Filtration and Separation Technology

Munktell
AHLSTROM

World Head Office:

Munktell Filter AB
Box 1003
SE – 791 10 Falun, Sweden
Tel: +46 (0)23 70 58 80
Fax: +46 (0)23 401 15
E-mail: info.munktell@ahlstrom.com

Germany:

Munktell & Filtrak GmbH
Niederschlag 1
DE – 09471 Bärenstein, Germany
Tel: +49 37347 830
Fax: +49 37347 8364
E-mail: filtrak@ahlstrom.com

France:

Filtres Fioroni S.A.S.
15, rue Pierre et Marie Curie
FR – 45140 Ingré
Tel: +33 238432263
Fax: +33 238430022
E-mail: contact@filtres-fioroni.com

Dear Customers,

we are very proud to announce that Munktell is now part of the Ahlstrom Group. Ahlstrom is a fibre-based materials company, partnering with leading businesses around the world to help its customers to stay ahead.

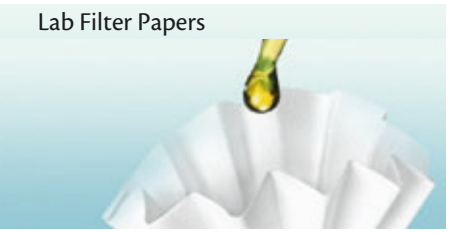
This integration allows us to further extend our product portfolio and to become a global leader in life science and laboratory media filtration. At the same time we will continue offering you a complete product range for venting filters, breathing system filters, filter media for medical applications as well as protection and sterilization papers.

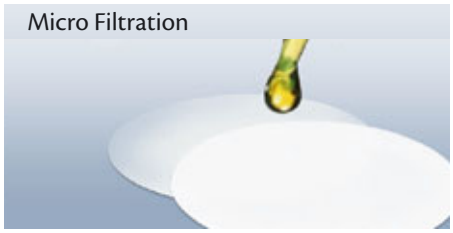
Our Catalogue is Divided into Seven Different Sections:

- Lab Filter Papers
- Micro Filtration
- Environmental Control
- Industrial Filter Papers
- Medical Products
- Air Filtration
- Technical Information

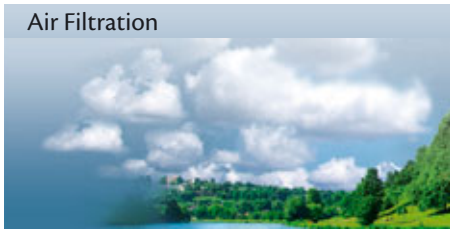
Please let us have an opportunity to respond to your inquiries so that we may offer additional information.

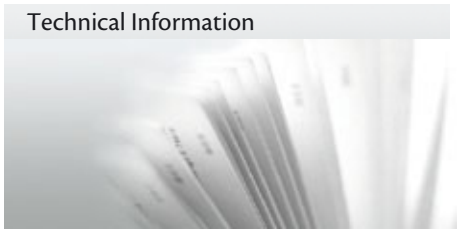
Wilhelm Kirk
Commercial Manager Laboratory and Life Science





Contents





History

Munktell Filter Papers were for a long time delivered in handmade birchbark packages.

1815 1850 1900

Jöns Jacob Berzelius (1779–1848) is regarded a father of modern chemistry as well as the inventor of the first real filter paper. He was the first to use a pure, wetlaid, allrag paper for the retention of precipitates in chemical analysis.

At Berzelius' suggestion, the development and manufacture of such paper was begun around 1815 at J. H. Munktell's paper mill at Grycksbo, Sweden.

Similar production was later started in England and Germany, but "Swedish Filter Paper", recognized for its quality and performance soon became the world standard for analytical filter papers.

The filter paper that was hand-made at the time of Berzelius is still made in that same paper mill today, but now with the aid of modern paper-making technology. Packages of Munktell brand filter papers, are your assurance of the highest possible quality.

Our heritage and experience in papermaking is the guarantee of high quality filter papers with properties tailored to different applications.

… today a global leader.

1950 2000 2050

Being now part of the Ahlstrom Group, Munktell will empower its strong position in the European market, at the same time taking advantage from Ahlstrom's solid presence in North America and growing globally.

Access to new markets will also be granted by the wider product portfolio now available. There is a clear fit between the two companies, which will allow our customers to be successful.

Our brand products are available through a network of distributors around the globe. We welcome your interest and will forward your inquiry to your local dealer.

info.munktell@ahlstrom.com
filtrak@ahlstrom.com
contact@filtres-fioroni.com

1. Munktell Filter AB,
   World Head Office, Falun, Sweden
   Tel: +46(0)23 70 58 80

2. Munktell & Filtrak GmbH,
   Bärenstein, Germany
   Tel: +49 37347 830

3. Munktell Paper Mill
   Grycksbo, Sweden

4. Filtres Fioroni S.A.S.
   Ingré, France
   Tel: +33 238 432 263

1.


2.


3.


4.


Munktell Management System

Our main objective is to exceed your expectations of our product quality and customer service. To achieve this goal, we understand that our business depends entirely on your success. We intend to do everything necessary to maintain your confidence in our products and service.

Munktell has achieved its high level of brand recognition and product reliability through years of continuous quality management from pulp to paper. Our chemists and technicians work as a team and fine-tune each of our filtration products to your specific applications. Raw material and water qualities are closely monitored to ensure consistency of the finished products as are the production process controls for each and every grade of paper produced at all of our production facilities.

We pride ourselves in our cutting edge, process automation controls that monitor the many settings of our paper machines and minimize even the slightest of process deviations to ensure lot to lot consistency. In addition to the instrumentation and automation, the Munktell quality management system relies upon highly skilled machine operators and well-trained laboratory staff at each production site to ensure excellence.

Our entire staff is continually trained in quality assurance to ensure long term customer satisfaction.
We depend on YOU – and we know it!

Introduction

DIN/SS EN ISO 9001:2008

Munktell's Quality Management System is certified to conform to the requirements of DIN/SS EN ISO 9001:2008. It guarantees the high quality standards required to enable Munktell to deliver reliable and consistent high quality products to the international market.

The third-party, independent certification is your assurance of our "pulp to paper" customer focus and our passion for continuous product improvement. The Munktell brand represents a 200 year tradition of excellence that is responsible for our reputation for product quality and customer service.

ISO 13485

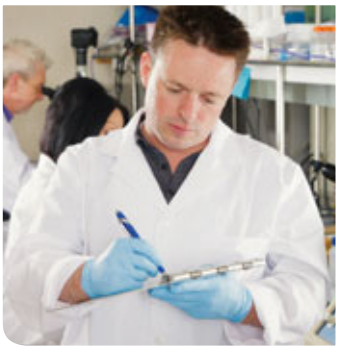
As many of our products are used in medical applications, our manufacturing and quality control processes have also been certified to comply with ISO 13485:2003. Munktell closely controls each step of the manufacturing process from incoming materials through production and finished products with step-by-step documentation. Upon request we can supply certification of our test data. Our Quality Management System is supervised and certified by Intertek Semko AB of Stockholm Sweden.

Directive 98/79/EC

TFN sample carrier paper meets the basic requirements of directive 98/77/EC, annexes I and III (other IVD).

Environmental Management System – ISO 14001

Munktell has implemented the guidelines of ISO 14001:2004 to minimize the impact of our manufacturing processes on the environment.



This means that we have control and knowledge of our:

- Incoming products
- Production/processes
- Waste/waste disposal
- Environment legislation guidelines

Our primary objective is to minimize the negative impact on the environment caused by our manufacturing processes and to continually work to further lessen our environmental "footprint". We have integrated the elements of ISO 14001:2004 into our total quality management system to ultimately benefit the environment while minimizing our production costs.

Our independent quality management certifications are:

- ISO 9001, quality management system,
- ISO 14001, environmental management system
- ISO 13485, medical products
- CE Certificates-medical products
- Nintei, Japan-medical products
- FDA/510K-medical products
- CLSI

They may also be viewed in detail on our website: www.munktell.com.

OEM and Private Labeling

Munktell has during many years supplied OEM products to customers around the world. We supply several large filter manufacturers with private label products to compliment their own product lines.

For many years Munktell has supplied OEM products to customers around the world. In addition, Munktell supports the requirements of several large filter manufacturers with private label production to compliment their own product lines.

Should you have an idea for a new product or a specific demand, please do not hesitate to contact us.

We can supply the following OEM products:

Laboratory Filtration Products

- Filter Paper
- Thimbles
- Special Grades
- Membranes
- Syringe Filters
- Indicator Papers
- Chromatography/Blotting Papers
- Cellulose Stoppers

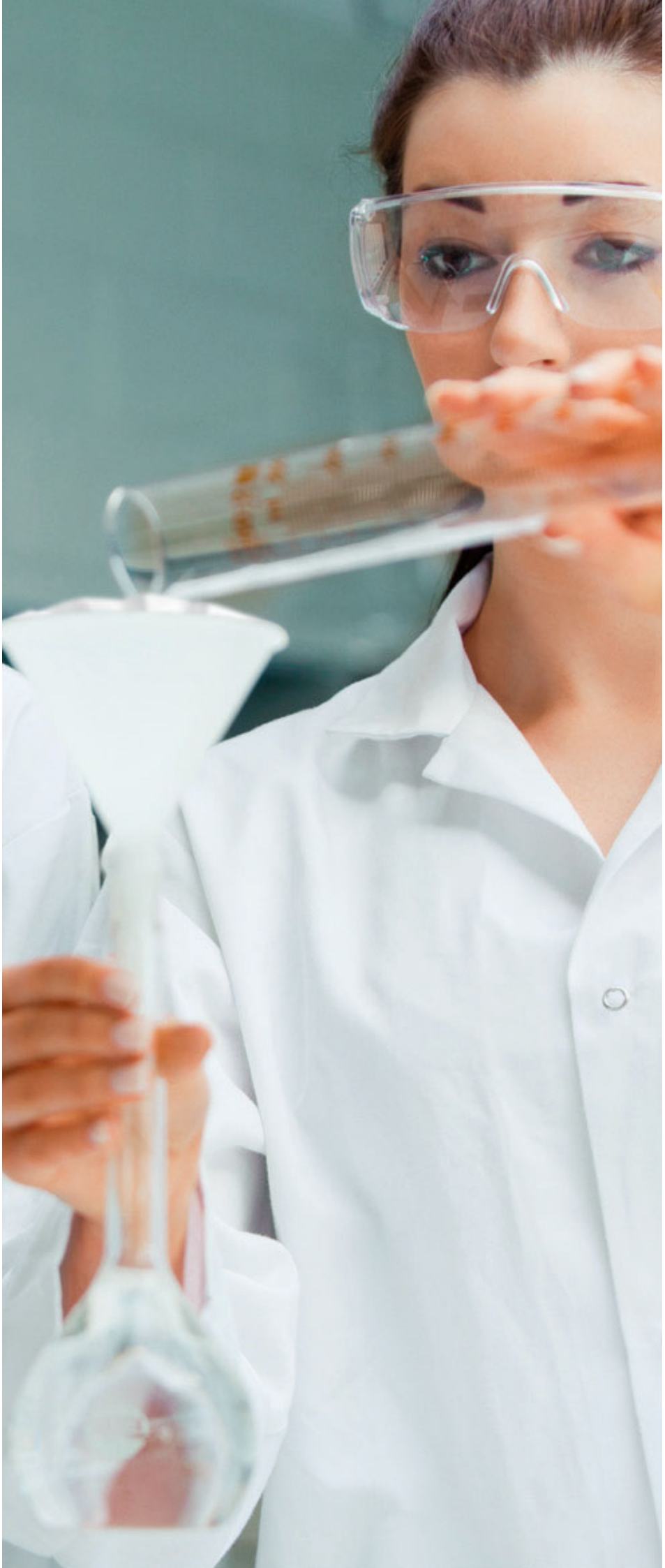
Introduction

Environmental Control

- Micro-Glass Fiber Papers
- Micro-Quartz Fiber Papers
- Air Filter Media

Medical Products

- Neonatal/Newborn Screening
- Sterilization Papers
- Dental Papers
- Cyto Strips
- Basic Paper for Forensic Products



Lab Filter Papers

Filter papers separate the solids from liquids or air, and retain particulate matter on the surface as well as within the matrix of the paper. Filter paper properties vary by fine particle filtration efficiencies, retention capacities as well as by flow rates.

Munktell uses only the finest raw materials in the production of its filter papers: cotton linters, high alpha-cellulose pulp, borosilicate micro-glass and extremely pure micro-quartz fibers. We offer a wide range of filtration products to meet most every laboratory filtration requirement.

Contents

Guide for Filter Papers

	Analytical				General Purpose	
	Quantitative		Qualitative		Qualitative-Technical	
	Ashless	Ashless Hardened	High-Purity			
1. Gel-type			5		37/N	39/N
2. Coarse crystalline	00R	388 ●	3	1288	1602/N 603/N 1003 3 w	
3. Medium crystalline	00M	389 ○	150 1F	1289	6 53 3 hw, 15 1002 4 b	
4. Fine crystalline	00K 00A 006	392 ● 390 ●	292 a Munktell No. 1 Munktell No. 2 292 106	1290	3 m/N 3 h 3 S/h 1001	
5. Very fine crystalline	00H	391 ● 393 ●	120H 293	1291		

1. Very fast filtering, open fiber matrix
2. Fast filtering, open to semi-open fiber matrix
3. Medium to fast filtering, semi-open to open fiber matrix
4. Medium to slow filtering, medium-tight fiber matrix
5. Very slow filtration, very tight fiber matrix

Quantitative Ashless Papers

Quantitative ashless filter papers are recommended for use where a high purity is required for quantitative analysis. Munktell quantitative filter papers are acid-washed to remove impurities and

are made using pure cellulose with an alpha-cellulose content of almost 100%. Ash content of Munktell ashless grades is less than 0.01%.

Grade	Basis Weight g/m²	Filtration Speed s/10 ml	Herzberg s/100 ml	Typical Retention µm
Ashless hardened				
388	84	10	40	12 – 15
389	84	20	90	8 – 12
392	84	50	300	5 – 8
390	84	100	800	3 – 5
391	84	180	1,200	2 – 3
393	100	250	2,500	1 – 2
Ashless				
00R	90	11	120	>10
00M	90	13	305	8 – 10
00K	80	29	375	5 – 6
00A	80	48	600	4 – 5
006	100	75	860	3 – 4
00H	80	160	1,500	1 – 2

Part Numbers – Ashless Hardened

Size mm	Grades 388	389	390	391	392	393	Pcs/ pack
Circles							
47	103020	103096	103157	103220	103280	103326	100
50	103021	103097	103159	103221	103281	103327	100
55	103023	103100	103162	103222	103282	103328	100
70	103025	103103	103163	103226	103283	103329	100
90	103028	103107	103167	103229	103285	103331	100
110	103032	103111	103171	103233	103288	103332	100
125	103035	103114	103173	103235	103291	103333	100
150	103038	103118	103179	103239	103294	103335	100
185	103040	103123	103182	103242	103295	103339	100
240	103042	103125	103184	103244	103297	103340	100
320	103044	103128	103186	103247	103301	103341	100
Folded Filters							
110	103046	103132	103189	103250	103304	103343	100
125	103049	103134	103190	103251	103305	103344	100
150	103051	103136	103191	103252	103309	103345	100
185	103054	103138	103193	103253	103310	103346	100
240	103056	103141	103197	103255	103312	103348	100
270	103057	103142	103198	103256	103313	103349	100
320	103058	103144	103199	103257	103314	103350	100
Sheets							
460×570	103008	103074	103147	103209	103270	103319	100
580×580	103009	103076	103149	103211	103271	103321	100

Part Numbers – Ashless

Size mm	Grades 00H	006	00A	00K	00M	00R	Pcs/ pack
Circles							
47	100013	100121	100085	100088	100091	100101	100
50	100107	100079	100086	100089	100092	100102	100
55	100000	100080	100023	100105	100045	100055	100
70	100001	100081	100024	100034	100046	100056	100
90	100002	100017	100025	100035	100047	100057	100
110	100003	100018	100026	100036	100048	100058	100
125	100004	100019	100027	100037	100049	100059	100
150	100005	100020	100028	100038	100050	100060	100
185	100006	100021	100029	100039	100051	100061	100
240	100007	100022	100030	100040	100052	100062	100
320	100008	100082	100087	100041	100099	100063	100
Sheets							
470×470	100011	100083	100032	100042	100053	100064	100
470×470	100012	100084	100033	100090	100100	100104	500

Color Codes

Ashless Hardened

Grade	Color Code	Filtration Properties	Applications
388	●	Fast filtering	For coarse and voluminous precipitates such as iron-, aluminium-, and chromium hydroxide; Si-determination in steel and pig iron analysis
389	○	Medium to fast filtering, medium to open fiber matrix	Typical grade for quantitative tasks, coarser precipitates such as lead-, iron- and silver sulfide; alkali carbonates; food stuff and soil analysis
392	●	Medium to slowly filtering, medium to tight fiber matrix	Fast filtration of fine precipitates such as calcium oxalate, magnesium ammonium phosphate, coarser forms of barium sulfate
391	●	Very slowly filtering, tight fiber matrix	Fine-grained precipitates such as barium sulfate, metastannic acid, cuprous oxide
390	●	Slowly filtering, tight fiber matrix	Filtration of fine precipitates such as lead dioxide, calcium fluoride, nickel sulfide, zinc sulfide
393	●	Particulary slow filtration, very tight fiber matrix	For extremely difficult filtration conditions and particularly fine precipitates

Ashless

Grade	Filtration Properties	Applications
00R	Fast filtering, open fiber matrix	For coarse and voluminous precipitates such as iron-, aluminum-, and chromium hydroxide; Si-determination in steel and pig iron analysis
00M	Medium to fast filtering, medium to open fiber matrix	Medium to fast filtering, medium wide pores, typical ashless grade for quantitative tasks, coarser precipitates such as lead-, iron- and silver sulfide; alkali carbonates
00K	Medium to slowly filtering, medium to open fiber matrix	Typical grade for quantitative tasks, coarser precipitates such as lead-, iron- and silver sulfide; calcium oxalate
00A	Medium to slowly filtering, medium to tight fiber matrix	Fast filtration of fine precipitates such as calcium oxalate, magnesium ammonium phosphate, coarser forms of barium sulfate
006	Slowly filtering, tight fiber matrix	Filtration of fine precipitates such as lead dioxide, calcium fluoride, nickel sulfide, zinc sulfide
00H	Very slowly filtering, tight fiber matrix	Fine-grained precipitates such as barium sulfate, metastannic acid, cuprous oxide

Qualitative Filter Papers

Grade	Basis Weight g/m²	Filtration Speed s/10 ml	Herzberg s/100 ml	Typical Retention µm
High-Purity Hardened Filter Papers				
1288	84	10	40	12 – 15
1289	84	20	90	8 – 12
1292	84	50	300	5 – 8
1290	84	100	800	3 – 5
1291	84	180	1,200	2 – 3
High-Purity				
Munktell no. 1	88	40	170	10
Munktell no. 2	97	60	400	8
5	130	9	60	>20
20	115	11	130	12 – 15
3	90	11	85	>10
150	90	13	130	8 – 10
292	87	45	250	5 – 8
292a	97	60	400	5 – 8
1F	80	29	300	5 – 6
106	100	75	750	3 – 4
120H	80	160	1,200	1 – 2
293	80	300	2,500	1 – 2

Grade	Filtration Properties	Applications
5, 1288, 20	Very fast filtering, open fiber matrix	For coarse and voluminous precipitates such as iron-aluminum- and chromium hydroxide; Si-determination in steel and pig iron analysis
3	Fast filtering, open fiber matrix	For coarse and voluminous precipitates such as iron- aluminum- and chromium hydroxide; Si-determination in steel and pig iron analysis
150, 1289	Medium fast filtering, open to medium fiber matrix	Typical grades for qualitative tasks, coarser precipitates such as lead-, iron- and silver sulfide; alkali carbonates; calcium oxalate
1F	Medium to slowly filtering, medium tight fiber matrix	Fast filtration of fine precipitates such as calcium oxalate, magnesium ammonium phosphate, coarser forms of barium sulfate
1292, Munktell no. 1, 292	Medium to slowly filtering, medium tight fiber matrix	Fast filtration of fine precipitates such as calcium oxalate, magnesium ammonium phosphate, coarser forms of barium sulfate
1290, Munktell no. 2, 292a	Slowly filtering, tight fiber matrix	Filtration of fine precipitates such as lead dioxide, calcium fluoride, nickel sulfide, zinc sulfide
120H, 1291	Very slowly filtering, tight fiber matrix	For very fine precipitates such as barium sulfate, metastannic acid, cuprous oxide
293	Particularly slowly filtering, particularly tight fiber matrix	For extremely difficult filtration conditions and particularly fine precipitates, common type for wine clarification

Munktell qualitative filter papers containing nearly 100% high alpha-cellulose are produced under tightly controlled manufacturing conditions to assure lot to lot quality, year after year.

Our high-purity grades are made of pure cotton linters and have an ash content of less than 0.06%.

High-purity hardened filter papers, grades 1288 to 1291 are also produced from cellulose with an alpha content of nearly 100% resulting in an ash content of < 0.1%.

All grades are available as filter discs, sheets or as folded filters.

Qualitative Filter Papers

Part Numbers – High-Purity

Size mm	Grades Munktell no. 1	Munktell no. 2	5	20	3	150
Circles						
45		113440				
47	110045	113441	110141		110140	110132
50		113442				110034
55	110138	113443	110080	110153	110063	110035
70	110139	113444	110081	110154	110064	110036
90	110046	113445	110082	110155	110065	110037
110	110047	113447	110083	110156	110066	110038
125	110048	113450	110084	110157	110068	110039
150	110049	113451	110085	110158	110069	110040
185	110050	113452	110086	110159	110070	110133
240	110051	113453	110087	110160	110071	110041
320	110053	113455	110088	110161	110072	110135
Folded Filters			V5		V3	V150
90						
110						110102
125			110114		110109	110103
150			110115		110110	110104
185			110116		110111	110105
240			110117		110112	110106
270						110108
320			110118		110113	110107
500						
Sheets						
460×570	110054	113435				
480×480			110090		110075	110136
480×480			110142		110076	110137
580×580		113436				

Folded Filters

Munktell folded filter papers offer significant time savings,
(compared to filter discs of the same grade) when used to clarify solutions.

292	292a	1F	106	120H	293	Pcs/ pack
113298	113359				113400	100
113300	113360	110131	110121	110146	113402	100
113301	113361				113403	100
113304	113362	110017	110122	110001	113404	100
113306	113364	110018	110123	110002	113407	100
113311	113366	110019	110010	110003	113409	100
113314	113368	110020	110011	110004	113410	100
113317	113370	110021	110124	110005	113411	100
113320	113373	110022	110125	110006	113414	100
113323	113376	110023	110126	110007	113415	100
113327	113377	110024	110127	110008	113417	100
113330	113378	110025	110128	110119	113418	100
		V1F	V106	V120H		
113332	113381				113419	100
113334	113382				113421	100
113336	113384	110148	110098	110094	113423	100
113338	113386	110100		110095	113424	100
113341	113388			110096	113425	100
113344	113389	110101		110097	113426	100
113346	113390				113427	100
113348	113391				113428	100
113352	113392				113431	100
113284	113357				113396	100
		110027	110129	110009		100
		110028	110130	110120		500
113287	113358				113398	100

Qualitative Filter Papers

Part Numbers – High-Purity Hardened

Size mm	Hardened Grade 1288	1289	1290	1291	1292	Pcs/ pack
Circles						
45	113035	113112	113162	113207	113240	100
47	113037	113113	113163	113208	113241	100
50	113039	113114	113164	113209	113242	100
55	113041	113115	113165	113210	113243	100
70	113045	113116	113166	113211	113244	100
90	113048	113118	113168	113212	113245	100
110	113053	113119	113170	113213	113246	100
125	113057	113121	113172	113214	113247	100
150	113060	113123	113175	113215	113248	100
185	113063	113124	113178	113216	113249	100
240	113068	113127	113180	113217	113250	100
320	113070	113131	113181	113218	113252	100
Folded Filters						
90	113075	113135	113183	113219	113253	100
110	113076	113136	113185	113221	113254	100
125	113078	113137	113187	113223	113255	100
150	113080	113140	113189	113225	113257	100
185	113083	113141	113191	113228	113258	100
240	113085	113146	113194	113230	113259	100
270	113087	113147	113195	113231	113260	100
320	113089	113148	113196	113233	113262	100
500	113092	113152	113198	113234	113263	100
Sheets						
460×570	113017	113102	113156	113203	113236	100
580×580	113022	113105	113159	113205	113238	100

General Purpose Filter Papers

Grade	Basis Weight g/m²	Surface	Filtration Speed s/10 ml	Herzberg s/100 ml	Typical Retention µm
3 h	65	plain	35	220	6 – 9
3 m/N	65	plain	30	120	7 – 10
15	65	plain	25	170	8 – 12
3 hw	65	plain	20	80	8 – 12
3 w	65	plain	15	70	9 – 13
53	70	embossed	18	100	8 – 12
4 b	75	plain	22	100	8 – 12
603/N	75	creped	8	35	12 – 14
6	80	plain	15	70	10 – 13
100/N	85	plain	30	120	6 – 8
5H/N	85	creped	3	25	>20
1001	90	plain	110	1,200	2 – 3
1002	90	plain	28	240	6 – 10
1003	90	plain	10	80	12 – 15
3 S/h	200	plain	55	400	5 – 7

Munktell offers a wide range of filter papers made from pulp with a high alpha-cellulose content and an average ash content of 0.1% that are suitable for typical general filtration tasks.

These filter papers are available in different basis weights, filtration finenesses, flow rates and surfaces.

General Purpose Filter Papers

Part Numbers – General Purpose Filter Papers

Size mm	Grades 3 h	3 m/N	15	3 hw	3 w	53
Circles						
47						
55	123006	123151	120047	123073	123249	
70	123007	123152	120048	123074	123250	123388
90	123008	123153	120001	123080	123251	123389
110	123010	123154	120049	123084	123253	123390
125	123011	123155	120050	123087	123254	123391
150	123012	123156	120051	123089	123256	123392
185	123013	123157	120052	123091	123257	123393
240	123015	123160	120053	123093	123260	123394
270	123016	123161	120076	123095	123261	123395
320	123018	123162	120054	123098	123263	123398
385	123019	123163	120077	123100	123264	123399
450			120078	123101		123400
500			120079	123102		123401
Folded Filters						
90	123020	123168		123104	123265	
110	123021	123169		123107	123266	123404
125	123022	123170		123109	123267	123405
150	123023	123171		123111	123268	123406
185	123024	123172		123113	123269	123408
240	123025	123174		123117	123270	123409
270	123026	123175		123120	123271	123410
320	123027	123176		123122	123272	123411
385	123028	123177		123124	123274	123412
450	123029	123178		123126		
500	123030	123179		123128	123275	123413
Sheets						
480×480			120067			
480×480			120068			
580×580	123002	123145		123051	123242	123378

4b	603/N	6	100/N	5 H/N	1001	1002	1003	3 S/h*	Pcs/ pack
						120064	120082		100
123308	123585	123449	123538	123347	120000	120065	120029	123211	100
123310	123586	123450	123539	123348	120002	120012	120030	123212	100
123312	123587	123452	123540	123349	120003	120013	120031	123213	100
123313	123588	123453	123542	123351	120004	120014	120032	123215	100
123314	123591	123454	123543	123352	120005	120015	120033	123217	100
123315	123592	123455	123544	123353	120006	120016	120034	123218	100
123316	123595	123457	123545	123354	120007	120017	120035	123220	100
123317	123599	123458	123548	123355	120008	120018	120036	123222	100
123318	123602	123459	123549	123356				123223	100
123321	123604	123460	123550	123357	120009	120019	120037	123224	100
123323	123608	123461		123358					100
									100
123324	123609	123463		123359					100
123326		123464		123360					100
123327		123465		123361					100
123328		123466		123362					100
123329		123467	123554	123363					100
123330		123471	123555	123364					100
123331		123474	123556	123365				123225	100
123332		123476	123557	123366				123226	100
123334		123478	123558	123367				123227	100
123335		123479	123559	123369					100
									100
123337		123481	123560	123370				123228	100
					120010	120021	120040		100
					120069	120055	120066		500
123299	123584	123437	123535	123344				123208	100

* packs of 50 pcs, sheets and folded filters in packs of 100 pcs

Chromatography and Blotting Filter Papers

Munktell Chromatography and Blotting Filter Papers are made of pure cotton linters with an alpha-cellulose content of nearly 100%. The adjacent chart lists the grades by weight

in grams per square meter and their absorption rates.

Here are some hints as to their practical application:

- In order to obtain reproducible results, the fiber direction has to be taken into account
- The capillary rise is always higher in machine direction than in cross direction.
- The machine direction can be determined with a drop of water
- The larger elliptical diameter of the water drop is an indication for the machine direction.

Grade	Basis Weight g/m²	Capillary Rise mm/30 min	Thickness mm	Absorption
Chromatography Filter				
FN 1	90	145	0.19	fast
FN 2	125	145	0.24	fast
FN 3	90	93	0.19	medium fast
FN 4	125	93	0.24	medium fast
FN 6	125	60	0.22	slow
FN 7	150	145	0.32	fast
FN 7a	200	145	0.41	fast
FN 8	280	170	0.55	very fast
FN 30	320	240	0.90	very fast
FN 100	195	115	0.35	fast
27 CH	700	170	1.30	very fast

Part Numbers – Chromatography Filter Papers

Size mm	Grades FN 1	FN 2	FN 3	FN 4	FN 6	FN 7a	FN 100	Pcs/ pack
Sheets								
460×570	143111	143118	143129	143137		143163	143226	100
580×600	143116	143120	143130	143139	143145	143166*	143231	100

* 50 pcs/Pack

Size mm	Grades FN 7	FN 8	27 CH	Pcs/ pack
Sheets				
460×570	143154	143176		50
580×600	143156	143177	143236	50

Size mm	Grades FN 30	Pcs/ pack
Sheets		
460×570	143188	25
580×600	143192	25

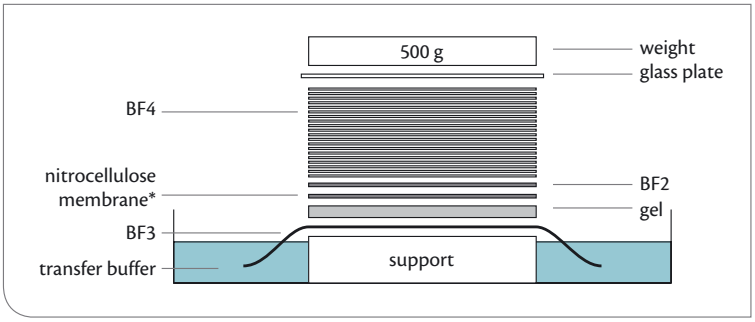
Grade	Basis Weight g/m²	Capillary Rise mm/10 min	Thickness mm
Blotting Papers			
BF 2	195	70	0.35
1600	250	75	0.50
BF 3	330	130	0.76
BF 4	550	160	1.30

Part Numbers – Blotting Papers

Size mm	Grades BF 2	1600	BF 3	BF 4	Pcs/ pack
Sheets					
70×100				143279	25
150×150				143287	25
150×150		143053			200
200×200			143265		50
200×200	143246				100
200×200		143059			200
300×600			143269		50
300×600	143250				100
460×570				143294	25
460×570			143271		50
460×570	143252				100
480×480		143018			50
580×600				143296	25
580×600			143273		50
580×600	143255	143047			100

Application of Blotting Papers

Grade	Application
BF 2	Cover for gel-membrane sandwich
1600	Slot and Dot processes, gel-lifting, buffer-wicking, semi-dry blotting used for Southern, Northern and Western transfers
BF 3, BF 4	– Capillary and semi-dry blotting, liquid buffer for DNA and RNA – Liquid buffer, highest absorbency – Thick papers are used for the lysis and/or denaturation of plaque lifts or colony. – Where papers must ensure a high absorption capacity



* Blotting membranes please see page 61.

Filter Papers for Soil Analysis

These papers are used to determine the presence of trace elements and nutrients in soil samples to optimize plant growth and are available in disc, folded filter, and sheet configurations.

Grade	Basis Weight g/m²	Filtration Speed s/10 ml	Herzberg s/100 ml	Application
131	80	100	100	low phosphate, low potassium content
132	80	55	450	low phosphate, low potassium content
4/M	80	150	920	low magnesium content
292	87	45	500	low nitrogen content
292a	97	60	650	low nitrogen content

Part Numbers – Filter Papers for Soil Analysis

Size mm	Grades 131	132	4/M	292	292a	Pcs/ pack
Circles						
150	146003	146020		113320	113373	100
Folded Filters			V4/M			
110			120080*			
125			120060*			100
150	146007	146029	120081*	113338	113386	100
185	146008	146030		113341	113388	100
240	146009	146032		113344	113389	100

* stacked in towers

Pulp Testing

Munktell grade 1600 is often used when preparing laboratory sheets of most forms of pulp for physical testing in accordance with ISO Test Method 5269-1: 2005, Part 1

Blotter: Grade 1600

Basis Weight g/m²	Klemm Absorbency mm	Dimensional Change %	Water Uptake g/m²
250 ±25	70 ±20	< 3	450 ±50

Part Numbers – Blotter: Grade 1600

Size mm	Grade 1600	Pcs/pack
Circles		
120	143036	200
125	143037	200
140	143039	200
150	143038	200
170	143040	200
185	143041	200
220	143042	200
230	143043	200
240	143044	200

Size mm	Grade 1600	Pcs/pack
Sheets		
120 × 250	143050	200
143 × 230	143052	200
150 × 150	143053	200
165 × 165	143055	200
170 × 170	143056	200
175 × 175	143057	200
180 × 180	143058	200
200 × 200	143059	200
240 × 240	143017	200
240 × 340	143032	200
250 × 250	143014	200
260 × 260	143023	200

Seed Testing and Germination Capacity Test Paper

All seed testing papers have the following characteristics required for germination substrate filter paper:

- Munktell blotter papers are made of cotton linters and/or pure cellulose, are sufficiently strong for the test and do not contain any substances which could influence the growth of seeding.
- Colors used are non-toxic to germinating seed.
- A broad weight range enables the seed technician to maintain the required moisture level for the whole duration of germination test period.

Munktell offers seed germination blotter papers in white, three shades of blue and yellow. Analysis of tiny, almost transparent germinating roots is easier with the use of colored blotter papers.

Munktell blotter and seed toweling papers comply with ISTA and AOSA requirements for seed analysis.

Corn germination roll test

Beet seeds in pleated strips

Grass seeds on circles

Centian seeds, different treatments

Seed Testing and Germination Capacity Test Paper

Grade	Description	Surface	Weight g/m²
1765	Pleated strips, white, 50 double pleats	plain, pleated	110
1766	Pleated strips, gray, 50 double pleats	plain, pleated	110
6	Inlay strips	plain	80
292	White	plain	87
1700	White	plain, circles with slot for wicks	135
1731	White	plain	400
50S	White	plain	120
37/N	White	creped	135
C 160	White	plain	160
4 b	Wick for Jacobsen, Copenhagen tanks		75
190	Filter board, blue	plain	300
191	Filter board, blue	plain	700
NEW Grade 192	Filter board, dark blue	plain	720
193	Filter board, yellow	plain	160
194	Filter board, dark blue	plain	430
195	Brown paper sheets	creped	65
196	Brown paper sheets	creped	120
C 300	Cuts, white	plain	300
C 350	Cuts, white	plain	350
39/N	Cuts, white	creped	180
M-Towel Pair			
1750 with	Filter white and	plain	90
1755	PE-coated paper	plain	53

* BP – between papers
PP – pleated paper
TB – top of paper
** B – between blotters
P – cover petri dishes
TC – top of creped cellulose paper without blotter
T – paper toweling

Thickness mm	ISTA* Method	AOSA** Method	Type of seeds	Size mm	Part Number	Pcs/ pack
0.22	PP	PP	50 double pleats for pelleted, medium and large seeds	2,000×110	146036	1,000
0.22	PP	PP	For seeds with fine roots	2,000×110	146001	1,000
0.17			For all types of seed	110×580 200×600	123420 123426	500 500
0.18	TP	P, TB	Small specimens in petri dishes or Jacobsen Tanks with grass or flowers	∅ 90	113311	100
0.31	TP, BP	P, TB		∅ 75 ∅ 85 ∅ 88 ∅ 95 18×320 400×480	144003 144000 144001 144002 144004 144005	500 500 500 500 1,000 250
0.78	TP, BP	P, TB		∅ 75 ∅ 85 ∅ 95 ∅ 130 ∅ 160 ∅ 162 ∅ 170	144044 144024 144045 144013 144046 144015 144016	200 200 200 200 200 200 200
0.22	TP, BP	P, TB		240×250	146045	500
0.5		P, TC		∅ 70 580×580	233208 213030	50 100
0.31	TP, BP			580×580	203031	100
0.15				30×160	123613	100
0.65	TP, BP	TB, B, P	All specimens like vegetable, herbs and flowers	∅ 80 ∅ 82.6 ∅ 135 ∅ 140 85×120 102×102 152×229	146065 146067 146021 146070 146060 146061 146063	100 100 100 100 100 100 100
1.35	TP, BP			∅ 90 105×105 140×200 150×310	146077 146072 146073 146075	100 100 100 100
1.45	TP, BP			140×200	146079	50
0.32	TP, BP			210×297	146080	100
0.68	TP, BP			∅ 50 ∅ 82.6 102×102 119×120	146085 146087 146081 146083	100 100 100 100
0.17	BP	T, TC	Cereals, toweling	254×381 254×762	146089 146091	100 100
0.3	BP	T, TC		254×762	146092	100
0.52	TP, BP	TB, B	Cereals	200×600	223010	250
0.63	TP, BP	TB, B		580×580	223023	100
0.65	TP, BP	T, TC		150×700 580×580	213061 213078	100 100
		T	Cereals, toweling; grade 1755 coated to minimize root break-through and the spread of mold			
0.2				220×400	144017	500
0.19				190×400	146000	500

Filter Papers for Sugar Industry

Munktell offers 6 different grades of filter papers that are widely used in sugar industry quality management labs around the globe. In the analysis of cane or sugar beet, the fruit is mashed and

filtered to facilitate further analysis of the raw juice.

Potassium-, nitrogen-, sodium-, and saccharine contents can then be determined by spectrophotometry.

Grade	Basis Weight g/m²	Filtration Speed s/10 ml	Characteristics
Sugar Beet			
601/N	65	13	creped
603/N	75	8	creped
49	78	18	embossed
100/N	85	30	plain, low sodium, potassium, ammonium
6 S/N	145	12	creped
Sugar Cane			
1290	84	100	plain

Part Numbers – Filter Papers for Use in Sugar Laboratories

Size mm	Grades 601/N	603/N	49	100/N	6 S/N	1290	Pcs/ pack
Circles							
150	146229	123592		123544		113175	100
185	146234	123595		123545		113178	100
190		123596					100
230		123598					100
240	146235			123548		113180	100
¼ Folded Filters							
240			203068*				100
Folded Filters							
240			203067		213143		100

* for immediate application, especially designed for large series of standard filtration

Weighing Papers

Grade	Basis Weight g/m²	Character-istics	Appli-cation	Format mm	Part Number	Pcs/ pack
919	25	Easily crushable	Weighing syrup and semi-crystalline substrates	100×100	146058	1,000

¼ Folded filters

Filter Papers for Breweries and Beverage Industry

Munktell offers filters for malt analysis and malt filtration according MEBAK, ASBC, and EBC standards.

Grade	Basis Weight g/m²	Filtration Speed s/10 ml	Properties/Applications
41b	75	22	Medium fast filtration, qualitative, plain, recommended for malt analysis
6	80	15	Thicker and faster filtration, compared to grade 41b, plain for malt analysis. Recommended in the ASBC manual for Malt-4 analysis and degassing
53	70	18	Embossed, particularly suitable for wheat beer analysis
15	68	25	Plain, for final attenuation of congress wort
11-1450	80	10	Fast filtering, open fiber matrix, hardened
12/N	80	25	Medium fast filtering, medium open fiber matrix, hardened particularly suitable for extract (EBC-method)
470	140	80	Plain, kieselguhr paper for fine turbidity

Part Numbers – Filter Papers for Breweries and Beverage Industry

Size mm	Grades 41b	6	53	V11-1450	V12/N	470	Pcs/ pack
Folded Filters							
240	146279	123474	123409	144029	144040	146351	100
320	146282	123478	123411	144039	144041	146352	100

Filter Papers for Use in Wine Laboratories

Grade	Basis Weight g/m²	Filtration Speed s/10 ml	Properties/Applications
293	80	300	Slow filtration, very tight fiber matrix, high efficiency retention of finest particles
3 hw	65	20	Medium fast filtration, high wetstrength, smooth surface
37/N	135	4	Particularly open fiber matrix, fast filtration, creped surface, ideal for juice filtration
470	140	80	Smooth surface, kieselguhr (diatomite) paper for fine turbidity
MG 1387/1	90		Micro-glass fibers for sample preparation in wine analytics.

Part Numbers – Filter Papers for Use in Wine Laboratories

Size mm	Grades 293	3 hw	37/N	470	MG 1387/1	Pcs/ pack
Folded Filters						
150	113424	123111	213039			100
240	113426	123117	213041	146351		100
Circles						
125					443097	50

Filter Cards for Milk Products

Grade	Characterisation	Application	Part No.	Pcs/ pack
914	ADMI test filter card	Determination of scorched particles in milk powders according to ADMI method	146093	500
917	Sediment test filter card	Determination of sediment in milk powder, dairy products, etc.	146094	500
2602	Disc, nonwoven, 150 g/m², ∅ 32 mm	Dirt analysis in milk	146369	1,000

Cellulose Extraction Thimbles for Soxhlet Extraction

Munktell extraction thimbles are seamless with rounded bottom and are made of high-purity alpha-cellulose. Available in over 30 sizes, they are perfect sample reservoirs for quality

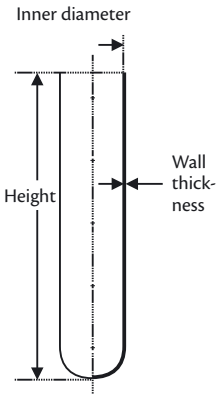
control, research and analytical applications where solvent extraction of solids and semi-solids must be carried out.

Features of Munktell thimbles

- Consistent physical properties time after time
- Made of the finest materials

Examples of use

- Ideal for fat and lipid extractions in food industry
- Used in determining environmental pollutants
- Quality Management of components used in pharmaceutical formulations
- Extraction of polymers



Tolerances*

Inner diameter (ID)	0/–3 mm
Thimble height	± 10 mm
Wall thickness	1.5 ± 0.5 mm
Ash content	<0.1 %

* acc. to DIN 12449

Part Numbers – Cellulose Extraction Thimbles for Soxhlet Extraction

Size mm Internal ∅ × Height	ET/C	Pcs/ pack
10 × 50	142000	25
19 × 90	142087	25
20 × 80	142089	25
22 × 80*	142002	25
22 × 100	142027	25
25 × 100*	142004	25
25 × 60	142028	25
25 × 80	142003	25
26 × 100	142018	25
26 × 60	142005	25
26 × 60 T	142014	25
26 × 80	142006	25
27 × 80	142030	25
28 × 22***	142060	25
28 × 100	142016	25
28 × 120	142032	25

Size mm Internal ∅ × Height	ET/C	Pcs/ pack
30 × 100	142029	25
30 × 77	142007	25
30 × 80	142026	25
30 × 95	142008	25
33 × 100	142022	25
33 × 118	142083	25
33 × 80**	142009	25
33 × 94*	142010	25
35 × 120	142001	25
35 × 150	142011	25
40 × 150	142037	25
43 × 123*	142012	25
43 × 125	142024	25
48 × 145	142015	25

* fits Büchi B-811
** fits Gerhard Soxterm Automatic, Foss Tecator Systems, Velp Solvent Extractors
*** fits Foss Soxtec 2050

Surface Protection with Coated Paper

LabSorb coated paper protects work surfaces from spilled chemicals, as well as toxic or infectious substances. Spills are quickly absorbed into the surface layer of cellulose material and prevented from penetrating to the surface of the work bench by a thin coating of polyethylene that serves as a carrier for the absorbent layer.

LabSorb papers can be treated with disinfectants for use in clinical laboratories to prevent biological contamination.

LabSorb coated papers are also suitable for lining chemical storage areas, trays and experimental animal cages. LabSorb coated papers are available in two levels of absorbency.

Two layer surface protection:

Layer 1:
Top layer consists of highly absorbent cellulose to quickly capture any spills.

Layer 2:
Bottom layer is an impermeable polyethylene coating that prevents the covered surface from contamination.

Grade	Basis Weight g/m²	Water Absorption	Characteristics
LabSorb	140	150%	Highly absorbent
LabSorb Ultra	187	300%	Ultra absorbent

Part Numbers – Surface Protection with Coated Paper

Size	LabSorb	LabSorb Ultra	Pcs/pack
Reels			
400 mm × 50 m	146287		1
400 mm × 100 m	146288		1
460 mm × 100 m	146294		1
500 mm × 50 m	146289		1
500 mm × 100 m	146298		1
600 mm × 50 m		144027	1
Sheets			
460 mm × 570 mm	146306		50
480 mm × 600 mm	146314		50
480 mm × 600 mm		144028	100

Price-Competitive Filter Papers

When budgets are tight

- Available in both 580 × 580 mm and 460 × 570 mm sizes in basis weights ranging from 60 g/m² to 100 g/m² in plain or creped surfaces. On occasion our price-competitive papers may be available in other sizes.
- Pack sizes can be adjusted to meet your requirements.

Please contact us directly for additional information and pricing.

Papers for Special Applications

Grade	Basis Weight g/m²	Typical Retention µm	Thickness mm	Filtration Speed s/10 ml
4/N	80	2 – 3	0.16	10
11	80	12 – 15	0.21	150
389F	84	9 – 12	0.19	20
480	85	–	0.19	–
918	85	–	0.17	45
470	140	–	0.32	70 – 90
69/K	155	–	0.36	65
1200	280	6.1	0.60	15

Part Numbers – Papers for Special Applications

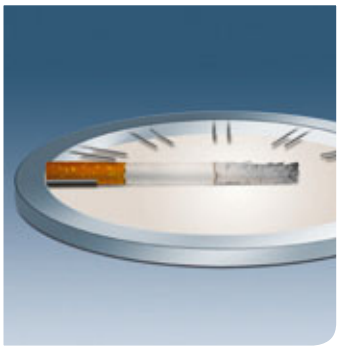
Size mm	Grades 4/N	11	389 F	480
Circles				
55			146154	
70			146156	146320
90		144030	146158	146322
110	100122	144031	146160	146324
125	100123	144032	146162	146327
150		144033	146164	146330
180			146165	
185	100124	144043	146166	146332
240			146167	146333
Folded Filters		V11		
110			146168	
125			146169	146336
150			146172	146337
185		144035	146174	146339
200			146175	
240		144036	146177	146340
270		144037		146341
320		144038		146342

Characteristics	918	470	69/K	1200**	Pcs/ pack
Plain	146198	146347	146187*		100
Plain, hardened	146199	146348	146188*		100
Plain, for determination of fat in foodstuffs	146200		146190*		100
Plain, phase separation paper, hydrophobic silicone-impregnated paper	146201		146191*		100
Black Filter Paper, stained with a sulfur coloring To reveal the particles of bright color – detection of fluorine or silicon – mycelium in cultivated mushrooms	146202	146349	146192		100
Plain, kieselguhr (diatomite) paper for fine turbidity	146203				100
Plain, activated carbon – Laboratory: clarification and brightening of dull and dark urines, for polarimetric sugar determination – Industry: filtration of galvanic baths and clarification of colored liquids					100
Plain, medium fast, slightly wetstrengthened for gelatine and oil filtration. For use in filter presses for transformer oil filtration	146204	146350	146193		100
	146206		146196*		100
					100
					100
					100
					100
					100
		146351			100
					100
		146352			100

* Pack size 50 pcs
** Ordering information upon request

Papers for Cigarette Ignition Strength Testing

Certified quality filter papers for use in ASTM E 2187-09* and DIN EN ISO 12863**



Munktell presents the new filter paper used as the required substrate: Munktell grade 2CT, ∅ 150 mm.

Munktell now offers grade 2CT for use as a substrate in tobacco testing labs when evaluating the ignition strength or ignition propensity of self-extinguishing cigarettes. Grade 2CT has been certified by independent, third-party laboratories both in Europe and the United States to meet the required physical properties of the paper required by the DIN EN ISO as well as the ASTM test methods.

The ASTM E 2187 mentions in its introduction: "This test method uses standard substrates to determine the extent to which, as the substrate draws heat from the cigarette, the cigarette combustion remains strong enough to be capable of initiating a fire."

- Certified to meet the physical requirements of both ISO** and ASTM* test methods
- Made of 100% cotton linters
- Documentation upon request
- Munktell grade 2CT, certified quality, 150 mm circles, 100 per pack,

Part Number: 146183

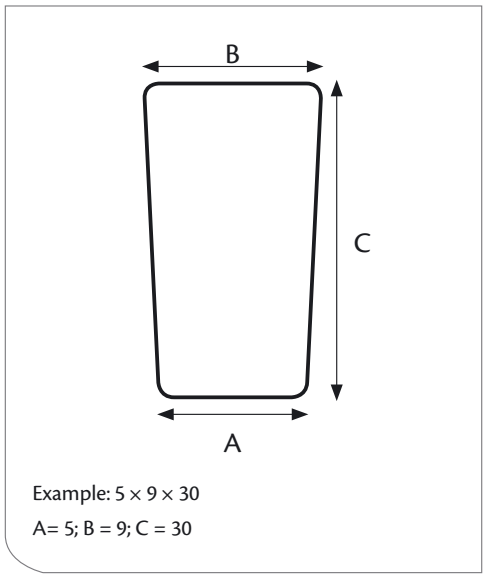
* ASTM Standard E2187-09, "Standard Test Method for Measuring the Ignition Strength of Cigarettes," ASTM International, West Conshohocken, PA, 2003, DOI: 10.1520/E2187-09

** DIN EN ISO 12863: "Standard test method for assessing the ignition propensity of cigarettes" (ISO 12863:2010 + Cor. 1:2011)

Cellulose Stoppers

Grade 5 CS

- Made with high-purity alpha-cellulose
- Air permeable
- Can be sterilized to 200 °C (maximum)
- Hygienic – single use
- Economical



Example: 5 × 9 × 30
A= 5; B = 9; C = 30

Suitable for capping:

- Flasks
- Erlenmeyers
- Test tubes
- Various bottles

Size mm A × B × C	5 CS	Pcs/ pack
5 × 9 × 30	146110	á 1,000
6 × 8.5 × 11	146111	á 1,000
7 × 11 × 30	146112	á 1,000
8 × 14 × 32	146113	á 1,000
9 × 12 × 30	146114	á 1,000
10 × 18 × 37	146115	á 1,000
11 × 16 × 32	146116	á 1,000
11 × 17 × 40	146117	á 1,000
12 × 17 × 37	146118	á 1,000
12 × 18 × 42	146119	á 1,000
12 × 20 × 32	146120	á 1,000
13 × 18 × 32	146121	á 1,000
15 × 19 × 30	146122	á 1,000
16 × 20 × 30	146123	á 1,000
17 × 21 × 38	146124	á 1,000
18 × 22 × 30	146125	á 1,000
19 × 24 × 30	146126	á 1,000
20 × 23 × 41	146127	á 500

Size mm A × B × C	5 CS	Pcs/ pack
23 × 28 × 30	146128	á 500
24 × 28 × 43	146129	á 200
25 × 34 × 60	146130	á 200
26 × 36 × 60	146131	á 200
28 × 33 × 63	146132	á 200
29 × 38 × 60	146133	á 200
30 × 40 × 40	146134	á 200
30 × 42 × 55	146135	á 100
33 × 37 × 63	146136	á 100
35 × 36 × 40	146137	á 200
35 × 40 × 60	146138	á 100
35 × 46 × 60	146139	á 100
37 × 50 × 50	146140	á 100
39 × 61 × 63	146141	á 50
40 × 58 × 65	146142	á 50
42 × 52 × 51	146143	á 50
58 × 65 × 70	146144	á 25

pH Indicator Papers

- Rapid and precise readings
- Filter paper treated with one or more colored pH indicators

Grade 911 – Universal pH Indicator Papers

Scale Value												
pH 1–14	1	2	3	4	5	6	7	8	9	10	12	14
pH 0–10	0	1	2	3	4	5	6	7	8	9	10	
pH 1–11	1	2	3	4	5	6	7	8	9	10	11	
pH 0.5–5	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5		
pH 4–7	4	4.5	5	5.5	6	6.5	7					
pH 5–9	5	5.5	6	6.5	7	7.5	8	8.5	9			
pH 6.5–10	6.5	7	7.5	8	8.5	9	9.5	10				
pH 9–13	9	9.5	10	10.5	11	11.5	12	12.5	13			
pH 3.8–5.8	3.8	4.1	4.3	4.5	4.7	4.9	5.2	5.5	5.8			
pH 4–7	4	4.3	4.6	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7	
pH 6.4–8	6.4	6.7	7	7.2	7.4	7.7	8					
pH 7.2–9.7	7.2	7.5	8	8.5	8.8	9.2	9.7					
pH 8–10	8	8.2	8.4	8.7	9	9.2	9.6	10				
pH 12–14	12	12.5	13	13.5	14							

Roll of 8 mm × 5 m

Refill pack of 3 rolls of 8 mm × 5 m

Box of 200 test strips,
10 mm × 70 mm

Booklet of 100 test strips,
8 mm × 75 mm

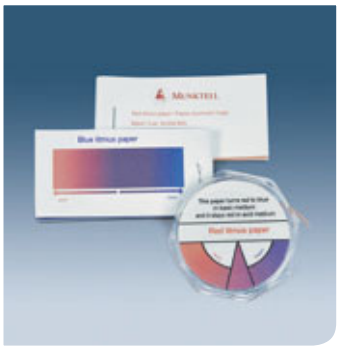
Tube of 200 test strips,
9 mm × 60 mm

Part Numbers – Grade 911 – Universal pH-Indicator Papers

	Roll 1 Pcs (1)	Refill Pack 3 Rolls (2)	Box 200 Strips (3)	Booklet 100 Strips (4)	Tube 200 Strips (5)
pH 1–14	142459	142313	142326	142339	142352
pH 0–10	142460	142314	142327	142340	142353
pH 1–11	142461	142315	142328	142341	142354
pH 0.5–5	142462	142316	142329	142342	142355
pH 4–7	142463	142317	142330	142343	142356
pH 5–9	142464	142318	142331	142344	142357
pH 6.5–10	142465	142319	142332	142345	142358
pH 9–13	142307	142320	142333	142346	142359
pH 3.8–5.8	142308	142321	142334	142347	142360
pH 4–7	142309	142322	142335	142348	142361
pH 6.4–8	142310	142323	142336	142349	142362
pH 8–10	142311	142324	142337	142350	142363
pH 12–14	142312	142325	142338	142351	142364

pH Indicator Papers

- Rapid determination of pH value in industrial applications
- General analysis in school



Grade 912 – Universal Test Papers

- Litmus paper:

  General control of acid or alkaline reactions

– Blue litmus	Blue		Red
– Neutral litmus	Purple		Blue/Red
– Red litmus	Red		Blue

- Phenolphtalein paper:

Neutralization control	White		Red

- Congo red paper:

	Red		Blue

Test Paper for Qualitative Detection

- Lead acetate paper:

Detection of hydrogen sulfide (H_2S)	White		Brown/Black

- Potassium iodide starched paper:

Detection of free nitrites in free chlorine	White		Blue/Purple

- Cobalt chloride paper:

Detection of moisture	Blue		Pink

Part Numbers – Grade 912 – Universal pH-Indicator Papers*

	Roll 1 Pcs (1)	Refill Pack 3 Rolls (2)	Box 200 Strips (3)	Booklet 100 Strips (4)	Tube 200 Strips (5)
Blue litmus	142365	142373	142381	142389	142397
Neutral litmus	142366	142374	142382	142390	142398
Red litmus	142367	142375	142383	142391	142399
Phenolphtalein paper	142368	142376	142384	142392	142400
Red Congo paper	142369	142377	142385	142393	142401
Lead acetate paper	142370	142378	142386	142394	142402
Potassium iodide starched paper	142371	142379	142387	142395	142403
Cobalt chloride paper	142372	142380	142388	142396	142404

* Pack size see page 41

Grade 1010 – pH Test Strips

- Indicator colors are bonded to the cellulose fibers to prevent bleeding of the colors to give the technician a more precise measurement and also prevent contamination of the test solution.
- Reliable pH measurements can be obtained even in weakly buffered solutions and the test strips can remain in the test solution until the final reaction color is obtained.
- Color bands on the test strips are separated to make pH tests easily read by the user.

- Color bands are bonded to a thin but flexible plastic strip for improved handling
- Packaged in a transparent plastic box of 100 strips 6 mm × 80 mm with a color reference chart

- Fire/police/hazmat
- Aquaculture
- Surface treatment industry
- Soil analysis
- Schools/universities

Part Numbers – Grade 1010 – pH Test Strips

	Scale Value															Part Number
pH 0–14	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	142413
pH 0.5–5	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5						142414
pH 5.5–9	5.5	6	6.5	7	7.5	8	8.5	9								142415
pH 9.5–13	9.5	10	10.5	11	11.5	12	12.5	13								142416

Visual Color Test/Liquid pH Indicator

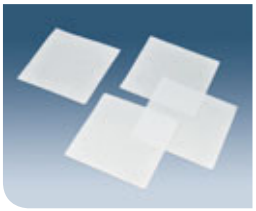
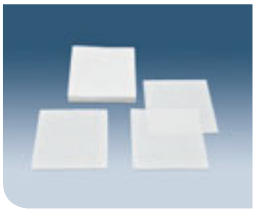
- Reliable (replace the pH meters)
- Rapid and precise readings
- Easy to use
- Economical (200 tests)

Part Numbers – Visual Color Test

	Scale Value								Part Number	Pack
pH 4.0–8.5	4.0	5.0	5.5	6.0	6.5	7.0	8.0	8.5	142417	30 ml

- Laboratory, industry
- Hydroponic cultures, etc…

Special Purpose Papers

	Grade	Applications
	900	Blotting Paper Block, absorbing excess liquids in microscopic preparations or in any drying of samples
	905	Antibiotic Testing Paper
	901	Weighing Containers for: – viscous products – pasty products – powders, etc.
	908	Weighing Paper, ideal for the weighing of all types of substances
	913	Lens Cleaning Tissue, cleaning of various optical lenses (lint-free paper for cleaning of optical surfaces such as lens and mirrors of microscopes, etc…)
	605	Joseph Paper, cleaning and drying of laboratory glass containers, tubes, flasks, microscopic plates, bottles in laboratories and hospitals
	388R	For collection of soot specimens or oil derivate from gas chimneys acc. DIN 51 402-T2

Specifications	Size mm	Part Number	Pcs/ pack
Pad of blotting paper sheets, 73 g/m^2	37 × 100	146095	50
Absorbent thick paper 290 g/m^2, made of 100% cotton linters	∅ 6 ∅ 9 ∅ 12 ∅ 13 ∅ 25	146216 146217 146218 146219 146220	1,000 1,000 1,000 1,000 1,000
Made of parchment paper with low nitrogen content	58 × 10 × 10	146096	100
Smooth surface paper 45 g/m^2 with satin appearance, wetstrength resistance	100 × 100 95 × 110	146097 146098	250 250
Very fine paper, 12 g/m^2 made of pure manila vegetable fiber, non-abrasive	80 × 100 95 × 135 100 × 150 135 × 170 135 × 190 200 × 300	146099 146100 146101 146102 146103 146104	25 25 100 500 500 100
Thin paper 25 g/m^2, very absorbent and lint-free	150 × 150 350 × 500 350 × 500* 350 × 500*	146105 146106 146107 146108	200 500 500 50
Filter paper for soot analysis, smooth surface, 84 g/m^2	∅ 45 ∅ 45	146179 146180	100 5,000

* folded

Archival Storage Products

www.munktell.com

Munktell
AHLSTROM

Glass Fiber Pads

Accessories for Microwave- and Infrared Drying

The absorbent glass fiber filter facilitates analysis of liquid, pasty and fatty samples. These sample carriers are recommended for evaluation of highly viscous samples.

	Grade	Basis Weight g/m²	Characteristics
Microwave drying	MG 160	75	Binder-free
Infrared drying	MG 161	75	Binder, inorganic

Part Numbers – Glass Fiber Pads for Moisture Determination

Size mm	MG 160	MG 161	Pcs/ pack
Circles			
70	410004	440016	50
90	410005	440017	50

Absorbent Filter Boards

Highly absorbent boards used in specimen mailing containers to minimize damage from any leakage in handling or shipment

Grade	Basis Weight g/m²	Water Pick-up g/m²	Water Pick-up %
SEK 330	330	1500	> 450
SEK 550	430	1650	> 300
SEK 770	770	3800	> 500

Available in sheets upon request.

Micro Filtration

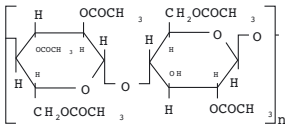
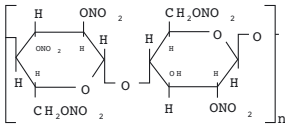
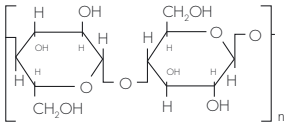
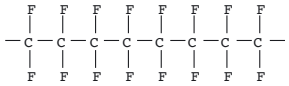
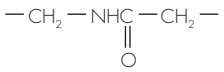
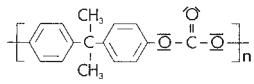
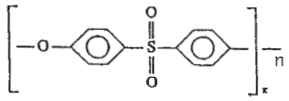
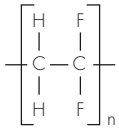
Membrane filters are surface filters used to remove particulate or collect microorganisms for analysis from solutions. Mainly on and near the surface of the filter matrix by mechanical means. Membranes are available in several diameters and pore sizes. They are made of different polymers and are selected to meet the particular filtration challenge.

Membrane filters are widely used in microbiological quality control procedures in food, beverage, cosmetics and pharmaceutical industries.

Contents

Membrane Filters

Membrane Filtration Media

Type	Description
Cellulose Acetate 	Low protein-binding, well suited for sterile filtration and clarification of aqueous solutions, nutrient media, buffers, and sera, they provide superior chemical resistance to alcohol and oil. These hydrophilic membranes offer excellent flow rates as well as thermal stability up to 180°C max.
Cellulose Nitrate 	Cellulose nitrate membranes set the standard in both analytical and microbiological filtration. Cellulose nitrate is available in a range of pore sizes and is well suited for microbial analysis in water, food and beverage applications. Available in dispenser strips or individually sealed.
Regenerated Cellulose 	Regenerated cellulose membranes are resistant to solvents and are hydrophilic. 0.45 µm pore size is typically used for HPLC sample preparation.
PTFE 	Permanently hydrophobic filter material, very suitable for air and gas filtration. PTFE membranes are extremely resistant to aggressive solvents and acids and can be used to filter particulate from both liquid and gas samples.
Polyamide 	Membranes are hydrophilic and are widely used in both aqueous and organic solvent filtration applications. Well suited for sterilization and clarification of buffers and nutrient media with a low level of extractables.
Polycarbonate 	PC membranes have uniform, smooth-bore, round pores that pass straight through the membrane creating a precise capillary structure. The smooth, flat surface of the PC membrane offers high visibility of captured particles.
Polyether Sulfone 	PES membranes have a uniform pore structure with high mechanical stability and are chemically inert. PES offers excellent flow rates for critical filtration situations where high throughput is required with the lowest protein adsorption. PES is the perfect choice for the filtration of biological and pharmaceutical specimens.
PVDF 	Polyvinylidene difluoride membranes are hydrophilic and widely used for the efficient removal of particles from fluids requiring a high throughput for HPLC sample preparation. PVDF membranes also have very low extractables. These membranes are available integrated into syringe filters only.
Glass Fiber Pre-Filters	Glass fiber pre-filters are placed directly on top of the filtration membrane to add depth filtration or “dust holding” of large particles and thereby increase filter life to enable filtration of a higher volume.

Munktell offers a complete line of micro filtration products for laboratory needs including membranes, syringe filters, bottle top filters as well as dispenser and nutrient pads, all at competitive prices.

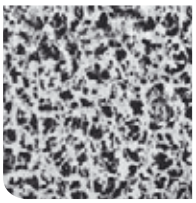
Selection Guide – Membrane Filtration Media

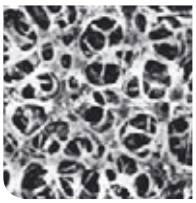
Membrane Type	Available Pore Size µm	Flow Rate for Water [1.; 2.] ml/min	Bubble Point [1.] bar	Color
				White
Cellulose Acetate	0.2	24	2.9	•
	0.45	65	2.4	•
	0.65	115	1.5	•
	0.8	200	1.0	•
	1.2	320	0.8	•
	5	570	0.4	•
Cellulose Nitrate	0.2***			
	0.45	70	2.4	•
	0.65	130	2.0	•
	0.8	200	1.7	•
	1.2	320	1.0	•
	3	430	0.6	•
	5	570	0.5	•
	8	750	0.3	•
Regenerated Cellulose	0.2	15	4.4	•
	0.45	30	2.9	•
PTFE	0.2	11**	1.0*	•
	0.45	0.20**	0.8*	•
	1.2	1.6**	0.45*	•
	5	4**	0.1*	•
Polyamide	0.2	>15	3.5	•
	0.45	>35	2.3	•
Polycarbonate	0.2	20	4.8	•
	0.4	70	2.5	•
Polyether Sulfone	0.1	>10	<2.8*	•
	0.2	>25	3.5	•
	0.45	>46	2.6	•

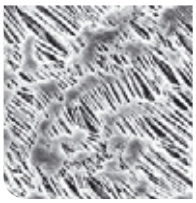
* with Isopropanol/Water (60/40)
** with Isopropanol per cm², Δp = 1 bar /~ 15 psi
*** application microbiology, only

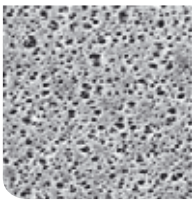
[1.] acc. DIN 58355
[2.] average value per cm² area at Δp = 1 bar (100 kPa; 15 psi)
[3.] continuous operating temperature in water

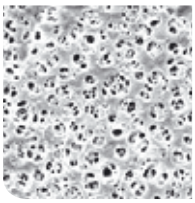
Color/Grid					Extractables with Water	Chemical Compatibility	Max. Thermal Stability	Sterilization
White/Black	White/Green	Green/Dark green	Gray/White					
				}	< 1%	Resistant against aqueous solutions, pH 4–8, against most alcohols, oils and other organic solvents	180°C	Autoclaving at 121°C or 134°C, dry heat, gamma radiation (25 kGy) or with ethylene oxide
•								
•				}	< 1%	Resistant against aqueous solutions, pH range 4–8, against hydrocarbons and some solvents	130°C	Autoclaving at 121°C, gamma radiation (25 kGy) or with ethylene oxide
•	•	•	•					
•	•		•					
•			•					
•	•							
				}	< 1%	Compatible with aqueous solutions (pH 3–12) and organic solvents. Resistant against almost all solvents and against aqueous solutions, pH range 3–12	200°C	Autoclaving at 121°C or 134°C, dry heat (180°C), gamma radiation (25 kGy) or with ethylene oxide
				}	none detectable	Resistant to solvents, acids and bases	200°C	Autoclaving at 121°C or 134°C or with ethylene oxide
				}	< 1%	Resistant to many solvents and alkali-solutions, pH range 3–14	100°C[3.]	Autoclaving at 121°C or 134°C or with ethylene oxide
				}	Low		140°C	Autoclaving at 121°C
				}	< 2%	Resistant to some solvents and aggressive, aqueous solutions, pH 1–13	200°C	Autoclaving at 121°C and 134°C, gamma radiation (25 kGy) or with ethylene oxide

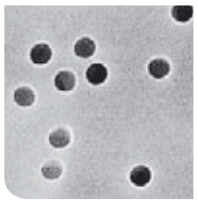

Cellulose Nitrate


Cellulose Acetate


PTFE


Polyether Sulfone


Regenerated Cellulose


Polycarbonate

Membrane Filters

Part Numbers – Membrane Filters, Nonsterile, White

Size ∅ mm	Pore size	Part No.	Pcs/ pack
Cellulose Acetate			
47	5 µm	703191	100
25	1.2 µm	703187	100
50	1.2 µm	703188	100
142	1.2 µm	703189	25
293	1.2 µm	703190	25
25	0.8 µm	703000	100
47	0.8 µm	703001	100
50	0.8 µm	703002	100
142	0.8 µm	703003	25
142	0.8 µm	703004	100
293	0.8 µm	703005	25
25	0.65 µm	703006	100
47	0.65 µm	703007	100
50	0.65 µm	703008	100
142	0.65 µm	703009	25
293	0.65 µm	703010	25
13	0.45 µm	703011	100
25	0.45 µm	703012	100
30	0.45 µm	703013	100
47	0.45 µm	703015	100
47	0.45 µm	703231	200
50	0.45 µm	703018	100
85	0.45 µm	703020	100
90	0.45 µm	703021	25
100	0.45 µm	703022	25
100	0.45 µm	703024	100
142	0.45 µm	703025	25
142	0.45 µm	703026	100
293	0.45 µm	703027	25
25	0.2 µm	703028	100
30	0.2 µm	703029	100
47	0.2 µm	703031	100
50	0.2 µm	703033	100
90	0.2 µm	703034	25
100	0.2 µm	703035	25
100	0.2 µm	703036	100
142	0.2 µm	703037	25
142	0.2 µm	703038	100
293	0.2 µm	703039	25
293	0.2 µm	703040	100

Size ∅ mm	Pore size	Part No.	Pcs/ pack
Cellulose Nitrate			
25	8 µm	703041	100
37	8 µm	703042	100
47	8 µm	703044	100
50	8 µm	703047	100
142	8 µm	703049	25
150	8 µm	703050	25
25	5 µm	703105	100
47	5 µm	703106	100
50	5 µm	703107	100
90	5 µm	703108	25
13	3 µm	703052	100
25	3 µm	703053	100
47	3 µm	703055	100
50	3 µm	703057	100
90	3 µm	703058	25
142	3 µm	703059	25
25	1.2 µm	703061	100
47	1.2 µm	703063	100
50	1.2 µm	703065	100
142	1.2 µm	703066	25
293	1.2 µm	703067	25
13	0.8 µm	703068	100
20	0.8 µm	703069	100
25	0.8 µm	703070	100
37	0.8 µm	703071	100
47	0.8 µm	703073	100
50	0.8 µm	703075	100
142	0.8 µm	703076	25
142	0.8 µm	703077	100
293	0.8 µm	703078	25
25	0.65 µm	703079	100
47	0.65 µm	703081	100
50	0.65 µm	703083	100
13	0.45 µm	703084	100
20	0.45 µm	703085	100
25	0.45 µm	703086	100
30	0.45 µm	703087	100
37	0.45 µm	703088	100
47	0.45 µm	703090	100
50	0.45 µm	703092	100
85	0.45 µm	703093	100

Size ∅ mm	Pore size	Part No.	Pcs/ pack
Cellulose Nitrate			
90	0.45 µm	703094	25
90	0.45 µm	703095	100
100	0.45 µm	703096	25
100	0.45 µm	703097	100
110	0.45 µm	703098	100
142	0.45 µm	703099	25
142	0.45 µm	703100	100
293	0.45 µm	703101	25
293	0.45 µm	703102	100
Regenerated Cellulose			
13	0.45 µm	703266	100
25	0.45 µm	703267	100
47	0.45 µm	703268	100
50	0.45 µm	703269	100
100	0.45 µm	703270	25
142	0.45 µm	703271	25
13	0.2 µm	703273	100
25	0.2 µm	703274	100
47	0.2 µm	703275	100
50	0.2 µm	703276	100
142	0.2 µm	703277	25
PTFE (Teflon) with Support			
47	5 µm	703185	100
PTFE (Teflon)			
25	5 µm	703180	100
47	5 µm	703181	100
50	5 µm	703182	100
100	5 µm	703183	25
142	5 µm	703184	25
13	1.2 µm	703159	100
25	1.2 µm	703160	100
47	1.2 µm	703161	100
50	1.2 µm	703162	100
100	1.2 µm	703163	25
142	1.2 µm	703164	25
13	0.45 µm	703165	100
25	0.45 µm	703166	100
47	0.45 µm	703167	100
50	0.45 µm	703168	100
90	0.45 µm	703169	25
100	0.45 µm	703170	25
142	0.45 µm	703171	25
293	0.45 µm	703172	25

Size ∅ mm	Pore size	Part No.	Pcs/ pack
PTFE (Teflon)			
13	0.2 µm	703173	100
25	0.2 µm	703174	100
47	0.2 µm	703175	100
50	0.2 µm	703176	100
100	0.2 µm	703177	25
142	0.2 µm	703178	25
293	0.2 µm	703179	25
Polyamide			
13	0.45 µm	703283	100
25	0.45 µm	703284	100
47	0.45 µm	703285	100
47	0.45 µm	703297	200
50	0.45 µm	703286	100
90	0.45 µm	703287	25
293	0.45 µm	703288	100
13	0.2 µm	703289	100
25	0.2 µm	703290	100
47	0.2 µm	703291	100
50	0.2 µm	703292	100
90	0.2 µm	703293	25
142	0.2 µm	703294	100
293	0.2 µm	703295	25
293	0.2 µm	703296	100
Polycarbonate			
25	0.4 µm	703278	100
47	0.4 µm	703279	100
25	0.2 µm	703280	100
47	0.2 µm	703281	100
50	0.2 µm	703282	100
Polyether Sulfone			
25	0.45 µm	703255	100
47	0.45 µm	703256	100
50	0.45 µm	703257	100
25	0.2 µm	703258	100
47	0.2 µm	703259	100
50	0.2 µm	703260	100
25	0.1 µm	703262	100
47	0.1 µm	703263	100
50	0.1 µm	703264	100

Membrane Filters

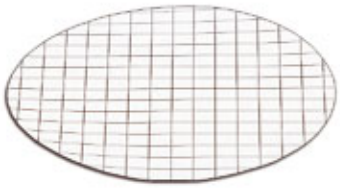
Part Numbers – Gridded Membrane Filters (Sterile Version Individually Packed)

Size mm	Pore Size	Part No.	Pcs/ pack
Cellulose Acetate			
47	0.45 µm, sterile	703014	100
50	0.45 µm, sterile	703016	100
47	0.2 µm, sterile	703030	100
50	0.2 µm, sterile	703032	100
Cellulose Nitrate			
47	8 µm, sterile	703043	100
50	8 µm, sterile	703045	100
47	3 µm, sterile	703054	100
50	3 µm, sterile	703056	100
47	1.2 µm, sterile	703062	100
50	1.2 µm, sterile	703064	100
47	0.8 µm, sterile	703072	100
50	0.8 µm, sterile	703074	100
47	0.65 µm, sterile	703080	100
50	0.65 µm, sterile	703082	100
47	0.45 µm, sterile	703089	100
50	0.45 µm, sterile	703091	100
Cellulose Mixed Ester White with Black Grid			
47	0.22 µm, sterile	703298	200

Size ∅ mm	Pore Size	Part No.	Pcs/ pack
Cellulose Nitrate White with Black Grid			
47	1.2 µm	703114	100
50	1.2 µm	703117	100
47	1.2 µm, sterile	703112	100
47	1.2 µm, sterile	703113	1000
50	1.2 µm, sterile	703115	100
50	1.2 µm, sterile	703116	1000
47	0.8 µm	703124	100
50	0.8 µm	703126	100
47	0.8 µm, sterile	703122	100
47	0.8 µm, sterile	703123	1000
50	0.8 µm, sterile	703125	100
47	0.65 µm, sterile	703128	100
50	0.65 µm, sterile	703129	100
47	0.45 µm	703133	100
47	0.45 µm	703134	1000
50	0.45 µm	703138	100
50	0.45 µm	703139	1000
82	0.45 µm	703141	50
47	0.45 µm, sterile	703131	100
47	0.45 µm, sterile	703132	1000
50	0.45 µm, sterile	703136	100
50	0.45 µm, sterile	703137	1000
Cellulose Mixed Ester White with Black Grid			
47	0.45 µm, sterile	703299	200

Cellulose nitrate white with black grid, 0.45 µm, sterile

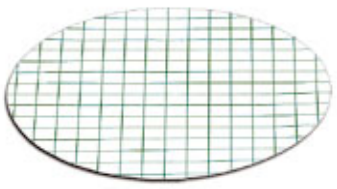
Cellulose nitrate green with dark green grid, 0.45 µm



Cellulose nitrate white with black grid, 1.2 µm

Cellulose nitrate white with black grid, 0.45 µm, sterile, 6 mm hyrdophobic edge

Size ∅ mm	Pore Size	Part No.	Pcs/ pack
Cellulose Nitrate White with Black Grid			
47	0.2 µm	703147	100
50	0.2 µm	703150	100
High Flow Cellulose Nitrate White with Black Grid			
47	0.45 µm, sterile	703153	100
47	0.45 µm, sterile	703154	1000
50	0.45 µm, sterile	703155	100
50	0.45 µm, sterile	703156	1000
Cellulose Nitrate White with Black Grid			
47	0.2 µm, sterile	703145	100
47	0.2 µm, sterile	703146	1000
50	0.2 µm, sterile	703148	100
50	0.2 µm, sterile	703149	1000
Cellulose Nitrate Gray with White Grid			
47	8 µm	703196	100
50	8 µm	703197	100
47	0.8 µm	703201	100
47	0.8 µm, sterile	703199	100
47	0.8 µm, sterile	703200	1000
50	0.8 µm, sterile	703202	100
50	0.65 µm	703208	100
47	0.65 µm, sterile	703205	100
50	0.65 µm, sterile	703206	100
50	0.65 µm, sterile	703207	1000
47	0.45 µm	703214	100
50	0.45 µm	703217	100
47	0.45 µm, sterile	703212	100
47	0.45 µm, sterile	703213	1000
50	0.45 µm, sterile	703215	100
50	0.45 µm, sterile	703216	1000



High flow cellulose nitrate white with green grid, 0.45 µm, sterile

Size mm	Pore Size	Part No.	Pcs/ pack
Cellulose Nitrate White with Black Grid			
47	0.45 µm, sterile	703223	100
47	0.45 µm, sterile, 6 mm hyrdo-phobic edge	703225	100
50	8 µm, 3 mm hydro-phobic edge	703222	100
47	0.45 µm, 3 mm hydro-phobic edge	703226	100
Cellulose Nitrate White with Black Grid			
50	0.45 µm, sterile	703227	100
47	0.2 µm, sterile	703228	100
50	0.2 µm, sterile	703230	100
Cellulose Nitrate Green with Dark Green Grid			
50	0.45 µm	703237	100
50	0.45 µm	703238	1000
47	0.45 µm, sterile	703233	100
47	0.45 µm, sterile	703234	1000
50	0.45 µm, sterile	703235	100
50	0.45 µm, sterile	703236	1000
High Flow Cellulose Nitrate White with Green Grid			
47	0.45 µm, sterile	703252	100
47	0.45 µm, sterile	703253	1000
50	0.45 µm, sterile	703254	100
Cellulose Nitrate White with Green Grid			
47	1.2 µm, sterile	703241	100
47	0.65 µm, sterile	703242	100
47	0.45 µm	703245	100
50	0.45 µm	703248	100
47	0.45 µm, sterile	703243	100
47	0.45 µm, sterile	703244	1000
50	0.45 µm, sterile	703246	100
50	0.45 µm, sterile	703247	1000

Membrane Auto-Dispenser

Membrane filters packaged in perforated strips are released from their sterile packaging automatically, one at a time, at the touch of a button, or "hands-free" when an optical sensor

detects approaching lab tweezers.

Part Numbers – Membrane Auto-Dispenser, Sterile

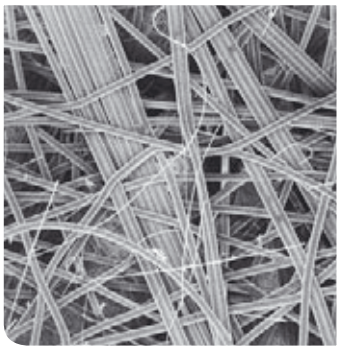
Size mm	Membrane Filters for Dispenser	Part No.	Pcs/pack
Cellulose Nitrate White with Black Grid			
47	0.45 µm	703135*	3 x 100
50	0.45 µm	703140*	3 x 100
47	0.45 µm	703142	3 x 100
50	0.45 µm	703143	3 x 100
47	0.2 µm	703151	3 x 100
50	0.2 µm	703152	3 x 100
High Flow Cellulose Nitrate White with Black Grid			
47	0.45 µm	703157	3 x 100
50	0.45 µm	703158	3 x 100
High Flow Cellulose Nitrate Gray with White Grid			
47	1.2 µm	703203	3 x 100
Cellulose Nitrate Gray with White Grid			
50	1.2 µm	703204	3 x 100
47	0.65 µm	703209	3 x 100
50	0.65 µm	703210	3 x 100
47	0.45 µm	703218	3 x 100
50	0.45 µm	703219	3 x 100
High Flow Celllulose Nitrate Gray with White Grid			
50	0.45 µm	703220	3 x 100
Cellulose Nitrate Green with Dark Green Grid			
47	0.45 µm	703239	3 x 100
50	0.45 µm	703240	3 x 100
Cellulose Nitrate White with Green Grid			
47	0.45 µm	703249	3 x 100
50	0.45 µm	703250	3 x 100
High Flow Celllulose Nitrate White with Green Grid			
47	0.45 µm	703251	3 x 100
Auto-Dispenser			
Auto-Dispenser		733059	1

* Rools

Glass Fiber Pre-Filters

Munktell offers three different grades of glass fiber pre-filters both with and without binder. Binder-free filters are recommended for analytical and gravimetric analysis as well as for the pre-filtration of solutions of tissue culture media.

Micro-glass pre-filters are relatively open structures of very fine high-purity, borosilicate glass fibers that are used to capture relatively large particles in the fiber matrix. The fine particle filtration efficiency of the pre-filter increases as the pre-filter becomes loaded and a dust cake forms, becoming yet another layer to the filter structure, adding further service life to the membrane beneath until the flow of the filtrate slows or stops.



Specification of Glass Fiber Filters

	Grade MG 1387/1	MGB	MGD
Basis Weight g/m^2	90	143	120
Material	borosilicate glass fibers	borosilicate glass fibers	borosilicate glass fibers
Binder	yes	no	no
Thickness	0.38 mm	0.7 mm	0.53 mm
Sterilization	autoclave – 121°C dry heat – 180°C	autoclave – 121°C dry heat – 180°C	autoclave – 121°C dry heat – 180°C
Max. Temperature Resistance	220°C	500°C	500°C

Part Numbers – Glass Fiber Filters

Size mm	Grade MG 1387/1	MGB	MGD	Pcs/pack
Circles				
20	443078	410043	410111	50
25	443079	410044	410112	50
42	443082	410151	410191	50
44	443083	410152	410192	50
47	443085	410038	410114	50
50	443086	410048	410115	50
60	443089			50
70	443090	410040	410118	50
80	443092			50
90	443093	410041	410117	50
100	443095	410047	410179	50
110	443096	410139	410212	50
125	443097	410140	410120	50
130	443098	410149		50
142	443099	410143		50
150	443100	410141	410119	50
200	443103			50
240	443104	410142*	410210*	50
257	443105			50
279	443106			50

* 25 Pcs/Pack

Syringe Filters

Luer Slip outlet and
Luer Lock outlet

Membrane	Polyether Sulfone			Cellulose Acetate[6]						Cellulose Acetate with GF[7] Pre-Filter			GF[7] Depth Filter
Pore Size (µm)	0.1	0.2	0.45	0.2	0.45	0.65	0.8	1.2	5	0.2	0.45	1.2	–
Filter Diameter (mm)	28	28	28	28	28	28	28	28	28	28	28	28	28
Housing[1]	MBS	MBS	MBS	MBS	MBS	MBS	MBS	MBS	MBS	MBS	MBS	MBS	MBS
Color Code	dark red	royal blue	yellow	blue	yellow	pink	green	red	brown	blue	yellow	red	white
Process Volume[2]	100	100	100	100	100	100	100	100	100	100	100	100	100
Sterilization[3]													
EO	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GI		•		•	•	•			•	•	•	•	•	•			
Feasible Sterilization													
EO		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GI		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
AU																	
Connector Inlet													
Female Luer Lock	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Male Luer Slip													
Connector outlet													
Male Luer Lock	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Male Luer Slip			•	•		•	•	•									•
Male Spike													
Application													
Sterile Filtration													
Sterile Venting													
Chromatography Sample Preparation													
Clarification													
Medical													

[1] MBS: Meta acrylate-butadien-styrene polymerisate; PP: polypropylene
[2] Process volume is a recommended value and depends on the ratio of retensive substance
[3] EO: Ethylene oxide; GI: Gamma irradiation; AU: Autoclave 121°C, 30 min
[4] Pore size and type of membrane of 15 and 25 mm syringe filters is printed on the housing, 4 mm filter units are packed in a color coded tray (blue for 0.2 µm, yellow for 0.45 µm)
[5] Possible sterilization modality
[6] Surfactant-free Cellulose Acetate
[7] Binder-free glass fiber depth filter

3 mm Filter

Spike outlet

Polyamide		Polyamide with Pre-Filter		PTFE						PTFE	Regenerated Cellulose						PVDF					
0.2	0.45	0.2	0.45	0.2	0.2	0.2	0.45	0.45	0.45	0.2	0.2	0.2	0.2	0.45	0.45	0.45	0.22	0.22	0.22	0.45	0.45	0.45
28	25			4	15	25	4	15	25	26	4	15	25	4	15	25	13	25	33	13	25	33
PP	PP			PP	PP	PP	PP	PP	PP	MBS	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
printed[4]	printed[4]			4	printed[4]	printed[4]	4	printed[4]	printed[4]	white	4	printed[4]	printed[4]	4	printed[4]	printed[4]	printed[4]	printed[4]	printed[4]	printed[4]	printed[4]	printed[4]
100	100			1	20	100		20	100		1	20	100	1	20	100	20	100	150	20	100	150
•	•				•	•				•												
																	•	•	•	•	•	•
•	•			•	•	•	•	•	•	•				•	•	•						
•	•			•	•	•	•	•	•	•				•	•	•						
•	•	•	•	•	•	•	•	•	•	•	•			•	•		•	•		•	•	
										•												
										•	•											
•	•	•	•	•	•		•	•		•				•	•	•	•	•	•	•	•	•
						•			•			•										

Syringe Filters

Part Numbers – Syringe Filters

Description	µm	∅ mm	Part No.	Pcs/ pack
High flow PES/MBS, luer lock outlet, sterile	0.1	28	713012	50
PES/PP, luer lock outlet, sterile	0.2	15	713064	100
High flow PES/MBS, luer lock outlet, γ-sterile	0.2	28	713000	50
High flow PES/MBS, luer lock outlet, sterile	0.2	28	713001	50
High flow PES/MBS, luer lock outlet, nonsterile	0.2	28	713002	500
High flow PES/MBS, luer slip outlet, sterile	0.2	28	713011	50
High flow PES/MBS, luer lock outlet, sterile	0.45	28	713009	50
High flow PES/MBS, luer lock outlet, nonsterile	0.45	28	713010	500
High flow PES/MBS, luer slip outlet, γ-sterile	0.45	28	713003	50
High flow PES/MBS, luer slip outlet, sterile	0.45	28	713004	50
High flow PES/MBS, luer slip outlet, nonsterile	0.45	28	713005	500
CA/MBS, male luer slip outlet, sterile	0.2	28	713045	50
CA/MBS, male luer slip outlet, nonsterile	0.2	28	713046	500
CA/MBS, luer lock outlet, γ-sterile	0.2	28	713006	50
CA/MBS, luer lock outlet, sterile	0.2	28	713007	50
CA/MBS, luer lock outlet, nonsterile	0.2	28	713008	500
CA/PP, luer outlet, nonsterile	0.22	25	713104	100
CA/PP, luer outlet, sterile	0.22	25	713108	100
CA/MBS, male luer slip outlet, sterile	0.45	28	713047	50
CA/MBS, male luer slip outlet, nonsterile	0.45	28	713048	500
CA/MBS, luer lock outlet, γ-sterile	0.45	28	713013	50
CA/MBS, luer lock outlet, sterile	0.45	28	713014	50
CA/MBS, luer lock outlet, nonsterile	0.45	28	713015	500
CA/PP, luer outlet, nonsterile	0.45	25	713105	100
CA/MBS, luer slip outlet, sterile	0.65	28	713016	50
CA/MBS, luer lock outlet, sterile	0.8	28	713017	50
CA/MBS, luer lock outlet, nonsterile	0.8	28	713018	500
CA/PP, luer outlet, nonsterile	0.8	25	713106	100
CA/MBS, luer lock outlet, sterile	1.2	26	713041	50
CA/MBS, luer lock outlet, nonsterile	1.2	26	713042	500
CA/MBS, luer lock outlet, sterile	5	26	713043	50
CA/MBS, luer lock outlet, nonsterile	5	26	713044	500
GF/CA/MBS, luer lock outlet, sterile	0.2	26	713079	50
GF/CA/MBS, luer lock outlet, nonsterile	0.2	26	713080	500
GF/CA/MBS, luer lock outlet, sterile	0.45	26	713084	50
GF/CA/MBS, luer lock outlet, nonsterile	0.45	26	713085	500
GF/CA/MBS, luer lock outlet, nonsterile	1.2	26	713083	500
GF/MBS, luer slip, nonsterile	~1	28	713090	500
GF/MBS, luer lock outlet, sterile	~1	26	713081	50
GF/MBS, luer lock outlet, nonsterile	~1	26	713082	500
PTFE/MBS, luer slip with venting needle, sterile	0.2	15	713021	50
PTFE/MBS, luer slip outlet, nonsterile	0.2	15	713023	500
PTFE/PP, spike outlet, nonsterile	0.2	15	713026	50
PTFE/PP, spike outlet, nonsterile	0.2	15	713027	500
PTFE/MBS, luer lock outlet, nonsterile	0.2	26	713019	500
PTFE/MBS, luer lock outlet, sterile	0.2	26	713020	50
PTFE/PP, luer outlet, sterile	0.2	15	713030	50
PTFE/PP, luer outlet, nonsterile	0.2	15	713031	50

Description	µm	∅ mm	Part No.	Pcs/ pack
PTFE/PP, luer outlet, nonsterile	0.2	15	713032	500
PTPE/MBS, luer slip outlet, nonsterile	0.2	26	713024	500
PTFE/PP, luer outlet, sterile	0.2	25	713035	50
PTFE/PP, luer outlet, nonsterile	0.2	25	713036	50
PTFE/PP, luer outlet, nonsterile	0.2	25	713037	500
PTFE/PP, luer outlet, nonsterile	0.22	25	713102	100
PTFE/PP, luer outlet, sterile	0.22	25	713107	100
PTFE/PP, luer slip outlet, nonsterile	0.45	4	713073	50
PTFE/PP, luer slip outlet, nonsterile	0.45	4	713074	500
PTFE/PP, spike outlet, nonsterile	0.45	15	713028	50
PTFE/PP, spike outlet, nonsterile	0.45	15	713029	500
PTFE/PP, luer outlet, nonsterile	0.45	15	713033	50
PTFE/PP, luer outlet, nonsterile	0.45	15	713034	500
PTFE/PP, luer outlet, nonsterile	0.45	25	713038	50
PTFE/PP, luer outlet, nonsterile	0.45	25	713039	500
PTFE/PP, luer outlet, nonsterile	0.45	25	713103	100
NY/PP, luer slip, outlet, nonsterile	0.2	15	713060	50
NY/PP, luer slip, outlet, nonsterile	0.2	15	713061	500
NY/PP, luer slip, outlet, nonsterile	0.45	15	713062	50
NY/PP, luer slip, outlet, nonsterile	0.45	15	713063	500
NY/PP, luer slip outlet, sterile	0.2	25	713086	50
NY/PP, luer slip outlet, nonsterile	0.2	25	713087	500
NY/PP, luer outlet, nonsterile	0.22	25	713099	100
NY/PP, luer slip outlet, sterile	0.45	25	713088	50
NY/PP, luer slip outlet, nonsterile	0.45	25	713089	500
NY/PP, luer outlet, nonsterile	0.45	25	713100	100
GF/NY/MBS, luer slip outlet, nonsterile	0.2	25	713091	50
GF/NY/MBS, luer slip outlet, nonsterile	0.2	25	713092	500
GF/NY/MBS, luer slip outlet, nonsterile	0.45	25	713093	50
GF/NY/MBS, luer slip outlet, nonsterile	0.45	25	713094	500
RC/PP, luer slip outlet, nonsterile	0.2	4	713075	50
RC/PP, luer slip outlet, nonsterile	0.2	4	713076	500
RC/PP, luer slip outlet, sterile	0.2	15	713050	50
RC/PP, luer slip outlet, nonsterile	0.2	15	713051	50
RC/PP, luer slip outlet, nonsterile	0.2	15	713052	500
RC/PP, luer slip outlet, sterile	0.2	25	713055	50
RC/PP, luer slip outlet, nonsterile	0.2	25	713056	50
RC/PP, luer slip outlet, nonsterile	0.2	25	713057	500
RC/PP, luer slip outlet, nonsterile	0.45	4	713077	50
RC/PP, luer slip outlet, nonsterile	0.45	4	713078	500
RC/PP, luer slip outlet, nonsterile	0.45	15	713053	50
RC/PP, luer slip outlet, nonsterile	0.45	15	713054	500
RC/PP, luer slip outlet, nonsterile	0.45	25	713058	50
RC/PP, luer slip outlet, nonsterile	0.45	25	713059	500
PVDF/PP, luer outlet, nonsterile	0.22	13	713097	100
PVDF/PP, luer outlet, nonsterile	0.45	13	713098	100
PVDF/PP, luer outlet, nonsterile	0.45	25	713101	100

Munktell Micro Filtration Products

Munktell brand

Part Numbers – Munktell Membrane Filters

Size ∅ mm	Pore size µm	Part No.	Pcs/pack
Cellulose Acetate			
13	0.45 µm	703312	100
47	0.2 µm	703310	100
47	0.45 µm	703311	100
47	0.65 µm	703313	100
Cellulose Nitrate White with Black Grid, Sterile			
47	0.45 µm, sterile	703314	100
Polyamide			
13	0.45 µm	703315	100
47	0.45 µm	703316	100

Part Numbers – Munktell Syringe Filters

Description	µm	∅ mm	Part No.	Pcs/ pack
CA/MBS, luer lock outlet, sterile	0.2	28	713109	50
GF/CA/MBS, luer lock outlet, sterile	0.2	28	713110	50
PES/MBS, luer lock outlet, sterile	0.2	28	713111	50
CA/MBS, luer lock outlet, sterile	0.45	28	713112	50
CA/MBS, luer lock outlet, sterile	0.8	28	713113	50
CA/MBS, luer lock outlet, sterile	1.2	28	713114	50
CA/MBS, luer lock outlet, sterile	5.0	28	713115	50
RC/PP, luer outlet, nonsterile	0.45	25	713116	500
PES/MBS, luer lock outlet, sterile	0.45	28	713117	50
RC/PP, luer outlet, nonsterile	0.2	25	713118	50
RC/PP, luer outlet, nonsterile	0.2	13	713119	50

Blotting Membranes

Blotting Membranes for all Blotting Applications

0.22 µm and 0.45 µm membranes are well adapted to all protein blotting systems such as: electro transfer, semi-dry or simply capillary blotting. They can be easily cut to the desired gel dimension.

Under the electrical field and some capillary drive, proteins move from the gel to the membrane which binds them immediately.

Nitrocellulose membranes are the most frequently specified transfer media in the world for Southern, Northern and Western blotting.

Part Numbers – Munktell Blotting Membranes

Description	µm	Size mm	Part No.	Pcs/ pack
Cellulose Nitrate	0.45	300 mm × 3 m	703103	1 reel
Cellulose Nitrate	0.22	300 mm × 3 m	703104	1 reel

Venting Filters

Ready-to-connect filtration unit consists of a hydrophobic (PTFE) membrane filter in a polypropylene housing

Standard Hose Barb

⅛" NPT Thread

∅ 64 mm PTFE Venting Filters

PTFE venting filters can be repeatedly autoclaved and are available with 0.2 µm or 0.45 µm pore size membranes. In addition, they are ideally suited for small scale air/gas sterilizing applications such as:

- The sterile venting of filling vessels and fermentation carboys including culture vessels
- The venting of holding tanks for sterile, distilled water and liquid culture media
- Autoclave venting
- The in-line sterilization of and particulate removal from air and gases

The excellent chemical resistance of the materials in these venting filter units makes them suitable for particle removal from a wide range of chemical solutions and solvents.

The female luer connection in the hose nipple allows the unit to be firmly fitted onto an appropriate syringe.

Technical Specifications

Features	Benefits	
Filter material	PTFE – reinforced with polypropylene gauze	
Housing material	Polypropylene	
Filtration area	20 cm^2	
Housing diameter	64 mm	
Priming volume	Approx. 3 ml	
Maximum operating pressure	300 kPa (3 bar = 44 psi)	
Water penetration point (breakthrough)	0.2 µm – approx. 400 kPa (4 bar = 58 psi) 0.45 µm – approx. 300 kPa (3 bar = ~ 44 psi)	
Max. autoclaving temperature	134°C	
Max. autoclave cycles	20	
Hold-up volume	Before the bubble point approx. 1.0 ml After the bubble point approx. 0.5 ml	
Biosafety	USP Plastics Class VI	
Bubble point with isopropanol (60%)	0.45 µm 0.2 µm	≥ 0.9 bar (~13.1 psi) ≥ 1.1 bar (~16 psi)
Flow rate for air at Δp = 0.1 bar (1.45 psi) (1 bar = 100 kPa = 14.5 psi)	0.2 µm pore size 0.45 µm pore size	5.0 l/min 8.5 l/min

Part Numbers – ∅ 64 mm PTFE Venting Filters

Pore size	Membrane	Connectors E/A	Sterile	Part No.	Pcs/Case
0.45 µm	PTFE	Hose barb/hose barb	Yes	713065	12
0.45 µm	PTFE	Hose barb/hose barb	Yes	713066	25
0.45 µm	PTFE	⅛" / ⅛" NPT	Yes	713067	12
0.2 µm	PTFE	Hose barb/hose barb	Yes	713068	12
0.2 µm	PTFE	Hose barb/hose barb	Yes	713069	25
0.2 µm	PTFE	⅛" / ⅛" NPT	Yes	713070	12
0.2 µm	PTFE	⅛" / ⅛" NPT	Yes	713071	25
0.2 µm	PTFE	Hose barb/hose barb	No	713072	100

Hydrophobic PTFE Venting Filters

Hydrophobic PTFE venting filters have both male and female luer lock connectors and are used on small containers and air venting bottles. The filter housing is MBS and can withstand pressures up to 6 bar. The housing contains a 26 mm 0.2 µm pore size polyester-reinforced PTFE membrane and is available in sterile and nonsterile versions.

Part Numbers – Hydrophobic PTFE Venting Filters

Description	µm	∅ mm	Part No.	Pcs/ pack
PTFE/MBS, luer lock outlet, nonsterile	0.2	26	713019	500
PTFE/MBS, luer lock outlet, sterile	0.2	26	713020	50

Pumpgard

Pumpgard filters prevent water from over-flowing from a flask into a vacuum pump, thereby preventing possible damage to the pump as well as costly down-time in the laboratory.

Pumpgard is a ready-to-connect filter unit consisting of a PTFE membrane filter sealed within a polypropylene housing.

Technical Specifications

Features	Benefits
Housing	polypropylene
Membrane	PTFE 0.45 µm reinforced with polypropylene grid
Connectors stepped hose barb	6–12 mm
Diameter	64 mm
Filter area	20 cm^2
Typical air flow rates	1.8 l/min at 0.02 bar 4.6 l/min at 0.05 bar 8.5 l/min at 0.1 bar
Max. operation pressure	3 bar (300 kPa)
Water penetration point	approx. 400 kPa (0.2 µm)
Max. temperature	134°C (autoclave)
Pre-sterilized with	ethylene oxide
Pack size	3 pcs/pack
Part Number	733116

Ready-to-Use Pressure Filtration Units

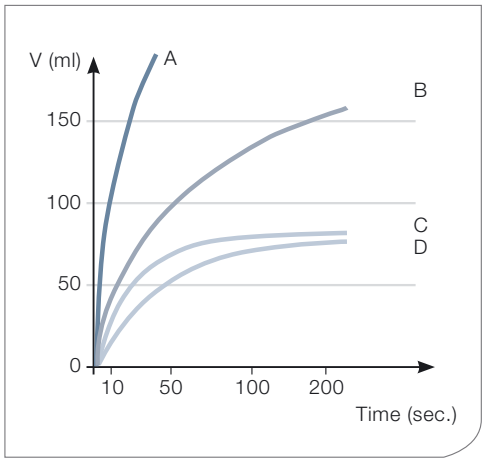
Ready-to-use pressure filtration units are available with or without micro-glass pre-filters for single use applications and are delivered as individually packaged, sterile units.

These ready-to-use filtration units feature surfactant-free, cellulose acetate membranes with very low, non-specific protein binding characteristics in combination with a hydrophobic PTFE membrane in a polycarbonate housing and allow fast, sterile filtration of aqueous solutions and media containing serum.

When used in combination with a binder-free, micro-glass pre-filter, a much higher filtrate volume can be processed.

The units are available in various configurations:

- With either a hose nipple (barb) or
- Luer lock as the inlet connector.



A 0.2 µm unit with pre-filter
B 0.2 µm unit
C Competitor product, mixed ester
D Competitor product, PVDF

Technical Specifications

Properties	Description	
Filter material	Cellulose acatate 0.2 µm pore size and PTFE	Cellulose acetate 0.2 µm pore size with GF and PTFE
Housing material	Polycarbonate	Polycarbonate
Color code	Transparent	Transparent
Filter diameter	64 mm	64 mm
Connector inlet	Female luer lock or stepped hose nipple with 6–12 mm outer diameter	Female luer lock or stepped hose nipple with 6–12 mm outer diameter
Connector outlet	Hose nipple	Hose nipple
Filling bell	Available	Available
Filtration area	20 cm^2	20 cm^2
Hold-up volume before bubble point	1 ml	Approx 1.5 ml
Housing burst pressure	> 5 bar/72.5 psi	> 5 bar/72.5 psi
Bubble point	> 3.2 bar/46.4 psi	> 3.2 bar/46.4 psi
Max. recommended inlet pressure	3 bar/43.5 psi	3 bar/43.5 psi
Flow rate for water	> 250 ml/min at Δp = 1 bar/14.5 psi	> 250 ml/min at Δp = 1 bar/14.5 psi
Filtration range	100 ml–max. 5 l	100 ml–max. 10 l
pH-range	4–8	4–8
Non-specific protein adsorption	No loss of protein detectable (filtration of γ-globulin, method acc. to Bradford)	< 80 µg/cm^2 (filtration of γ-globulin, method acc. to Bradford)
Sterilization	EO sterilization	EO sterilization
Biosafety	Class VI Plastics Test	Class VI Plastics Test

Munktell AHLSTROM

Part Numbers – Ready-to-use Pressure Filtration Units, Package of 10 Units

Description	Part Numbers			
	733117	733118	733119	733120
Cellulose acetate membrane 0.2 µm	•	•	•	•
Glass fiber pre-filter			•	•
Filling bell	•	•	•	•
Hose nipple inlet	•		•	
Luer Lock inlet		•		•
Hose nipple outlet	•	•	•	•

Bottle Top Systems – Ready-to-Use Vacuum Filtration Units

Introducing a new product line of disposable vacuum filtration units. Both bottle top unit (BT) and receiver flask (RF) contain PES membranes for the highest flow rates with extremely low protein binding.

The filtration properties of Bottle Top Systems make them ideal for separation of tissue culture media, buffers, additives, and other aqueous biological solutions. RF and BT vacuum units are available as 150 ml, 500 ml and 1,000 ml units. The 500 ml and 1,000 ml units contain 90 mm diameter 0.22 µm PES membrane filters for cost effective filtration.

The filter funnels, dust covers and receiver bottles are manufactured from virgin, heavy metal-free polystyrene.

- Quality and reliability
- Low protein binding
- Fast flow and high throughput
- Easy to use

Part Numbers – Bottle Top Systems

Volume	Filter Area cm^2	Membrane	Part No.	Pcs/ pack
RF				
150 ml	18	0.22 µm PES	733121	12
250 ml	24	0.22 µm PES	733127	12
500 ml	63	0.22 µm PES	733122	12
1000 ml	79	0.22 µm PES	733123	12
BT				
150 ml	18	0.22 µm PES	733124	48
500 ml	63	0.22 µm PES	733125	12
1000 ml	79	0.22 µm PES	733126	12

Multiple Vacuum Filtration Systems

This filtration system is entirely made of stainless steel, corrosion-resistant.

Manifolds are available with either 3 or 6 branches

- Stainless steel 300 ml funnels, corrosion resistant
- Aluminum clamps
- Valves seated in PTFE bushings
- For use with 47 mm or 50 mm membranes

Applications

- Continuous filtration
- Microbiological fluids removal and particle analysis
- Filtration of biological solutions (proteins)

Glass Solvent Filter

This vacuum filtration unit is made of glass and is suitable for removal of particles in solvents or for purification of solutions in analytical works.

- Funnel of 300 ml
- Glass frit filter support
- Flask of 1000 ml
- Aluminum clamp
- For use with 47 mm or 50 mm membranes

Applications

- Filtration of aqueous and organic solvents
- Purification and outgas of solutions and HPLC solvents

Vacuum Pump

The vacuum pump is used in addition with the multiple vacuum filtration systems.

Part Numbers

Description	Part No.	Pcs/pack
Multiple vaccum filtration system – 3 branches	733192	1
Multiple vaccum filtration system – 6 branches	733193	1
Glass solvent filter	733191	1
Vaccum pump 200 mbars, 15 l/mn	733190	1

VIVASPIN Ultra Filtration Family

VIVASPIN ultra filtration family – sample concentration up to 20 ml.

Vivaspin centrifugal concentrators offer optimal solutions for the concentration or buffer exchange application over a broad range of volume capacities and MWCO's.
High flow rates and recoveries are possible due to the unique vertical membrane design.

The patented dead-stop technology design of the concentrator assures convenient and safe sample handling and allows direct recovery of the concentrate without further re-spin.

VIVASPIN applications

- Concentration of biological samples containing antigenes, antibodies, enzymes or nucleic acids
- Concentration of diluted protein samples from chromatography eluates
- Desalting or Diafiltration/Buffer exchange
- Sample concentration for crystallization and NMR spectroscopy
- Removal of very small or large contaminants

Feature	Benefit
Vertical, large membrane design	Fast, minimal membrane blocking
Integrated Dead-Stop-Volume	No risk (to concentrate to dryness)
Low-binding materials	High recovery
No Re-spin necessary	Easy handling, fast
Membrane selection	Highest recovery with extremely low binding
Broad volume range from 0.5–100 ml	High volume flexibility
Wide MWCO range from 2 kDa – 0.2 µm	High MWCO flexibility

VIVASPIN 500
500 µl* – 5 µl**

VIVASPIN 2
2 ml – 8 µl

VIVASPIN 4
4 ml – 20 µl

VIVASPIN 6
6 ml – 30 µl

* Volume
** Dead stop vol.

Part Numbers – VIVASPIN Ultra Filtration Family

PES Membrane	Dead Stop vol.	MWCO Volume 3kDa	5kDa	10kDa	30 kDa	50 kDa	Pcs/ pack
0.5 ml	5 µl	723033	723024	723021	723026	723028	25
		723034	723025	723023	723027	723029	100
2 ml	8 µl	723045	723039	723037	723041	723042	25
		723046	723040	723038			100
4 ml	20 µl		723053	723051	723055	723056	25
			723054	723052			100
6 ml	30 µl	723066	723059	723058	723060	723062	25
					723061		100
15 ml	50 µl			723067	723070	723071	10
			723069	723068			40
20 ml	50 µl	723092	723081	723079	723083	723085	12
		723093	723082	723080	723084	723086	48

PES Membrane	Dead Stop vol.	MWCO Volume 100kDa	300kDa	1000kDa	0.2 µm	5 of each	Pcs/ pack
0.5 ml	5 µl	723030				723036	25
			723031		723032		100
2 ml	8 µl	723043			723044	723049	25
							100
4 ml	20 µl				723057		25
							100
6 ml	30 µl		723063	723064	723065		25
							100
15 ml	50 µl						10
							40
20 ml	50 µl	723087	723089	723090			12
		723088		723091			48

VIVASPIN 15
15 ml – 50 µl

VIVASPIN 15R
15 ml – 30 µl

VIVASPIN 20
20 ml – 50 µl

NUTRI CULT, Culture Media, Ready-to-Use

NUTRI CULT is used in the membrane filter method that allows large sample volumes with low microbial count to be tested. Inhibitors such as essential oils or disinfectants can be removed

by rinsing after filtration and before incubation.

NUTRI CULT reduces labor, saves time and simplifies many microbiological test procedures.

NUTRI CULT pad sets are sterile, dehydrated culture media. When moistened with 3.0 – 3.5 ml of sterile and de-mineralized (or distilled) water, the media are immediately ready for use and will provide microorganisms with an appropriate media for optimal growth. The level of moisture is optimal when an excess ring of water surrounding the pad set is visible.

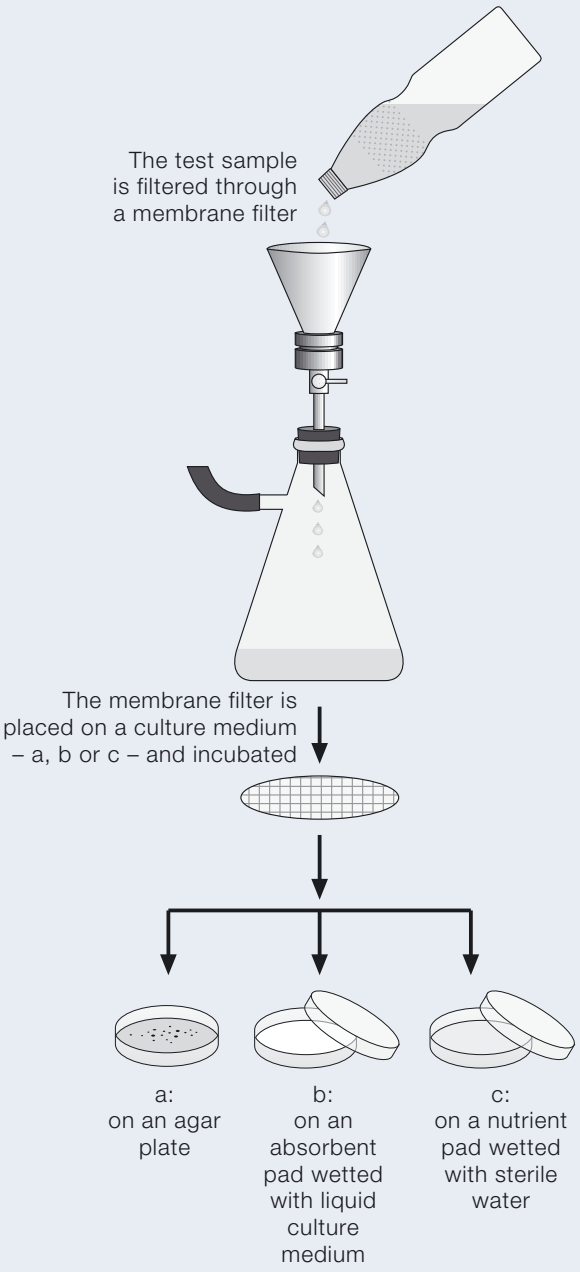
All Nutri Cult pad sets are supplied with appropriate 47 mm or 50 mm membrane filters that are individually, sterile packaged to meet the requirements of microbial detection.

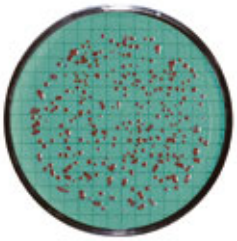
The standard NUTRI CULT box contains 100 sterile pads, each of which is individually inserted in a petri dish and sterilized. Ten each of these petri dishes are sealed in an aluminum bag to protect the sensitive NUTRI CULT formulae during transport and storage from fluctuations in temperature and humidity.

Currently, there are more than 30 different Nutri Cult types to meet the diverse objectives of microbiological analysis. Beyond the European drinking water directive, they comply with other international regulations and recommendations: international pharmacopoeias, DIN and ISO standards, the American Standards for Water and Foods, mineral water regulations, brewery guidelines, such as MEBAC or EBC, and recommendations of the food industry, such as LMBG, NCA and ICUMSA, etc.

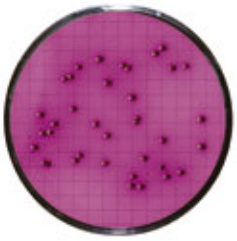
- Trouble-free storage up to 24 months
- Economical thanks to time- and cost-savings
- Compliance with international standards and references
- Easy handling
- Validation Guide available
- Consistently high quality
- Highly versatile

CFU Determination – Membrane Filter Method

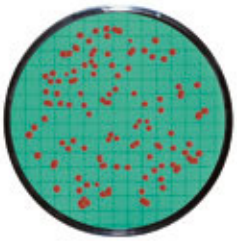




Bacillus subtilis

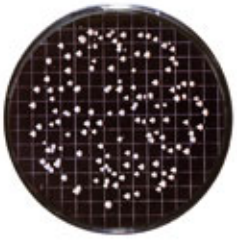


Escherichia coli



Rhodotorula spec.

Lactobacillus brevis



Saccharomyces cerevisiae

NUTRI CULT, Culture Media, Ready-to-Use

Nutri Cult, individually, sterile packaged in petri dishes, 100 per box, with 100 individually, sterile packaged 47 mm or 50 mm membrane filters.

Part Numbers – Nutri Cult, Culture Media, ready-to-use

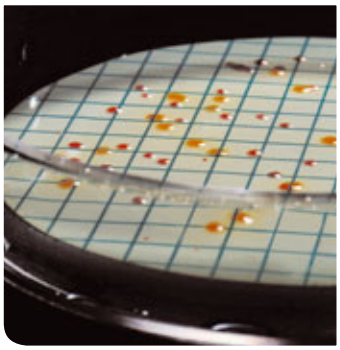
Determination of	Type (Filter Type)*
Total count	Caso[1]
Total count	R2A[1]
Total count	Standard TTC[1]
Total count	Standard TTC/mod.[1]
Total count	Standard[1]
Total count	TGE/Tryptone Glucose Extract[1]
Total count	Yeast Extract[1]
E. coli and coliforms	Chromocult[7]
E. coli	ECD[2]
E. coli and coliforms	Endo[9]
Enterobacteria, E. coli	MacConkey[2]
E. coli and coliforms	m FC[2]
E. coli and coliforms	Teepol/Lauryl Sulphate[2]
E. coli and coliforms	Tergitol TTC[2]
Enterococci	Azide/KF Strep[1]
Salmonellae	Bismuth Sulfite[1]
Pseudomonas aeruginosa	Cetrimide[2]
Staphylococci, Staph. aureus	Chapman[2]
Wild yeasts	Lysine[3]
Yeasts and molds	Malt Extract[8]
Yeasts and molds	Malt Extract[6]
Yeasts and molds	Sabouraud[10]
Yeasts and molds	m Green yeast and mold/ Schaufus Pottinger[4]
Yeasts and molds	m Green yeast and mold/ Schaufus Pottinger[5]
Yeasts and molds	m Green yeast and mold/ Schaufus Pottinger[6]
Yeasts and molds	m Green yeast and mold/ Schaufus Pottinger[3]
Yeasts and molds and bacteria	Wallerstein/WL Nutrient[2]
Yeasts and molds	Wort[3]
Thermophilic spore formers and mesophilic bacteria	Glucose Tryptone[2]
Leuconostoc oenos and other wine spoiling microorgan.	Jus de Tomate/Tomato Juice[1]
Acid-tolerant microorganisms	Orange Serum/pH 5.5[1]
Acid-tolerant microorganisms	Orange Serum/pH 3.2[6]
Lactobacilli and Pediococci and other beer spoiling microorganisms	VLB-S7-S[2]
Mesophilic slime-forming bacteria esp. Leu. mesenteroides	Weman[1]

Part No. ∅ 47 mm	Part No. ∅ 50 mm
743019	743020
743044	743045
743005	743006
743046	
743021	
743038	743039
743051	743052
743049	
743042	
743002	743003
743056	
743025	743026
743024	
743007	743008
743000	743001
743009	
743036	743037
743034	743035
743015	
743048	
743047	
743028	743029
743030	743031
743032	743033
743041	
743043	
743050	743011
743010	
743023	
743040	
743016	743018
743055	
743013	743014
743066	

* A set contains 100 nutrient pads and 100 membrane filters, both individually, sterile packaged.
The membrane filters are selected for optimum growth together with the corresponding nutrient media. The supplied membrane filter type is listed within brackets:

[1] = green with dark green grid, 0.45 µm pore size
[2] = white with green grid, 0.45 µm pore size
[3] = gray (after wetting black) with white grid, 0.65 µm pore size
[4] = white with green grid, 0.65 µm pore size
[5] = white with green grid, 1.2 µm pore size
[6] = gray (after wetting black) with white grid, 0.8 µm pore size
[7] = white with black grid, 0.45 µm pore size
[8] = gray (after wetting black) with white grid, 0.45 µm pore size
[9] = white with green grid, 0.45 µm pore size, High Flow
[10] = gray (after wetting black) with white grid, 0.45 µm pore size, High Flow

Most of the Nutri Cult types are also available in a dispenser version on request.



NUTRI CULT, Culture Media, ready-to-use

Typical Application Examples

Product	Detection and enumeration of…
Beer	Lactobacilli and Pediococci and other beer spoiling organisms
	Total colony count
	Wild yeasts
	Yeasts and molds
Foods	Acid-tolerant microorganisms
	Enterobacteria, E. coli and coliforms
	Enterococci, Enterococcus faecalis
	Pseudomonas aeruginosa
	Salmonellae
	Staphylococci, Staphylococcus aureus
	Thermophilic spore formers and mesophilic bacteria
	Total colony count
	Yeasts and molds
Fruit juice	Enterobacteria, E. coli and coliforms
	Oenococcus and other product spoiling organisms
	Yeasts and molds
Milk	E. coli and coliforms
	Enterococci, Enterococcus faecalis
	Salmonellae
Pharmaceuticals, WFI, raw materials and cosmetics	Enterobacteria, E. coli
	Enterococci, Enterococcus faecalis
	Pseudomonas aeruginosa
	Staphylococci, Staphylococcus aureus
	Total colony count
	Yeasts and molds, Candida albicans
Soft drinks, concentrates	Acid-tolerant microorganisms, Lactic-acid bacteria
	Enterobacteria, E. coli and coliforms
	Mesophilic slime-forming bacteria, Leuconostoc
	Total colony count
	Yeasts and molds
Sugar, sugar products	E. coli and coliforms
	Mesophilic slime-forming bacteria, Leuconostoc
	Thermophilic spore formers and mesophilic bacteria
	Yeasts and molds
Water (general quality), mineral water, natural water, waste water	Acid-tolerant microorganisms, Lactic-acid bacteria
	Enterobacteria, E. coli and coliforms
	Enterococci, Enterococcus faecalis
	Pseudomonas aeruginosa
	Salmonellae
	Staphylococci, Staphylococcus aureus
	Total colony count
	Yeasts and molds, Candida albicans
Wine	Acetobacter
	Acid-tolerant microorganisms, Lactic-acid bacteria
	Oenococcus and other wine spoiling organ.
	Yeasts and molds

Nutrient Pad type
VLB-S7-S
Standard, Standard TTC
Lysine
Malt Extract*, Wallerstein Nutrient, Wort
Orange Serum
Chromocult, ECD, Endo, (MacConkey), m FC, Teepol/Lauryl Sulphate, Tergitol TTC
Azide/KF Strep
Cetrimide
Bismuth Sulfite
Chapman
Glucose Tryptone
Caso, Standard, Standard TTC, TGE/Tryptone Glucose Extract
Malt Extract, Wort
Endo, (MacConkey), Tergitol TTC*
Jus de Tomate/Tomato Juice, Orange Serum
Malt Extract, Schaufus Pottinger/m Green yeast and mold,Wallerstein Nutrient, Wort
Endo
Azide/KF Strep
Bismuth Sulfite
MacConkey
Azide/KF Strep
Cetrimide (cosmetics only)
Chapman
Caso, R2A
Sabouraud
Orange Serum, VLB-S-7-S
Endo, MacConkey
Weman
Standard*, Standard TTC*, TGE/Tryptone Glucose Extract
Malt Extract, Schaufus Pottinger/m Green yeast and mold, Wallerstein Nutrient, Wort
Endo
Weman
Glucose Tryptone
Malt Extract*, Schaufus Pottinger/m Green yeast and mold, Wort*
Orange Serum
Chromocult, ECD, Endo, (MacConkey), m FC, Teepol/Lauryl Sulphate, Tergitol TTC
Azide/KF Strep
Cetrimide
Bismuth Sulfite
Chapman
Caso, R2A, Standard, Standard TTC, TGE/Tryptone Glucose Extract, Yeast Extract
Sabouraud
Orange Serum, Wort (both wetted with 5-8% ethanol)
Orange Serum
Jus de Tomate/Tomato Juice
Malt Extract, Schaufus Pottinger/m Green yeast and mold, Wallerstein Nutrient, Wort

These types are suitable for the determination of the mentioned micro-organisms, although the media are not explicitely declared in the references described in this publication.

Environmental Control

Munktell glass fiber filters are made of 100% pure borosilicate glass fibers. These depth filters characterize fast flow rates, high loading capacity and retention of very fine particles. The temperature stability is 500°C for binder-free filters or 180°C for filters with binder. Compared to cellulose filters the chemical resistance is better.

Munktell quartz fiber filters are made of pure quartz fibers without any binder or glass fiber additive. The temperature stability of ~ 900°C makes these filters ideal for use in applications like stack measurement.

Contents

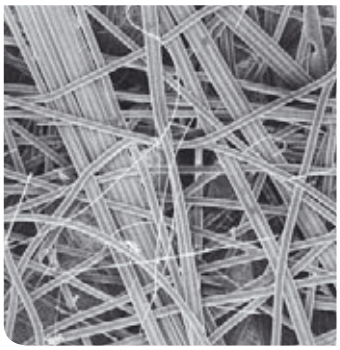
Micro-Glass Fiber Filters

- Binder-free micro-glass fiber filters
- Micro-glass fiber filters with binders
- Micro-glass fiber filters, supported

Micro-glass fiber filters offer high efficiency, submicron particle retention combined with high permeability and high dust holding capacity. Micro-glass filters are made of high-purity borosilicate glass microfibers that are biologically inert and resistant to most solvents and reagents with the exception of hydrofluoric acid and highly concentrated alkali solutions.

Binder-free grades are temperature resistant to about 500°C. Grade MG 550 HA can withstand temperatures to 550°C. Grades with binders can resist temperatures of about 180 °C and brief exposures to 250°C.

The micro-glass fibers used in Munktell filters are made of 100% borosilicate glass of varying diameters "fine-tuned" to the particle retention and flow requirements of the



grades. For example grade MGF employs the finest diameter fibers for the highest filtration efficiency, whereas the fibers used in grade MGD are thicker and have lower fine particle capture efficiency.

Micro-Glass Fibers without Binder

Grade	Basis Weight g/m²	Thickness mm	Particle Retention in Liquids µm	Pressure Drop* mbar
MGA	52	0.23	1.6	38
MGB	143	0.70	1.0	95
MGC	52	0.24	1.2	55
MGD	120	0.53	2.7	140
MGF	75	0.45	0.7	120
MGG	65	0.28	1.5	30
MG 550 HA	65	0.3	1.5	–

* A = 10 cm^2, flow velocity 400 cm^3/sec

Grade	Application
MGA	Highly efficient for general laboratory filtration, clarification of buffer and reagent solutions, corresponds to many international standards for air and water pollution monitoring. Foodstuff analysis, filtration of algae, bacteria cultures, proteins
MGB	Filtration of suspended solids in water, waste water analysis, pre-filters for membranes, suitable for filtration of large volumes
MGC	Standard filter for the clarification and monitoring of waste water and water, scintillation counting on the filter, cell harvesting, hydrocarbon analysis where cellulose fibers are a inconvenience
MGD	Universal membrane pre-filter material
MGF	Higher efficiency in particle retention for smaller particles than other glass fiber grades, clarification of protein solutions, filtration of liquids prior to HPLC
MGG	Filtration and monitoring of water
MG 550 HA	Withstands temperatures till 550°C. Recommended for determining total suspended solids in water (TSS/standard method 2540D)

Binder-Free Micro-Glass Fiber Filters for Analytics and Diagnostics

The next chart indicates typical applications of Munktell micro-glass grades. Your specific filtration requirements may require a tailored solution. Part numbers for popular sizes of each grade are listed on the facing and following pages. Custom sizes upon request.

Application	Grades MGA	MGB	MGC	MGD
Staining of dyed papers			•	
Clarification filtration (biochemical)				
Ligand binding test			•	
Solvent filtration	•			
Membrane pre-filters		•		•
Specimen filtration (HPLC)				
Protein filtration				
Radio-immuno test		•	•	
Scintillation counting	•	•		
Cell harvesters			•	
Carbohydrate analysis			•	

Application	Grades MGF	MGG	MG 550 HA	MG 160
Staining of dyed papers				
Clarification filtration (biochemical)	•		•	•
Ligand binding test				
Solvent filtration	•			•
Membrane pre-filters				
Specimen filtration (HPLC)	•			•
Protein filtration	•			
Radio-immuno test			•	
Scintillation counting		•	•	
Cell harvesters	•	•	•	
Carbohydrate analysis				

Part Numbers – Binder-Free Micro-Glass Fiber Filters

Size mm	Grade MGA	MGC	MGF	MGG	MG 550 HA	Pcs/ pack
Circles						
21					410082	100
24	410122	410052	410156	410161	410083	100
25	410220	410063	410157	410162	410084	100
27					410085	100
28					410086	100
30					410087	100
32					410088	100
35	410138	410155			410089	100
37			410158	410163	410090	100
42.5	410035				410091	100
45			410159	410164		100
47	410121	410054	410066	410165	410092	100
50	410132	410055	410067	410166	410103	100
52		410154				100
55	410124	410056	410068	410167	410093	100
70	410134	410057	410069	410168	410094	100
82					410095	100
85					410096	100
90	410123	410058	410070	410169	410097	100
100	410137	410206	410211	410215		100
105					410098	100
110	410032	410059	410071	410185	410099	100
120	410130		410160	410186		100
125	410204	410207	410072	410078	410100	100
150	410136	410061	410073	410217	410101	100
185	410033	410208	410213	410218	410102	100
240	410031*	410053	410214	410219	410187	100
320					410188	100
Sheets						
203254					410106	100

* pack size 25

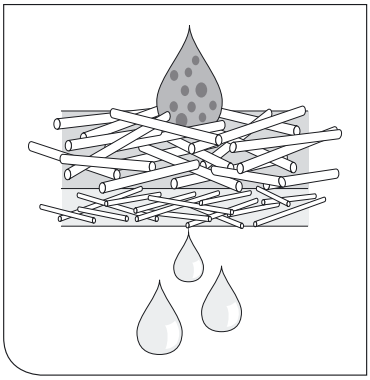
Binder-Free Micro-Glass Fiber Filters for Analytics and Diagnostics

Part Numbers – Binder-Free Micro-Glass Fiber Filters

Size mm	Grade MGB	MGD	Pcs/ pack
Circles			
13	410150	410189	50
20	410043	410111	50
24	410037	410183	50
25	410044	410112	50
37	410144	410190	50
40	410153	410113	50
42	410151	410191	50
44	410152	410192	50
47	410038	410114	50
50	410048	410115	50
55	410039	410116	50
70	410040	410118	50
88	410145	410193	50
90	410041	410117	50
100	410047	410179	50
110	410139	410212	50
120	410146	410180	50
124	410147		50
125	410140	410120	50
127	410148	410181	50
130	410149	410182	50
142	410143		50
150	410141	410119	50
240	410142	410210	50
Sheets			
203254			100

Size mm	Grade MG 160	Pcs/ pack
Circles		
37	410001	50
45	410002	50
47	410015	50
50	410000	50
55	410003	50
64	410007	50
70	410004	50
90	410005	50
100	410006	50
110	410013	50
120	410008	50
125	410126	50
140	410127	50
142	410009	50
150	410014	50
185	410010	50
240	410125	50
293	410011	50
Sheets		
203254	410012	50
203254	410020	100

Dual Layer-Structured Micro-Glass Fiber Filter



MG 1502

This gradient filter media has a top layer of particle retention ~ 10 µm over a layer of fine ~ 1.0–2.0 µm particle retention.
The construction is not a laminate but rather a web of different fiber diameters combined in the web forming process.
The layer of coarse fibers acts as a pre-filter with high particulate holding capacity and yet allows high flow rates. Fine particle filtration efficiency actually increases as particulate holding increases. Grade 1502 can be used at temperatures up to 500°C.

1502 is a binder-free filter medium of 100% borosilicate micro-glass fibers.

Grade	Basis Weight g/m²	Thickness mm	Filtration Speed s/50 ml
MG 1502	142	0.65	11

Dimensions and minimum order quantity upon request.

Synthetic Filter “SUSP 70”

Woven Fabric Filter “SUSP 70”

SUSP 70 is a woven polyamide fabric with a 70 µm mesh size used to capture coarse particles such as may be found in waste water.

This type of fabric filter can also be offered in other mesh sizes.

Part Numbers

Size mm	SUSP 70	Pcs/ pack
Circles		
47	460001	100
50	460002	100
55	460003	100

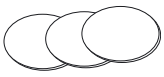
Water Pollution Control

With the use of micro-glass fiber filters, water samples can be analyzed to determine total suspended solids.

- High flow rates are possible while still retaining fine particles
- Binder-free
- Suitable for evaluation of potable water as well as water for industrial applications
- Grades MGC and MG 550 HA are widely used in laboratory applications to determine total suspended solids in waste water
- Non-hygroscopic, biologically inert

Application	Grades MGA	MGC	MG 550 HA
Particle retention	fine	fine	high
Flow rate	high	good	highest
Correspond to standard method 2540D for determining total suspended solids			•
Correspond to DIN EN 872 Determination of suspended solids- method by filtration through glass fiber filters Mass loss of these filters < 0.017 mg/cm^2	•	•	•
Collection of suspended solids in potable water and natural and industrial wastes		•	
Service water filtration		•	•
Drinking water control		•	
Pathogenic germs	•		
Filtration of algae, water and sewage	•		
Temperature resistant	500°C	500°C	550°C

Total suspended solids (generalized protocol)

Waste water → Filter* specified amount of waste water →  → Solids retained on the filter → Dry sample and weigh back filter → Portion of total solids (in solution) retained on the filter

* rinsed and pre-weighed

Munktell
AHLSTROM

Pre-Weighed Micro-Glass Filters for Waste Water Analysis

Work flow

Munktell pre-weighed, binder-free, micro-glass filters are individually weighed and washed three times with de-ionized water to remove any extractables. The filters are then dried at 105°C (or at 550°C in the case of Grade MG 550 HA-PW for volatiles analysis), slowly cooled and then desiccated prior to reweighing to the nearest 0.1 mg. After reweighing, the pre-weighed filter circle is placed in an aluminum dish, labeled with an ID number and the filter weight, ready for use in the lab.

MG 550 HA-PW

Munktell's Grade 550HA-PW is a 65g/m^2 basis weight filter media that is widely used in waste water analysis of suspended or volatile solids. MG 550 HA-PW is available in several standard sizes.

MGA-PW and MGC-PW

These grades are both binder-free, 52 g/m^2 basis weight and offer different levels of particle retention and are references for EU Standards for waste water analysis.

Technical Data – Pre-weighed Filter Grades

Grade	Basis Weight g/m²	Thickness mm	Particle Retention in water µm	Temperature max. °C
MG 550 HA-PW	65	0.3	1.5	550
MGA-PW	52	0.23	1.6	500
MGC-PW	52	0.24	1.2	500

Part Numbers

Size mm	Grades MG 550 HA-PW	MGA-PW	MGC-PW	Pcs/ pack
42.5	410195	410198	410201	100
47	410196	410199	410202	100
55	410197	410200	410203	100

Each filter is packed individually in an aluminum dish, stacked in columns of 25 pieces, 100 pieces per box with sample numbers and filter weights clearly marked on a bar-coded label affixed to each aluminum dish, ready to use in the lab.

Munktell introduces a new line of pre-weighed, binder-free, micro-glass filters for waste water analysis with greater accuracy and increased lab productivity. Above all, this new line of

Munktell products helps you manage labor costs. Pre-weighed filters are time-savers and do not require any pre-washing. Yet they meet the requirements of Standard Method 2540D.

Air Pollution Control

Synthetic binders are used to ensure the integrity of the hydrophobic micro-glass media used in air filtration applications.

Fine fibers ensure high efficiency filtration of submicron particles while the fiber matrix creates both depth filtration and good air permeability. Micro-glass fiber papers with binder resist temperatures of about 180°C and for short periods even 220°C to 250°C.

General note:
These filter media are compatible with a large number of inorganic and organic solutions and they are physically and biologically inert.

Grade	Basis Weight g/m²	Pressure Drop 5.3 cm/sPa	Efficiency % (0.12–0.3 µm)	Finish
MG 227/1/60	60	260	99.3	hydrophobic
MG 227	75	350	99.93	hydrophobic
MG 400	80	400	99.95	hydrophobic
MGS	75	300	99.9	hydrophobic
MGT	75	450	99.95	hydrophobic
MG 1337	104	360	99.97	polyester laminate
MG 1338	104	360	99.97	polypropylene laminate
MG 161	75		99.95	hydrophilic

Part Numbers – Air Pollution Control

Size mm	Grades MG 227/1/60	Pcs/pack	MG 227	Pcs/pack
Circles				
25			443039	100
37	443002	100	443042	100
45	443004	100		
47	443005	100	443045	100
50	443006	100	443046	100
55	443007	100	443047	100
70	443009	100		
90	443010	100	443056	100
110	443012	100	443060	100
150	443014	100		
Sheets				
54×54				
210×297				

Typical Applications

Application	Grades MG 160	MG 400	MG 227/1/60	MG 227
Air pollution control	•			
– with chemical analysis			•	
Measurement of smoke spot number				•
Exhaust emission test	•	•		

MG 161	MG 400	MGS	MGT	Pcs/pack
	440007			50
	440005			50
		440020	440014	
	440006	440021	440011	50
	440003	440022	440012	50
440017				
440016				
	440004			50
		440008		100
			440013	100

Filter Media for Environmental Monitoring

Environmental legislation mandates analysis of exhaust emissions into the atmosphere.

Micro-glass media grades are used in test methods to capture particulate matter being released into the atmosphere.
Continuous emission testing minimizes danger to humans as well as the environment.

Air Sampling Filters for PM-10 Air Sampling

Munktell grade MG 160 is the filter for air sampling to collect atmospheric particulates and aerosols. Filters are applicable especially for use in high volume PM-10 air sampling equipment. Munktell grade MG 160 is recommended for the collection of both particulate and aerosol contaminants. Filters are used in EPA e.g.: "71 FR 61144, Oct. 17, 2006" ambient air monitoring for total suspended particles.

Typical Properties

Grade	Basis Weight g/m²	Thickness mm	Penetration %	Temperature Res. °C
MGA	52	0.25	< 0.002	500 max.
MGG	65	0.28	< 0.002	500 max.
MG 160	75	0.40	< 0.050	500 max.

Part Numbers – Filter Media for Environmental Monitoring

Size mm	Grade MG 160	Pcs/ pack
Circles		
37	410001	50
45	410002	50
47	410015	50
50	410000	50
55	410003	50
64	410007	50
70	410004	50
90	410005	50
100	410006	50
110	410013	50
120	410008	50

Size mm	Grade MG 160	Pcs/ pack
Circles		
125	410126	50
140	410127	50
142	410009	50
150	410014	50
185	410010	50
240	410125	50
293	410011	50
Sheets		
203254	410012	50
203254	410020	100
203254*	410128	100

* numbered

Order Information MGA and MGG please see page 79.

Munktell
AHLSTROM

Micro-Quartz Fiber Filters

Micro-quartz filters are useful for testing hot "stack" gases as the quartz fibers can withstand temperatures up to 900°C.
In addition, micro-quartz is used when the highest purity media is required. With excellent filtration properties and minimal traces of metals and minerals, quartz fibers are dimensionally stable and can be used in the analysis of acidic gases with the exception of hydrofluoric acid.

MK 360 is used in PM 10 testing according EPA ambient air monitoring, DIN EN ISO 23210 and DIN EN 14902:2005. These filters are available sequentially numbered according to EPA standards.

Description

- MK 360 conditioned by high temperature pre-heating

Each batch MK 360 is trace elements certified.

- Made of extremely pure micro-quartz fibers
- Binder-free
- Particularly suitable for low amount of particles

Typical Properties for MK 360 and T 293

Grade	Basis Weight g/m²	Efficiency** %	Pressure Drop* mbar	Penetration** %	Temperature °C
MK 360	85	99.95	51.5	< 0.05	900 max.
T 293	85	99.95	51.5	< 0.05	900 max.

* A = 10 cm², flow velocity 40 cm/s
** 0.3 – 1.2 µm

Typical Levels of Trace Elements in ppm

Element	MK 360	T 293
Al	25	50
As	0.2	0.75
Cd	< 0.02	1.5
Co	< 0.5	1
Cr	3.5	5
Cu	< 1	1.25
Fe	20	30
Hg	< 0.025	< 0.05
Mg	15	25
Mn	1	1.25
Na	10	40
Ni	0.5	2
Pb	0.3	0.75
Sb	< 1	1.25
Sn	< 0.5	0.5
Tl	1.5	2.5
V	< 0.5	0.5
Zn	3	5

Micro-Quartz Fiber Filters

Part Numbers – Micro-Quartz Fiber Filters

Size mm	Grade MK 360	Pcs/ pack
Circles		
20	420043	25
25	420016	25
28	420012	25
37	420011	25
45	420010	25
47	420008	25
50	420000	25
70	420014	25
80	420017	25
90	420001	25
95	420044	25
103	420002	25
110	420003	25
120	420004	25
142	420005	25
150	420013	25
185	420042	25
257	420009	25
293	420006	25
Sheets		
203×254	420007	25
203×254*	420050	100

* numbered

Size mm	Grade T 293	Pcs/ pack
Circles		
20	420045	50
25	420046	50
32	420038	50
37	420047	50
47	420031	50
50	420051	50
55	420032	50
70	420048	50
85	420040	50
90	420033	50
103	420034	50
110	420035	50
125	420052	50
150	420036	50
Sheets		
203×254	420037	25
203×254	420039	100

Extraction Thimbles – Glass | Quartz

Micro-Glass Fiber Thimbles

- Made of **micro-glass fibers** are used to sample dust particles and aerosols from gaseous streams. Both micro-glass and micro-quartz are highly temperature and chemical resistant. They share the same physical properties as filter circles of the same fibers. Thimbles of fine glass or quartz fibers are a convenient tool for the separation of aerosol droplets and condensate from gases used for analytical or technical purposes.

Micro-Quartz Fiber Thimbles

- Made of **micro-quartz fibers** are used for emission testing in high temperature environments (up to 900°C). Unlike micro-glass fiber, micro-quartz may also be used for the analysis of acidic gases. Quartz meets the highest purity requirements due to the lowest possible heavy metal content.

Cellulose thimbles please see page 32.

Besides the excellent filtration characteristics, the extraordinary purity of the micro-quartz fibers has made them increasingly more important.

Typical Properties

Grade	Fiber Type	Penetration % (0.3 µm)	Conditioned	Temperature °C
ET/MG 160	Glass	< 0.002	–	500 max.
ET/MK 360	Quartz	< 0.002	yes	900 max.

Tolerances

Thimble Type	Micro-Glass Fiber	Micro-Quartz Fiber
Internal Diameter (mm)	+1 | –3	+0 | –3
Thimble Height (mm)	±1	±1
Wall Thickness (mm)	2 ±0.5	2 ±0.5

Extraction Thimbles – Glass | Quartz

Part Numbers

Internal length mm	Grade ET/MG160	ET/MK 360	Pcs/ pack
10 50	400031		25
16 50	400017	400069	25
19 90	400014	400065	25
22 62		400055	25
22 70		400067	25
22 80	400001	400068	25
24 65		400078	25
25 60	400043	400075	25
25 70		400057	25
25 80		400086	25
25 90		400070	25
25 100	400002	400056	25
26 60	400023	400053	25
26 80	400003		25
26 100		400084	25
27 70		400088	25
28 60	400038	400066	25
28 100	400037	400087	25
29 110		400080	25
30 70	400008	400090	25
30 77	400004	400050	25
30 80		400061	25
30 95	400005		25
30 100	400015	400062	25
30 110		400054	25
30 150		400085	25
33 80	400006		25
33 94	400007	400071	25
34 150		400059	25
35 75		400083	25
35 90		400082	25
35 150	400009	400051	25
40 150	400024	400089	25
43 123	400010	400052	25
53 145	400011	400081	25

Guide for Micro-Glass and Micro-Quartz Fiber Products

Do you intend to filter liquids / air / gases?

no → For solid phase extractions we recommend extraction thimbles on page 32.

yes ↓

Does the filter need a high dirt holding capacity?

no → We recommend membrane filters page 47 and prefilters MGD, MGB and MG 160 for quicker filtration

yes ↓

or ↕

Do you require high flow rates and good efficiency in particle retention?

Filter paper for analytical purposes page 11.

yes ↓

You should use glass or quartz fiber filters

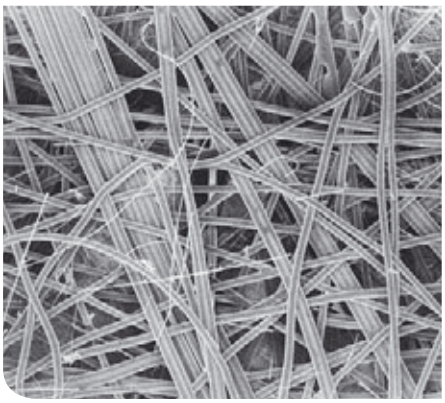
yes ↓

For temperatures > 500 °C

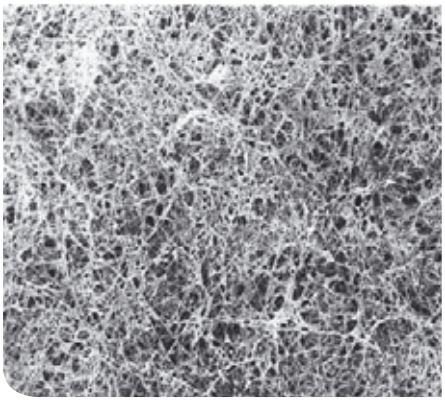
no → For temperatures of max. 500 °C

yes ↓

Quartz fiber filters MK 360 or T 293 (up to 900 °C) or MG 550 HA (up to 550 °C)



REM – Micro-glass fiber filters binder-free.



REM – Micro-glass fiber filter with binder.

Retention: < 1 µm – 3 µm

For very fine particles	Grade MGF
For water pollution	Grades MGC, MG 550 HA
Membrane prefilters for large particle volumes	Grade MG 160
For air monitoring	Grade MGG
For biochemical analysis	Grade MGA, MGG
For membrane prefilters analysis	Grade MGA
For coarse particle filters analysis	Grades MGA, MGD and MG 160

Industrial Filter Papers

Industrial filter papers are recommended for the filtration of edible oils, beverages, and galvanic baths. These papers are available as sheets, rolls, circles, folded filters as well as custom made sizes.

Contents

Filter Papers, Plain and Embossed

Filter Papers, Plain and Embossed

Grade	Basis Weight g/m²	Thickness mm	Typical Retention µm	Filtration Speed s/10 ml	Properties
49	78	0.17	10–15	18	Fast, embossed
1350	90	0.25	7–10	30	Medium fast, embossed
62	95	0.20	7.0	17	Medium fast, plain
94/N	100	0.22	7.0	25	Medium fast, plain
54	115	0.24	6–7	17	Medium fast, plain
1360	135	0.31	7–10	30	Medium fast, plain
1320	150	0.32	3–4		Medium fast, plain
C 160	160	0.30	5.0	40	Medium fast, plain
57/N	190	0.40	7.0	31	Medium fast, plain

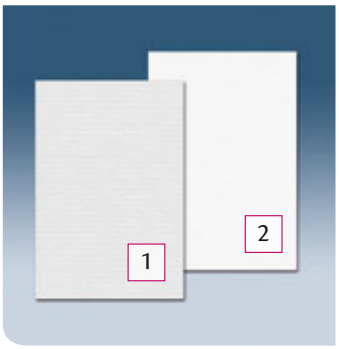
Typical Applications

Grade	Application
49	Embossed filter paper, excellently suited for salted solutions and sugar juice
1350	Absorption, protection
62	Essential oil, emulsions, essences, tinctures
94/N	Juices, essences, hair tonics, musts, wine, vegetal extracts
54	Technical filtration, galvanic baths
1360	Absorption, protection
1320	Absorption, substrate
C 160	Filtration of large amounts of liquids with fine-flaked precipitates, hair tonic, spirits
57/N	Filtration of large amounts of liquids, specially for mild acids and hot alkaline solutions

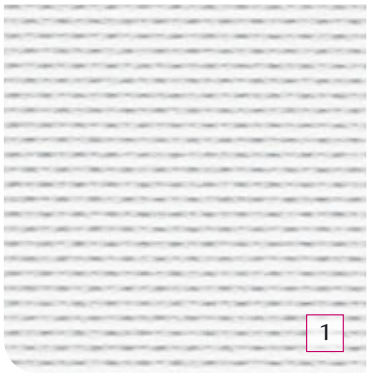
All grades are available in roll and circle form in diameters of >100 cm as well as in large sheets with a maximum length of 300 cm as well as in customer-specified size.

Order information upon request.

These papers are designed to meet specific filtration requirements. Generally, embossed surfaces as in grades 49 and 1350 provide a larger filtration area and offer higher filtration speed



compared to plain or "flat" filtration surfaces.

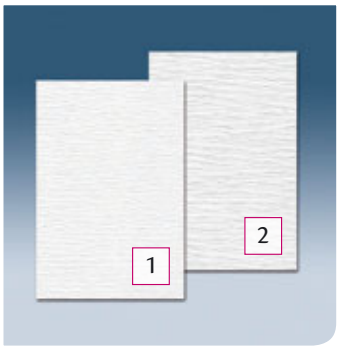


Embossed Filter Paper

Plain Filter Paper

Creped Filter Papers

Creped filter papers have larger filtration surfaces resulting in higher filtration velocities. In addition, the larger filtration surfaces offer greater particulate holding capacity compared



to plain or "flat" surface papers of the same size.

Benefits of Using Creped Filter Papers

- Larger surface area offers higher particle holding capacity and longer filter life
- More efficient clarification of the filtrate
- Elasticity of the creped surface has higher burst strength
- Biodegradable

Grade	Basis Weight g/m²	Thickness mm	Filtration Speed s/10 ml	Differential Pressure mbar
34/N	60	0.18	4	1.5
67/N	60	0.23	15	6.0
67/N	70	0.29	15	7.5
1602/N	70	0.22	5.0	2.5
55/N	75	0.28	14	6.5
21/N	80	0.28	10	5.5
67/N	80	0.33	14	8.0
5 H/N	85	0.28	3	1.0
33/N	90	0,35	4	1.5
67/N	90	0.38	13	6.5
22/NS	90	0.35	10	5.5
17	95	0.28	7	3.0
37/N	135	0.50	5	1.9
45/N*	140	0.58	15	8.0
6S/N	145	0.55	12	7.0
67/N	160	0.65	13	5.5
39/N	180	0.69	5	2.0
39/N	240	0.83	5	2.0
39/N	300	0.95	5	2.0

* unbleached

Order information upon request.

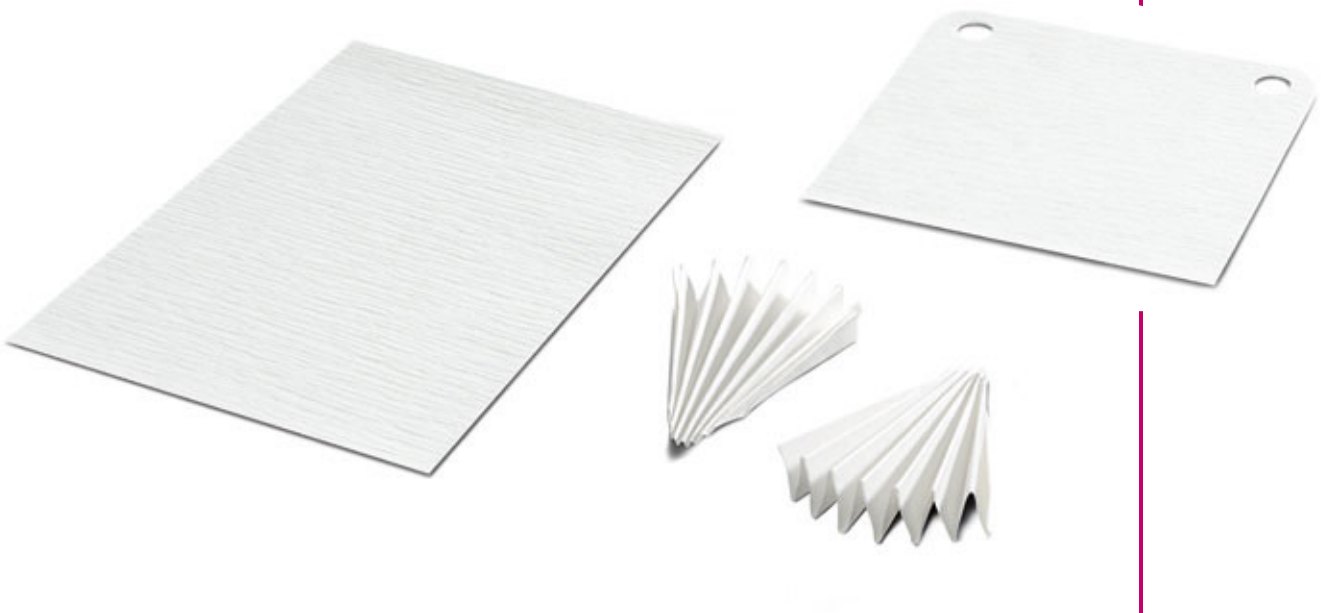
Structures of Filter Papers

Munktell
AHLSTROM

Typical Applications

Grade	Application
34/N	For strong contamination, protective paper for filter presses
67/N	Juices, edible oils, colloidal liquids, wine, hair tonics
1602/N	Universal paper for quick clarification
55/N	Edible oils, protective paper for filter presses, sugar industry
21/N	Galvanic baths
33/N	Technical oils, emulsions like agar-agar
22/NS	Clarification of galvanic baths
17	Tinctures, salted solutions
37/N	Lacquers, dye emulsions, gelatine, fruit juices, transformer oil
45/N*	Edible oils, technical greases
6S/N	Technical oils, edible oils, technical greases, pre-filter for transformer oils
39/N	Contaminated industrial liquids, lacquers and dye stuff, chip pan filters
5H/N	Essential oils, extract solutions

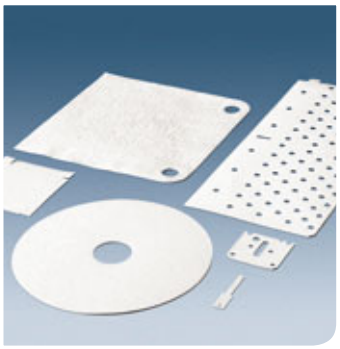
These filter papers can be supplied not only in form of rolls or sheets but also converted into circles and filter discs. Diameters of > 100 cm and large sheet sizes – also punched – with a max. length of 300 cm are no problem for us. Custom-made products upon request.



Filter Boards

Boards are keyed to specific applications.

Filter boards can be produced in disc or sheet form with one or more holes for use in filter press systems and can be produced to meet customer requirements for specific filtration challenges that are encountered in the chemical filtration industry.



Filter Boards

Grade	Basis Weight g/m²	Thickness mm	Capillary Rise mm/10 min	Differential Pressure mbar
57/NB	220	0.45	85	25
C 250	250	0.48	100	25
C 251	250	0.55	180	3.5
1522	275	0.58	105	9.3
358	280	0.60	100	9.5
C 300	300	0.55	100	25.0
1339	315	0.60	60	42.0
152/A	340	1.00	150	2.0
C 350	350	0.63	110	25.0
LF 1	360	0.90	175	5.5
152	380	1.00	200	2.5
539	400	0.95	170	8.0
167	420	1.30	210	1.3
171/K*	430	1.00	150	8.0
C 450	450	0.95	110	25.0
511	490	1.25	165	7.5
1220	475	1.10	120	25.0
K 12	520	1.60	200	2.5
M 600	600	1.60	165	3.5
157	700	1.80	150	8.0

* unbleached

Order information upon request.

Typical Applications

Grade	Application
57/NB	Galvanic baths
C 250	Galvanic baths, transformer oils
C 251	Technical oils, paraffin, edible oils
1522	Filter press applications
358	Filter press applications
C 300	Galvanic baths, transformer oils
1339	Raw paper for Bowie-Dick-test indicator sheets, sterilization control
152/A	Galvanic baths, hydrocarbons
C 350	Technical oils, transformer oils, galvanic baths
LF 1	Filter press applications
152	Oils, lacquers, transformer oils
539	Turbine oils, transformer oils, engine oils
167	Basis paper for pads
171/K	Oils, paraffin, transformer oils, resinous solutions
C 450	Galvanic baths, transformer oils
511	Galvanic baths, process water filtration, activated carbon retention
1220	Essential oils, galvanic baths, use in filter presses
K 12	Galvanic baths
M 600	Filter press applications, galvanic baths, edible oils and essential oils
157	Edible oils, essential oils, fine turbidities

Filter Discs from Filter Paper and Filter Board

Typical Diameters

Size mm Circles with Central Hole	Size mm Circles with Central Hole	Size mm Circles with Central Hole
75/5	248/45	450/50
136/32	250/183	455/41
148/45	260/40	456/100
145/43	270/50	460/100
160/40	270/60	465/40
165/50	280/50	467/41
180/33	295/40	470/60
200/65	295/60	485/60
202/60	300/40	485/70
205/33	302/102	505/55
210/32	305/102	510/95
210/33	312/128	600/68
210/60	350/41	603/68
213/60	350/135	845/76
215/32	360/100	850/76
240/32	412/175	910/75

Transformer Oil Filters

Sizes mm	Holes ∅ mm	Finish
Cuts		
185 × 185	2 holes, ∅ 18	without recess
188 × 188	2 holes, ∅ 18	without recess
230 × 230	2 holes, ∅ 20	with recess
275 × 275	2 holes, ∅ 25	without recess
320 × 310	2 holes, ∅ 36	without recess
310 × 340	2 holes, ∅ 30	with recess
320 × 320	2 holes, ∅ 24, 25, 27	without recess
310 × 322	2 holes, ∅ 36	with recess
327 × 327	2 holes, ∅ 28	without recess
200 × 223	2 holes, ∅ 20	with recess

Order information upon request.

Papers, Boards and Special Products

Typical Applications for the Galvanic Industry Grades

Type of Bath	Papers	Boards	Special Products
Lead	34/N	157	69/K
Cadmium	47/N, 67/N		69/K
Ferrum	34/N	152, 57/NB, LF 1, M 600	69/K
Bright copper bath	3m/N, 1001, 1002	157, 171/K, M 600	
Gold	34/N, 33/N, 21/N		
Iridium	34/N, 67/N, 47/N		
Copper	34/N, 33/N, 37/N, 39/N, 21/N	539, 1200, 1600	69/K
Manganese	3m/N, 1001, 1002, 1003	57/N, C 250	
Nickel	34/N, 37/N, 39/N	152, LF1, C 250	
Bright nickel bath	3m/N, 1001, 67/N	57/NB, 1600, 157, M 600	69/K
Nickel sulfamate	3m/N, 1001, 1002, 1003	K 12, 1220	MG 1337
Regeneration of galvanic baths	3m/N, 1001, 1002, 1003		69/K, MG 1337
Silver	3m/N, 34/N, 67/N	K 12, 157, 1220, 167, M 600, 539	
Zinc	34/N, 3m/N, 37/N, 39/N	57/NB, 1600, 157, 1200, 167, K 12	
Zinc/Nickel alloys	3m/N, 1001, 1002, 1003, 67/N		

Nonwovens Belt Filters

Nonwoven filtration media of rayon and polyester are offered in a wide range of filtration efficiencies and basis weights. Nonwoven media offer a multitude of paths for the impinge-

ment of target particles and hence, offer depth filtration as well as high particle retention capacity in both gas and liquid environments.

Belt filters of nonwoven media are usually specified to meet specific filtration demands. Roll widths available to fit customer filtration systems.

- Ideal for filtration of samples containing visible particles from air or gas medium
- Δ "P" can be maintained by lateral belt movement through the particle stream
- Additional filtration of fine particles can be obtained by medium flow through the accumulation of particulate "dust cake" on the upstream side
- Belt filtration makes the recovery of precious materials possible

Typical Properties

Grade	Basis Weight g/m^2	Tensile Strength N/cm MD	CD	Air Permeability DIN 53887 l/m^2 s	Typical Retention µm
Rayon (Viscose)					
2601	20	70	6	5,000	115
2601	25	85	8	5,000	100
2601	30	95	8	5,000	100
2601	35	100	10	4,000	95
2601	40	120	11	3,500	85
2601	50	140	12	3,000	80
2601	60	150	14	2,800	75

Grade	Basis Weight g/m^2	Tensile Strength N/5 cm MD	CD	Air Permeability DIN 53887 l/m^2 s	Typical Retention µm
Polyester					
2701	30	80	75	5,000	100

Grade	Basis Weight g/m^2	Thickness mm	Water Permeability $m^3/m^2/h$	Air Permeability l/m/s	Typical Retention µm
Viscose (Acrylic Binder)					
2025	25	0.20	369	5,399	193
2035	35	0.26	323	4,633	181
2050	50	0.35	254	3,483	158

Applications

- Internal and external grinding
- Profile grinding
- Final grinding
- Honing
- Drilling
- Milling
- Turning
- Lapping
- Hot and cold rolling
- Galvanizing
- Hardening
- Wire cutting
- Washing/Cleaning
- Oil recovery and recycling.

Filtration

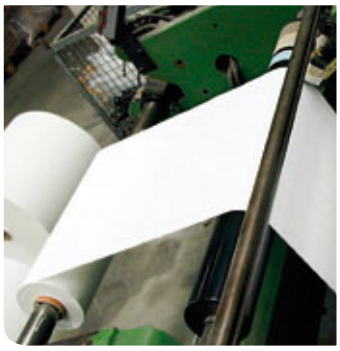
- Emulsions
- Grinding oils
- Synthetic solutions
- Honing-, cutting-, rolling oils
- Petroleum
- Washing solutions

The operating mode of the filter unit determines the needed properties of the filter media.

Media selection is based on filter medium (liquid or gas), the minimum particle size to be captured as well as the nature of the particulate to be retained by the filtration matrix.

Our experience suggests the grades in the following chart as those most commonly used.

Nonwoven belt filters are often used in metal processing applications to remove particulate from liquids.



Standard Programs

Basis Weight	Reel Width mm		Reel Length mm		Reel ∅ mm	
	2601	2701	2601	2701	2601	2701
2601, 20 g/m²	420		250		210	
	490		320		230	
	700		250		210	
	710		400		250	
	1,015		250		210	
	1,015		550		290	
	1,500		550		290	
2601, 35 g/m² 2701, 30 g/m²	420	420	150	250	210	220
	490	490	200	250	240	220
	700		150		210	
	710	710	250	250	260	220
	1,015	1,015	250	250	260	220
	1,015	1,015	350	350	310	250
2601, 50 g/m²	710		150		250	
	1,015		150		250	
	1,015		300		340	
	1,040		200		280	
	1,500		200		280	
2025 2035 2050	rolls, discs, sheets					

Other dimensions and basis weights are available upon request.

Mesh Filters

- Waste water and drinkable waters,
- Air and gases,
- Various filtrations…

Technical Specifications

Advantages		
Media	Polyamide 6.6	Polypropylene
Pore size	1–325 µm	75–5,100 µm
Max. temperature	115°C	90°C
Abrasion resist.	good	limited
Acid resistance	limited	good
Availability	discs/sheets/rolls	discs/sheets/rolls

Activated Carbon In-Line Filter

This in-line filter is used for filtration of samples of hydrocarbons, cetone, alcohols, ether, organic acids, ambient air, various gases, smokes, …

Technical Specifications

Housing media:		green transparent polycarbonate
Composition:		activated carbon granules + cellulose disc
Size:	external diam. × length	26 mm × 82 mm
Connecting:	inlet/outlet	6.3 mm

Grade	Activated Carbon Volume cm^3	Pressure of Service bars	Max. Temperature °C	Part Number	Pcs/ pack
1000	11.5	4	70	243176	10

Pipe Filter Paper

- Filter paper for reduction of nicotine
- Food grade quality

Technical Specification

Grade	Basis Weight g/m²	Thickness mm	Finish
P 80	85	0.16	plain

Available in rolls and sheets.
Order information upon request.

Medical Products

Paper is the ideal medium for many clinical-chemical applications.

Munktell papers are ideal for the collection and storage of blood and other bodily fluids for later analysis.

Munktell also offers paper with a hydrophobic finish that is widely used to package instruments, surgical garments and drapes for sterilization and maintains the sterility until use.

Contents

Munktell TFN

The new specimen collection paper for blood sampling and newborn screening (NBS).

Application

Blood sample collection requires the use of a special grade of filter paper like Munktell Grade TFN to preserve the cells needed for neonatal screening. Today, depending upon the State and Country, the newborn's few drops of blood collected on a test card enable doctors to detect and begin early treatment of more than 30 serious conditions.

Grade TFN meets the requirements of Clinical Standards Laboratory Institute (CLSI) Approved Standard, 2007, "Blood Collection on Filter Paper for Newborn Screening Programs; Approved Standard-Fifth Edition (LA4-A5)".

Characteristics

TFN paper is manufactured from 100% pure cotton linters without wetstrength additives that could adversely influence the stability of the sample collected.

To ensure the quality and the stability of the sample collected Munktell controls the entire manufacturing process to assure uniform composition, thickness, absorbency and flow rate to guarantee the highest possible, consistent quality.

The CLSI (Clinical and Laboratory Standards Institute (formerly the National Committee for Clinical Laboratory Standards)) defines the critical parameters for blood absorbency, serum uptake and circle size for a specified volume of blood. TFN has been tested by an independent testing lab, Newborn Screening Quality Assurance Program. TFN conforms to this rigorous standard.

Working Rule – CE Mark

Grade TFN paper is classified as 'sample vessel' within the meaning of the Directive 98/79/EC, IVD Device. It requires the CE mark if sold within the European Union. All TFN specimen collection devices manufactured and printed by Munktell for neonatal testing in the EU are exposed to printing quality control and carry the CE mark. Munktell cannot assume responsibility for the quality or performance of TFN collection devices not printed, converted or packaged by Munktell.

Custom Printing

Munktell offers customized collection cards of TFN paper for use in large sampling studies to enable researchers and clinicians to standardize samples obtained from multiple sources. Customer-specific solutions such as printing on both sides of the collection card, bar coding and multi-part forms are all possible. Our staff is available to work closely with your design team to tailor a solution to your analytical requirements.

Munktell TFN

Munktell TFN untreated filter paper for Dried Blood Spot (DBS) analysis of body fluids

TFN for Micro Volume Sampling

TFN can be used for micro volume sampling of blood spots and body fluids as well.
For applications where DNA extractions are required TFN is an ideal sample carrier.

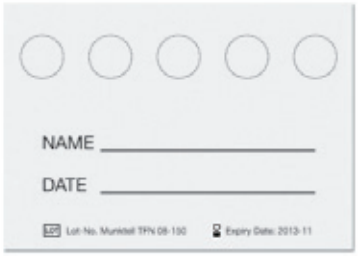
Samples are applied directly onto the paper matrix. There is no need for a separate collection vessel. DBS techniques are ideal for low volume assays.

Advantages

- No impregnated chemicals to interfere with analysis
- Blood spots or body fluids spots dry within 2 h

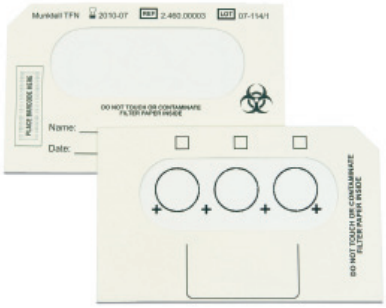
Part Numbers-Grade TFN printed

Part Number	Size mm	Characteristics	Pcs/pack
323027	76 × 108	Single part filter paper with 5 circles	500
354015	52.5 × 85	Frame cassette filter cards with 3 circles and one sloped edge	500
323046	88 × 62	Filter paper with wraparound cover, 5 circles	100



Single part filter paper card

Filter paper with wraparound cover


Frame cassette filter paper cards


Multiple part form with detachable filter paper

Munktell
AHLSTROM

Sterilization Paper

Produced in accordance with DIN EN 868-2:2009 and DIN EN ISO 11607-1(2009-09), under the regular supervision of an international testing institute to guarantee the highest, consistent quality.

Grade: 363 – 58 g/m²

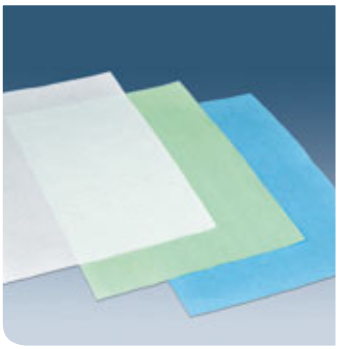
- Colors: white, green and blue
- Creped
- Hydrophobic
- For drying ovens up to 180°C
- Suitable for autoclaves, steam sterilization, gas and gamma sterilization

Advantages

- Regular supervision by an independent test institute
- Protects against contamination after sterilization
- When properly wrapped and stored, the sterility of goods is guaranteed for six months
- Container filters available upon request
- Available with angular or rounded corners, 230 × 230 mm and 190 mm circle with a 6 mm center hole

Available in rolls and sheets.

Sterilization Paper is a special wrapping paper of hydrophobic finish for use in steam, gas and gamma-ray sterilization. Its specific pore distribution and high air flow resistance ensure



extremely safe storage properties. The material is available in creped surface finish.

Part Numbers – Sterilization Paper

Width mm	Length m	363 White	363 Green	Pcs/pack
Rolls				
500	100	313000	313040	2
600	100		313041	1
750	100	313001	313042	1
1000	100	313002	313043	1

Size mm	363 White	363 Green	363 Blue	Pcs/pack
Sheets				
400 × 400	313014	313059	313030	500
450 × 450	313016			500
500 × 500	313019	313063	313032	500
600 × 600	313022	313066		500
750 × 750	313023	313069		250
800 × 800		313070		250
900 × 900		313074	313038	250
1,000 × 1,000	313004	313046		250
1,200 × 1,200	313007		313029	125

Covers and Protection Papers – Medicrepe

Grade: 326 – 65 g/m²

- Highly absorbent
- Wetstrengthened

Wherever high hygienic levels are a necessity:

- Pure cellulose, non-chlorine
- Hypoallergenic
- Acts as a moisture barrier to protect both patients and surfaces from possible cross-contamination
- Tear-resistant
- Extremely strong

User-Orientated Applications

- Cover for an examining table, chair in a medical office, on gurney, or use in a recovery room following a completed surgical procedure
- Available in rolls and sheets for all commercially available chairs and stretchers.

Part Numbers – Rolls (6 pcs/pack)

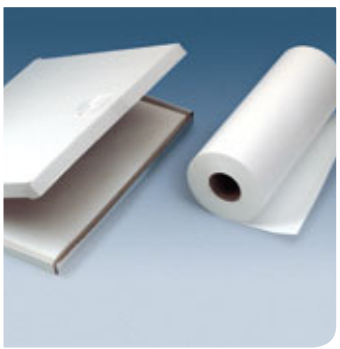
Width mm	Length m	Part Number
500	40	313081
550	40	313082
590	40	313083

Perforation interval 30 cm;
also available without perforation

Part Numbers – Sheets

Width mm	Length mm	Part Number
450	800	313091
450	1,200	313090
630	800	313095
630	1,200	313096

Covers and Protection Papers – Semicrepe



Grade: 376 – 50 g/m²

- High value and utility at a competitive price point
- Produced from recycled raw materials generated entirely within Munktell's production facilities to reduce our, as well as your own, environmental "footprint".

User-Orientated Applications

Economic, and yet the highest Munktell quality

- Dimensionally stable
- Offers high burst and tear strength
- Highly absorbent to resist penetration of bodily fluids
- Available in 390 × 390 mm sheet packs of 500 sheets

Part Number: 313079

Other sizes upon request.

Covers and Protection Papers – Mediline-Covers

Grade: 326 – 65 g/m²

The covers maintain their strength even when wet.

- Designed for use on work surface protection

Also available in rolls and sheets, as well as a coated version, grade LabSorb and LabSorb Ultra on page 35.

Dental Tray Papers

- Environmentally friendly
- Both hydrophobic and hydrophilic types are available
- Suitable for steam, gas, gamma and hot air sterilization
- Available in creped and embossed finishes

Also available in 280 mm × 360 mm.

The ideal tray covers for modern dental offices to protect instruments during procedures. These grades are also suitable for use as an absorbent tray cover during sterilization.

Technical Specifications

Grade	Basis Weight g/m²	Finish	Sizes mm	Part Number	Sheets/ Pack
1357	90	embossed, hydrophilic	180 × 275	200010	250
363	60	creped, hydrophobic, white	180 × 280	313009	250

Finish: white, creped and embossed.

Dental Napkins

- Creped grade 376 and coated on one side grade LabSorb Ultra

Technical Specifications

Grade	Basis Weight g/m²	Standard Sizes mm	Part Number	Pcs/ Pack
376	50	390 × 390	313079	500
LabSorb Ultra	187	430 × 430	146313	250

Cytocentrifugation

Cyto-Strips made of filter board for cytocentrifuges

- For single chambers and multiple chambers

Application

Absorption of excess liquids from the staining of samples in cytologic analysis. E.g: grade 906 is used for Shandon and Bayer cytocentrifuges.

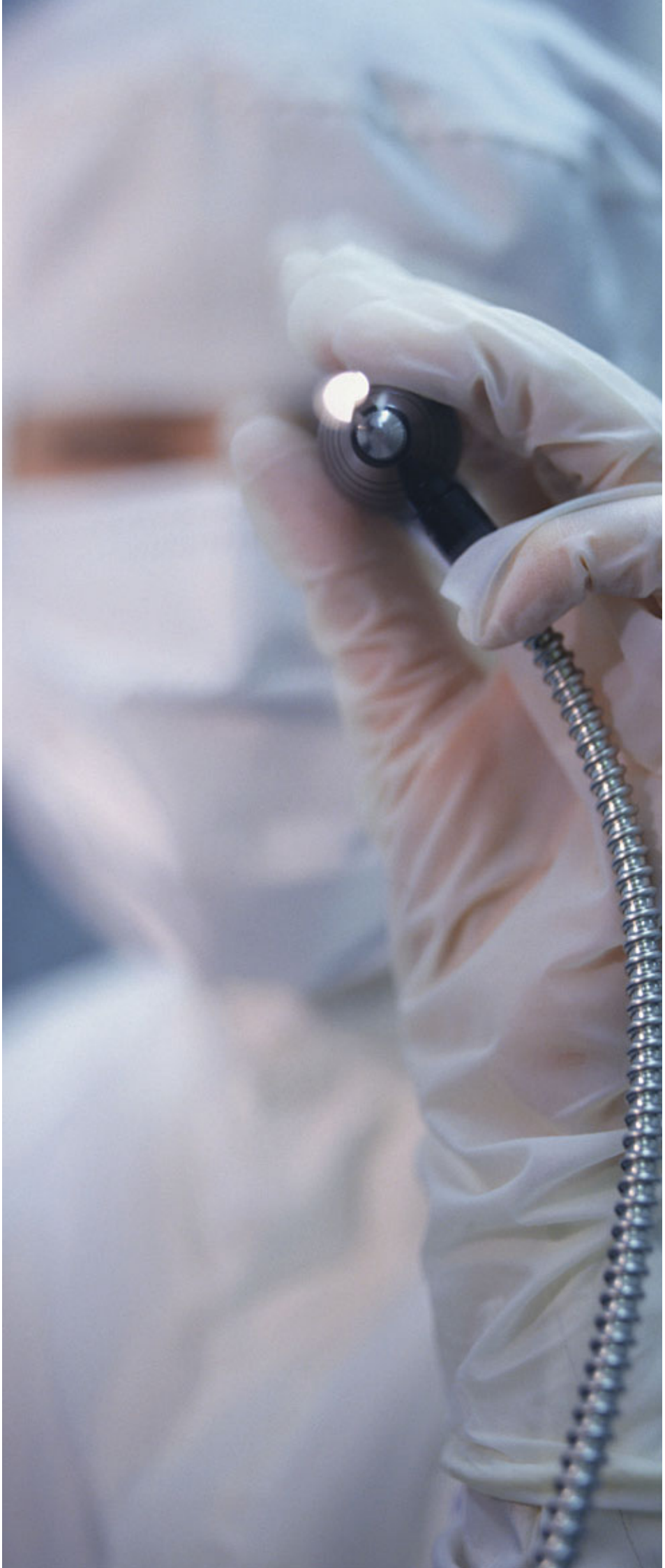
All grades are available in different sizes and configurations.

Grade	Basis Weight g/m²
C 300	300
906	430
C 450	450
151	460

www.munktell.com

Medical Filtration Technology

Munktell
AHLSTROM



Air Filtration

Several Munktell micro-glass fiber grades are suitable for manufacturing HEPA (High Efficiency Particulate Air) and ULPA (Ultra Low Penetration Air). These media enable the filter manufacturer to produce filters that can meet the classification standards established by EN 1822:2009 and ASHRAE Standard 52.2 for use in medical and electronic industry cleanrooms as well as in commercial and residential installations.

Contents

HEPA/ULPA Micro-Glass Fiber Papers

Munktell Air Filter Media

The Munktell filter media concept is to manufacture media in all efficiency ranges of interest to the cleanroom industry – efficiencies from 99.95% to 99.9999% for 0.12 µm particle size.

These products are then converted by the customers into a variety of shapes and configurations to suit a multitude of industrial, medical, electronical and personal protection applications.

Munktell air filter media offer flexibility in filter design and open doors to new markets. They are produced on a paper machine especially designed for the processing of micro-glass fibers. Only high-purity borosilicate glass fibers are employed, in thicknesses ranging from 0.2 to 2.0 µm, depending on the required level of efficiency.

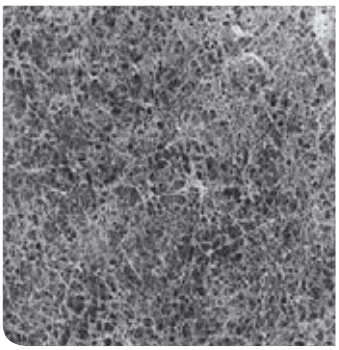
State of the Art Test Stands Document the Quality

Munktell maintains an extensive laboratory where technicians monitor production in real-time with in-line sensors. In addition, quality management staff conducts physical testing of each production lot to ensure compliance with grade-specific standards. Particle removal efficiencies are closely monitored for each grade enabling you, the Munktell customer, to make better decisions in selecting media for your specific HEPA/ULPA application.

Our test facilities give you the most accurate and reliable data possible. You will know what kind of filtration performance you can expect from each grade, i.e. the removal efficiency for each particle size at a chosen flow rate. The test stand measures particle sizes from 0.05 to 0.5 micron with extreme accuracy. This enables you to make better decisions in designing your products and provides hard fact to validate your decisions with your customers.

HEPA/ULPA Air Filter Media

Munktell can also supply specially engineered grades. If your requirements cannot be met with our standard grades, please contact us directly as we are able to develop proprietary grades that meet or exceed your unique filtration requirements.



Micro-glass fiber filter with binder

Grade		MG 120	MG 235	MG 265	MG 295	MG 325	MG 355	MG 450	MG 500
Basis Weight g/m^2		75	75	75	75	75	75	75	75
Thickness mm		0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Density kg/m^3		215	215	215	215	215	215	215	215
Tensile Strength N/m	MD	800	800	800	800	800	800	800	800
	CD	700	700	700	700	700	700	700	700
Tensile Stiffness kN/m	MD	160	180	180	180	180	180	180	180
Pressure Drop Pa 5.3 cm/s		120	235	265	295	325	355	450	500
Penetration %		5*	0.5*	0.05*	0.03**	0.02**	0.01**	0.005*	0.0005*
Water Repellency s		>60	>60	>60	>60	>60	>60	>60	>60
Combustible Material %		6	6	6	6	6	6	6	6
Filter Class		H11	H12	H13	–	–	–	H14	U15

* Air flow velocity 2 cm/s
** Air flow velocity 15 cm/s MPPS

Above data are typical values from production runs and do not represent a specification.

Technical Information

This chapter contains useful technical information about Munktell`s product range.

Contents

Grade Comparison

Munktell	Whatman	Ahlstrom	MFS/ Advantec	Macherey & Nagel
Munktell no. 1	1	601	2	616
Munktell no. 2	2	642	232	616 md
3S/H	3	237	131	675
1288	4	631	1	1670
1289	n/a	n/a	n/a	1672
1290	6	950	n/a	619eh
1291	n/a	n/a	n/a	1674
293	5	610	235	n/a
3	4	631	1	1670
150	2	642	232	616
1F	1	601	2	616 md
120H	5	610	235	619 eh
3hw	Student grade	601	5A	615
388	54	54 / 55	5A	640 w
389	41	n/a	7	640 m
390	40	74	5B	640 d
391	44	95	6/4A	640 de
392	43	75	n/a	640 md
393	42	94	5C	640 de
00A	43	75	n/a	640 md
00R	54	54 / 55	5A	640 w
00H	42	94	5C	640 de
00M	41	n/a	7	640 m
006	44	95	6 / 4A	640 de
00A	43	75	n/a	640 md
55/N	91	615	n/a	n/a
4 b	93	613	n/a	n/a
3m/N	93	613	n/a	n/a
1001	6	950	n/a	619eh
1002	Student grade	601	n/a	615
1003	4	631	n/a	617
ET/C	Thimbles/ 2800	Extraction Thimbles	84	645
ET/MG160	603 G	n/a	86R	649
ET/MK 360	603 Q	n/a	88RH	n/a
Labsorb	Benchcote	Polyshield 4002	n/a	210 PE LabTop
Labsorb ultra	Benchcote plus	Polyshield 4003	n/a	n/a

Munktell	Whatman	Ahlstrom	MFS/ Advantec	Macherey & Nagel
FN 100	3MMChr	238	1514A	n/a
FN 1	4 Chr	631	51A	260
FN 2	n/a	n/a	n/a	n/a
FN 3	1 Chr	601	151B	261
FN 30	17CHR	243	n/a	n/a
FN 4	2 Chr	642	n/a	214
FN 6	n/a	n/a	n/a	n/a
FN 7a	3 Chr	237	n/a	n/a
FN 8	31 ETChr	222	n/a	827
BF 2	3MMChr	238	131	218 B
BF 3	182	n/a	n/a	727 B
BF 4	n/a	n/a	n/a	866 B
MGA	GFA	111	GA-55	GF1
MGB	GFB	121	GB-140	GF2
MGC	GFC	131	GC-50	GF3
MGD	GFD	141	GD-120	GF4
MGF	GFF	151	GF-75	GF5
MG 550-HA	934 AH	161	n/a	n/a
MK 360	QM-A	n/a	QR-100	QF-10
6 S/N	113	n/a	n/a	n/a
6 or 41 b	114	n/a	102 1/2	514
480	1PS	n/a	n/a	616 WA
601/N	91	n/a	n/a	n/a
1765	181	n/a	n/a	n/a
TFN	903	226	n/a	818GT

Chemical Compatibility – Filter Materials

Key to Symbols

- ● = Compatible
- ○ = Limited compatibility
- – = Not compatible
- ? = Not tested

	Cellulose Acetate	Cellulose Nitrate	Reg. Cellulose/ Cellulose Papers	PTFE	Polyamide	Glass Fiber	Polycarbonate	Polyether Sulfone
Solvents								
Acetone	–	–	●	●	–	●	○	–
Acetonitrile	?	?	●	●	–	?	?	●
Benzene	●	●	●	●	●	●	?	●
Benzyl alcohol	○	○	●	●	●	●	?	–
n-Butyl acetate	○	–	●	●	●	●	●	●
n-Butanol	●	●	●	●	●	●	●	●
Carbon tetrachloride	○	●	●	●	●	●	?	●
Cellosolve	●	–	●	●	?	●	–	●
Chloroform	–	●	●	●	●	●	–	–
Cyclohexane	○	○	●	●	?	●	●	–
Cyclohexanone	–	–	●	●	●	●	?	?
Diethylacetamide	–	–	●	●	●	●	?	?
Diethyl ether	●	–	●	●	●	●	●	?
Dimethyl formamide	–	–	○	●	○	●	–	?
Dimethylsulfoxide	–	–	●	●	●	●	–	–
Dioxane	–	–	●	●	●	●	–	●
Ethanol, 98%	●	○	●	●	●	●	●	●
Ethyl acetate	–	–	●	●	●	●	?	–
Ethylen glycol	●	○	●	●	?	●	●	●
Formamide	?	?	?	●	?	●	–	?
Gasoline	●	●	●	●	●	●	●	●
Glycerine	●	●	●	●	●	●	●	●
n-Heptane	●	●	●	●	?	●	?	?
n-Hexane	●	●	●	●	●	●	●	?
Isobutanol	○	○	●	●	●	●	●	?
Isopropanol	●	○	●	●	●	●	●	●
Isopropyl acetate	○	–	●	●	?	●	?	●
Methanol, 98%	●	–	●	●	?	●	●	●
Methyl acetate	–	–	●	●	●	●	?	–
Methylene chloride	–	○	●	●	●	●	–	–
Methyl ethyl ketone	–	–	●	●	●	●	?	–
Methyl isobutyl ketone	●	–	●	●	●	●	?	?
Monochlorobenzene	●	●	●	●	●	●	–	?

	Cellulose Acetate	Cellulose Nitrate	Reg. Cellulose/ Cellulose Papers	PTFE	Polyamide	Glass Fiber	Polycarbonate	Polyether Sulfone
Solvents								
Nitrobenzene	●	○	●	●	●	●	–	?
n-Pentane	●	●	●	●	●	●	●	?
Perchloroethylene	●	●	●	●	●	●	●	?
Pyridine	–	–	●	●	●	●	–	–
Tetrahydrofuran	–	–	●	●	●	●	–	–
Toluene	●	●	●	●	●	●	?	●
Trichlorethane	○	●	●	●	?	●	?	?
Trichloroethylene	●	●	●	●	●	●	–	●
Xylene	●	●	●	●	●	●	●	●
Acids								
Acetic acid, 25%	●	●	●	●	○	?	○	●
Acetic acid, 96%	–	–	●	●	–	?	?	●
Hydrochloric acid, 25%	–	○	–	●	–	?	●	●
Hydrochloric acid, 37%	–	–	–	●	–	?	●	●
Hydrofluoric acid, 25%	●	○	○	●	–	?	●	?
Hydrofluoric acid, 50%	●	○	–	●	–	?	●	?
Nitric acid, 25%	–	○	–	●	–	?	●	●
Nitric acid, 65%	–	–	–	●	–	?	●	●
Perchloric acid, 25%	–	○	○	●	–	?	?	?
Phosphoric acid, 25%	●	○	○	●	–	?	?	?
Phosphoric acid, 85%	○	○	○	●	–	?	–	?
Sulphuric acid, 25%	–	○	○	●	–	●	?	●
Sulphuric acid, 98%	–	–	–	●	–	?	–	?
Trichloroacetic acid, 25%	–	○	●	●	–	?	?	?
Bases								
Ammonium, 1N	●	●	○	●	●	●	–	●
Ammoniumhydroxide, 25%	–	○	–	○	●	○	–	●
Potassium hydroxide, 32%	–	–	○	●	○	○	–	●
Sodium hydroxide, 32%	–	–	○	●	○	○	–	●
Sodium, 1N	○	–	○	●	●	●	–	●
Aqueous Solutions								
Formalin, 30%	○	●	○	●	○	●	●	●
Hydrogen peroxide, 35%	●	●	○	●	○	?	?	?
Sodium hypochlorite, 5%	●	○	●	●	○	●	?	?

Contact time:
24 hours at 20°C

Chemical compatibilities can be influenced by various factors.

Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with the actual filtration.

Chemical Compatibility – Syringe Filters

Key to Symbols

- ● = Compatible
- ○ = Limited compatibility
- – = Not compatible
- ? = Not tested

		Syringe Filters				
	PTFE Venting Unit 64 mm	Cellulose Acetate	Venting Unit 26 mm	Reg. Cellulose/ Cellulose Papers	PTFE	PVDF
Solvents						
Acetone	●	–	–	●	–	○
Acetonitrile	●	–	?	●	●	○
Benzene	●	–	–	?	●	●
Benzyl alcohol	●	?	?	?	●	○
n-Butyl acetate	○	–	–	?	●	?
n-Butanol	●	○	○	●	●	○
Carbon tetrachloride	●	○	○	?	●	?
Cellosolve	○	–	–	●	○	?
Chloroform	●	–	–	●	●	●
Cyclohexane	●	–	–	?	●	–
Cyclohexanone	●	–	–	?	●	–
Diethylacetamide	●	–	–	●	●	○
Diethyl ether	●	?	?	?	●	○
Dimethyl formamide	●	–	–	?	●	–
Dimethylsulfoxide	●	–	–	●	●	○
Dioxane	●	–	–	●	●	●
Ethanol, 98%	●	–	–	●	●	○
Ethyl acetate	●	○	○	●	●	●
Ethylen glycol	●	?	?	●	●	?
Formamide	●	?	?	?	●	●
Gasoline	●	●	●	●	●	–
Glycerine	●	●	●	?	●	?
n-Heptane	●	●	●	?	●	?
n-Hexane	●	●	●	●	●	?
Isobutanol	●	○	○	●	●	●
Isopropanol	●	○	○	–	●	?
Isopropyl acetate	●	○	○	?	●	●
Methanol, 98%	●	–	–	●	●	?
Methyl acetate	●	–	–	?	●	?
Methylene chloride	●	–	–	●	●	–
Methyl ethyl ketone	●	–	–	●	●	–
Methyl isobutyl ketone	●	?	?	?	●	?
Monochlorobenzene	●	?	?	?	●	?

	PTFE Venting Unit 64 mm	Syringe Filters				
		Cellulose Acetate	Venting Unit 26 mm	Reg. Cellulose/ Cellulose Papers	PTFE	PVDF
Solvents						
Nitrobenzene	●	?	?	?	●	?
n-Pentane	●	●	●	●	●	?
Perchloroethylene	●	○	○	?	●	○
Pyridine	●	–	–	?	●	●
Tetrahydrofuran	●	–	●	●	●	●
Toluene	●	–	●	●	●	●
Trichlorethane	●	○	○	●	●	?
Trichloroethylene	○	?	?	?	○	?
Xylene	●	–	–	●	●	○
Acids						
Acetic acid, 25%	●	○	○	?	?	●
Acetic acid, 96%	●	–	–	?	●	●
Hydrochloric acid, 25%	●	–	–	?	●	–
Hydrochloric acid, 37%	●	–	–	?	●	●
Hydrofluoric acid, 25%	●	○	○	?	●	?
Hydrofluoric acid, 50%	●	○	○	?	●	?
Nitric acid, 25%	●	–	–	?	●	–
Nitric acid, 65%	●	–	–	?	●	–
Perchloric acid, 25%	●	?	?	?	●	?
Phosphoric acid, 25%	●	●		?	●	?
Phosphoric acid, 85%	–	?	?	?	●	?
Sulphuric acid, 25%	●	–	–	?	●	●
Sulphuric acid, 98%	●	–	–	?	●	–
Trichloroacetic acid, 25%	●	–	–	●	●	–
Bases						
Ammonium, 1N	●	●	●	?	●	●
Ammoniumhydroxide, 25%	●	○	○	?	●	●
Potassium hydroxide, 32%	●	–	–	?	●	?
Sodium hydroxide, 32%	●	–	–	?	●	○
Sodium, 1N	●	○	○	?	●	?
Aqueous Solutions						
Formalin, 30%	●	–	–	?	●	–
Hydrogen peroxide, 35%	●	●	●	?	●	–
Sodium hypochlorite, 5%	●	●	●	?	●	?

Contact time:
24 hours at 20°C

Chemical compatibilities can be influenced by various factors.

Therefore, we recommend that you confirm compatibility with the liquid you wish to filter by performing a trial filtration run before you begin with the actual filtration.

Test Parameters

Test parameters of filter papers, glass- and quartz fiber filters

Basis Weight acc. DIN EN ISO 536 (g/m²)

The basis weight has to be tested, if possible, on a surface of min. 500 cm² and max. 1000 cm². The balance used should have an accuracy of 0.5%.

Thickness acc. DIN EN ISO 534 (mm)

The thickness of filter papers is measured with a thickness test device under a pressure of 10 N/cm².

Tensile Properties acc. DIN EN ISO 1924-2 respectively DIN EN ISO 1924-3 (N/15 mm)

A paper strip 15 mm wide and 180 mm long is charged vertically with a permanently increasing weight. The tensile strength is the force needed for the paper to tear and is measured both in machine and cross direction at the moment when the paper strip tears.

Bursting Strength acc. DIN ISO 2758 (kPa)

A paper with a surface of 10 cm² is clamped over a rubber membrane which is kept under a uniformly increasing charge. At the moment of burst, the pressure is measured.

Tensile Strength after Immersion in Water acc. ISO 3781 / Bursting Strength after Immersion in Water acc. ISO 3689 (N/m)

Prior to testing tensile and bursting strength, paper samples are wetted with water.

Filtration Speed (s)

On a quarter-folded, wetted, suspended circle of 110 mm diameter the time needed is measured for the filtration of 10 ml of pre-filtered distilled water (20°C).

Filtration Speed acc. Herzberg (s/100 ml)

Filtration time for 100 ml pre-filtered, distilled water (20°C) is measured on a filter surface of 10 cm² and at a constant pressure of 5 cm water column.

Air Flow Resistance (mbar)

The air flow resistance is the pressure drop occurring after the filtration of a defined air stream through a filter paper (7.5 cm/s A = 10 cm²).

Capillary Rise (Klemm method) acc. DIN ISO 8787 (mm)

A 15 mm wide test strip is hung vertically into distilled water (20°C) so that the water rises through the capillaries of the strip. After a test period of 10 min. and 30 min., the wetted part of the strip is measured and recorded as test value.

Residue on Ignition (Ash Content) acc. DIN 54 370 (%)

Residue on ignition for 10 g of filter paper is determined after ignition at 800°C in a platinum crucible.

Retention (µm)

It is extremely difficult to make indications on pore size due to the large number of papers and their different properties. Measurements of many years allow a comparison of our paper grades and their classification into different particle retention ranges.

Water Repellency

Is the resistance of the filter to the penetration of water. Two different methods are used: The sample is exposed to a permanently increasing water pressure on one side until penetration occurs. The height of water gauge at the point of penetration is recorded. A drop of a 25% alcohol-water solution is applied to the sample. If the droplet does not penetrate the sample within a specified period of time, the material is sufficiently hydrophobic.

Efficiency in Particle Retention acc. BS 4400 (%)

The sample is precipitated with sodium chloride aerosols < 1 µm (max. 0.3 – 0.5 µm). The aerosols penetrating the samples are determined photometrically.

Pressure Drop (mbar)

Air is passed through the sample at a defined flow rate. The pressure drop across the sample is measured and expressed in mbar. Usually the air flow velocity is 40 cm/s.

Penetration acc. CEN 1822-1, 1998 (%)

The test medium used for this test is an aerosol of hot paraffin oil. The percentage of test medium penetrating the filter is measured. Flow speed is 15 cm/s for particles of 0.1–0.3 µm.

Test Parameters

Test parameters of membrane filters.

Air Flow

The amount of air which passes through the membrane at a specified pressure difference is measured. The flow rate is calculated from the test results. The test is performed according to ASTM D737, DIN 53887, ISO 9237.

Bacteria Challenge Test

Establishing a correlation between bacterial retention of a sterilizing-grade filter and a non-destructive integrity test is decisive for determining the reliability of a sterile filtration process. According to the Health Industry Manufacturers Association's (HIMA) regulations ASTM F 838-83 and DIN 58355, a sterilizing grade filter should produce a sterile filtrate when challenged with a minimum concentration of 107 Brevundimonas diminuta (ATCC 19146) organism/cm^2 of filter surface.

The FDA "Guidelines on Sterile Drug Products Produced by Aseptic Processing," June 1987 states:
"After a filtration process is properly validated for a given product, process and filter, it is important to assure that identical filter replacements (membrane or cartridge) used in production runs will perform in the same manner. One way of achieving this is to correlate filter performance data with filter integrity testing data.
Normally, integrity testing of the filter is performed after the filter unit is assembled and sterilized prior to use. More importantly, however, such testing should be conducted after the filter is used in order to detect any filter leaks or perforations that may have occurred during filtration."

Bubble Point

The Bubble Point method is used to detect the largest pore in a membrane filter. The membrane is wetted and placed into a filter holder. Pressure is applied onto the membrane. The Bubble Point is reached when air passes through the largest pores. The test is performed according to DIN 58355.

Note:
A certain quantity of air passes the membrane before the Bubble Point is reached. This passage of air is caused by diffusion. The rate of diffusion is increased by increasing the pressure. The Bubble Point is dependent on the medium used to wet the membrane.

Burst Pressure

Air pressure is applied onto wet membrane without using a support. The pressure is recorded when the membrane bursts.

Flow Rate Water/Ethanol

A filter with a defined area is placed into a filter holder. A defined volume of medium is filtered through the membrane. Time is taken when the medium has been completely filtered through the membrane. The flow rate (ml/min bar cm^2) is calculated from the test results. The test is performed according to DIN 58355.

Extractables with Water/Ethanol

A defined amount of membrane is extracted in a defined amount of water or alcohol. The difference in weight before and after the extraction is measured. The loss of weight in percentage is calculated based on the results.

Hydrophilicity

Refers to a filter's ability to naturally wet with water.

Hydrophobicity

Refers to a filter's lack in ability to wet with water. Ideal for venting applications.

Integrity Test

A non-destructive test used to evaluate the functional performance of a filter. To obtain meaningful results, such a test should be correlated with a standardized bacterial retention test. Examples: bubble point test, diffusion test, flow rate test

Membrane Filter

A polymeric matrix with pressure-resistant structure having thousands of microscopically small pores.

Protein Binding

The membrane is immersed in a BSA solution until it is saturated. The pH is 7.0, the buffer is 0.05 m KPi. The excess BSA which is not bound is washed off with buffer. The BSA bound to the membrane is measured with BCA reagent.

Note:
The level of adsorption is dependent on the following variables:

- The test method
- The kind of membrane material and the kind of protein
- The environment (pH, salt concentration.)
- The total inner surface of the membrane sample (i.e. the pore size)

Pore Size

The pore size of a membrane refers to the size of a specific particle or organism that is being retained by the filter with a specific efficiency. For example a membrane with 0.2 µm pore size is said to retain 107 germs per ml per cm^2 of the type Brevundimonas diminuta.

Porosity

Is a measure for the overall empty volume (pores) of a membrane. Generally, membranes consist of 50 – 90% of empty volume. The flow rate is directly proportional to the porosity of the membrane. (more pores = higher flow rate).

Thickness

The thickness is measured with a gauge. The test is performed according to DIN 53105.

Product Register

Product Register

Part Number Index

Part Number	Page
103159	12
103162	12
103163	12
103167	12
103171	12
103173	12
103179	12
103182	12
103184	12
103186	12
103189	12
103190	12
103191	12
103193	12
103197	12
103198	12
103199	12
103209	12
103211	12
103220	12
103221	12
103222	12
103226	12
103229	12
103233	12
103235	12
103239	12
103242	12
103244	12
103247	12
103250	12
103251	12
103252	12
103253	12
103255	12
103256	12
103257	12
103270	12
103271	12
103280	12
103281	12
103282	12
103283	12

Part Number	Page
103285	12
103288	12
103291	12
103294	12
103295	12
103297	12
103301	12
103304	12
103305	12
103309	12
103310	12
103312	12
103313	12
103314	12
103319	12
103321	12
103326	12
103327	12
103328	12
103329	12
103331	12
103332	12
103333	12
103335	12
103339	12
103340	12
103341	12
103343	12
103344	12
103345	12
103346	12
103348	12
103349	12
103350	12
110001	17
110002	17
110003	17
110004	17
110005	17
110006	17
110007	17
110008	17
110009	17

Part Number	Page
110010	17
110011	17
110017	17
110018	17
110019	17
110020	17
110021	17
110022	17
110023	17
110024	17
110025	17
110027	17
110028	17
110034	16
110035	16
110036	16
110037	16
110038	16
110039	16
110040	16
110041	16
110045	16
110046	16
110047	16
110048	16
110049	16
110050	16
110051	16
110053	16
110054	16
110063	16
110064	16
110065	16
110066	16
110068	16
110069	16
110070	16
110071	16
110072	16
110075	16
110076	16
110080	16
110081	16

Part Number	Page
110082	16
110083	16
110084	16
110085	16
110086	16
110087	16
110088	16
110090	16
110094	17
110095	17
110096	17
110097	17
110098	17
110100	17
110101	17
110102	16
110103	16
110104	16
110105	16
110106	16
110107	16
110108	16
110109	16
110110	16
110111	16
110112	16
110113	16
110114	16
110115	16
110116	16
110117	16
110118	16
110119	17
110120	17
110121	17
110122	17
110123	17
110124	17
110125	17
110126	17
110127	17
110128	17
110129	17

Part Number Index

Part Number	Page
113253	18
113254	18
113255	18
113257	18
113258	18
113259	18
113260	18
113262	18
113263	18
113284	17
113287	17
113298	17
113300	17
113301	17
113304	17
113306	17
113311	17, 27
113314	17
113317	17
113320	17, 24
113323	17
113327	17
113330	17
113332	17
113334	17
113336	17
113338	17, 24
113341	17, 24
113344	17, 24
113346	17
113348	17
113352	17
113357	17
113358	17
113359	17
113360	17
113361	17
113362	17
113364	17
113366	17
113368	17
113370	17
113373	17, 24

Part Number	Page
113376	17
113377	17
113378	17
113381	17
113382	17
113384	17
113386	17, 24
113388	17, 24
113389	17, 24
113390	17
113391	17
113392	17
113396	17
113398	17
113400	17
113402	17
113403	17
113404	17
113407	17
113409	17
113410	17
113411	17
113414	17
113415	17
113417	17
113418	17
113419	17
113421	17
113423	17
113424	17, 31
113425	17
113426	17, 31
113427	17
113428	17
113431	17
113435	16
113436	16
113440	16
113441	16
113442	16
113443	16
113444	16
113445	16

Part Number	Page
113447	16
113450	16
113451	16
113452	16
113453	16
113455	16
114017	27
120000	21
120001	20
120002	21
120003	21
120004	21
120005	21
120006	21
120007	21
120008	21
120009	21
120010	21
120012	21
120013	21
120014	21
120015	21
120016	21
120017	21
120018	21
120019	21
120021	21
120029	21
120030	21
120031	21
120032	21
120033	21
120034	21
120035	21
120036	21
120037	21
120040	21
120047	20
120048	20
120049	20
120050	20
120051	20
120052	20

Part Number	Page
120053	20
120054	20
120055	21
120060	24
120064	21
120065	21
120066	21
120067	20
120068	20
120069	21
120076	20
120077	20
120078	20
120079	20
120080	24
120081	24
120082	21
123002	20
123006	20
123007	20
123008	20
123010	20
123011	20
123012	20
123013	20
123015	20
123016	20
123018	20
123019	20
123020	20
123021	20
123022	20
123023	20
123024	20
123025	20
123026	20
123027	20
123028	20
123029	20
123030	20
123051	20
123073	20
123074	20

Part Number Index

Part Number	Page
123388	20
123389	20
123390	20
123391	20
123392	20
123393	20
123394	20
123395	20
123398	20
123399	20
123400	20
123401	20
123404	20
123405	20
123406	20
123408	20
123409	20, 30
123410	20
123411	20, 30
123412	20
123413	20
123420	27
123426	27
123437	21
123449	21
123450	21
123452	21
123453	21
123454	21
123455	21
123456	21
123457	21
123458	21
123459	21
123460	21
123461	21
123463	21
123464	21
123465	21
123466	21
123467	21
123471	21
123474	21, 30

Part Number	Page
123476	21
123478	21, 30
123479	21
123481	21
123535	21
123538	21
123539	21
123540	21
123542	21
123543	21
123544	21, 28
123545	21, 28
123548	21, 28
123549	21
123550	21
123554	21
123555	21
123556	21
123557	21
123558	21
123559	21
123560	21
123584	21
123585	21
123586	21
123587	21
123588	21
123591	21
123592	21, 28
123595	28
123595	21, 28
123596	28
123598	28
123599	21
123602	21
123604	21
123608	21
123609	21
123613	27
142000	32
142001	32
142002	32
142003	32

Part Number	Page
142004	32
142005	32
142006	32
142007	32
142008	32
142009	32
142010	32
142011	32
142012	32
142014	32
142015	32
142016	32
142018	32
142022	32
142024	32
142026	32
142027	32
142028	32
142029	32
142030	32
142032	32
142037	32
142060	32
142087	32
142089	32
142083	32
142307	39
142308	39
142309	39
142310	39
142311	39
142312	39
142313	39
142314	39
142315	39
142316	39
142317	39
142318	39
142319	39
142320	39
142321	39
142322	39
142323	39

Part Number	Page
142324	39
142325	39
142326	39
142327	39
142328	39
142329	39
142330	39
142331	39
142332	39
142333	39
142334	39
142335	39
142336	39
142337	39
142338	39
142339	39
142340	39
142341	39
142342	39
142343	39
142344	39
142345	39
142346	39
142347	39
142348	39
142349	39
142350	39
142351	39
142352	39
142353	39
142354	39
142355	39
142356	39
142357	39
142358	39
142359	39
142360	39
142361	39
142362	39
142363	39
142364	39
142365	40
142366	40

Part Number Index

Part Number Index

Part Number	Page
410067	79
410068	79
410070	79
410071	79
410072	79
410073	79
410078	79
410082	79
410083	79
410084	79
410085	79
410086	79
410087	79
410088	79
410089	79
410090	79
410091	79
410092	79
410093	79
410094	79
410096	79
410097	79
410098	79
410099	79
410099	79
410100	79
410101	79
410102	79
410103	79
410106	79
410111	55, 80
410112	55, 80
410113	80
410114	55, 80
410115	55, 80
410116	80
410117	55, 80
410118	55, 80
410119	55, 80
410120	55, 80
410121	79
410122	79
410123	79

Part Number	Page
410124	79
410125	80, 86
410126	80, 87
410127	80, 88
410128	86
410130	79
410132	79
410134	79
410136	79
410137	79
410138	79
410139	55, 80
410140	55, 80
410141	55, 80
410142	55, 80
410143	55, 80
410144	80
410145	80
410146	80
410147	80
410148	80
410149	55, 80
410150	80
410151	55, 80
410152	55, 80
410153	80
410154	79
410155	79
410156	79
410157	79
410158	79
410159	79
410160	79
410161	79
410162	79
410163	79
410164	79
410165	79
410166	79
410167	79
410168	79
410169	79
410179	55, 80

Part Number	Page
410180	80
410181	80
410182	80
410185	79
410186	79
410187	79
410188	79
410189	80
410190	80
410191	55, 80
410192	55, 80
410193	80
410195	83
410196	83
410197	83
410198	83
410199	83
410200	83
410201	83
410202	83
410203	83
410204	79
410206	79
410207	79
410208	79
410210	55, 80
410211	79
410212	55, 80
410213	79
410214	79
410215	79
410217	79
410218	79
410219	79
410220	79
420000	88
420001	88
420002	88
420003	88
420004	88
420005	88
420006	88
420007	88

Part Number	Page
420008	88
420009	88
420010	88
420011	88
420012	88
420013	88
420014	88
420016	88
420017	88
420031	88
420032	88
420033	88
420034	88
420035	88
420036	88
420037	88
420038	88
420039	88
420040	88
420042	88
420043	88
420044	88
420045	88
420046	88
420047	88
420048	88
420050	88
420051	88
420052	88
440003	85
440004	85
440005	85
440006	85
440007	85
440008	85
440011	85
440012	85
440013	85
440014	85
440016	45, 85
440017	45, 85
440020	85
440021	85

Part Number Index

Part Number	Page
703096	51
703097	51
703098	51
703099	51
703100	51
703101	51
703102	51
703103	63
703104	63
703105	50
703106	50
703107	50
703108	50
703112	52
703113	52
703114	52
703115	52
703116	52
703117	52
703122	52
703123	52
703124	52
703125	52
703126	52
703128	52
703129	52
703131	52
703132	52
703133	52
703134	52
703135	54
703136	52
703137	52
703138	52
703139	52
703140	54
703141	52
703142	54
703143	54
703145	53
703146	53
703147	53
703148	53

Part Number	Page
703149	53
703150	53
703151	54
703152	54
703153	53
703154	53
703155	53
703156	53
703157	54
703158	54
703159	51
703160	51
703161	51
703162	51
703163	51
703164	51
703165	51
703166	51
703167	51
703168	51
703169	51
703170	51
703171	51
703172	51
703173	51
703174	51
703175	51
703176	51
703177	51
703178	51
703179	51
703180	51
703181	51
703182	51
703183	51
703184	51
703187	50
703188	50
703189	50
703190	50
703191	50
703196	53
703197	53

Part Number	Page
703199	53
703200	53
703201	53
703202	53
703203	54
703204	54
703205	53
703206	53
703207	53
703208	53
703209	54
703210	54
703212	53
703213	53
703214	53
703215	53
703216	53
703217	53
703218	54
703219	54
703220	54
703222	53
703223	53
703224	53
703225	53
703226	53
703227	53
703228	53
703230	53
703231	50
703233	53
703234	53
703235	53
703236	53
703237	53
703238	53
703239	54
703240	54
703241	53
703242	53
703243	53
703244	53
703245	53

Part Number	Page
703246	53
703247	53
703248	53
703249	54
703250	54
703251	54
703252	53
703253	53
703254	53
703255	51
703256	51
703257	51
703258	51
703259	51
703260	51
703262	51
703263	51
703264	51
703266	51
703267	51
703268	51
703269	51
703270	51
703271	51
703273	51
703274	51
703275	51
703276	51
703277	51
703278	51
703279	51
703280	51
703281	51
703282	51
703283	51
703284	51
703285	51
703286	51
703287	51
703288	51
703289	51
703290	51
703291	51

Part Number Index

World Head Office:

Munktell Filter AB
Box 1003
SE – 791 10 Falun, Sweden
Tel: +46 (0)23 70 58 80
Fax: +46 (0)23 401 15
E-mail: info.munktell@ahlstrom.com

Germany:

Munktell & Filtrak GmbH
Niederschlag 1
DE – 09471 Bärenstein, Germany
Tel: +49 37347 830
Fax: +49 37347 8364
E-mail: filtrak@ahlstrom.com

France:

Filtres Fioroni S.A.S.
15, rue Pierre et Marie Curie
FR – 45140 Ingré
Tel: +33 238432263
Fax: +33 238430022
E-mail: contact@filtres-fioroni.com

12345