

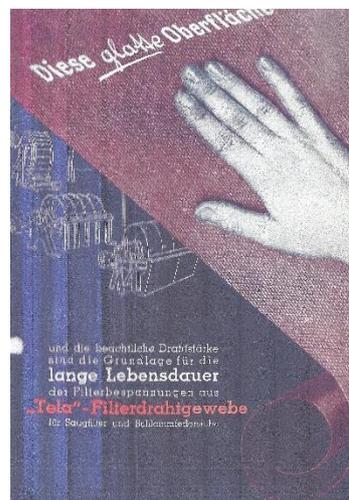
## FILTERING THROUGH THE NEWS No. 16

Date : 26-02-2016-rev 3

Attn :

To whom it may concern;

### SCREEN SELECTION HOW & WHY:



Based on the question that reached me recently I will think your concept over try as good as possible to give an overview and the criteria / information you require to make the right choice in selecting the correct filter media for your application . We hope the following info will shine a light on the discussion about screen retention.

In the use of textile filter cloth (Polypropylene, polyester, Nylon , etc) it is very simple and the cloth is only specified in terms of mono filament, multi filament a combination of both mono/multi or needle felt . The permeability is given in terms of air permeability in litre per dm<sup>3</sup>/minute at 20 mm water column pressure . The fact that the cloth once it is used will change its character in the application like swelling of the fibres by absorption of the cloth , shrinking , etc , make it very difficult to put a retention figure on it . Textile Filter cloth companies like SEFAR are your best choice for filter cloth used on vacuum belt-, vacuum drum filters, filter presses and other cloth consuming applications. Fr cloth used on Pulse type pressure leaf filters like the PTS , RPP, Cricket , etc we can offer our special seamless filter cloth that has been developed to meet critical application conditions.

When we use a metal wire mesh this is different and the retention very well can be determined by three (3) known methods;

- 1) RETENTION BY CALCULATION:
- 2) RETENTION BY GLASS PERL TEST
- 3) RETENTION BY BUBBLE TEST.

When asked by the client we can perform all three but we mainly use the calculation test in house to prove our point.

In the wide spread information on screen retention there is a lot that can but also can't be trusted or used and we should consider the different interest that players in the wire weaving industry have.

The wire thickness and thus the weight are of immediate influence in the cost per square meter.

No. 17 & 19, Jalan Pengacara U1/48,  
Temasya Industrial Park,  
40150 Shah Alam,  
Selangor Darul Ehsan, Malaysia.  
Tel: +603 5569 3993 / 4240  
Fax: +603 5569 3131  
Email: info@pmi-group.com  
<http://www.pmi-group.com>

#### Plant 1:

No. 3, Hala Jati 10, Taman Meru Industrial Estate,  
30020 Jelapang, Ipoh, Perak Darul Ridzuan, Malaysia.  
Tel: +605 529 2900 / 2901 Fax: +605 529 2903

#### Plant 2:

Lot 2, Kawasan Perusahaan Tmn Meru 3B, Jalan Jelapang,  
30020 Jelapang, Ipoh, Perak Darul Ridzuan, Malaysia.  
Tel: +605 527 5010 / 4286 Fax: +605 527 5210



The retention is created by the wire thickness used or by the method of weft i.e. the weaving pattern.

Plain square weave like 60 mesh has a retention of 240 micron and wire thickness of 0,19 mm.

The same weave but now twilled weave 60 mesh with wire 0,26 mm will have a retention of 150-160 microns but in terms of weight there is at least 1,14 kg/m<sup>2</sup> in case of plain weave and 2,43 kg/m<sup>2</sup> when twilled weave is used. The open area is for plain weave 60 mesh 30,5% while the twilled weave only has 13,7 %. Both called 60 mesh but a world of difference.

Therefore we have tried to find a relation between WEAVE , MESH and MICRONS . The enclosed list can be used but should be handled with care. It is a list that shows you the difference but the influence of different weave's has not been included since there are too many.

The most used explanation of mesh is as follows;

**THE MESH COUNT OF A METAL WIRE MESH IS NOT THE MICRON RETENTION OF THE SCREEN . IT ONLY TELL'S YOU THE NUMBER OF WIRES THAT ARE USED PER SQUARE INCH I.E. AT 60 MESH WE WILL HAVE 60 WIRES IN BOTH WARP AND SHUTE. FOR 24 X 110 DUTCH WEAVE/HOLLANDER WEAVE THIS WILL BE 24 WIRES IN THE WARP AND 110 WIRES IN THE SHUTE.**

Since all industrial metal wire mesh weaving companies have more or less the same program, one should expect they also have identical specification . This is however far from reality.

The market is flooded with wire mesh named 24 x 110 Dutch weave but when measuring the wire thickness or looking at the specifications we see big differences.

The real 24 x 110 Plain Dutch weave should have warp wire 0,36 mm (24x) and 0,26 mm shute (110 x).

In most cases where we checked the screen we found however ; 0,35 mm Warp and 0,27 mm Shute. When measuring the screen we found (absolute)retentions in the range of 127 micron for the real 24x110 Dutch weave to 144 for the screen with thinner wires.

***We should mention that thinner wires are weaker and cheaper but weaker means easy to damage.***

When the application requires a screen with smaller retention other screen types should be considered . The Dutch weave type screen can be used but in order to have 80 microns the screen would become 30x150 mesh and the wire thickness of 0,19/0,26 mm. A better option would be the use of Panzer weave PZ80 S also 80 micron with wire thickness 0,2 and 0,4 mm.



**Plant 1:**

**Plant 2:**

When ordering screen one should however always mention that the screen should be delivered FLAT without any waves ,wobbles or sharp folds and cut in the correct direction i.e. The Height if the leaf should have the correct wires in the vertical position

**OVERVIEW OF MAIN SCREEN TYPES USED IN PRESSURE LEAF PRE-COAT FILTER APPLICATIONS**

The main filter screen types sued are ;

**A) PLAIN MESH SCREEN.**

This screen should be handled with care and in order to get into the retentions that we mainly use in pre-coat pressure leaf filter applications the wire thickness becomes less. With 60 mesh the wire has reached a thickness of 0,19 mm and this is as low as we would go . The nature of this screen will make it suitable for only too be used with course or fibrous solids/filter aids and the screen can easily be damaged. Typical use in edible oil applications ; Crude full or pre-pressed oils(fibres direct) and winterised oils(with pre-coat). 60 Mesh plain weave ,wire 0,19 mm and retention approx 240 micron.



**B) TWILLED WEAVE.**

This screen is no longer plain but combines the character of the plain 60 mesh with a more solid i.e. thicker wire and stronger weave. The screen should have 0,26 mm wire thickness and with 150 microns retention a great variety of filter aids can be used .

Typical use in edible oil applications ; Crude full or pre-pressed oils (fibres direct) winterised oils (with pre-coat)and bleached oils(best with pre-coat and possible body feed).

60 Mesh twilled weave ,wire 0,26 mm and retention approx 150 micron.



**C) PLAIN DUTCH WEAVE**

The main screen use in the industry is the Plain Dutch weave 24 x 110. In order to ensure the absolute retention to be between 120 and 130 microns it is essential that the correct wire thickness is used. In our case the wire is 0,26 mm versus 0,36 mm.

Typical use in edible oil applications ; winterised oils (with pre-coat and or body feed) and bleached oils(direct or with only pre-coat).

24 x 110 Mesh Dutch weave ,wire 0,26/0,36 mm and retention approx 120 micron.



**Plant 1:**

No. 3, Hala Jati 10, Taman Meru Industrial Estate,  
30020 Jelapang, Ipoh, Perak Darul Ridzuan, Malaysia.  
Tel: +605 529 2900 / 2901 Fax: +605 529 2903

**Plant 2:**

Lot 2, Kawasan Perusahaan Tmn Meru 3B, Jalan Jelapang,  
30020 Jelapang, Ipoh, Perak Darul Ridzuan, Malaysia.  
Tel: +605 527 5010 / 4286 Fax: +605 527 5210

#### **D) PANZER CLOTH (REVERSED DUTCH WEAVE) MICRODUR.**

This screen with smaller retentions is mainly used in 80 micron variety. The PZ80 S stands for a strong weave with 80 micron absolute retention and wire thickness of 0,2 and 0,4 mm.

One should pay attention to the following characteristics;

Screen thickness = 0,75 mm

Wire warp =0,40 mm, Wire Shute =0,20 mm

Air permeability is 2.300 l/m<sup>2</sup>xsec.

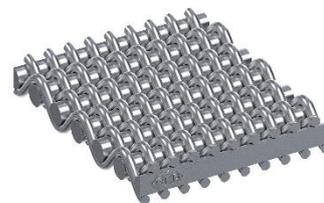
Sieve test (glass pearl)=80-90 micron absolute. Weight is 3,1 kg/m<sup>2</sup>.

The market offers screens under the same name but in reality they are 132 x 32 mesh.

The screen used is 0,18 mm shute and 0,38 mm warp resulting in only 100-110 micron and air permeability of 4.100 l/m<sup>2</sup>xsec.

The main difference is however the weight i.e. only 2,7 kg/m<sup>2</sup> which is 15 % less.

This screen should be much less in price but when possible avoided since it can be replaced by our 24 x 110 Dutch weave having the same retention at much lower cost.



Typical use in edible oil applications ; dry degummed oils to replace centrifuge (clay or filter aid with silica), bleached oils with clay and/or silica (direct or with pre-coat). Interesterified oils, hydrogenated oils and detox oils with clay and activated carbon. Depending on particle size one can select direct filtration or filtration with pre-coat and even a little body feed in some cases.

#### **E) TELA WEAVE FILTER SCREEN.**

This screen is more used as a back-up screen in special leaf designs but has recently been tested on bleached oil filtration.

The Tela has shown a very good performance but is expensive and not better than other screen used in these applications.

Tela 565 weave, wire 0,3 mm and retention approx 275 micron.



#### **F) KÖPER TRESSEN SCREEN (KPZ55)**

When because of the application or because of filter type and model it becomes important to have even smaller retention screen (centrifugal filters and precious catalyst applications) we can select the normal reversed Dutch weave (This screen is available down to 10 micron but the screen becomes too tight for any filtration and with only very little open area huge filter area's would be required to handle industrial capacities).

The screen has wire diameters of 0.034 mm (warp) and 0,11 mm (shute) which will make it very weak and easy to damage.

KPZ 55 Koeper panzer Tressen weave, wire 0,15/0,3 mm and retention approx 55 micron.



#### **Plant 1:**

#### **Plant 2:**



The industrial screen with the lowest micron retention used is the KPZ 55 with wire thickness of 0,15 and 0,3 mm . This screen results in 55 micron absolute retention and a good strength comparable with PZ 80 S type. The 5 micron still allows a high relative flow rate at low clean DeltaP. In special cases weaves with retentions < 40 micron are used but require special attention.

Typical use in edible oil applications ;none.

this information is by far not complete and one can choose from a variety of different screens that not have been mentioned.

Multi braid screen , solid weave , sintered weaves etc are other options that can be chosen off in different applications.

With special attention of which screen is used for which application in the edible vegetable /animal oil & fat , bio-dies and oleo-chemical industry we are able to provide you with actual up to date write up 's on the following applications;

- Crude oil filtration after expeller presses in both pre-press and full-press applications.
- Miscella filtration (lecithin)
- Bleached oil filtration (BE) and Detoxificated oil filtration (AC).
- Pre-treatment of oil following (BE or Silica) degumming and prior to trans esterification in bio-diesel process
- Hydrogenated oil filtration.
- Post bleached oil filtration.
- Sterol/Glucosides Filtration in bio-diesel process
- Winterised oil filtration.(both full conventional winterising and polish winterising after centrifugal dewaxing)
- Fractionation.
- all polishing filtration.

Other area's of expertise are ;

- Sugar and sweeteners (Cane sugar carbonitiation and sulfitation)
- Cacao, Gelatine, pectine, and oleo chemicals.
- Oil & Gas incl GTL and CTL
- Chemical applications
- Mineral processing (leaching process mixed sulphides) Nickel , Zinc., Gold (Merril Crow process), Copper polish sulphides , Uranium (yellow cake), molten sulphur, etc .

We hope that this will help in the much wanted and required overall improvement and in case of any questions please call our service and support centre

VT Wong at PMI Sdn,Bhd. Mail ( [vtwong@pmi-group.com](mailto:vtwong@pmi-group.com).)

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40150 Shah Alam,  
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Tel: +605 527 5010 / 4286 Fax: +605 527 5210