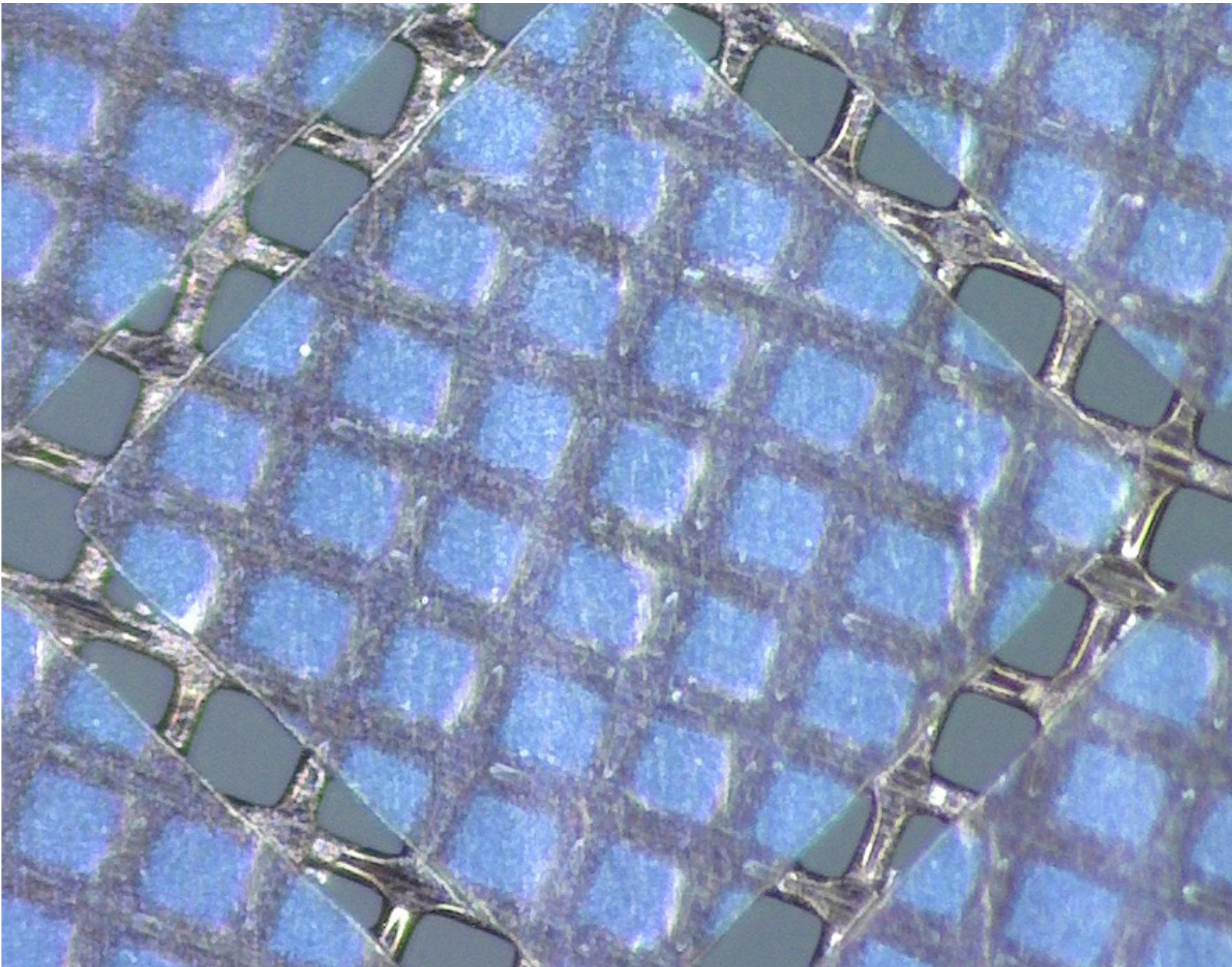


Guide for Precision Electronic Screens

Product Information



S E F A R
■ ■ ■ ■

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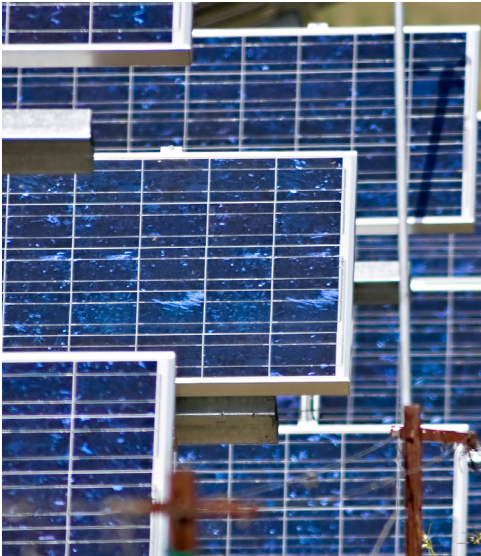
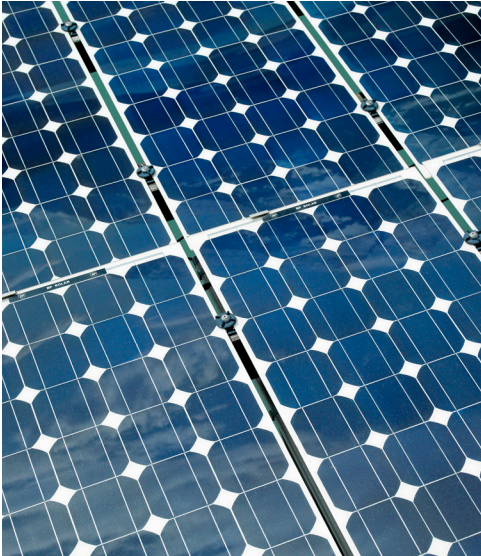
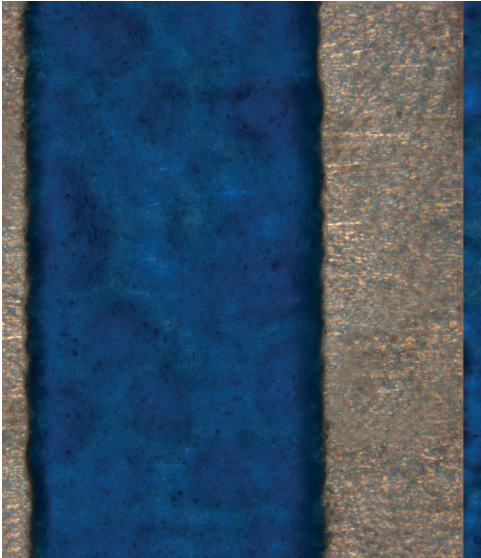
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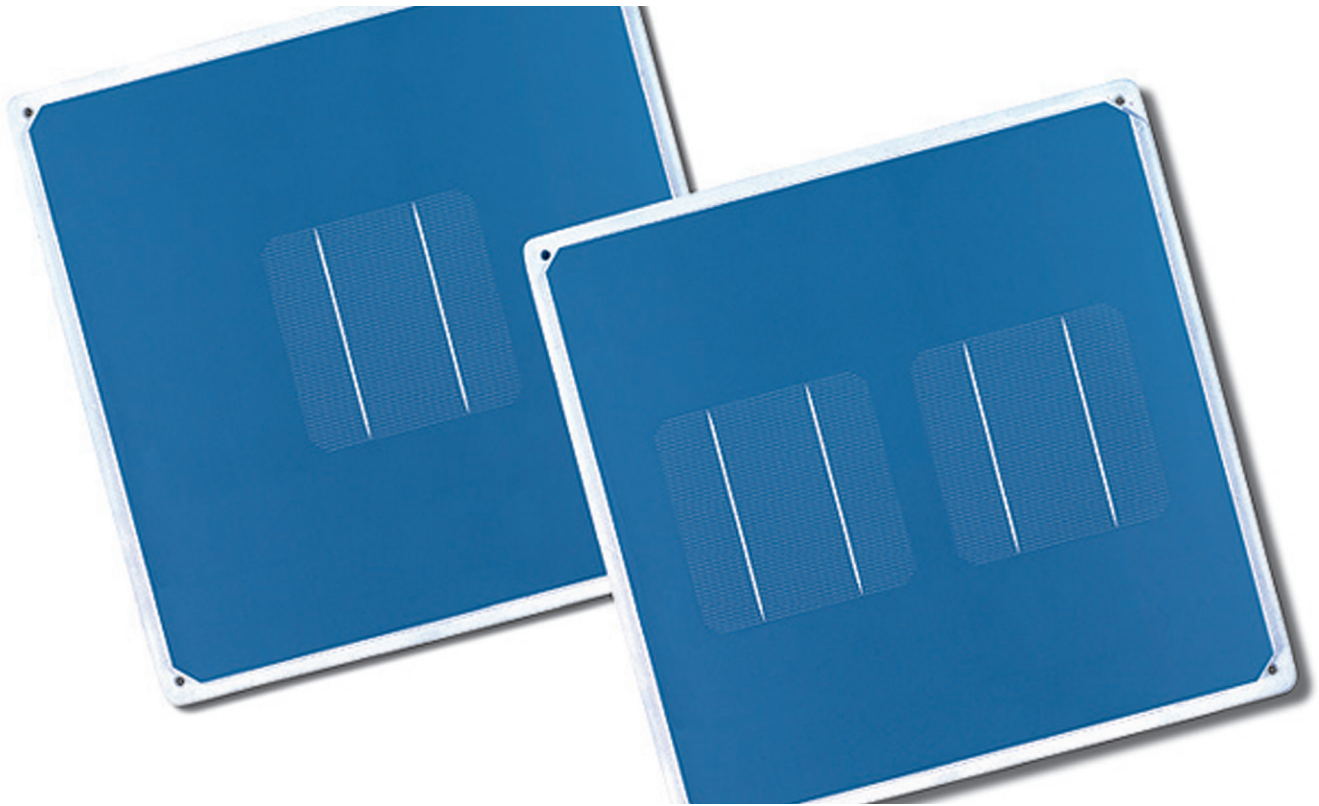
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Combined Leaders

The specification requirements for high-end screen printing continue to be more demanding, as seen as in industries like automotive, medical device, defense, energy, aerospace, and mobile phones.

Industrial screen printers today are no longer looking for just a mesh supplier. These days, buyers prefer to have a partner—such as Sefar – who can cater to the special needs of the business, in particular, to the manufacturing specifications of their application. Armed with this experience, Sefar can produce both high quality mesh and high quality screens to meet the needs of your organization.

Sefar is a leading manufacturer of precision woven synthetic mesh, serving the screen

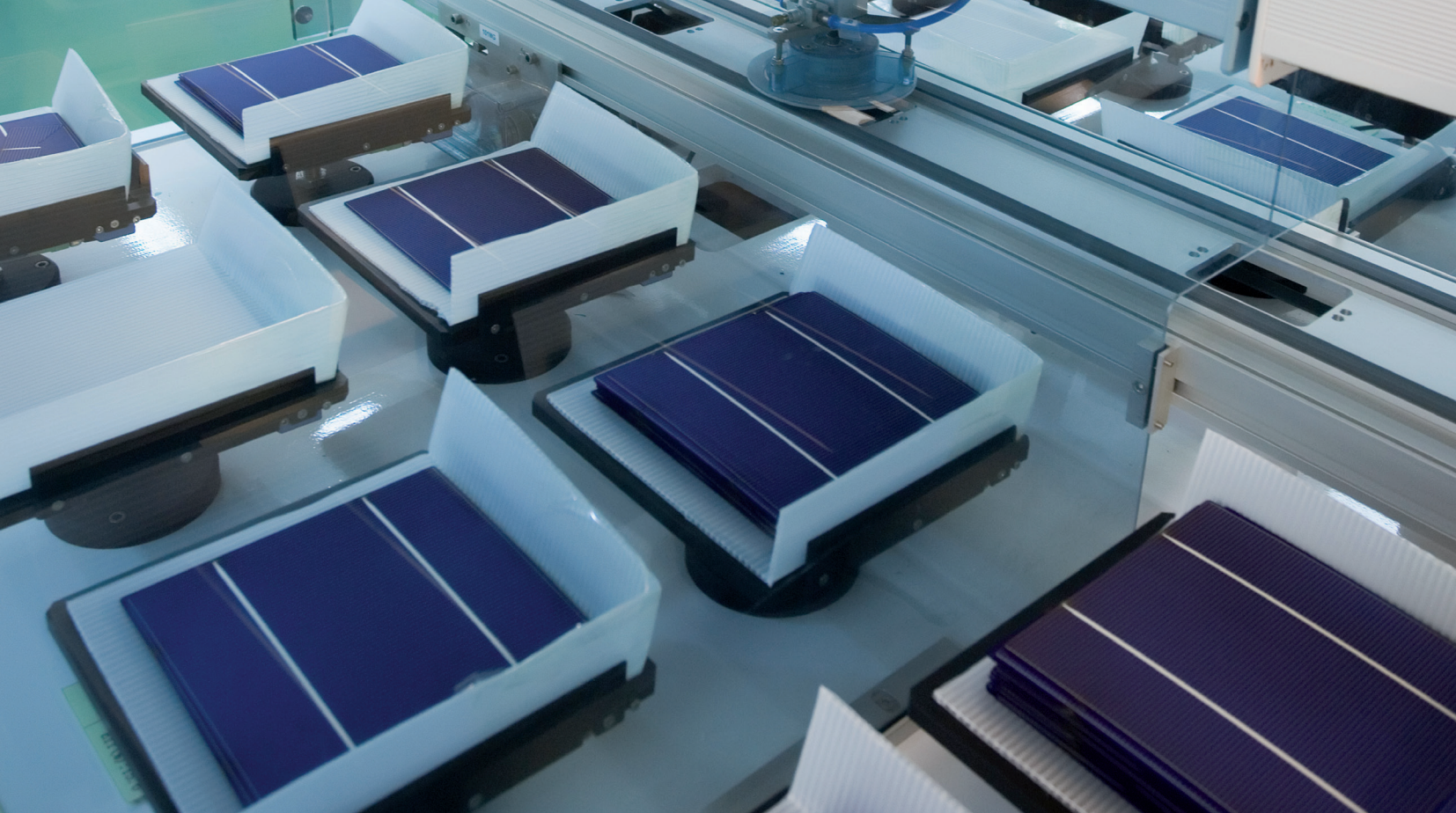
printing and filtration industries. Headquartered in Switzerland, Sefar is globally present across five continents in more than 25 countries.

Sefar is world-renowned for offering the most comprehensive and diversified mesh line available, while continuing to develop new and innovative products. Sefar offers regional fabrication facilities for various industrial applications.

Sefar Inc. is the North American branch of the Sefar Group. In the United States, Sefar is the largest manufacturer of commercial thick film screens for the electronics industry. With more than 193 years of experience in weaving and over 55 years of experience in screen fabrication, Sefar offers customers the benefit of their

knowledge in the development of product quality and the advancement in technology.

As leaders in the screen-printing industry, Sefar is committed to the assurance of quality, service, and technical support in all of its products. These products include pre-stretched screens, pre-sensitized (coated) screens, and imaged screens. Sefar also provides an in-house laser plotting service and a CAD staff to plot, convert, or draw customer artwork. A complete list of screen-printing accessories is also available to support the needs of our customers.



Screens Used In Renewable Energy Manufacturing

Tomorrow's Technology, Today

With the growing awareness for alternative power resources today, Sefar recognizes the importance for the fuel cell and photovoltaic industries to work with dependable partners that ensure both manufacturing efficiency and the highest quality standards.

With over 55 years of combined experience and technical expertise in supplying solar and thick film screens to the

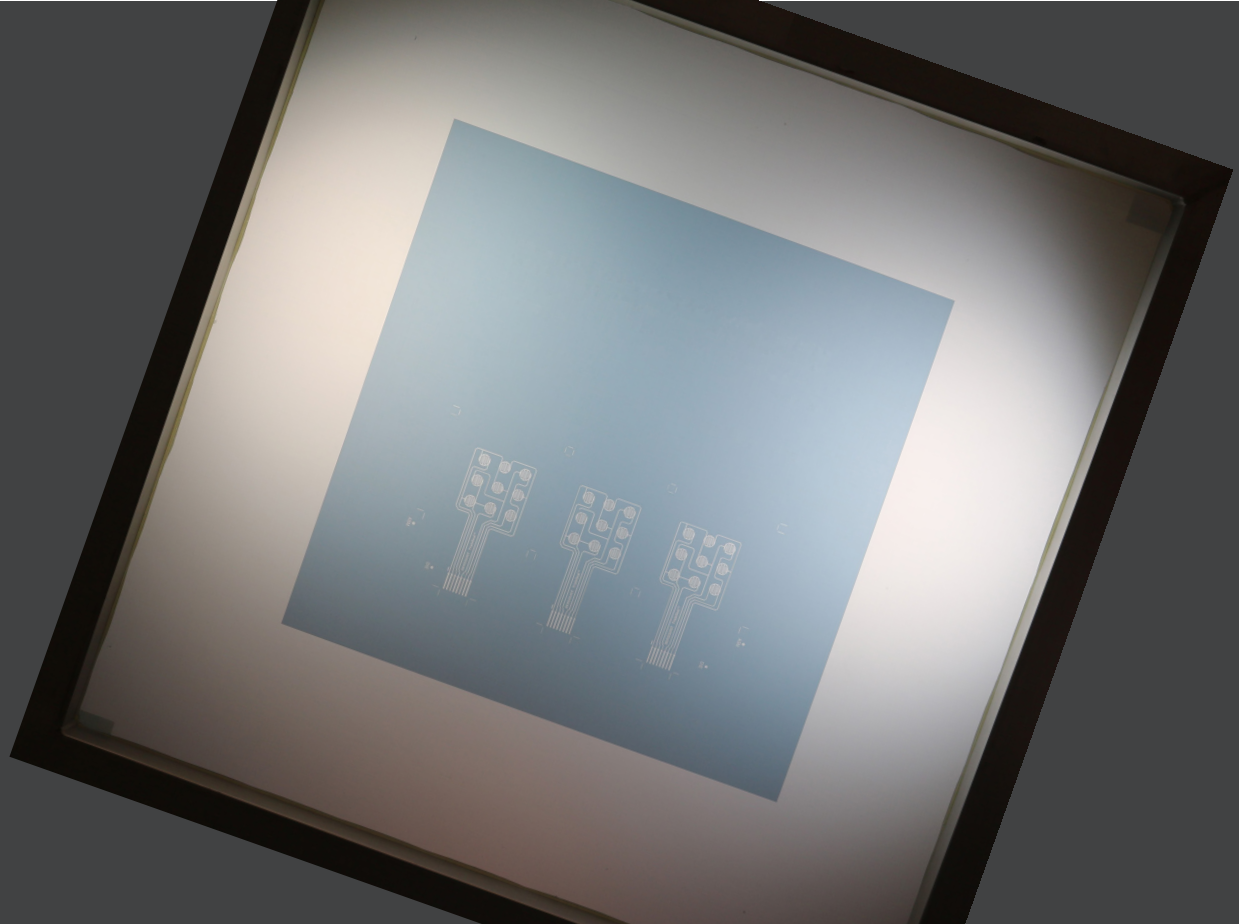
industry, Sefar is dedicated to the advancement of this technology, and to providing the renewable energy manufacturing market with precision screens for their innovative and challenging designs.

Capacity for your Demands

Growth in the green energy sector has caused the customer demand for this technology to significantly increase over the last decade.

Our stretching facility, located in Onatrio, CA, makes it easy for us to serve you regionally—and nationally—if your need for screens increases with industry growth and expansion.

Having the largest capacity for stretched screens in the US, Sefar is capable of providing large volumes of custom made screens on-demand.



Screen Making Services

Artwork

The Sefar CAD department is capable of designing and supplying precision film positives for our customers including fine line widths to below 25 microns (tolerance of +/- 3 microns). Our experience in providing films to the industry for over a decade and our dedication to working closely with the customer ensures that we can help you best achieve the desired target line thickness for your specific application. Sefar's plotting capability can achieve an industry leading 50,000 dpi.

Screens

Equipped with state-of-the-art stretching equipment and technology, Sefar is capable of stretching frames of various sizes or type to a desired tension using our wide variety of mesh. As the leasing supplier of stretched screens in North America, Sefar can accommodate any screen parameter that your application needs, and deliver the precision that your process requires.

Coating and Imaging

Capable of providing screen coating and imaging services that excel above industry standards, Sefar is well equipped to be your full-service partner for screens. We offer a wide variety of emulsions that are capable of producing the 25 micron and finer elements widths necessary for specialized applications. With the help of our technical experts, the correct emulsion can be selected for your application based on variables such as solvent resistance, fine line requirements, and screen durability against abrasive materials.

Products & Services

Fabricated Screen Applications

- Thick Film micro-electronics
- Hybrid circuits
- Ultra-fine lines
- Medical Device
- LTCC and HTCC
- Membrane switch circuits
- Multi-Chip Module (MCM)
- Surface Mount Technology
- Solder paste & adhesives
- Multilayer Ceramic Capacitor
- Aerospace and Defense
- Electrical Display Systems
- Printed circuits

Screen Fabrication Options

• Frames for Purchase

Precision cast aluminum screen

frames from 5 x 5 inch up to 24 x 24 inch are available from Sefar. Custom aluminum tubular and cast aluminum frame sizes are available upon request.

• Mesh Only Screens

The foundation of Sefar's high quality screens begins with Sefar mesh products. Premium stainless steel and Sefar polyester mesh are properly stretched and balanced to optimal tension across our (or your) frames at the specified angle ($\pm 4^\circ$).

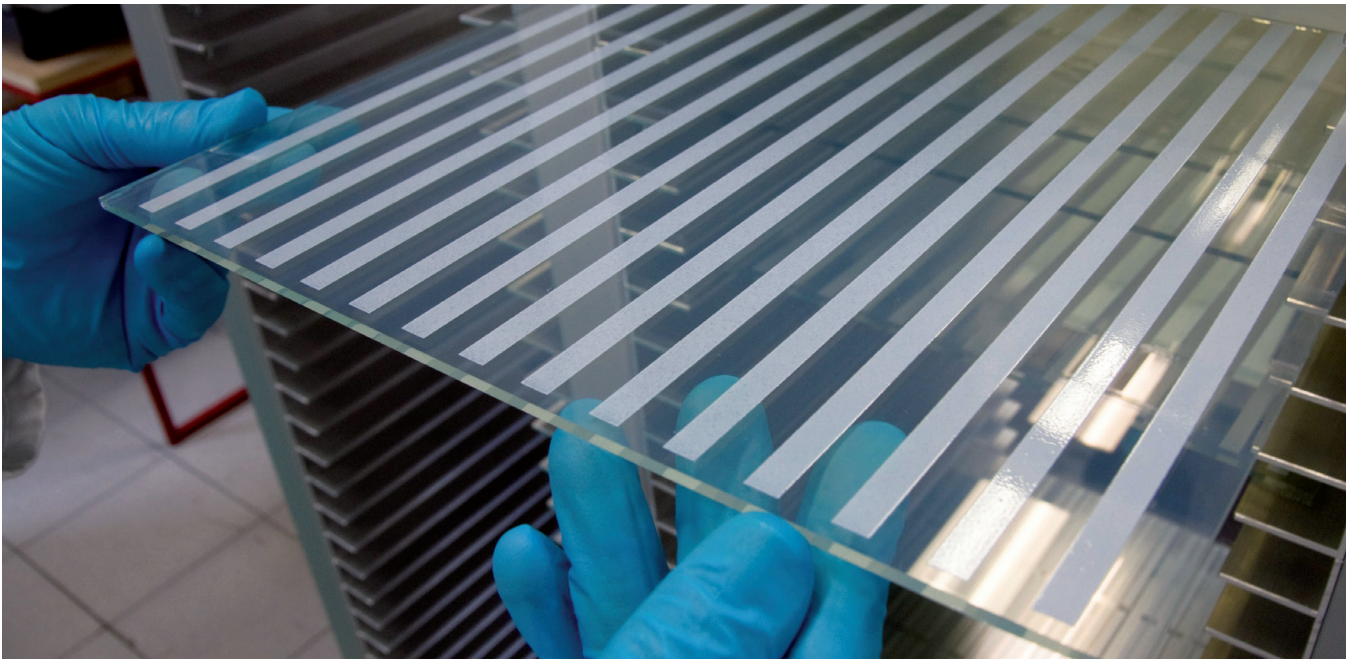
• Pre-sensitized Screens

Our high performance emulsions

are uniformly coated onto our stretched screens from 0.0001 inches (2.5 μm) thick or greater. Sefar's clean room coating environment eliminates image defects, providing screens ready for quick exposure in your facility.

• Imaged Screens

Screens arrive at your facility ready to print. Highly skilled quality-conscious Sefar technicians image and develop your screens from film positives that you supply or we generate from your supplied drawing or electronic file.



Related Products & Services

• Screen Tension Meters

Digital and mechanical tension meters and meter calibration services available.

• Large Chases & Tubular Frames

Custom sizes available. See page 14 for more information.

• CAD Artwork Generation & Laser Photoplotting

Precision, high resolution plots. CAD artwork generation and modification including image reduction, step and repeat, editing, and Gerber[®] file conversion.

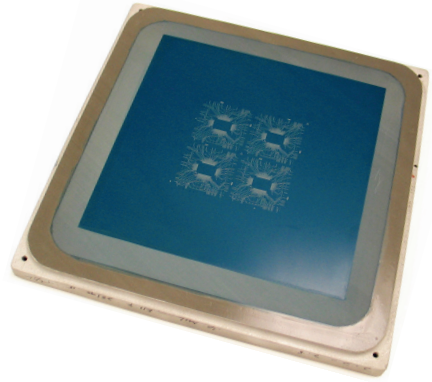
• RKS Squeegee Blades

Contact us today, to provide you with a recommendation of the optimal RKS squeegee for your application.

Cast Frames

Sefar's cast aluminum screen frames are designed for dimensional stability and tension-retaining properties. Each new Sefar cast frame is precision ground and inspected for flatness, parallelism, thickness, mounting hole location, and thread size. We offer all industry standard cast

frame sizes from 5 x 5 inch up to 24 x 24 inch that fit most thick film screen printers today. Should larger frames be required, custom tubular extrusion frames or self-tensioning chases are available. (Please consult Sefar for recommendations and availability.) Frame drawings are available upon request.

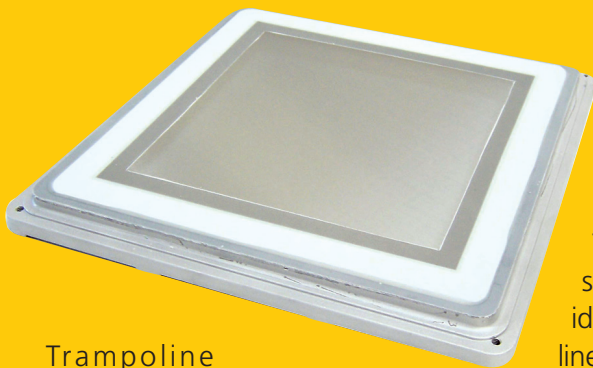


Sefar Cast Aluminum Screen Frame Parameters

I. D. (inches)	O. D. (inches)	Corner Hole Locations (centers, in inches)	Hole Size (thread size)	Frame Thickness (inches)	Flat & Parallel ± (inches)
5 x 5	6.70 x 6.70	5.875 x 5.875	10/32	0.735 ± 0.002	0.003
8 x 10	9.65 x 11.70	8.500 x 10.750	1/4 - 20	0.735 ± 0.002	0.003
10 x 10	11.70 x 11.70	10.000 x 10.000	1/4 - 20	0.735 ± 0.002	0.005
12 x 12	14.10 x 14.10	13.000 x 13.000	1/4 - 20	1.000 ± 0.002	0.003
12 x 17	15.00 x 20.00	13.000 x 18.000	1/4 - 20	1.000 ± 0.002	0.005
15 x 15	17.70 x 17.70	16.000 x 16.000	1/4 - 20	1.000 ± 0.002	0.003
20 x 20	23.10 x 23.10	21.000 x 21.000	1/4 - 20	1.000 ± 0.002	0.005
24 x 24	28.10 x 28.10	26.000 x 26.000	1/4 - 20	1.000 ± 0.002	0.005

Other sizes available upon request

Trampoline Mounted Screens from Sefar



Trampoline mounted screens from Sefar can be a cost-effective and wise alternative for fine line, high resolution, high mesh count applications.

Consisting of stainless steel wire mesh supported by a border of

polyester mesh, a trampoline screen combines the best properties of both mesh types.

The high mesh count stainless steel mesh is ideally suited for fine line, high resolution printed line applications (these printing characteristics are difficult to achieve with other types of mesh). Polyester mesh has superior elasticity properties that are well suited for high volume printing, tension

consistency, and the flexibility required for the constant deformation associated with off contact printing.

In combination, these two mesh types create a screen that has excellent print performance, long screen life, and higher process yields. For this reason, trampoline screens are an excellent choice if you are looking to reduce the financial burden associated with expensive, fine line printing applications.

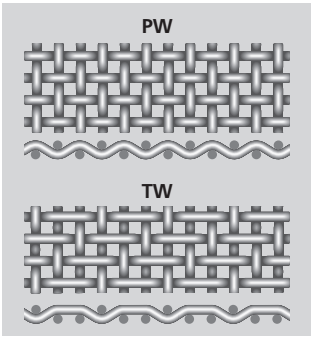
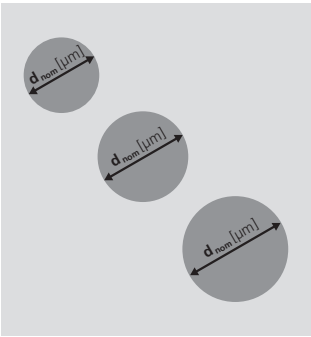
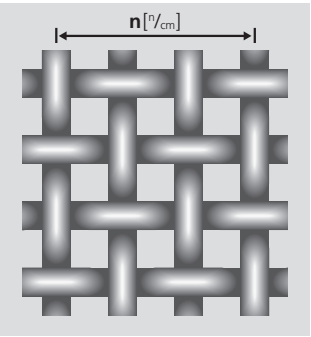
Wire Mesh

Sefar uses the finest stainless steel wire cloth in our screen manufacturing process, which offers higher strength, better tension-retaining properties and exceptionally uniform mesh

thickness. Calendered stainless steel mesh is also available. A calendered mesh is slightly flattened between two heavy rollers to create a thinner, smoother, and more uniform

mesh (the mesh opening size and open area are unaffected). As a result, calendered wire typically is 20% thinner than standard wire mesh, resulting in a thinner ink deposit during printing.

150/380-31 W PW
 150/380-31 W PW
 150/380-31 W PW
 150/380-31 W PW
 150/380-31 W PW

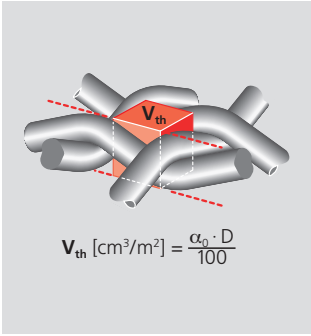
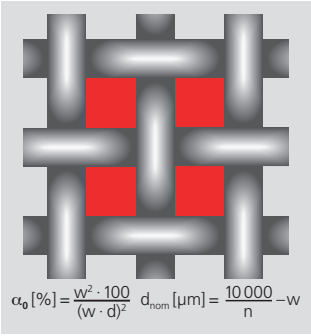
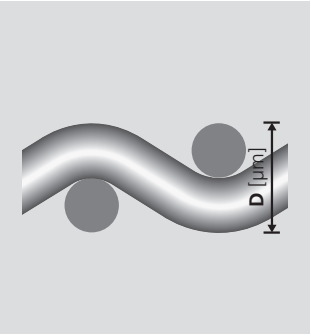
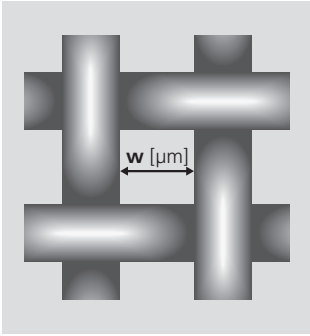


Nomenclature
 Mesh count $1/cm$ 150/380-31 W PW
 Mesh count $1/inch$ 150/380-31 W PW
 Thread- \varnothing d_{nom} 150/380-31 W PW
 Mesh colour 150/380-31 W PW
 Type of wave 150/380-31 W PW
 (white = W, yellow = Y)

Mesh count $n [1/cm]$
 The mesh count n stands for the number of threads per cm or inch. The tolerance is the defined range of the statistically ascertained mean values of mesh counts.

Thread diameter nominal $d_{nom} [\mu m]$
 The diameter d_{nom} is measured on the thread before weaving.

Weave
 The type of weave is either **PW** (plain weave 1:1) or **TW** (twill weave 2:1, 2:2)



Mesh opening (Mo) $w [\mu m]$
 The mesh opening Mo is the distance between two adjacent warp or weft threads.

Mesh thickness $D [\mu m]$
 The mesh thickness D is measured according to DIN 53855-1. The tolerance is the defined range of the statistically ascertained mean values of mesh thickness.

Percentage of open area $\alpha_0 [\%]$
 The percentage of open area α_0 is the sum of all mesh opening areas expressed as a percentage of the total screen area. It is calculated from the mean value of mesh openings and the actual diameter of the threads.

Theoretical ink volume $V_{th} [cm^3/m^2]$
 The theoretical ink volume V_{th} is calculated from the mesh thickness D and the percentage of open area α_0 .

Sefar Precision Stainless Steel Wire Cloth Specifications

Product Name	Mesh Count (threads/inch)	Wire Diameter (mils)	Wire Diameter (µm)	Mesh Opening (mils)	Mesh Opening (µm)	Fabric Thickness (mils)		Fabric Thickness (µm)		Open Area (%)	Standard Tension (N/cm)**	TIV (cm ² /m ²)
						-	-	-	-			
30.65	30	6.50	165	26.80	681	11.50	- 14.00	292	- 356	64.8	26 -37	210
50.55	50	5.50	140	14.50	368	9.40	- 10.60	239	- 269	52.6	26-37	134
60.45	60	4.50	114	13.00	330	8.10	- 9.50	206	- 241	58.3	26-37	130
80.20	80	2.00	51	10.50	267	3.70	- 4.60	94	- 117	70.5	18-24	74
80.37	80	3.70	94	8.80	224	7.00	- 8.90	178	- 226	49.5	26-37	100
105.30	105	3.00	76	7.00	178	6.00	- 6.70	152	- 170	46.9	26-37	76
120.26	120	2.60	66	6.50	165	4.50	- 5.80	114	- 147	47.3	26-37	62
135.23	135	2.30	58	5.70	145	5.20	- 5.80	132	- 147	47.3	26-37	66
145.22	145	2.20	56	4.70	119	4.50	- 5.00	114	- 127	46.4	26-37	56
150.26	150	2.60	66	4.10	104	5.20	- 5.80	132	- 147	37.2	26-37	52
165.20	165	2.00	51	4.10	104	3.80	- 4.60	97	- 117	44.9	26-37	48
180.18	180	1.80	46	3.80	97	3.60	- 4.30	91	- 109	45.7	26-37	46
200.14	200	1.40	36	3.50	89	2.90	- 3.40	74	- 86	51.8	26-34	41
200.16	200	1.60	41	3.40	86	3.10	- 3.80	79	- 97	46.2	26-35	40
200.21	200	2.10	53	2.90	74	4.10	- 4.60	104	- 117	33.6	26-37	37
230.11	230	1.10	28	3.20	81	2.30	- 2.60	58	- 66	54.0	18-24	34
230.11 Cal	230	1.10	28	3.20	81	1.70	- 2.00	43	- 51	54.0	18-24	25
230.14	230	1.40	36	2.90	74	2.80	- 3.40	71	- 86	45.9	22-34	36
230.14 Cal	230	1.40	36	2.90	74	2.10	- 2.50	53	- 64	45.9	22-34	27
250.12	250	1.20	30	2.80	71	2.30	- 2.50	58	- 64	49.7	19-25	30
250.14	250	1.40	36	2.60	66	2.80	- 3.30	71	- 84	43.0	26-34	33
250.16	250	1.60	41	2.40	61	3.30	- 3.70	84	- 94	36.0	26-37	32
270.14	270	1.40	36	2.30	58	2.90	- 3.40	74	- 86	38.6	26-36	31
280.10	280	1.00	25	2.60	66	1.80	- 2.20	46	- 56	53.0	17-23	27
280.13	280	1.30	33	2.40	61	2.50	- 2.90	64	- 74	42.0	21-33	29
290.08 HS	290	0.80	20	2.70	69	1.60	- 1.90	41	- 48	60.0	18-25	27
300.08 HS	300	0.80	20	2.60	66	1.40	- 1.70	36	- 43	60.0	18-25	24
300.08 Cal HS	300	0.80	20	2.60	66	1.20	- 1.60	30	- 41	60.0	18-25	21
325.09	325	0.90	23	2.20	56	1.90	- 2.20	48	- 56	50.1	15-21	26
325.09 Cal	325	0.90	23	2.20	56	1.20	- 1.60	30	- 41	50.1	15-21	18
325.09 HS	325	0.90	23	2.20	56	1.80	- 2.10	46	- 53	50.1	27-33	25
325.09 Cal HS	325	0.90	23	2.20	56	1.20	- 1.60	30	- 41	50.1	27-33	18
325.11	325	1.10	28	2.00	51	2.20	- 2.60	53	- 66	41.3	21-32	25
325.11 Cal	325	1.10	28	2.00	51	1.70	- 2.00	43	- 51	41.3	21-32	19
360.06 HS	360	0.60	15	2.20	56	1.20	- 1.60	30	- 41	60.0	14-20	21
360.06 Cal HS	360	0.60	15	2.20	56	0.80	- 1.10	20	- 28	60.0	14-20	14
400.07 HS	400	0.70	18	1.80	46	1.40	- 1.70	36	- 43	51.0	14-20	20
400.07 Cal HS	400	0.70	18	1.80	46	1.10	- 1.30	28	- 33	51.0	14-20	16
400.07 HC HS	400	0.70	18	1.80	46	0.90	- 1.10	23	- 28	51.0	14-20	13
400.09 Cal	400	0.90	23	1.60	41	1.50	- 1.70	38	- 43	40.0	18-25	16
400.10	400	1.00	25	1.50	38	1.80	- 2.20	46	- 56	38.0	20-28	19
400.10 Cal	400	1.00	25	1.50	38	1.50	- 1.80	38	- 46	38.0	20-28	16
500.18 HS	500	0.70	18	1.30	33	1.40	- 1.80	36	- 46	42.3	14-20	17
500.18 Cal HS	500	0.70	18	1.30	33	0.90	- 1.10	23	- 28	42.3	14-20	11
500.13 Cal HS	500	0.51	13	1.45	37	0.71	- 0.87	18	- 22	55.0	14-20	12
640.15 Cal	640	0.59	15	0.98	25	0.59	- 0.75	15	- 19	39.0	14-20	7
730.13 Cal	730	0.51	13	0.86	22	0.55	- 0.67	14	- 17	40.0	14-20	6

HS Indicates higher strength version

Cal = calendered mesh

Note: Special calendered thicknesses and other meshes available upon request,
**Custom tension maybe available upon request at extra charge



High Performance Polyester Mesh – SEFAR® PME

SEFAR® PME has been specially developed and engineered by Sefar to meet the needs of the industrial screen printer. SEFAR® PME allows for:

- Higher screen tensions with lower elongation
- Minimal loss of tension
- Greatest possible dimensional stability
- Shorter exposure time

SEFAR® PME – Precision mesh for high-end industrial screen printing

Mesh Specification	Mesh Count (t.p.i.)	Mesh Opening (µm)	Thread Diameter (µm)*	Open Area (%)	Mesh Thickness (µm)	TIV (cm ³ / m ²)	Tension
460-26 Yellow	460	24	26	19	41	8	17-25
420-30 Yellow	420	26	30	17	42	8	25-36
420-26 White	420	29	26	23	39	9	16-24
380-30 Yellow	380	30	30	20	42	9	24-35
355-30 Yellow	355	35	30	24	42	10	23-34
330-30 Yellow	330	44	30	33	46	15	21-32
305-35 Yellow	305	42	35	25	51	13	24-37
305-35 White	305	42	35	25	51	13	24-37
305-30 Yellow	305	52	30	38	45	17	17-28
280-35 Yellow	280	53	35	34	52	18	23-35
280-35 White	280	53	35	34	52	18	23-35
255-40 Yellow	255	57	40	32	61	20	29-37
255-40 White	255	57	40	32	61	20	29-37
255-35 Yellow	255	61	35	37	51	19	21-32
190-40 White	190	93	40	49	60	29	21-32
190-40 Yellow	190	93	40	49	60	29	21-32
180-48 Yellow	180	90	48	41	75	31	28-37
150-48 Yellow	150	121	48	51	74	38	25-37

All above product descriptions are plain weave unless designated TW (twill weave).

*Nominal Value

Note: Other meshes available upon request

SEFAR® PCF System

Sectionally Pre-Coated Mesh
for Screen Printing
Partiell vorbeschichtetes Siebdruckgewebe

Made in Switzerland

SEFAR® PCF System
Sectionally Pre-Coated Mesh
for Screen Printing
Partiell vorbeschichtetes Siebdruckgewebe



SEFAR
Mesh+Technology

Sefer Inc. Printing Division Sefer America Inc. Printing Division Sefer Asia Pacific Co., Ltd. Printing Division Sefer Latin America Ltda. Printing Division



Open only in yellow light!
Nur bei Gelblicht öffnen!
Ouvrir seulement à la lumière jaunie!
Aprire solamente sotto luce gialla!
Abrir solo con luz amarillada!
Somente abrir sob luz amarela!

Store in a cool and dry place!
Nicht und trocken lagern!
Conserver en lieu frais et sec!
Conservar en lugar fresco y seco!
Conservar em local fresco e seco!

SEFAR® PCF

SEFAR® PME is an innovative unique industrial pre-coated screen printing mesh SEFAR® PCF consist of a Sefar high modulus screen printing mesh coated with a solvent resistant emulsion. SEFAR® PCF is specially

developed for the production of top quality screen printing stencils, and for their subsequent use for the most challenging screen printing applications.

SEFAR® PCF - Fully Coated

Mesh Specification	Mesh Count (t.p.i.)	Thread Diameter (µm)*	Emulsion over mesh (µm)	Tension
460-27 Yellow	460	27	3	17-28
420-27 Yellow	420	27	4	16-26
420-31 Yellow	420	31	4	19-31
380-31 Yellow	380	31	7	18-28
355-31 Yellow	355	31	7	17-27
355-34 Yellow	355	34	4	19-30
305-31 Yellow	305	31	5	16-26
305-34 Yellow	305	34	8	17-27

Standard Polyester Mesh – SEFAR® PET 1500

SEFAR® PET 1500 is the industry's leading low elongation polyester mesh, which features improved stencil adhesion properties. It is available in the widest range of thread diameters and mesh counts.

SEFAR® PET 1500's increased mesh strength and durability combined with low elongation provide:

- Higher tension levels
- Increased durability

- Low elongation
- Consistent registration throughout the entire run
- Superior print quality
- Machine utilization

Mesh Specification	Mesh Count (t.p.i.)	Mesh Opening (µm)	Thread Diameter (µm)*	Open Area (%)	Mesh Thickness (µm)	TIV (cm3 / m2)	Tension
480-31 TW Yellow	480	16	31	9	54	5	22-35
480-31 TW White	480	16	31	9	54	5	22-35
460-31 TW Yellow	460	23	31	17	54	9	21-34
460-31 TW White	460	23	31	17	54	9	21-34
460-27 Yellow	460	22	27	16	42	7	17-28
420-34 TW Yellow	420	23	34	14	60	9	23-35
420-34 TW White	420	23	34	14	60	9	23-35
420-31 Yellow	420	23	31	15	48	7	19-31
420-31 White	420	23	31	15	48	7	19-31
420-27 Yellow	420	29	27	23	42	10	16-26
380-34 TW Yellow	380	26	34	15	59	10	20-32
380-34 Yellow	380	23	34	12	54	6	20-32
380-34 White	380	23	34	12	54	6	20-32
380-31 Yellow	380	32	31	23	45	10	18-28
380-31 White	380	32	31	23	45	10	18-28
380-27 Yellow	380	36	27	29	41	12	15-23
355-34 Yellow	355	32	34	20	59	12	19-30
355-34 TW Yellow	355	31	34	19	52	10	19-30
355-34 White	355	31	34	19	52	10	19-30
355-31 Yellow	355	36	31	25	46	12	17-27
355-31 White	355	36	31	26	46	12	17-27
330-34 Yellow	330	40	34	27	53	14	18-29
330-34 White	330	40	34	27	53	14	18-29
305-40 Yellow	305	37	40	20	64	13	23-37
305-40 White	305	37	40	20	62	12	23-37
305-34 Yellow	305	43	34	27	53	14	17-27
305-34 White	305	43	34	27	53	14	17-27
305-31 Yellow	305	49	31	35	46	16	16-26
305-31 White	305	49	31	35	46	16	16-26
280-40 Yellow	280	47	40	27	64	17	21-33
280-40 White	280	47	40	27	64	17	21-33
280-34 Yellow	280	54	34	35	53	19	16-26
280-34 White	280	54	34	35	53	19	16-26
255-40 Yellow	255	57	40	32	62	30	20-32
255-40 White	255	57	40	32	62	20	20-32
240-40 Yellow	240	62	40	35	62	22	20-31
230-48 Yellow	230	55	48	25	76	19	24-37
230-48 White	230	55	48	25	76	19	24-37
230-40 Yellow	230	68	40	37	61	23	19-31

Mesh Specification	Mesh Count (t.p.i.)	Mesh Opening (µm)	Thread Diameter (µm)*	Open Area (%)	Mesh Thickness (µm)	TIV (cm3 / m2)	Tension
230-40 White	230	68	40	37	61	23	19-31
195-48 Yellow	195	77	48	35	78	27	21-34
195-48 White	195	77	48	35	78	27	21-34
195-55 Yellow	195	67	55	27	84	22	27-37
195-55 White	195	67	55	27	84	22	27-37
186-55 Yellow	186	75	55	30	86	26	26-37
186-55 White	186	75	55	30	86	26	26-37
180-55 White	180	79	55	31	89	28	25-37
175-70 TW White	175	70	70	23	120	27	33-37
175-64 White	175	78	64	28	98	28	32-37
175-55 Yellow	175	85	55	33	86	29	24-37
175-55 White	175	85	55	33	86	29	24-37
156-70 White	156	86	70	28	109	30	31-37
156-64 Yellow	156	90	64	39	100	30	30-37
156-64 White	156	90	64	39	100	30	30-37
137-70 White	137	109	70	35	109	38	27-37
137-64 Yellow	137	115	64	39	100	39	26-37
137-64 White	137	115	64	39	103	40	26-37
131-70 White	131	121	70	38	109	42	25-37
123-80 White	123	122	80	34	124	43	34-37
123-70 Yellow	123	133	70	41	114	46	23-37
123-70 White	123	133	70	41	114	46	23-37
123-55 Yellow	123	151	55	53	88	46	17-27
123-55 White	123	151	55	53	88	46	17-27
115-70 White	115	150	70	46	108	49	22-36
110-90 White	110	136	90	34	145	50	34-37
110-80 Yellow	110	149	80	41	130	53	32-37
110-80 White	110	149	80	41	130	53	32-37
103-80 White	103	166	80	44	132	58	26-37
92-100 Yellow	92	174	100	39	163	64	23-37
92-100 White	92	174	100	39	163	64	23-37
92-90 White	92	183	90	43	144	62	21-37
83-120 White	83	191	120	37	210	78	25-37
83-100 Yellow	83	209	100	45	163	73	22-37
83-100 White	83	209	100	45	163	73	22-37
83-70 Yellow	83	240	70	59	116	68	19-31
83-70 White	83	240	70	59	116	68	19-31
76-120 White	76	211	120	40	211	85	22-37
70-140 White	70	222	140	36	245	88	24-37
70-120 White	70	249	120	45	206	93	22-37
60-140 White	60	270	140	42	248	104	20-37
60-120 White	60	294	120	50	210	105	20-35
54-140 White	54	333	140	49	255	125	19-37
45-180 White	45	375	180	46	332	151	20-37
40-250 White	40	417	250	39	415	162	25-37
40-200 White	40	465	200	49	354	172	20-37
30-140 White	30	688	140	68	267	175	17-30
25-260 White	25	740	260	55	470	257	21-37

Emulsion Data

Sefar Screen Emulsions

DCE9: Specifically formulated for harsher solvents such as NMP, DCE9 provides an excellent option as an emulsion choice in aggressive chemical environments. Resolution features are the most favorable in thinner emulsion build-ups, but this emulsion gaskets well and is easily handled by a customer exposing the screen in-house.

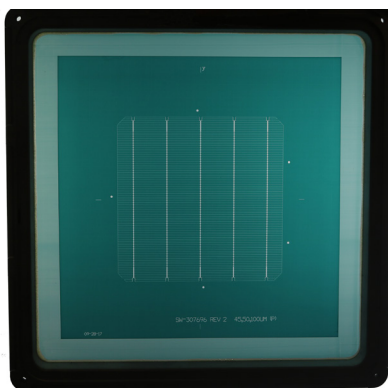
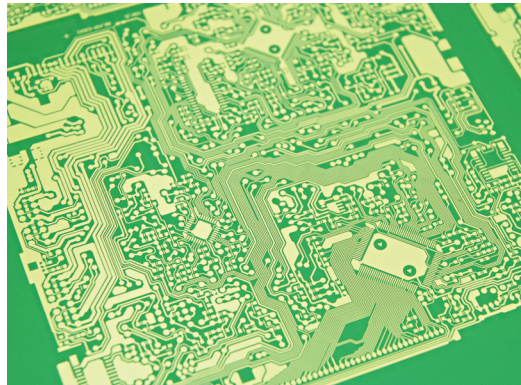
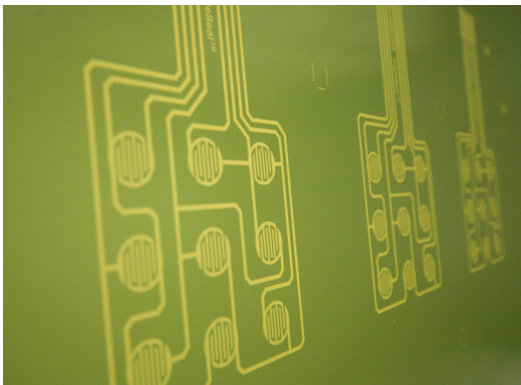
E11: Excellent emulsion for features 70 microns and greater. E-11 has high quality gasketing characteristics and solvent resistance. High sensitivity to ultraviolet (UV) light allows for quick exposures. Use E11 for various microelectronic printing applications, especially when resolution and edge definition are critical.

E80: Excellent emulsion for features 70 microns and greater. E80 has outstanding resistance to cleaning solvents and ink/paste vehicles. Combined with its excellent gasketing and printing characteristics, E80 becomes a great choice for applications which involve printing or cleaning with aggressive materials.

PEF2: PEF2 is a standard film emulsion that combines precision emulsion thickness control with excellent substrate gasketing properties and good resolution imaging capabilities. An ideal choice for pre-sensitized screens, this emulsion has a rapid exposure time and is easy for the customer to washout. PEF2 is best suited for applications with greater than 0.0003" EOM.

PE: An emulsion product with all of the same characteristics of PEF2, but ideally suited for very thin emulsion build-ups of equal to or less than 0.0003" EOM. A softer and more conforming emulsion to gasket multi-layer thick film applications in a non-aggressive environment.

S34: Specifically designed for ultra-resolution fine line printing. S34 is an excellent emulsion to maintain edge quality while reaching the extreme limits of fine line printing in the screen market today.



Sefar Emulsion Cross-Reference Chart

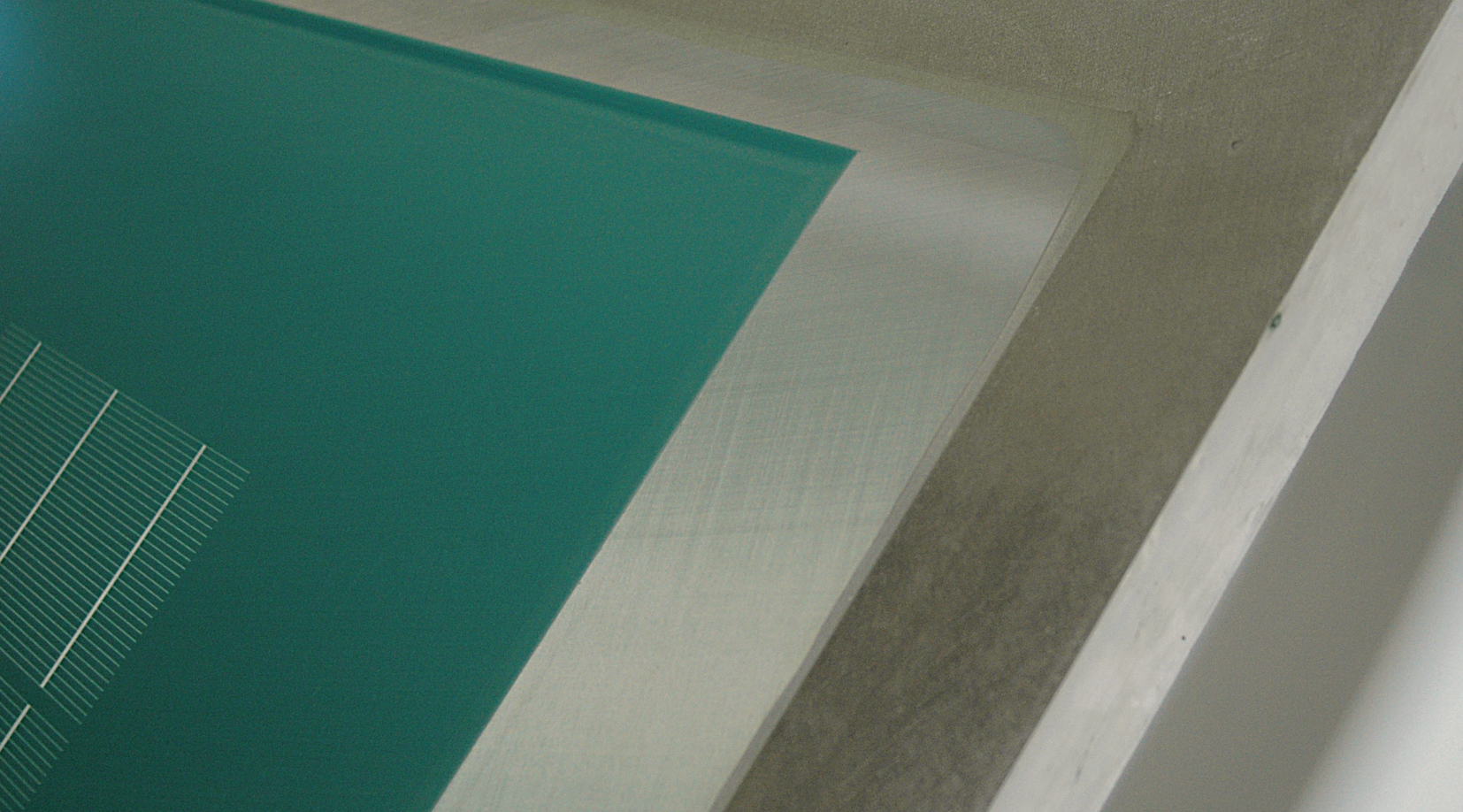
		Emulsion					
		DCE9	E11	E80	PEF2	PE	S34
Solvent	Toluene	A	A	A	A	A	A
	Xylene	A	A	A	A	A	A
	NMP	B	D	C	D	D	C
	Distilled Water	A	B	B	C	C	C
	Butyl Carbitol	A	A	A	A	A	A
	Butyl Cellosolve	A	A	A	A	A	A
	Butyl Carbitol Acetate	A	A	A	A	A	A
	Isopropanol	A	B	B	B	B	B
	1,1,1 Trichloroethane	A	B	A	B	B	A
	Terpineol	A	A	A	B	B	A
	Methyl Ethyl Keytone	B	C	A	B	B	B
	Acetone	A	B	A	A	A	B
	Methanol	A	B	B	C	C	B
	Rosstech 106 FE	A	A	A	A	A	A
	Rosstech 133	A	A	A	A	A	A
	Axarel 2000	A	A	A	A	A	A

A Safe

B Reasonably safe

C Use with caution

D Not Compatible



Emulsion Thickness Data

Sefar direct screen emulsions can be applied to our stretched screens in thicknesses from 0.0001 inch (2.54 µm) to 0.030 inch (762 µm) (increments of 0.001 inch (2.5 µm)) to the following tolerances:

Emulsion Thickness Target (microns)	Tolerance Thickness	Emulsion Thickness Target (inches)	Tolerance Thickness
0 µm to 30 µm	+/- 3 µm	0.0 to 0.0012" (30.5 µm)	+/- 0.00012" (30.5 µm)
30 µm and greater	+/- 10%	0.0012" (30.5 µm) and greater	+/- 10%

Determining Screen Emulsion Thickness (EOM)

The emulsion thickness your screens require can be determined in a number of ways:

- Ask your paste or ink supplier for a recommendation based on your application.
- Contact Sefar's support staff for a recommendation, based on current industry standards.
- Calculate the emulsion thickness you need based on the following formula:

$$EOM = TIV - (Ft \times Oa)$$

When:

EOM = Emulsion thickness
 TIV = Theoretical Ink Volume
 Ft = Fabric thickness
 Oa = % of open area

You will need to know the wet printed thickness you are trying to achieve as well as the parameters of the screen mesh you will be using in order to complete the above equation. This equation can be modified for use in determining the theoretical wet printed thickness achievable from any

screen mesh/emulsion thickness combination. The equation for determining theoretical wet printed thickness is shown below (the same conditions apply):

$$TIV = (Ft \times Oa) + EOM$$

(Factors affecting print thickness which relate to ink, screen printing equipment, setup parameters, etc., are not considered). As a result, those values are approximate. For precision, production testing is strongly recommended.

EOM: Emulsion Over Mesh

CAD & Photoplotting

Laser Photoplotter

Our laser photoplotting system can accurately reproduce the high resolution and the sharp edge definition needed for today's precision electronic designs. Using this system, our staff of certified Gerber® trained photo technicians can generate sharp, accurate photoplots for a wide variety of imaging applications.

Performance Specifications

Output media

Silver-Halide Coated Film

Maximum film size

22 x 28 inch

Maximum film thickness

0.007 inch

Maximum film image size

21.5 x 27.5 inch

Accuracy

10 microns

Repeatability

± 0.5 mil

- Competitive pricing
- Formats:
 - Gerber® files
 - AutoCAD
 - .DWG and
 - .DXF files

Sefar features a complete range of CAD drafting artwork generation and file editing, using the latest version of AutoCAD software. Data for CAD service and/or photoplotting may be supplied either on disk, electronic file, or as a dimensioned drawing. Any electronic data supplied that is not in Gerber® format can be translated into a Gerber® file for a nominal charge.

Film Output resolution (Dots/Inch)	Feature Tolerance (µm)	Minimum Feature (µm)
8,000	+/- 12	70
20,000	+/- 10	25
50,000	+/- 5	7

All files must be converted to Gerber® format by Sefar and a charge will be applied.

Screen Feature Tolerance

Feature Size	Tolerance
up to 125 µm	+/- 5 µm
125-200 µm	+/- 10 µm
Larger than 200 µm	+/- 10%

Overall Screen Dimensional Tolerance

Image Size	Tolerance
Under 6 inches	+/- 100 µm
6 to 10 inches	+/- 200 µm

Consumables

Squeegees

Sefar offers an extensive range of solvent resistant, polyurethane squeegees that are available in a variety of different durometers, colors, sizes, profiles, and composites. When ordering squeegees, it will be necessary to provide us with the following information:

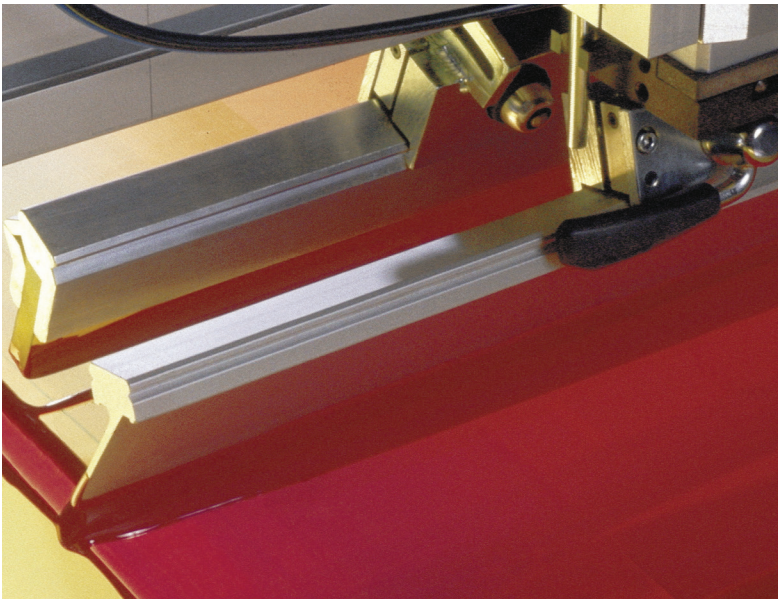
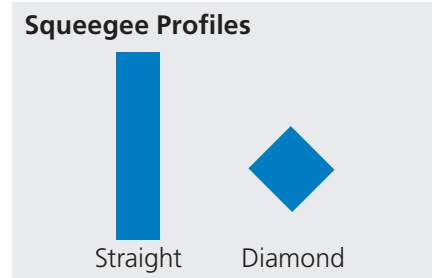
Size – Squeegee is available in standard coil lengths of 144" (to be cut by the customer).

Additional sizes are available—contact your Sefar representative to inquire about our current inventory.

Durometer – Durometer refers to the hardness of the squeegee blade. Each durometer is designed to provide the printer with a different print effect. If you are not sure which durometer to use, feel free to contact Sefar support staff for assistance. Squeegees are typically color coded according to the durometer.

Squeegee Profile

The profile refers to the shape of the squeegee's printing edge. Common squeegee profiles for electronics are straight and diamond (see below).



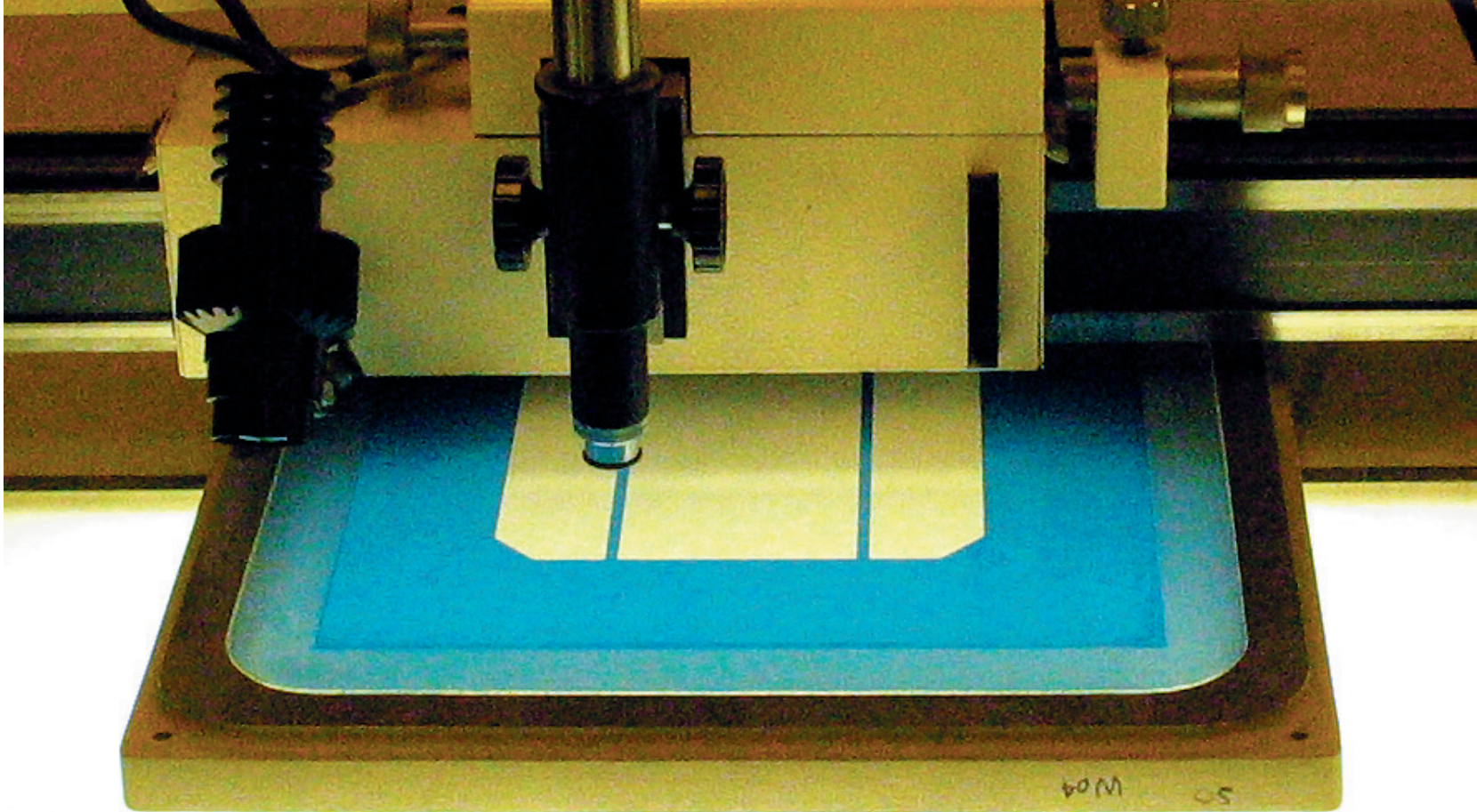
Features of Aluminum Frames

- Lightweight for ease of handling, yet robust to withstand movement throughout the shop and years of service
- Optimum weight-to-strength ratio, engineered to help maintain high mesh tensions
- Deep-welded for strength, warp resistance, and liquid-tight seals for screen processing
- Finished on one side for optimum mesh adhesion properties

Extruded Aluminum Frames

Sefar offers a broad selection of rigid aluminum frames. Our rigid frames are built with the stringent requirements necessary for successful screen printing. Different options are available to provide you with a frame that can excel in high tension, superior mesh adhesion, easy cleaning, and life-long durability.

Our aluminum frames are lightweight for easy handling and have an optimum stability-to-weight ratio to maintain flatness and squareness throughout the life of the frame. Deep and controlled penetration welding provides strength and warp resistance. Every frame is hermetically sealed (liquid-tight) and sandblasted or roughened for excellent synthetic or wire mesh adhesion. Sefar's aluminum screen frames are available in multiple profile sizes, and custom sizes are available upon request.



Ordering Screens

Contact us at **716-601-3159** to place an order for stretched screens.

To insure that your screens are made to your specifications, it is important for you to provide us with adequate information when placing an order. Please be prepared to provide the following screen parameters:

- **Frame Size** – If you need to purchase frames, please be sure to provide information on your frame requirements. For more information please see page 6. If you will be providing us with your frames, we will need to know the frame size for pricing purposes.
- **Mesh Specification** – When providing us with your mesh requirements, be sure to include both mesh count and wire diameter. For more information please see pages 7 through 9.
- **Mesh Tension** – Unless you require a special tension, all screens are stretched to established standards according to the cloth characteristics, such as mesh count and wire diameter. Custom tension specifications are available at an extra charge. (Mesh dependent)
- **Mesh Angle** – When determining mesh angle on your screens, it is important that none of the wires run parallel to the lines in your pattern (this can cause a reduction in the anticipated feature width and shape). Common angles are 30° and 22 ½°.
- **Emulsion Thickness (EOM)** – If you would like your screens to be coated with emulsion, please provide your emulsion over mesh (EOM) build-up. You may also specify total screen thickness (including mesh thickness). For more information, see pages 7 through 9, and the Emulsion Thickness calculation on page 12.
- **Artwork** – If we are coating your screens, we can image them too! Artwork can be supplied, or we can output your electronic files in-house. We accept .DXF, .DWG and Gerber® files. Please provide artwork details during the submission process (positive or negative films, right or wrong-reading images, etc.).
- **Image Orientation** – When imaging screens that are on rectangular frames, please provide accurate instructions on image orientation to the frame.
- **Screen Image Measurement** – Screen images can be measured by Sefar for an extra charge.

Corporate Headquarters

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Phone +41 71 898 57 00

North America

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Depew, NY 14043
Phone 716.683.4050

Sefar Ontario (Screen Manufacturing)

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Ontario, CA 91761
Phone 909.947.4100

Sefar Mexico (Screen Manufacturing)

Carretera Tepotzotlan-LA AU-rora KM 1
S/N Nave 3 Modulo A Estado de Mexico C.P 54719
Phone 52.55.5899.6100

Other Manufacturing Facilities

Sefar Kansas City

4221 NE 34th Street
Kansas City, MO 64117
Phone 816.452.1520

Sefar Gray

1447 Old Highway 11
Gray, GA 31032
Phone 888.445.8710

Sefar Canada

200 Clement-Gilbert
Saguenay (Quebec)
G7H 5B1, Canada
Phone 418.690.0888