

# Solid-Liquid-Filtration



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**SolidWEAVE**  
systems media solution

In many solid-liquid filters, woven wire cloth is used as a filtration media. The solids are retained in a process similar to a sieve. The build up of a filter cake on the wire cloth is an important factor in the filtration process. Woven metal cloths have the following technical characteristics:

- Chemical and heat resistance against the suspension,
- Efficient retention of solids
- Consistent flow rates during filtration cycle
- Highly durable
- Smooth surface for a good cake discharge
- Environmentally friendly, since they are reusable and recyclable

Today, filter cloths are woven from a wide range of alloys and synthetics.

## **Alloys/Materials**

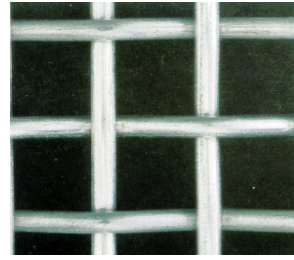
- Stainless steels - chrome and chrome/nickel
- Steel
- Non-iron metals
- Plated metals
- High-temperature alloys
- Titanium
- Combination materials
- Plastics

The wire cloth construction is defined by the type of weave pattern. The weave pattern is determined by the sequence of intersections between the warp and weft wires.

## **Weaves**

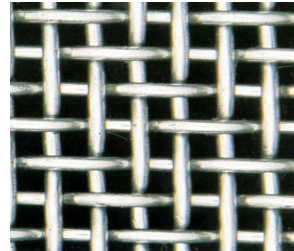
### **Plain Weave Wire Cloth**

Each warp wire passes over and under the successive weft wire and vice versa resulting in precise mesh opening and maximum cloth stability. The standard cloth for all purposes.



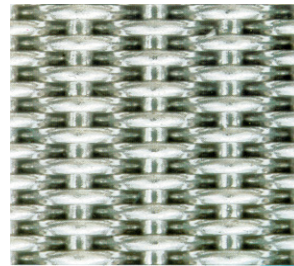
### **Twill weave**

The warp wire passes over and under two weft wires and vice versa. This type of weave allows the use of larger wire diameters to meet process requirements.



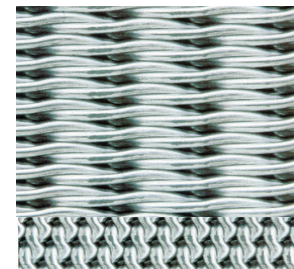
### **Plain Dutch Weave**

Weave pattern similar to plain woven cloths, however, the warp wires are larger and spaced farther apart than the weft wires. Mainly used for precoat filters and vacuum filters.



### **Dutch Twill Weave**

A Dutch Weave, but woven in a twill pattern which enables twice as many weft wires to be woven in the same area as a Plain Dutch Weave to achieve a finer filter opening. Typically produced for very fine filtration applications - 10 micron and finer.



### **PZ - Microdur Cloth**

A Reverse Plain Dutch Weave. The warp wires are smaller and spaced closer together than the weft wires. This weave allows the use of high tensile wires, which offer the most durable and stable fine filter cloth.

The Reverse Twilled Dutch weave (KPZ-Microdur) is woven under the same preferences and gives in special versions extreme rigid cloths with filtration grade down to 45 microns.



## **Weave Variables**

1. Altering the diameter of the wires in the warp direction (wires running in the longitudinal direction) and/or in the weft direction (transversal running wires).
2. Altering the number of wires in the warp and weft directions.
3. Altering the weave pattern.

## **Considerations When Choosing a Mesh Specification**

- Chemical strain from acid, caustic solutions or solvents
- Temperature
- Method of cleaning mesh after filtration cycle
- Filter opening depending on the required filtration quality
- Type and dimensions of the filter
- Type of wire cloth support (e.g. filter plate surface)
- Mechanical strain (pressure, elongation, abrasion)
- Method for discharging filter cake
- Location of the filter cloth in the application process, which indicates the quality of the filtrate and / or filter cake

## **Filtration Solutions**

As a Technical Weaving Mill, GKD not only provides media in roll form, but also in fabricated parts, pieces or widths. Depending on the type of filter, the cloth can be processed into drum filter cloths, filter media for centrifuges, covers for filter candles and vacuum filters, etc. Any special characteristic of the individual filter and process condition will be taken into account.

GKD is about providing solutions. Instead of selling you a roll of wire cloth, we are interested in offering you cost effective solutions.

Take advantage of our experience.

## Mesh Detail Charts

### Plain Weave

Part	Meshes Per Inch ( 25.4 mm)	Mesh Opening mm	Wire Diameter mm	Wire Diameter Inches ( 25.4 mm)	* Weight (Lbs/100Sq Ft)	Open Area %
10370020	500	.025	.025	.0010	3.8	25%
10370080	450	.034	.030	.0010	3.3	32%
10370180	370	.04	.030	.0012	3.8	33%
10370220	325	.042	.036	.0014	4.4	29%
10370340	280	.05	.040	.0016	5.5	31%
10370540	250	.063	.040	.0016	4.8	37%
10370810	200	.074	.053	.0021	6.2	34 %
10371040	180	.09	.056	.0022	6.7	38%
10371121	160	.10	.063	.0025	7.1	38%
10371560	100	.16	.100	.0040	11.0	38%
10371860	80	.20	.125	.0050	14.5	38%
10341250	70	.20	.15	.0063	20.8	31%
10372420	60	.25	.16	.0063	18.7	37%
10372540	60	.25	.20	.0078	26.8	31%
10372930	50	.32	.20	.0078	19.2	37%
10373060	40	.38	.20	.0086	19.5	42%
10373180	40	.40	.25	.0098	27.6	38%
10373660	35	.50	.20	.0078	17.3	51%
10373820	30	.50	.32	.013	34.8	37%
10374295	30	.61	.26	.010	23.7	49%
10374700	25	.63	.40	.016	42.0	37%
10375030	24	.80	.32	.013	27.5	51%
10375160	20	.80	.50	.020	55.2	38%
10342995	20	.80	.50	.020	55.2	38%
10375390	20	.95	.30	.013	25.4	54%
10375470	20	1.00	.22	.009	11.9	67%
10375530	20	1.00	.30	.014	28.7	54%
10375630	18	1.00	.50	.020	50.3	44%
10375740	16	1.00	.63	.025	64.8	38%
10375990	9	1.20	1.60	.063	249.0	18%
10376030	15	1.25	.40	.016	29.2	57%
10376440	12	1.25	.80	.031	78.4	37%
10376705	12	1.49	1.0/.90	.020	24.8	58%
10376930	12	1.60	.50	.020	24.8	58%
10377050	10	1.60	.90	.040	116.3	38%
10377530	10	2.00	.56	.022	34.7	61%
10377660	9	2.00	.90	.035	74.0	48%
12372735	8	2.25 x 2.02	1.25	.050	142.0	38%
10377950	8	2.50	.50	.020	20.7	69%
10377926	8	2.48	.70	.028	41.1	61%
10378180	6	3.0	1.0	.050	103.0	51%
10378540	5	4.0	1.0	.040	54.9	64%
10378760	5	4.2	1.4	.055	96.7	55%
10346780	5	4.2	1.4	.055	96.7	55%
10378821	4.5	4.8	1.6	.063	123.9	51%
10378850	4	5.0	1.0	.050	67.5	64%
10379110	3.5	6.0	1.0	.040	36.5	75%
10379550	3	8.0	1.6	.063	77.6	69%
10379680	2	10.0	1.5	.055	37.6	77%
10379750	2	10.0	2.0	.080	83.0	69%

## Optimesh - Cloths

Article Number	Weave Type	Mesh Count Per Inch ( 25.4 mm )	Thickness of Cloth (mm)	Filter Rating		Water-Permeability in l / (cm <sup>2</sup> x min) $\Delta p = 200$ mbar	Air-Permeability in l / ( m <sup>2</sup> xs ) $\Delta p = 2$ mbar
				Absolute in $\mu$ m	in		
13346000	Optimesh 10	154 x 1740	0.10	10		4.2	750
13375800	Optimesh 20	110 x 1000	0.13	20		5.8	1660
19370240	Optimesh 25	867 x 101	0.20	25		6.7	1920
19370315	Optimesh 31	749 x 79	0.23	31		7	2360
19370480	Optimesh 48	546 x 69	0.24	48		9	3740
19370550	Optimesh 60	392 x 48	0.32	60		10.3	4080
13372000	Optimesh 60	43,6 x 400	0.34	60		8.7	3300
19370780	Optimesh 80	320 x 36	0.48	80		11	4190
13371850	Optimesh 80	40 x 318	0.40	80		8	3090

## Plain Dutch Weave

Article Number	Weave Type	Mesh Count Per Inch ( 25.4 mm )	Thickness of Cloth (mm)	Filter Rating		Water Permeability in l / cm <sup>2</sup> x min $\Delta p = 200$ mbar	Air Permeability in l / ( m <sup>2</sup> xs ) $\Delta p = 2$ mbar
				Nominal in $\mu$ m	Absolute in $\mu$ m		
13372305	GT	50 x 250	.31	40	55-61	10.00	2670
13371400	GT	30 x 150	.49	65	100-110	9.60	3480
13370705	GT	24 x 110	.74	85	117-125	8.40	2960
13370170	GT	12 x 64	1.22		280-300	11.50	4350

## Twill Dutch Weave

Article Number	Weave Type	Mesh Count Per Inch ( 25.4 mm )	Thickness of Cloth (mm)	Filter Rating		Water Permeability in l / cm <sup>2</sup> x min $\Delta p = 200$ mbar	Air Permeability in l / ( m <sup>2</sup> xs ) $\Delta p = 2$ mbar
				Nominal in $\mu$ m	Absolute in $\mu$ m		
14377000	KT	400 x 2800	.07	1	5 - 6	2.00	130
14375451	KT	325 x 2300	.08	2	8 - 9	2.50	180
14373400	KT	200 x 1400	.15	5	11 - 13	3.20	220
14373200	KT	165 x 1400	.14	10	15 - 17	4.80	420
14373000	KT	165 x 800	.17	15	25 - 27	9.00	1150
14372701	KT	80 x 700	.25	25	35 - 38	6.20	700
14371700	KT	32 x 360	.55	80	95 - 105	5.50	1280

## Pz - Microdur-Cloths

Article Number	Weave Type	Mesh Count Per Inch ( 25.4 mm )	Thickness of Cloth (mm)	Filter Rating		Water Permeability in l / cm <sup>2</sup> x min $\Delta p = 200$ mbar	Air Permeability in l / ( m <sup>2</sup> xs ) $\Delta p = 2$ mbar
				Nominal in $\mu$ m	Absolute in $\mu$ m		
19370140	PZ 14	615 x 132	.20	14	17 - 20	3.2	650
19370150	PZ 15 L	733 x 152	.18	15	17 - 20	7.3	650
19370170	PZ 17	615 x 128	.21	17	22 - 25	6	590
19370270	PZ 25 S	615 x 102	.24	25	40 - 48	5.9	980
19370410	PZ 40	287 x 71	.35	40	50 - 55	6.2	1260
19370510	PZ 50	287 x 61	.38	50	55 - 57	6.9	1500
19370610	PZ 60	171 x 46	.57	60	82 - 94	8.1	1920
19370810	PZ 80 S	128 x 36	.77	80	98 - 106	7.1	2260
19371000	PZ 100 L	171 x 33	.60	100	96 - 111	9.3	3500
19371501	PZ 150 S	107 x 20	.03	150	200 - 215	9.1	3800
19371570	PZ 200 S	63 x 18	.34	200	210 - 225	11.3	3750
14375600	KPZ 55	325 x 39	.73	55	64 - 70	7.3	2200
19342001	KPZ 75	400 x 120	.25	75	72 - 78	13.6	3920

## Tela - Cloths

Article no.:	Type	Meshes Per Inch ( 25.4 mm )	Thickness of wire cloth in mm	Filter fineness		Water-Permeability in l / (cm <sup>2</sup> x min) $\Delta p = 200$ mbar	Air- * Permeability in l / ( m <sup>2</sup> xs ) $\Delta p = 2$ mbar
				Nominal in mm	Absolute in mm		
16372450	5110	107 x 60	.45	.077	.16 - .18	16.6	7620
16371200	580	78 x 58	.54	.13	.18 - .22	17.6	7970
16370850	565	63 x 33	.84	.10	.26 - .29	16.6	7070
16370309	524	23.3 x 19.4	1.70	.49	.65 - .75	21.8	9550
16370260	515	14.5 x 13.1	2.50	.85	1.15-1.20	21.4	9030

\* The density value calculated with is 7.85 kg/dm<sup>3</sup> for steel

\*\* measured values of air permeability per DIN 53887 - B, deviation  $\pm 10$  %

The wire cloths are also available in different materials at any time.

## PRECOAT FILTRATION

# SolidWEAVE

## systems media solution

The terms *precoating filtration system* or *precoat filter* are used as collective terms for various filter constructions. In most cases, however, the combination of process and apparatus is meant by these terms. These terms, which are mostly used arbitrarily, often lead to misunderstandings and should be replaced by the following definition.

*Precoat filtration systems* are technical separation process steps, which in the simplest case comprises a filter, a feeding pump and the corresponding connecting lines, including the feedback of the product. Precoat basin, dosage pumps and instrumentation equipment are supplementing the basic equipment depending on the process.

Construction and operation of precoat filtration systems depend primarily on the kind of product that has to be filtered and secondarily on the method the process is based upon.

*Precoat filtration* is a special filtration process in which the filter media is flushed on a base, e.g. a woven wire cloth, prior to the actual filtration operation.

The heart of a precoat filtration system is therefore any kind of filter construction that is suitable for the precoat filtration operation. In other words: only by the method and not by the type of construction a filter can be defined as a precoat filter. Therefore, beside the classic construction types such as candle or vertical leaf filters very often layer filters, filter presses and vacuum drum filters are used in precoat filtration systems.

### **Application:**

Precoat filtration systems were mainly designed for the filtration of medium to difficult filterable suspensions. They are particularly suitable for the discontinuous filtration of large batches and/or for continuous processes. The easy adaptability to semiautomatic or fully automatic operation processes is an important factor. A series of typical separating tasks in various industrial areas is listed below:

#### **Examples for applications:**

- Filtration of liquid sugar and molasses by means of activated carbon
- Processing and purification of circulating systems for rolling oil, hone oil, grinding agents and coolants
- Separation of bleaching earth in the edible oil refining
- Purification of electrolyte solutions in the galvanic industry
- Separation of catalysts in hydrogenation units
- Separation of catalysts in the process for hardening of fats
- Purification of beer and wine
- Purification of herbicides and insecticides
- Removing oil from condensates and processing



**Filter types:**

- Vertical leaf filter (Niagara filter)**
- Horizontal pressure leaf filter (centrifugal)**
- Candle filter (cylindrical)**
- Filter press**
- Layer filter**
- Rotating drum filter**

**Pre-coating:**

The process of pre-coating or pre-flushing is done by means of a suspension, which is pumped via the filter. This suspension consists of the actual precoat material and a suitable carrier liquid. Typical products for the pre-coating are siliceous earth, perlites and cellulose as well as mixtures, or solids contained in the liquid that is to be filtered, such as bleaching earth, activated carbon, catalysts, etc. Besides special liquids, in many cases already filtered product is used as a carrier liquid. In the simplest case the unfiltered product is the carrier liquid and contains the precoat material - e.g. in the filtration of carrier catalysts from hardened edible oils.

**Security or final filters:**

In the typical types of filters for precoat filtration systems in which metal or plastic woven cloths are used as basis for the pre-coating, the pores are wider than the particles of the used precoat material. i.e., only by building bridge formations of the precoat particles a fine filtration coat can be formed. These processes are the reasons for the excellent cleaning characteristics of such filter elements. This allows suitability for semi-automatic and fully automatically operating processes, which resides in this feature. The disadvantage of this principle is clearly the liability of the pre-coat and the sensitivity to operational disruptions or product variations.

This means that in applications in which the product is not allowed to have more than a certain content of particles, a "security or final filter system" is required. Layer filters or candle filters represent the majority of the security filters, and are often referred to as polishing filters or police filters. By the use of pre-manufactured filter layers as support for the pre-coating materials the additional security filter can be omitted, as these filters are representing precoat filter and security system all in one.

For this branch of filtration technology our Business Unit I offers optimized wire mesh media for most different filtration devices and applications. Above all within the field of the precoat filtration a wide range of high tensile PZ and KPZ wire cloths are available. The most attention is paid to the field of filter media for centrifugal filters and Niagara filters for the chemical industry and the food industry (filtration of beer).

Optimized in terms of their usage, the woven wire cloths can be manufactured as discs or ready cut to the required size. Wire cloth can also be supplied in ultrasonically cleaned rolls.

In addition to the supply of filter media we offer customer specific solutions in the field of ready-made filter cartridges/cylinders or special constructions. In the field of application, we are using, where possible, an existing standard production program on a specific candle filter basis.

Typical GKD filter wire cloths are available at short notice in ready-made form.

# Precision Slit and Sized Wire Mesh

## SolidWEAVE

systems media solution

### THE APPLICATION

GKD has been a precision weaver of wire cloth since 1925. In today's competitive environment, GKD's clients demand more.

In order to ensure their client's success, GKD has created a special department that has optimized their production to allow the supply of "ready-made" strips of wire cloth that can be streamlined into highly automated production machinery. This optimization eliminates inefficient unpacking, handling and processing.

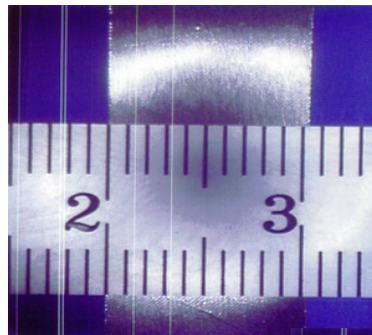
Typical applications are:

- Production of filter cartridges using wire cloth as a filtration media or support layer.
- Production of small wire cloth parts for filter screens
- Automotive systems such as ABS, fuel filters and hydraulic filters.
- Production of Ink Jet cartridges.
- Production of automotive Airbag systems.
- Production of rechargeable batteries.

### SPECIAL REQUIREMENTS

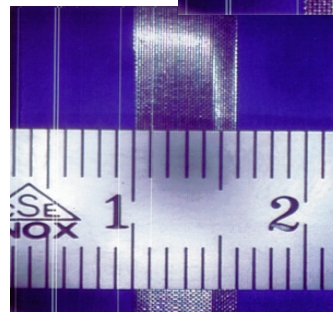
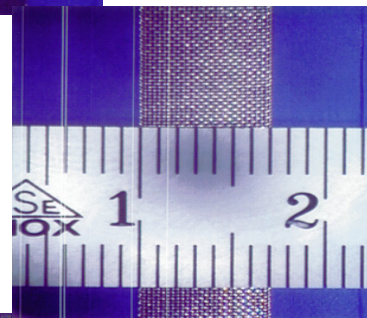
All of these applications have their own special requirements. However, GKD has found common needs for all industries considering the optimization of their wire cloth use:

- Strips are supplied with the longest length possible to reduce set up times.
- Strips are produced from the highest quality mesh.
- The strips are slit with closest width tolerances possible.
- Strips are slit so that loose wires on the edges are eliminated
- Strips are ultrasonically cleaned.
- Just in time logistics, in order to reduce inventory levels and guarantee flexibility.



400 Mesh - 304L  
Width - 10 mm +/- 0.1 mm  
50 m / roll

100 mesh - Phospor Bronze  
Width - 7.20 mm +/- 0.3 mm  
80 m / roll



156 Mesh - 304L  
Width - 6.00 mm +/- 0.1 mm  
180 m / roll

## OUR CAPABILITIES

### Length of rolls

With state of the art weaving machines, GKD is able to produce strips of wire cloth with extreme lengths. As an example, GKD produces strips of plain dutch weave 24x110 mesh in lengths up to 400 lineal feet. These strips, which are 4 times the length of a normal roll, are directly integrated into the production of automotive airbags. The use of typical 100 lineal feet rolls would result in inefficient set up and roll changes.

### Quality of Woven Wire Cloth

As a weaver, GKD is able to control the quality of their mesh to be used for strips. Strict quality inspections guarantee that only the rolls of woven mesh that meet the quality requirements of the final product are used.

### Tolerances on Widths

GKD's strip department has developed state of the art machinery that has the flexibility to customize strips for every new product that they produce. This permits the tightest width tolerances no matter what mesh is used. An example is once again the slitting of 24x110 mesh strips. GKD is able to supply 400 lineal feet long rolls with a tolerance of  $\pm .012$  inches. This precise slitting meets the requirements of their client's machinery to ensure a hassle free production.

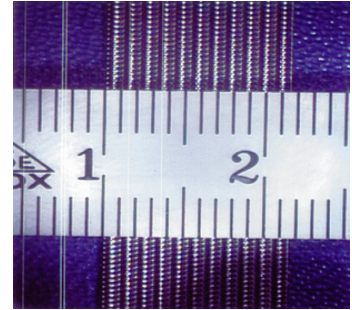
### Avoiding of Loose Wires by Special Treatment

The cutting of long strips always leads to the danger that the outside wires can fray from the structure of the weave pattern. These loose wires create problems in automated machinery since they can tangle around rollers or break off and contaminate finished parts.

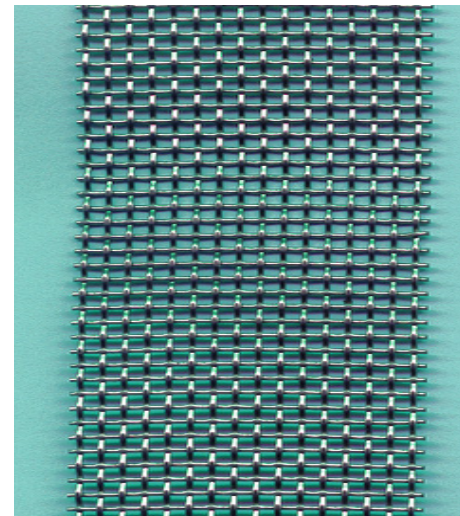
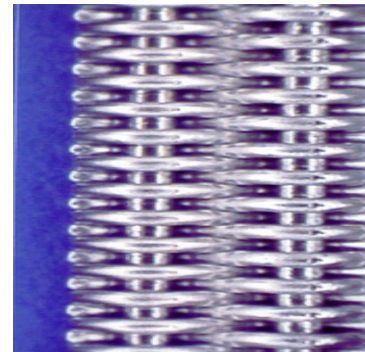
From the coarsest to the finest and most delicate mesh types, GKD has developed technology to avoid these loose wires. Today it is impossible to slit a finely woven 400 mesh without cutting over the warp wire on the outer edge of the strip. However, by taking special process steps, we assure that there will not be any loose or frayed wires in the strip.

### Cleanliness

The nature of metal woven wire cloth is that it cannot be woven without lubrication. Most applications cannot tolerate this potential contaminate. GKD has in house ultrasonic cleaning equipment designed for continuous cleaning of strips. This cleaning step removes potential contaminates to ensure a trouble free production.



24/110 - 304  
Width - 11.65 mm +/- 0.2 mm  
120 m / roll



7 mesh - 316  
Width - 48 mm +/- 1 mm  
50 m / roll

# Sieving Technology

## **SolidWEAVE**

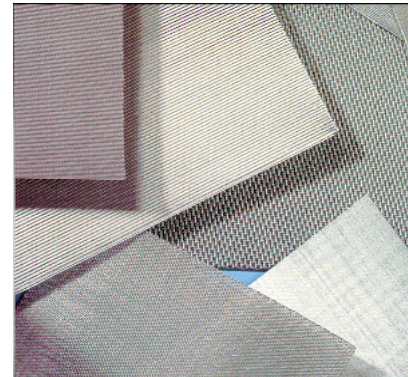
systems media solution

Woven wire cloth with different mesh openings can be used either as a single layer sieving/filtration media or as a support for more fragile medias. Wire cloth is utilized for the separation of solid media with different particle sizes as well as to purify liquids from mechanical contaminates. An important feature for a high quality wire cloth and provision for a smooth operation of a sieving machine is an exact aperture and wire diameter. This is ensured according to DIN ISO 9044.

### **Application:**

Metal woven wire cloths made from a variety of material grades are used in the:

- food industry
- beverage industry
- oil regeneration
- chemical and pharmaceutical industry
- air filtration / dust filtration



Many materials that are sieved, in particular carbon, coke, ore and crushed stones, have high demands as to the mechanical stability and wear resistance of the sieve. Other applications are delicate and require very fine and precise apertures. GKD has the weaving capability and experience to fulfill all of these needs. Depending on the application, GKD can offer plain woven mesh or special weave patterns, which include but are not limited to Dutch Twilled Weave and Tela Mesh.

The majority of sieving applications utilize wire cloth that has square openings formed by a plain weave pattern. We produce stainless steel wire cloth with square openings in the range from 25  $\mu\text{m}$  to 14 mm, which are suitable for almost every common sieving machine. In case of larger lots, customer specific fabrications are feasible at any time. We pay particular attention to the quick availability of standard mesh types. Our stock is permanently filled with standard cloths of widths up to 3 meters for extremely large sieving machines.