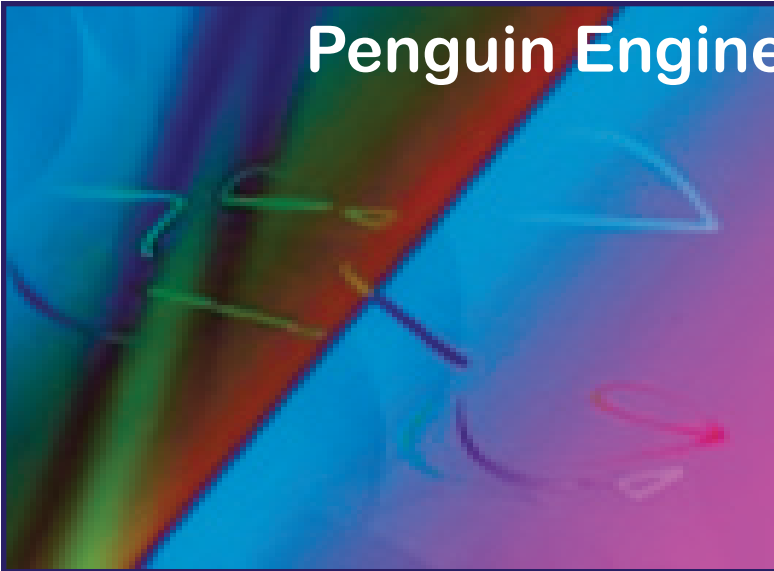


# Penguin Engineering Specifications

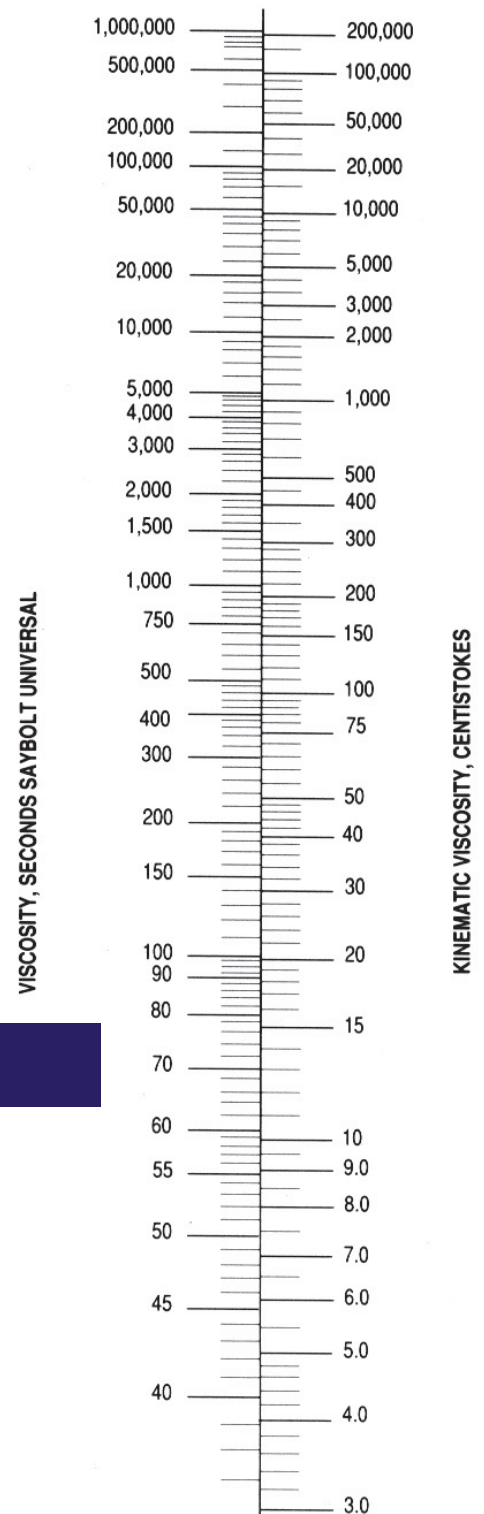


## Viscosity Conversion Chart

### Centipoises or Centistokes to Saybolt Universal Seconds

To convert the viscosity of a fluid given in absolute units of centipoises, divide the centipoises by the specific gravity of the fluid to obtain viscosity in centistokes.

Then read across the table to the right to find the equivalent S.S.U.



## Considerations For Efficient Filtration Installation

Penguin wound cartridge filters are a simple, economical solution to most problems of fluid clean-up. To achieve maximum benefit from this type of filtration, several factors should be considered when selecting the appropriate cartridge filter.

### 1) Viscosity of the Fluid Being Filtered

Highly viscous fluids tend to hold particles in suspension, allowing some larger particles through, thereby reducing efficiency. Conversely, gases drop out particles easily and efficiency is increased.

### 2) Flow Rate

Higher flow rates may reduce efficiency, lower rates increase it.

### 3) Pressure Drop

Very high pressure drops may slightly compress the element, increasing efficiency.

Penguin has prepared the following charts, tables, and nomographs to help you make the appropriate selection.

## Viscosity Conversion Table

Viscosity Values for Different Viscosities at the Same Temperature

Saybolt Universal Seconds	Saybolt Furot Seconds	Redwood No.1 Seconds	Redwood No.2 Seconds	Engler Degrees	Saybolt Universal Seconds	Saybolt Furot Seconds	Redwood No.1 Seconds	Redwood No.2 Seconds	Engler Degrees
30	-	-	-	1.0	375	38.0	334	33.4	11.0
33	-	31	-	1.1	382	38.7	341	34.1	11.2
36	-	34	-	1.2	389	39.4	347	34.7	11.4
40	-	37	-	1.3	396	40.2	353	35.3	11.6
43	-	40	-	1.4	403	40.9	359	35.9	11.8
47	-	43	-	1.5	409	41.5	365	36.5	12.0
50	-	46	-	1.6	416	42.2	371	37.1	12.2
54	-	49	-	1.7	423	42.9	377	37.7	12.4
57	-	52	-	1.8	430	43.5	383	38.3	12.6
61	-	55	-	1.9	437	44.3	390	39.0	12.8
65	-	59	-	2.0	444	45.0	396	39.6	13.0
68	-	61	-	2.1	450	45.6	401	40.1	13.2
72	-	65	-	2.2	457	46.3	408	40.8	13.4
75	-	67	-	2.3	464	47.1	414	41.4	13.6
79	-	71	-	2.4	471	47.8	420	42.0	13.8
83	-	74	-	2.5	478	48.5	426	42.6	14.0
86	-	77	-	2.6	484	49.1	432	43.2	14.2
90	-	81	-	2.7	491	49.8	438	43.8	14.4
93	-	83	-	2.8	498	50.5	444	44.4	14.6
97	-	87	-	2.9	505	51.2	451	45.1	14.8
101	-	90	-	3.0	512	51.9	457	45.7	15.0
107	-	96	-	3.2	519	52.3	463	46.3	15.2
115	-	103	-	3.4	525	53.2	468	46.8	15.4
121	-	108	-	3.6	532	54.0	474	47.4	15.6
129	-	115	-	3.8	539	54.7	481	48.1	15.8
136	-	121	-	4.0	546	55.4	487	48.7	16.0
142	-	127	-	4.2	552	56.0	492	49.2	16.2
150	-	134	-	4.4	559	56.7	498	49.8	16.4
156	-	139	-	4.6	566	57.4	505	50.5	16.6
163	-	145	-	4.8	573	58.1	511	51.1	16.8
171	-	152	-	5.0	580	58.8	517	51.7	17.0
177	-	158	-	5.2	597	60.5	532	53.2	17.5
184	-	164	-	5.4	614	62.2	548	54.8	18.0
191	-	170	-	5.6	631	64.0	563	56.3	18.5
198	-	177	-	5.8	649	65.8	579	57.9	19.0
205	-	183	-	6.0	666	67.6	594	59.4	19.5
212	-	189	-	6.2	682	69.2	608	60.8	20.0
218	-	194	-	6.4	699	70.9	624	62.4	20.5
225	-	201	-	6.6	716	72.6	639	63.9	21.0
232	-	207	-	6.8	733	74.3	654	65.4	21.5
239	-	213	-	7.0	750	76.1	669	66.9	22.0
246	-	219	-	7.2	768	78.0	685	68.5	22.5
252	25.5	225	-	7.4	785	79.6	701	70.1	23.0
259	26.3	231	-	7.6	802	81.3	715	71.5	23.5
266	27.1	237	-	7.8	819	83.0	731	73.1	24.0
273	27.7	243	-	8.0	836	84.7	746	74.6	24.5
280	28.4	250	-	8.2	853	86.5	761	76.1	25.0
287	29.1	256	-	8.4	870	88.2	776	77.6	25.5
293	29.7	261	-	8.6	887	89.9	791	79.1	26.0
300	30.4	268	-	8.8	904	91.7	806	80.6	26.5
307	31.2	274	-	9.0	921	93.4	822	82.2	27.0
314	31.8	280	-	9.2	938	95.1	837	83.7	27.5
321	32.6	286	-	9.4	955	96.9	852	85.2	28.0
328	33.3	292	-	9.6	972	98.6	867	86.7	28.5
334	33.9	298	-	9.8	999	100	883	88.3	29.0
341	34.6	304	30.4	10.0	1007	102	899	89.9	29.5
348	35.3	310	31.0	10.2	1023	104	912	91.2	30.0
355	36.0	316	31.6	10.4	1092	111	974	97.4	32.0
362	36.7	323	32.3	10.6	1160	118	1035	103.5	34.0
368	37.3	328	32.8	10.8	1228	125	1096	109.6	36.0

# Penguin Engineering Specifications

## Nomograph for Flow, Pressure Drop

### Water at 68°

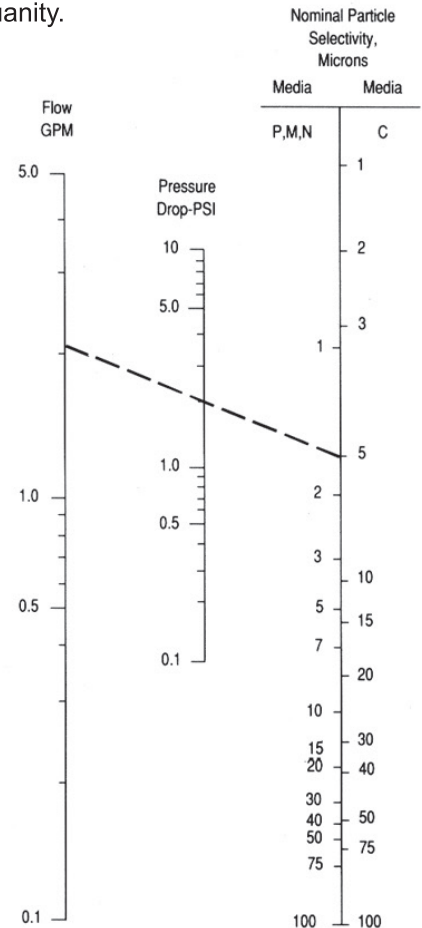
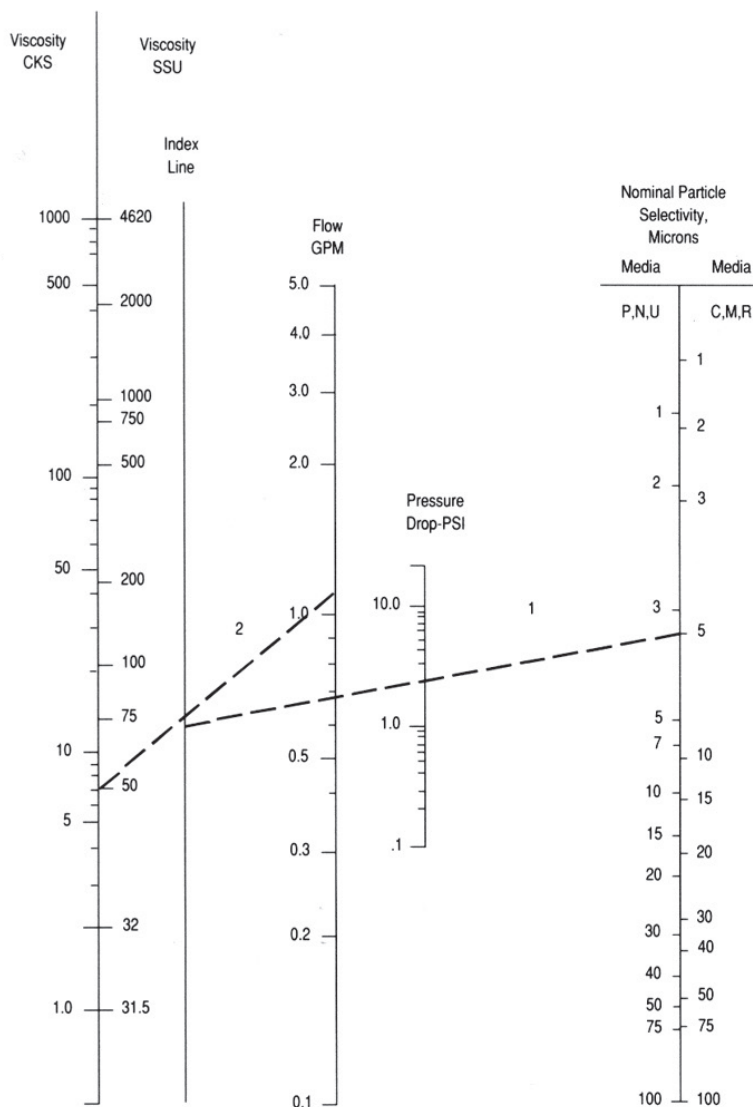
Instructions:

This is a direct reading. Connect the particle size with either flow or pressure drop to find the third quantity.

### Non-Aqueous Liquid

Instructions:

1. Connect desired particle size through specified pressure drop, extend to index line.
2. From viscosity draw a line through the previous intersection on the index line, continuing to intersect flow line. This is flow for one 10" element.



### Media Symbols

P	=	Polypropylene
C	=	Bleached cotton
U	=	Natural cotton
N	=	Nylon
M	=	Modacrylic (Dynel)
R	=	Rayon

S.S.U. = Seconds, Saybolt Universal Scale  
C.K.S. = Centistokes, dynamic viscosity  
(centipoises divided by specific gravity)

# Penguin Engineering Specifications

## Units of Measurement Equivalents

Mesh - Inch -Micron Conversion Chart

Meshes/Lineal Inch US and ASTM Std. Sieve No.      Inches      Actual Opening Microns			Meshes/Lineal Inch US and ASTM Std. Sieve No.      Inches      Actual Opening Microns		
10	.0787	2000	170	.0035	88
12	.0661 1/16	1680	200	.0029	74
14	.0555	1410	-	.0026	65
16	.0469 3/64	1190	230	.0024	62
18	.0394	1000	270	.0021	53
20	.0331 1/32	840	-	.0020	50
25	.0280	710	325	.0017	44
30	.0232	590	-	.0016	40
35	.0197 1/64	500	400	.00142	36
40	.0165	420	-	.00118	30
45	.0138	350	550	.00099	25
50	.0117	297	625	.00079	20
60	.0098	250	-	.00059	15
70	.0083	210	1,250	.000394	10
80	.0070	177	1,750	.000315	8
100	.0059	149	2,500	.000197	5
120	.0049	125	5,000	.000099	2.5
140	.0041	105	12,000	.0000394	1

### Micronic Comparisons

Cocoa equiv. to 8-10 microns  
Talcum powder equiv. to 1 micron  
Avg. diameter human hair is 50-70 microns  
Table salt equiv. to 100 microns

### Units of Pressure and Head

Feet of Water x 0.433 = Lbs. per sq. inch  
Lbs. per sq. inch x 2.307 = Feet of Water  
Feet of Water x 0.881 = Inches of Mercury  
Inches of Mercury x 1.135 = Feet of Water  
Inches of Mercury x 0.491 = Lbs. per sq. inch

### Units of Volume

Cubic Feet x 7.48 = Gallons  
Cubic Feet x 1728 = Cubic Inches  
Gallons x 0.134 = Cubic Feet  
Gallons x 231 = Cubic Inches  
Lbs. of Water x 2.77 = Cubic Inches  
Lbs. of Water x 0.0160 = Cubic Feet  
0.00334 x d<sup>2</sup> x Ht." = Volume in Gallons

### Units of Temperature

$9/5 \times C^{\circ} + 32^{\circ} = F^{\circ}$   
 $5/9(F^{\circ} - 32^{\circ}) = C^{\circ}$

### Units of Length

Inches x 25,400 = Microns  
Microns x  $3.94 \times 10^{-5}$  = Inches  
Inches x 2.54 = Centimeters  
0.001 Inches = 25.4 Microns

### Conversions

Seconds Saybolt Universal (S.S.U.) = 10 x Saybolt Furol (S.F.)  
Seconds Saybolt Universal (above 250 S.S.U.) = 4.62 x Centistokes (Cs)

Centistokes =  $\frac{\text{Centipoise}}{\text{Specific Gravity}}$

1 part per million (ppm) = 1 lb. per 120,000 Gallon H<sub>2</sub>O  
1 Gallon H<sub>2</sub>O = 8.3 Lbs.