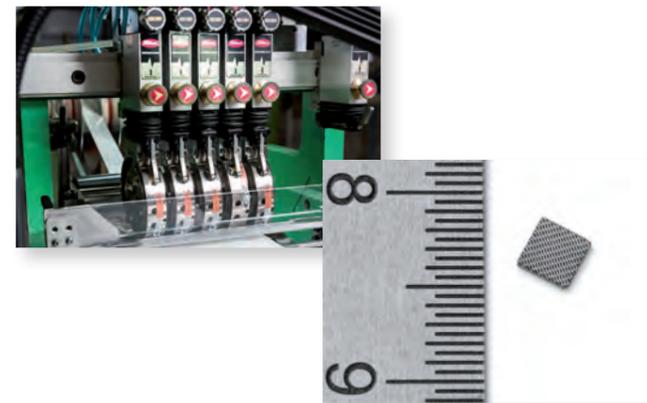
We are happy to provide assistance with selecting the right mesh specification in terms of acoustic values, material properties, geometric form and component design using:

- Demand analyses
- Materials recommendations
- Design suggestions
- Technical drawings
- Cost calculations
- Production engineering



Fabrication

- Precision cutting & die cutting
 - Perfectly cut edges and angles
- Forming, bending, drawing and edge binding
- Welding, soldering, bonding
- Prototypes, one-offs
- Efficient volume production
- Process orientated packaging



Calendering (AM LR-Types)

- Strips or entire rolls
- Up to 35% reduction in thickness
- Variable gloss levels
- Surface structure properties
- Customer-specific realization



Partnerships

We can carry out further processing in partnership with various reputable converters worldwide known for work including:

- Insert molding
- Pressure sensitive adhesive strips
- Component assembly
- ...and many others



Quality Control and Measurement

- Customer-specific quality checks
- Rayl measurements
- Production of measurement protocols
- Certification, records
- Frequency-dependent measurements



BOPP – Product range

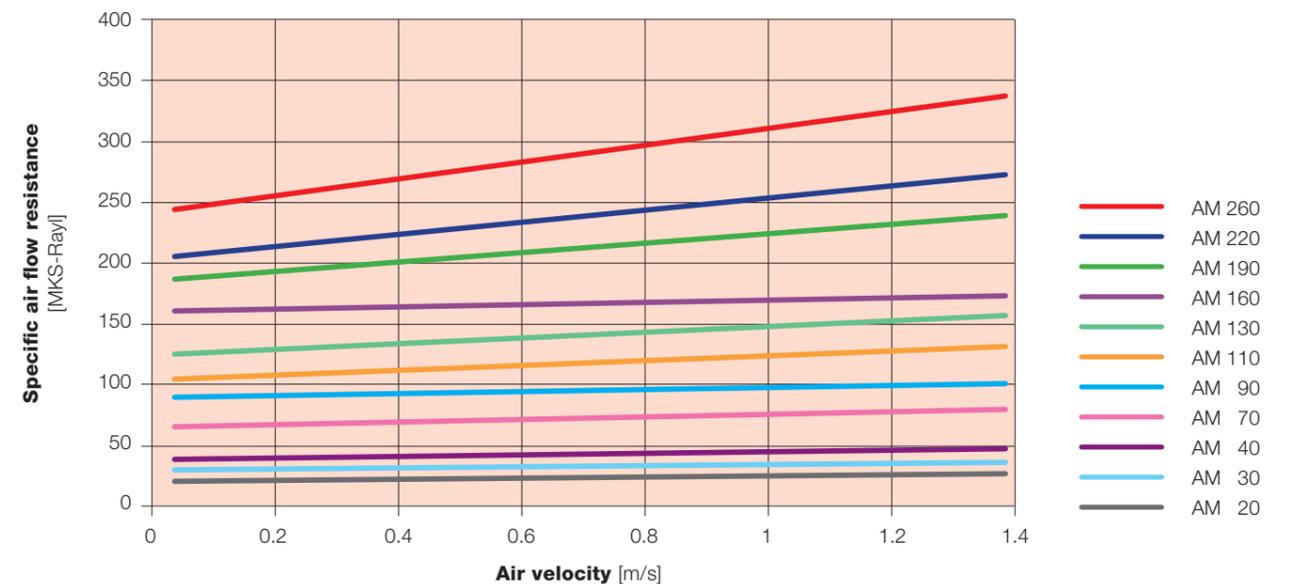
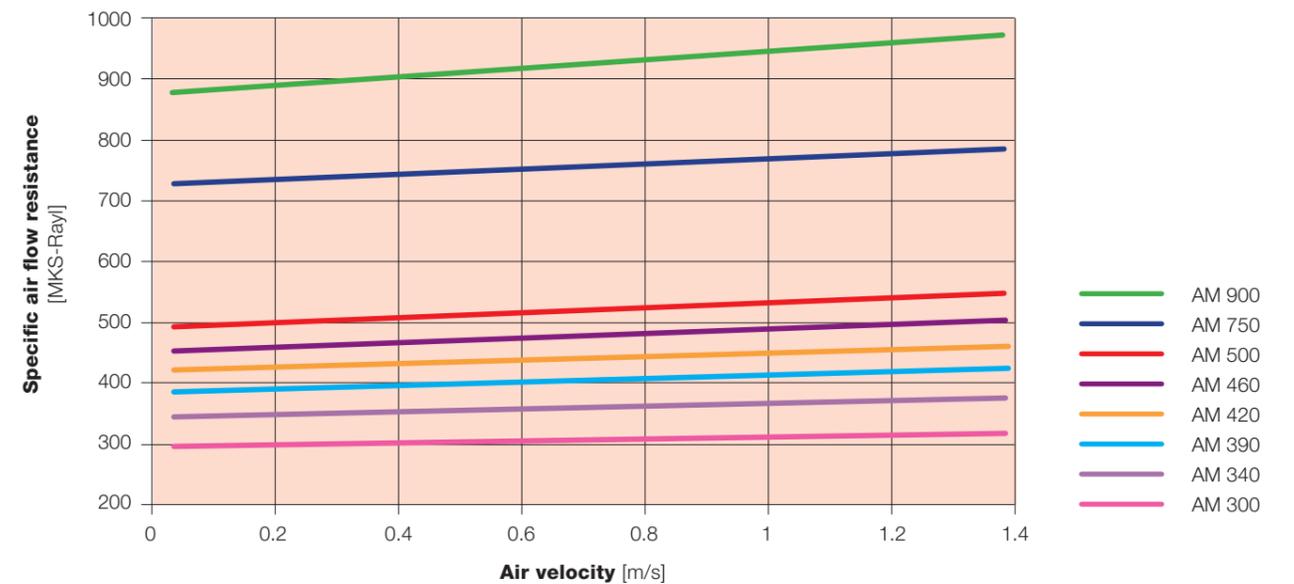
Acoustic Mesh AM

BOPP's AM product range offers a comprehensive choice of acoustic dampening meshes to match a diverse range of requirements. Browse through the unparalleled and extremely consistent MKS Rayl values and tight tolerances.

Mesh description	Specific air flow resistance @ 0.15 m/s [MKS-Rayl]	Specific air flow resistance @ 1.05m/s [MKS-Rayl]	Air flow rate		Hydrostatic water column test Class	Relative flow area AORel [%]	Absolute filter rating AFR [µm]	Mesh thickness [mm]	Weight [kg/m²]
			@ p=30 Pa/ (30 Pa)	@ p=100 Pa/ (100 Pa)					
AM 20	20	25	118	293	Class C	14%	76	0.26	0.65
AM 30	30	35	88	238	Class D	11%	59	0.26	0.78
AM 40	40	46	69	194	Class D	10%	54	0.26	0.87
AM 70	66	76	43	127	Class C	10%	48	0.26	0.97
AM 90	90	98	33	103	Class C	12%	30	0.15	0.49
AM 110	106	125	28	83	Class B	8%	41	0.26	1.07
AM 130	127	149	23	71	Class B	15%	56	0.26	1.09
AM 160	161	169	19	61	Class B	10%	28	0.17	0.69
AM 190	191	227	16	49	Class B	9%	43	0.26	1.16
AM 220	211	257	14	44	Class B	7%	36	0.26	1.19
AM 260	252	315	12	37	Class B	6%	33	0.26	1.22
AM 300	298	311	10	33	Class A	7%	19	0.15	0.66
AM 340	348	365	9	29	Class A	7%	19	0.15	0.67
AM 390	389	412	8	26	Class A	6%	17	0.15	0.68
AM 420	425	449	7	23	Class A	6%	16	0.15	0.70
AM 460	458	487	7	22	Class A	6%	16	0.15	0.71
AM 500	497	529	6	20	Class A	5%	16	0.15	0.75
AM 750	732	767	4	14	Class A	5%	13	0.15	0.73
AM 900	884	953	3	11	Class A	5%	13	0.15	0.76

- Absolute filter rating is determined using the bubble point test according to SAE/ARP 901.
- We reserve the right to make any necessary technical changes. Current information is always available on our website.
- **Hydrostatic pressure test**
Values given refer to meshes with an optional HC8 hydrophobic coating. BOPP uses hydrostatic pressure testing to illustrate the hydrophobic properties of our meshes. Providing data on IP ratings for individual meshes is not feasible as IP classification is only available on complete systems.
- **Specific air flow resistance**
Describes flow conditions dependent upon flow speed.
- **MKS-Rayl**
For information on MKS-Rayl values, the specific air resistance is measured as the ratio of the differential pressure divided by the speed of laminar flow. Our standard tolerances for MKS Rayl values are a maximum of +/-12%.
- Customer specific meshes to defined specifications and in all formats can be produced on request.

Overview Acoustic Mesh AM



BOPP – Product range Acoustic Mesh AM LR

Acoustically transparent properties mean that our low Rayl value specifications impress not just in terms of sound quality but also protect against poke and the ingress of dust as well as creating a pleasing optical aesthetic for the finished components.

Mesh description	Specific air flow resistance @ 1.00 m/s [MKS-Rayl]	Air flow rate		Hydrostatic water column test Class	Relative flow area AORel [%]	Aperture size [µm]	Mesh thickness [mm]	Weight [kg/m²]
		@ p=30 Pa/ p=100 Pa [cm³/s/cm²]	(30 Pa) (100 Pa)					
AM LR 30	30.3	99	297	Class C	31%	40	0.06	0.17
AM LR 28	27.7	108	321	Class B	29%	42	0.07	0.20
AM LR 26	25.5	117	352	Class B	34%	40	0.06	0.20
AM LR 22	22.8	128	358	Class C	37%	56	0.08	0.17
AM LR 20	20.4	144	418	Class C	34%	50	0.07	0.18
AM LR 18	17.9	156	403	Class C	28%	67	0.12	0.34
AM LR 16	15.8	167	396	Class C	35%	90	0.13	0.31
AM LR 14	14.7	183	456	Class C	38%	80	0.10	0.24
AM LR 12	11.3	206	470	Class C	38%	104	0.13	0.30
AM LR 10	10.0	258	642	Class D	53%	67	0.05	0.08
AM LR 8	8.3	282	653	Class C	51%	90	0.07	0.12
AM LR 6	6.3	306	645	Class D	47%	140	0.13	0.24
AM LR 5	5.5	323	666	Class D	46%	160	0.15	0.29
AM LR 2	1.5	664	1276	Class D	78%	224	0.06	0.04

• We reserve the right to make any necessary technical changes. Current information is always available on our website.

• **Hydrostatic pressure test**

Values given refer to meshes with an optional HC8 hydrophobic coating. BOPP uses hydrostatic pressure testing to illustrate the hydrophobic properties of our meshes. Providing data on IP ratings for individual meshes is not feasible as IP classification is only available on complete systems.

• **Specific air flow resistance**

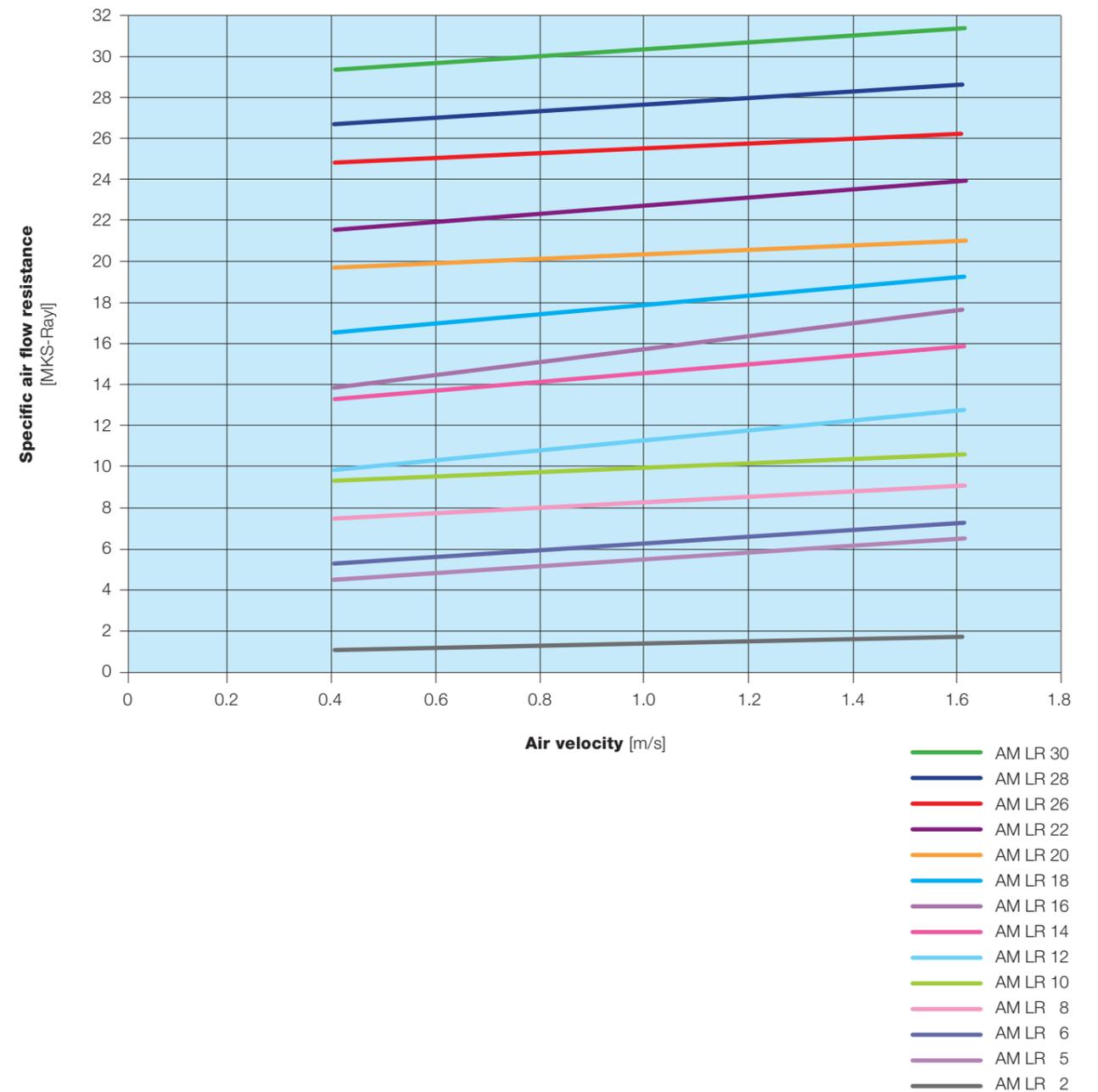
Describes flow conditions dependent upon flow speed.

• **MKS-Rayl**

For information on MKS-Rayl values, the specific air resistance is measured as the ratio of the differential pressure divided by the speed of laminar flow. Our standard tolerances for MKS Rayl values are a maximum of +/-12%.

• Customer specific meshes to defined specifications and in all formats can be produced on request.

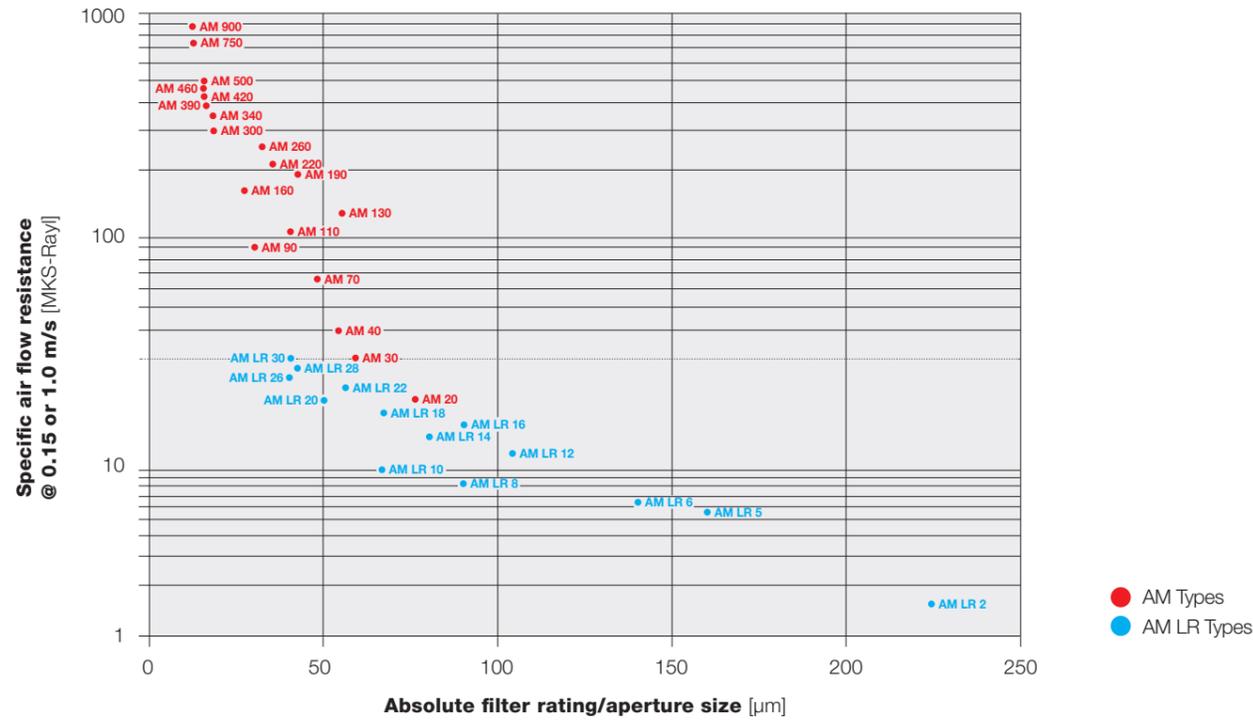
Overview Acoustic Mesh AM LR



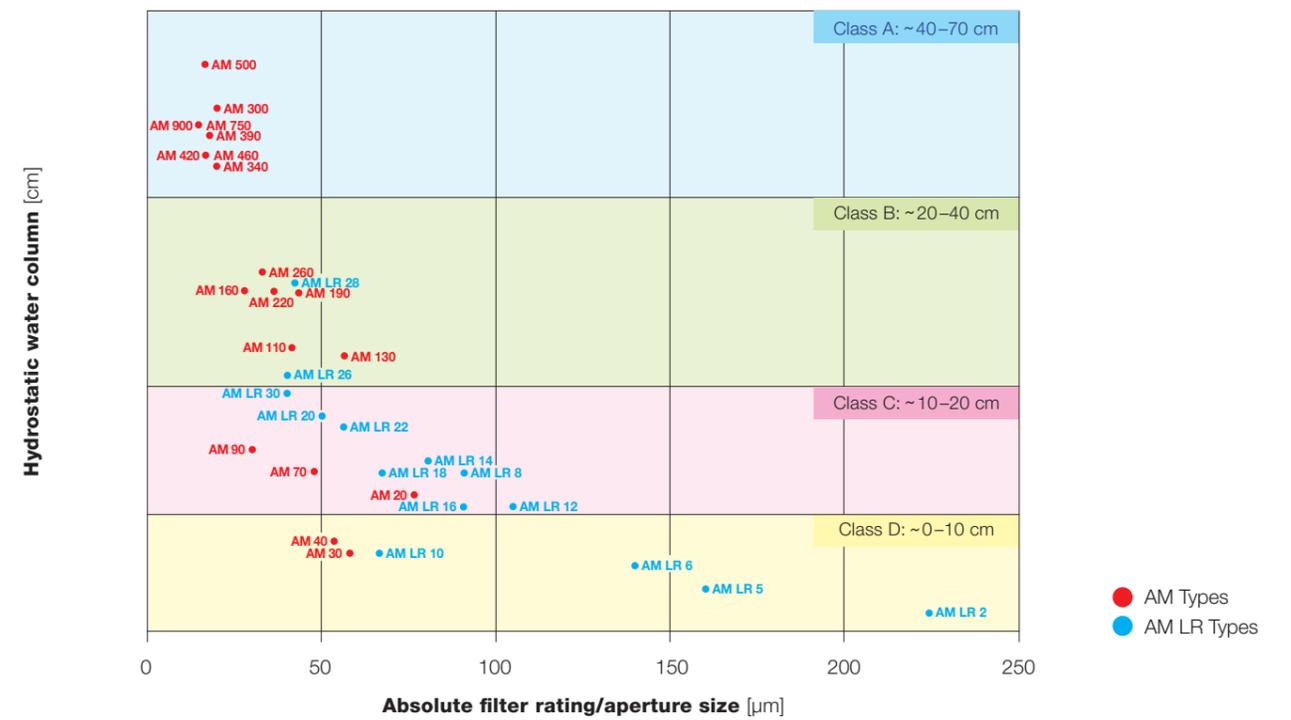
BOPP – The right mesh for your application

To make your choice a little easier, in order to clarify the technical data we have created graphical representations from the tables to make the information more accessible.

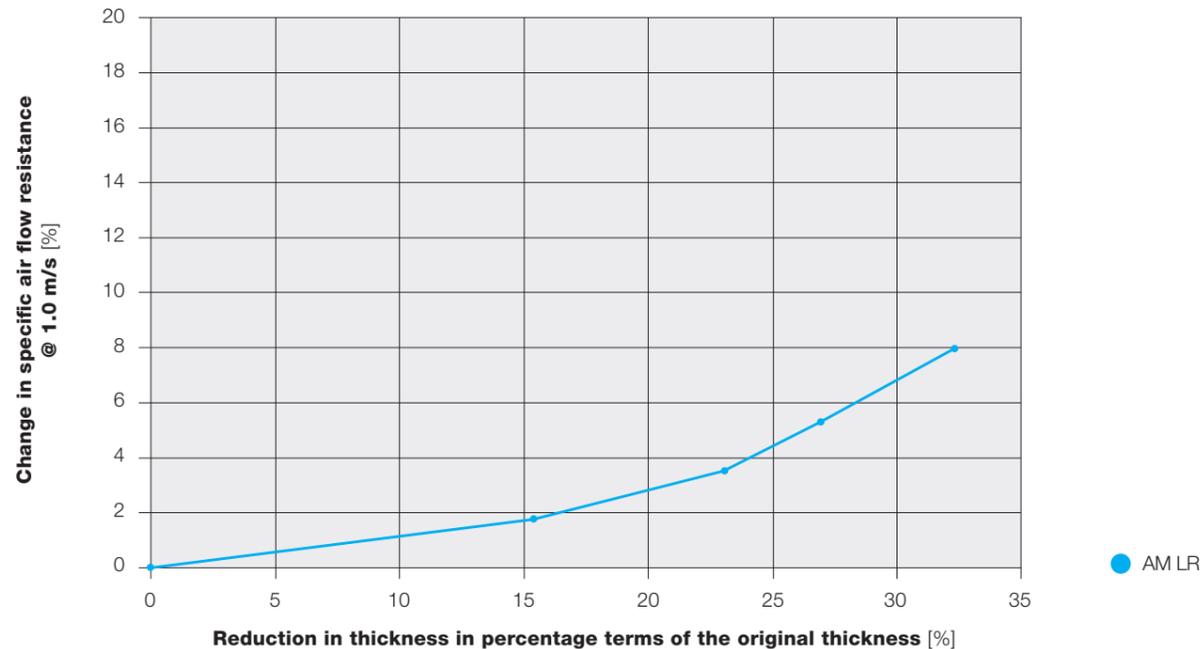
MKS-Rayl in relation to absolute filter rating



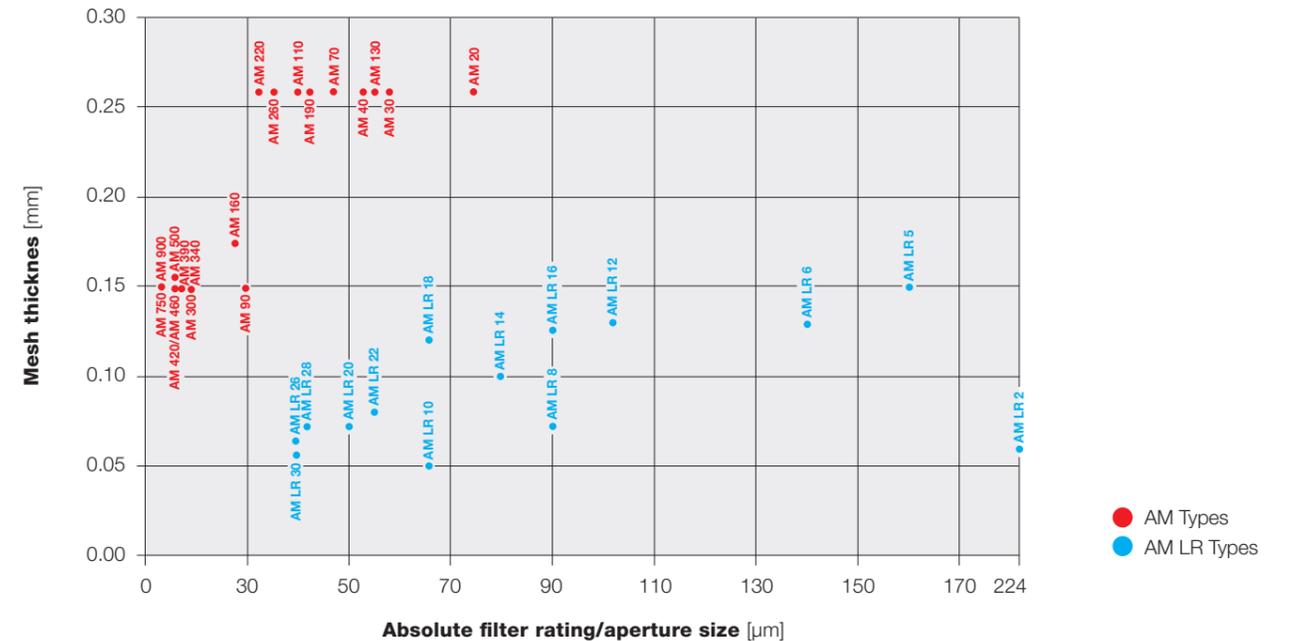
Hydrostatic water column categories



Effect of a reduction in thickness on the Rayl value for AM LR specifications



Mesh thickness compared with absolute filter rating



Seven good reasons to choose BOPP

BOPP innovations are founded on decades of experience. Alongside exceptional product performance characteristics in the most diverse applications, we also impress in terms of our fundamental properties and attributes.

1 Quality

We always maintain strict compliance with industry specific weaving standards. What's more, we have created our own in-house standards alongside each of these, which demand far more than the officially accepted values in terms of challenges and tolerances.

2 Experience

For many years, we have been working closely with renowned acoustics specialists, analysing applications and developing innovative solutions.

3 Cost Efficiency

We continue to find new ways to increase our production efficiencies with a simultaneous increase in quality standards.

4 Reproducibility

We maintain a process orientated approach to ensure optimum reproducibility.

5 In-house Wire Drawing

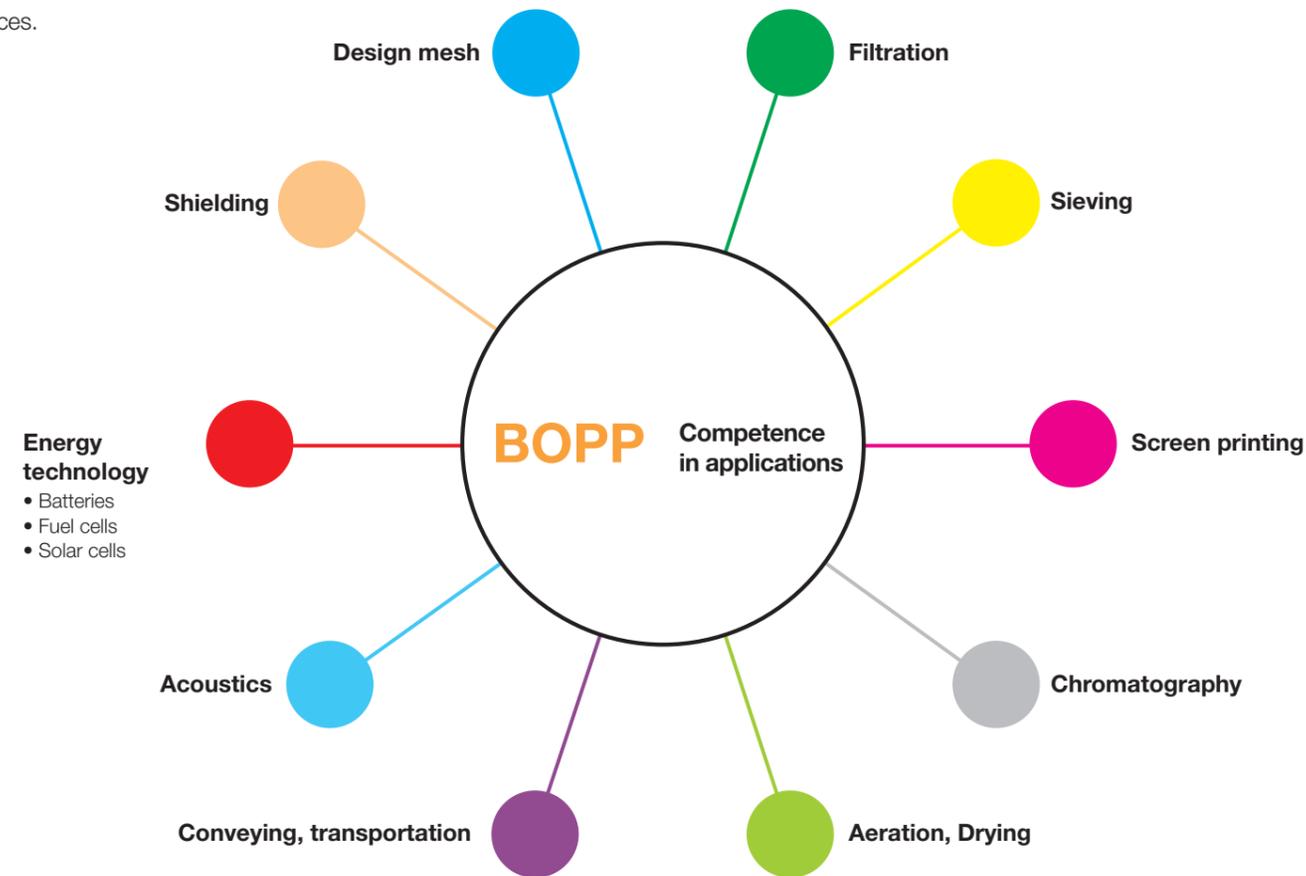
We are the only fine wire weavers to operate our own fine wire drawing plant. This means we can ensure reliable delivery schedules and maintain quality procedures totally independent of third party input, in contrast with our competitors.

6 Security

We manufacture in a trade-friendly and commercially stable environment, and are therefore able to guarantee above average levels of product availability, supported by extensive stockholding. In addition, the BOPP Group operates three separate production facilities, providing higher levels of process security in the supply chain.

7 Protecting the Environment

Our manufacturing plant complies with modern standards in terms of energy use and environmental sustainability. We are active participants in programmes to improve energy efficiency, and a member of Cleantech organisations.



The BOPP Group



- Headquarter
- Subsidiaries
- Representatives/Agents

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