All Metal Solutions
Fabrication & Engineering Sheet - Metal
Commercial Stainless Steel Kitchens
(Previously Rollpress-Wrights)

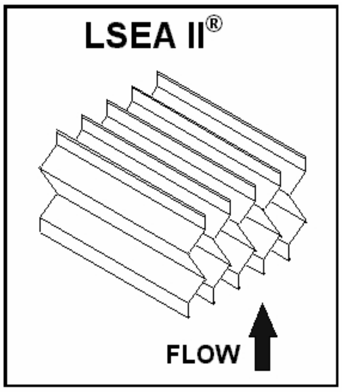
ABN 43 108 326 987

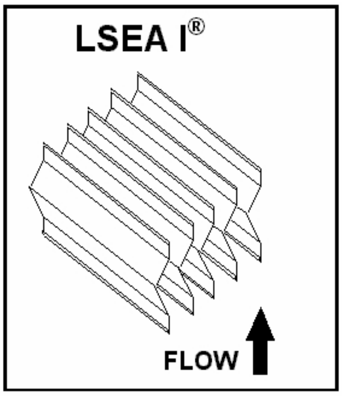
22-30 Southgate Drive
Southgate Industrial Park
MACKAY QLD 4740

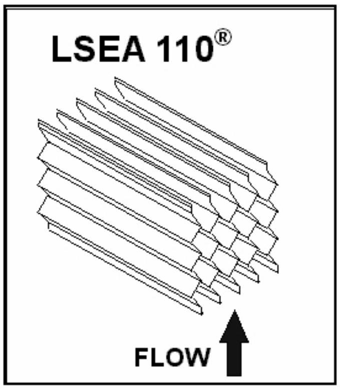
Telephone: (07) 4952 2255
Fax: (07) 4952 3864
Email: admin@allmetal.com.au

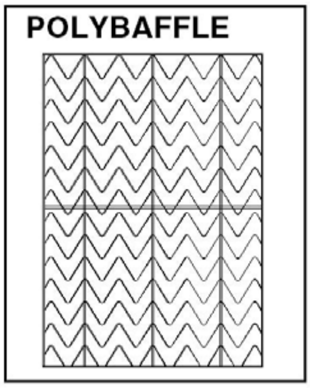
P.O. Box 5750
Mackay Mail Centre
MACKAY QLD 4741

MINIMIZATION OF SUGAR LOSSES
WITH
LOUVRE SUGAR ENTRAINMENT ARRESTORS









REGISTERED DESIGNS NUMBERS

134177 134298 134178

DESIGNED TO SUIT VARIOUS DUTIES IN

EVAPORATORS VACUUM PANS SUGAR DRYERS

- STANDARD MODULE OR CUSTOM MADE
- VERTICAL, HORIZONTAL OR ANGLED POSITIONING
- ROBUST CONSTRUCTION USING STAINLESS STEEL
- SIMPLE INSTALLATION
- COMPETITIVE PRICES

OTHER TYPES OF ARRESTORS

STANDARD CATTLE CREEK CHANNEL MAZE

ALSO AVAILABLE FROM ALL METAL SOLUTIONS

No Job Too Small

All Metal Solutions
Fabrication & Engineering Sheet - Metal
Commercial Stainless Steel Kitchens

NEW LOUVRE ARRESTORS FOR DE-ENTRAINMENT OF SUGAR VAPOURS

C. C. van Lint*, P. G. Wright**,
G. D. Ingram** and H. Martel*

***ALL METAL SOLUTIONS**
****SUGAR RESEARCH INSTITUTE**

LSEA Louvres

BACKGROUND

Louvres are used to remove droplets of juice or liquor from vapour produced in evaporators and vacuum pans, and to collect dust from air exiting sugar dryers.

LSEA I™, LSEA II™ and **LSEA 110™** are louvres designed by ALL METAL SOLUTIONS (ROLLPRESS-WRIGHTS). These louvres are modifications of the standard “Cattle Creek” (CCK) louvre design.

In 1997, SRI was commissioned by ALL METAL SOLUTIONS (ROLLPRESS-WRIGHTS) to conduct a test program on **LSEA I™**, **LSEA II™, LSEA 110™** and a range of other louvres including POLYBAFFLE louvres, CCK louvres, wave plate eliminators and inverted channel maze separators.

The pressure drop **(ΔP)** and the limiting face velocity **(V_{LF})** were selected as indicators of louvre performance.

PERFORMANCE INDICATORS

PRESSURE DROP
(ΔP)

ΔP occurs in the vapour flow through the louvres.

A velocity square law expression is used for the prediction of **ΔP.**

LIMITING FACE VELOCITY
(V_{LF})

V_{LF} is the face velocity of gas or vapour below which re-entrainment of large droplets will not occur.

V_{LF} is estimated from the *Souders-Brown* equation.

For good efficiency, the actual gas or vapour velocity should be less than **V_{LF}** in order to prevent re-entrainment of the collected liquid.

Generally, a good louvre has a low **ΔP** *and a high* **V_{LF}** **.**

TEST APPARATUS

Consisted of an air blower, water sprays and a duct fitted with a selection of test boxes containing the louvres.

The louvres could be oriented at variable angles, and were tested at the following orientations.

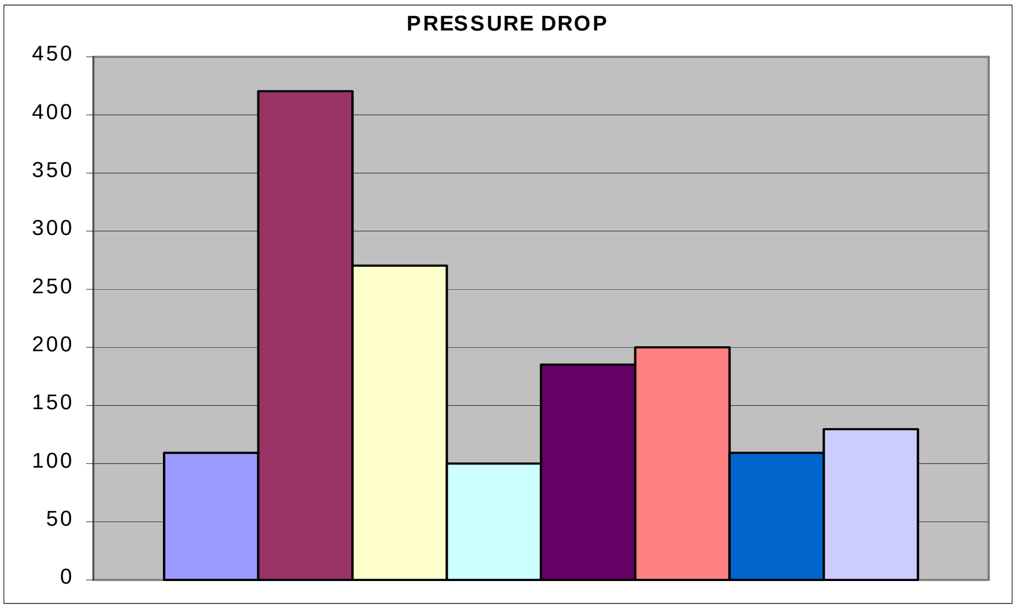
$\mathbf{V_{LF}}$ was measured with a *Velocicalc Plus 8360* hot wire anemometer.

$\mathbf{\Delta P}$ was measured with the differential pressure function of the *Velocicalc* unit.

LOUVRE	ORIENTATION
POLYBAFFLES (large)	Horizontal
CCK	20^0 tilt
LSEA 110™	20^0 tilt
LSEA I™	20^0 tilt
LSEA II™	20^0 tilt
Wave plate eliminator	20^0 tilt
Inverted channel maze separator (ICMS)	Horizontal 4^0 tilt

PRESSURE DROP (Pa) AT LIMITING FACE VELOCITY
&
LOUVRE AREA (m^2) REQUIRED PER 100 T/H VAPOUR

FINAL EVAPORATOR CONDITIONS



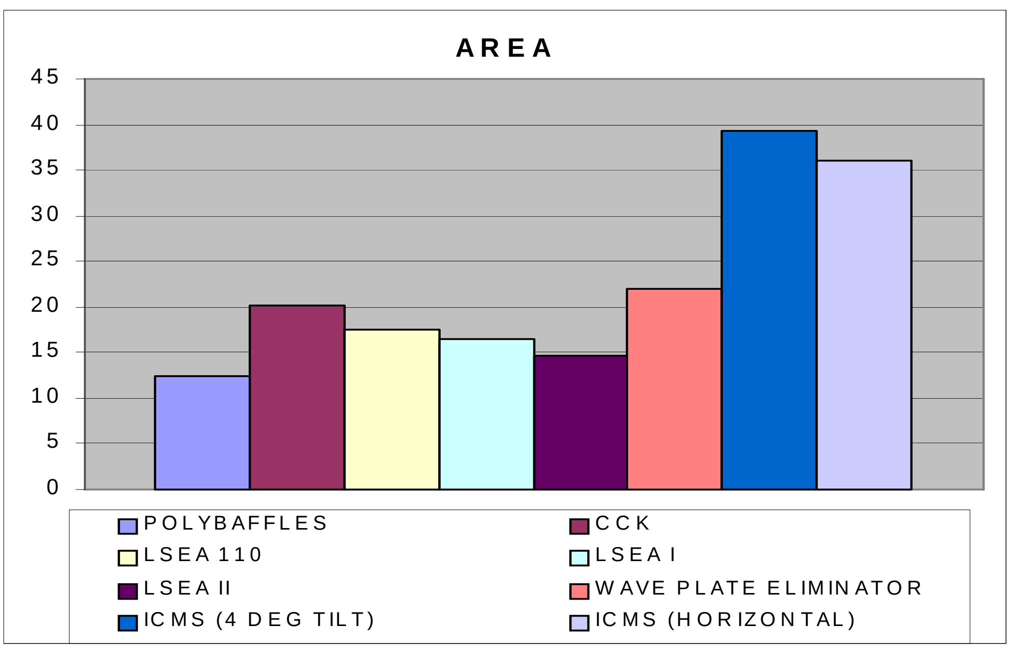


FIGURE 1

PRESSURE DROP (Pa) AT LIMITING FACE VELOCITY

FINAL EVAPORATOR CONDITIONS

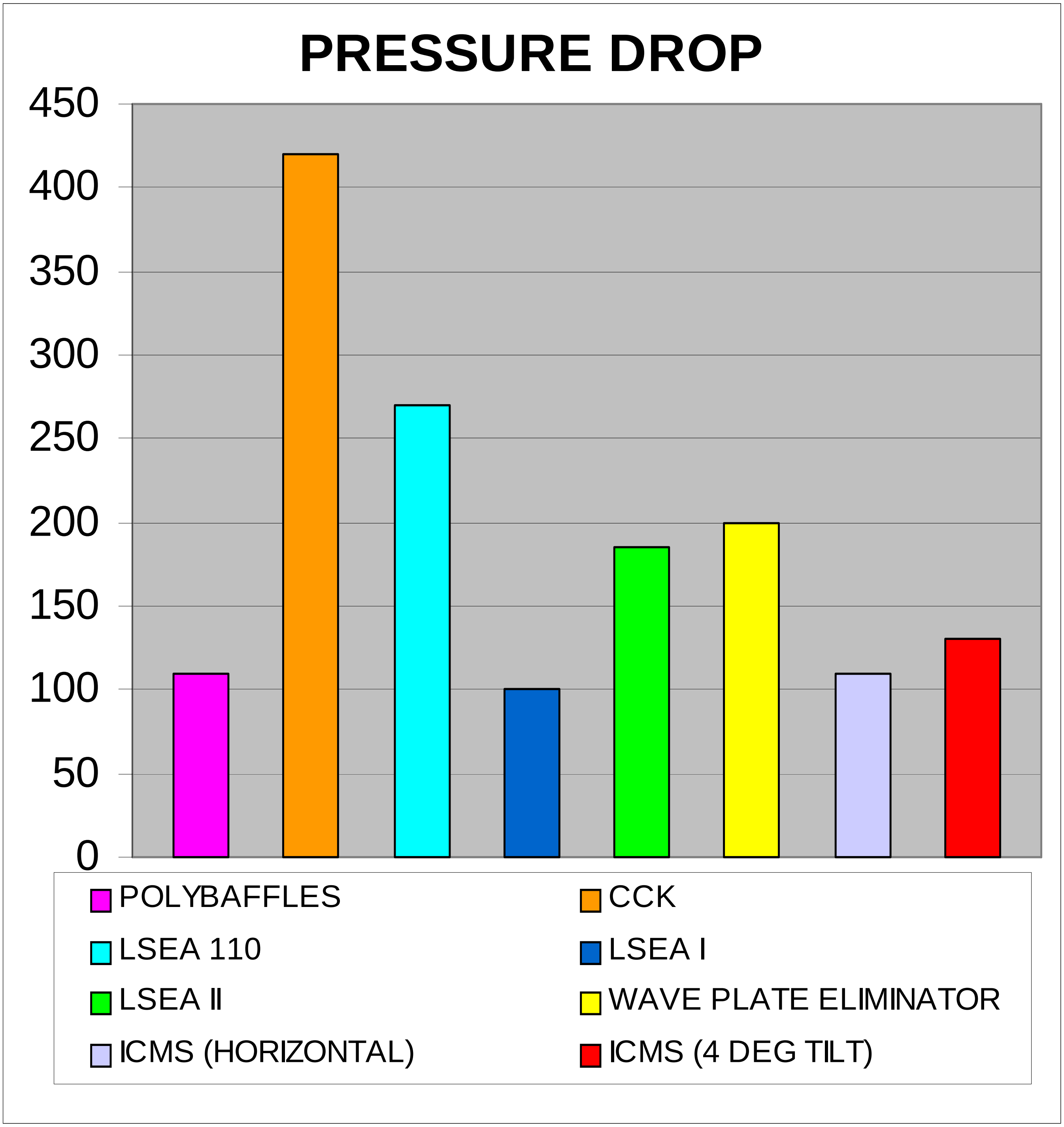


FIGURE 1

LOUVRE AREA (m^2) REQUIRED PER 100 T/H VAPOUR

FINAL EVAPORATOR CONDITIONS

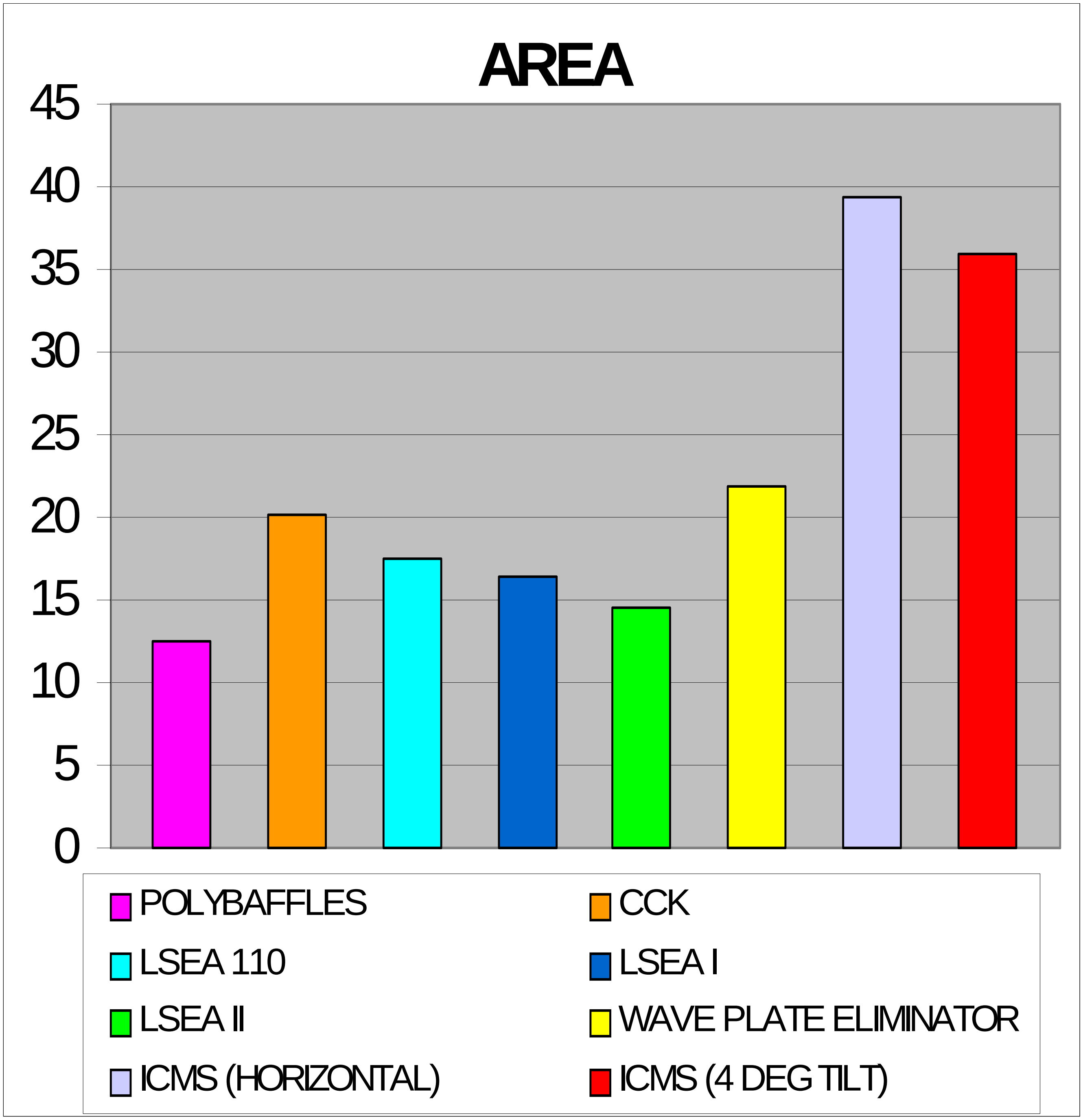


FIGURE 2

CAPTURE EFFICIENCY OF VERY FINE DROPLETS

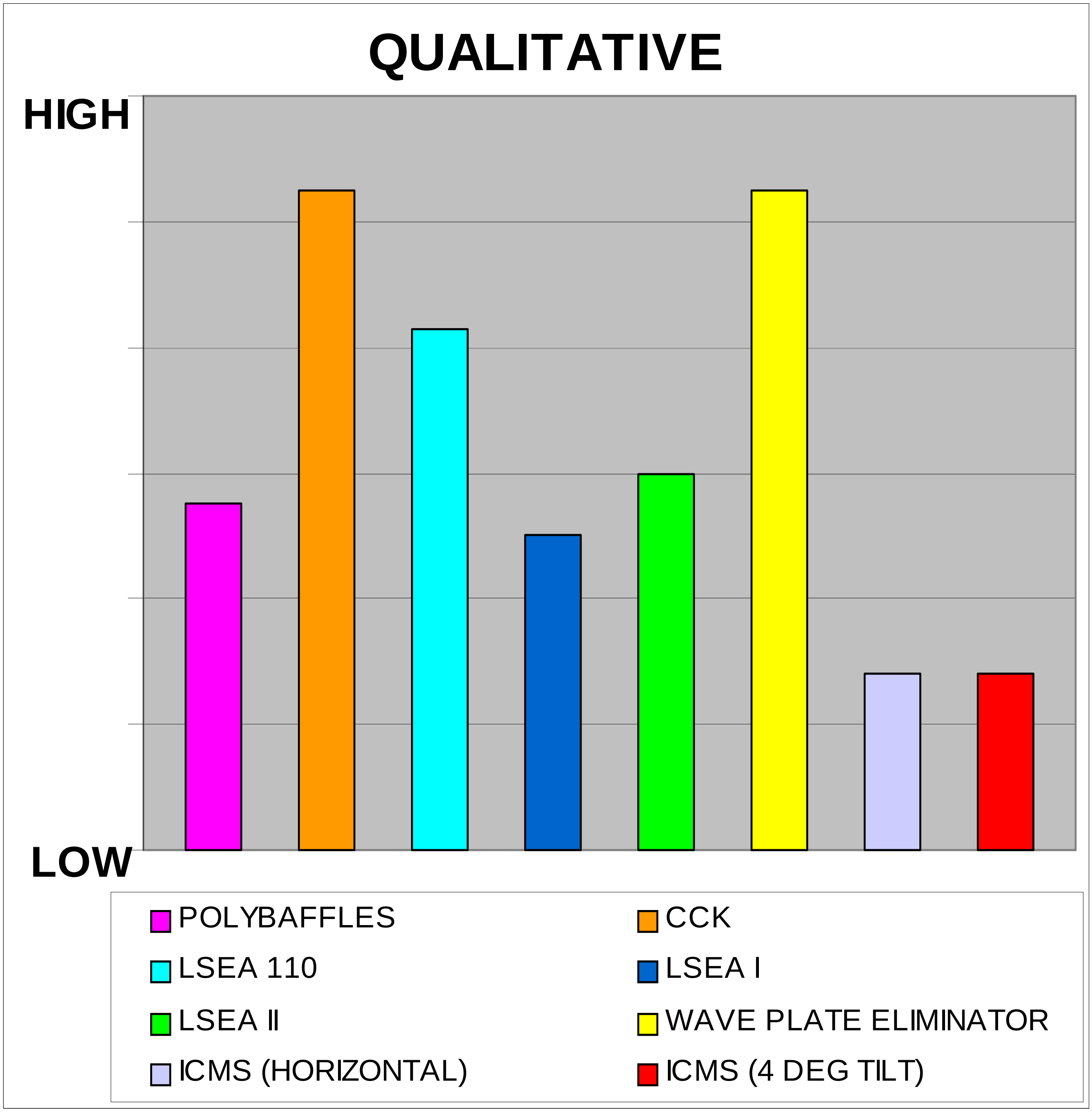


FIGURE 3

CONCLUSIONS

Figure 1 shows that, in a final evaporator, where an upper limit of **ΔP** of about 400 Pa is recommended, **LSEA I™** has the lowest **ΔP** value at 100 Pa. POLYBAFFLES and the horizontal inverted channel maze separator follow at 110 Pa, and the **ΔP** for **LSEA II™** is 185 Pa.

Figure 2 shows the louvre area required in final evaporator conditions (at 100 t/h vapour). The louvre area required steadily decreases from the CCK to the **LSEA II™** and the latter is about 17% higher than the POLYBAFFLES.

The $\mathbf{V_{LF}}$ values of the **LSEA I™**, **LSEA II™** and **LSEA 110™** are about 20-40% higher than the $\mathbf{V_{LF}}$ of the CCK but they are about 15-30% lower than the $\mathbf{V_{LF}}$ of the POLYBAFFLE.

Figure 3 shows the capture efficiency of very fine droplets. CCK and wave plate eliminators were most efficient in this mode. **LSEA 110™** is the next best followed by **LSEA II™** which is in turn better than the POLYBAFFLES and **LSEA I™**. In final evaporator conditions, the liquor is quite viscous and fine droplets should not be formed.