

ActionLaser

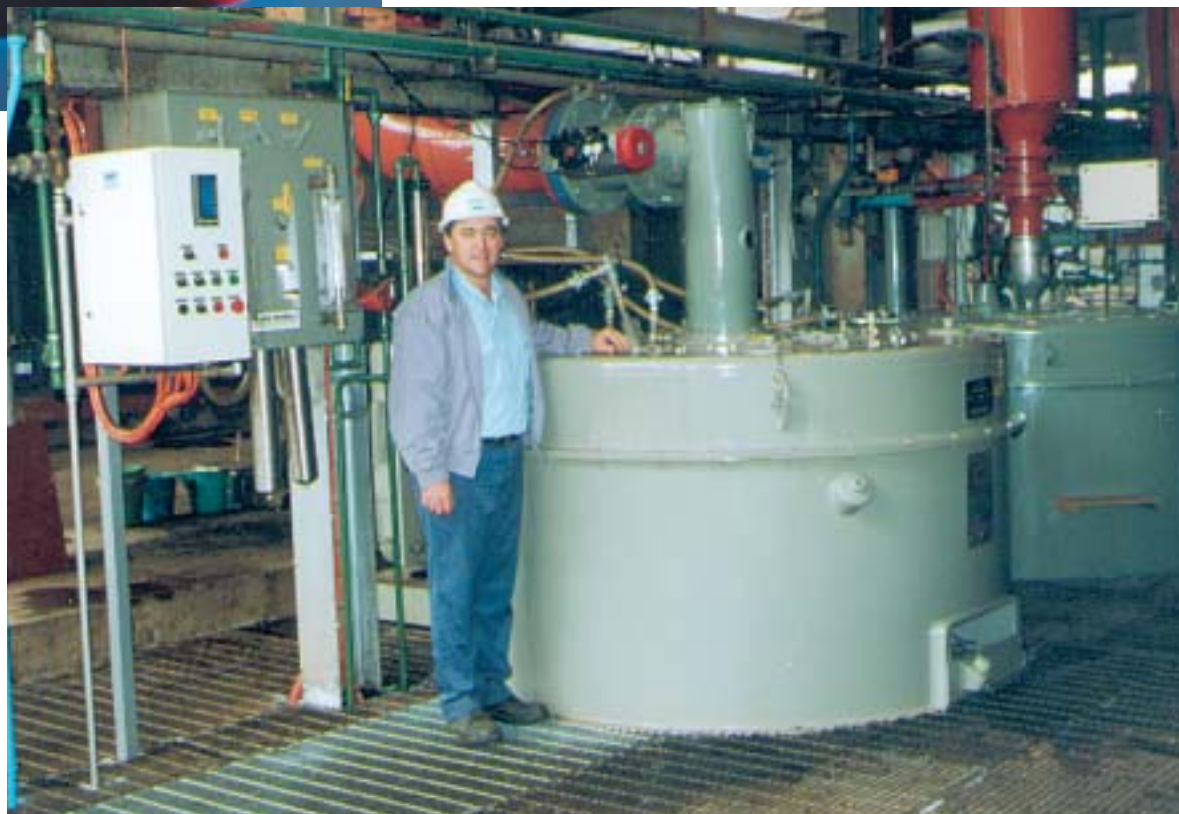
LaserScreens

Stainless Steel Laser-Drilled Centrifuge Screens



LaserScreens

Superior Performance and Durability in the Sugar, Food Processing, Chemical and Mineral Processing Industries



Export Data Sheet



ActionLaser: Applying laser technology to industrial filtration and screening

What is a LaserScreen?

LaserScreens are sheets of stainless steel perforated with millions of tiny tapered holes. The holes may be circular or slot shaped. Each LaserScreen is accurately perforated by a patented laser process to specific dimensions and open area.

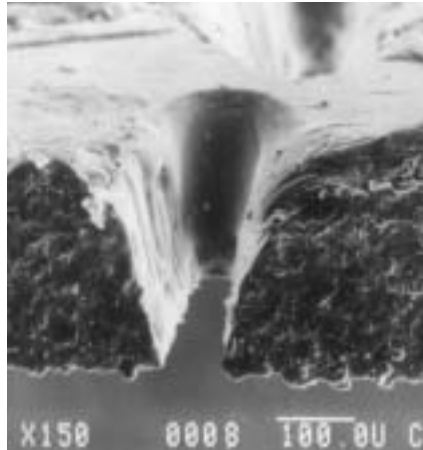
Unlike almost all other methods for manufacturing screens, laser drilling enables holes to be much narrower than the thickness of the material. Slot widths or hole diameters are available between 50 and 700 microns (0.05 and 0.7 mm) while material thickness is typically between 0.2mm and 3mm. High open area percentages are available (for example, up to 25% with 200 micron diameter holes in 0.22 mm thickness).

Great flexibility in screen shape and design is offered. The perforated area may be up to 0.8 metres wide and 2 metres long. Perforated and unperforated areas are routinely patterned and shaped to customer specifications.

LaserScreen perforations have very sharp, hardened working edges and high relief angles to achieve high separation efficiencies and prevent clogging. LaserScreens have close tolerances on slot width to accurately size particles, and very smooth working faces to aid flow. The working face is often plated with hard chromium to enhance its resistance to abrasion.

Although stainless steel is the popular choice of material, a wide range of metals can be laser-drilled.

*Cover photograph:
Silver-Weibull 5230 continuous low grade centrifugal. Isis Central Sugar Mill, Queensland Australia.
Centrifugal supplied by Importex (Qld) Pty Ltd.*



*LaserScreen slot cross section showing high relief angle and extremely sharp edges (magnification x 150).
100 MICRONS: _____*



*LaserScreen slot showing sharp slot edge and smooth working face (magnification x 260).
100 MICRONS: _____*

LaserScreens for Continuous Centrifuges

For the sugar industry, LaserScreens have a greatly increased wear resistance compared with chrome-nickel screens. Shorter slots and tougher material prevent enlargement and stretching of the slots over the backing screen. LaserScreens are also less likely to clog or corrode.

Fine LaserScreens for chemical and food industry applications have the benefits of chemical inertness, increased lifetime and strength.

Heavier duty centrifuge screens are used in high load sugar refinery applications, and to replace wedgewire baskets in the food processing, chemical and mineral processing industries.

Application areas include: Sugar (from cane and beet), lactose, fruit juice, wheat starch, pharmaceuticals, fine coal and other fine minerals.

Materials

LaserScreens are usually supplied in stainless steel and are available in a range of thicknesses from 0.2 mm to 3.0 mm. For many centrifuge screens, particularly sugar centrifugal screens, the standard material is 0.2 mm 316L stainless steel with 15 microns of hard chromium coating on the working face.

| Slot width (microns) | Slot width (inches) | % Open Area | |
|----------------------|---------------------|-------------|---------|
| | | Standard | Maximum |
| 60 | .0024 | 6.5 | 9.0 |
| 70 | .0028 | 7.5 | 10.0 |
| 90 | .0035 | 10.0 | 12.0 |
| 100 | .0039 | 11.5 | 14.0 |
| 120 | .0047 | 13.0 | 16.0 |
| 150 | .0059 | 15.0 | 20.0 |
| 200 | .0079 | 20.0 | 25.0 |

Standard Screen Parameters for 0.22mm thickness (example only).



Application Example: Screens for Continuous Sugar Centrifugals

Minimise Sugar Losses

Low grade continuous centrifugal stations are one of the main areas of sugar loss in the manufacturing process. When chrome-nickel screens are used, these losses are exacerbated by premature distortion and wear of the screens. This allows excessive loss of sugar crystals to the final molasses. LaserScreens are impressively durable and so avoid such excessive sugar losses. Their durability also facilitates operation at high loadings, which further minimises sugar loss.

Problems of chrome-nickel screens

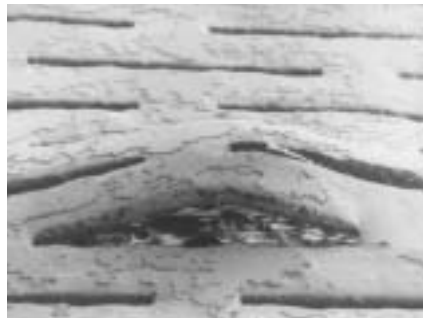
Chrome-nickel screens have a soft nickel substrate that is readily susceptible to deformation. This leads to slot distortion and consequent sugar crystal loss to molasses. Adhesion of the thin chromium layer is also relatively poor. Screen deformation therefore leads to chromium loss, which is exacerbated by corrosion at the chromium-nickel interface. The soft nickel substrate then erodes quickly, resulting in slot enlargement and further sugar loss.

LaserScreens are robust

LaserScreens feature a high-tensile stainless steel substrate and a pattern of shorter slots. LaserScreens therefore have up to ten times the tensile strength of chrome-nickel screens and robustly resist slot distortion. Also, adhesion of the chromium layer is outstanding. For these reasons LaserScreens exhibit long-term retention of sharp slot edges and design slot width, ensuring that sugar crystal losses are minimised over the considerable lifetime of the screens.



Harwood Sugar Mill and Refinery, Australia



*Chrome nickel screen showing slot distortion over the backing screen (magnification x 40).
1000 MICRONS: —————*

High grade continuous centrifugals

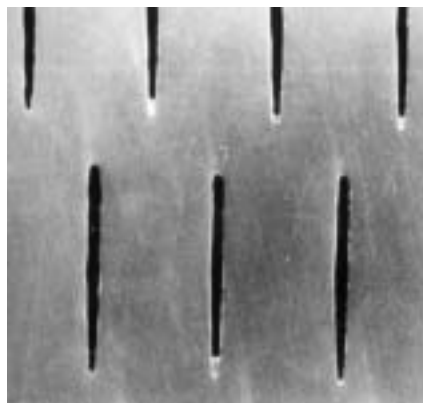
LaserScreens offer impressive durability and longevity when subject to heavy machine loadings. These attributes have made LaserScreens the clear preference of companies operating the increasingly popular high grade continuous centrifugals.

Actionlaser offers a wide range of perforation specifications for these applications.

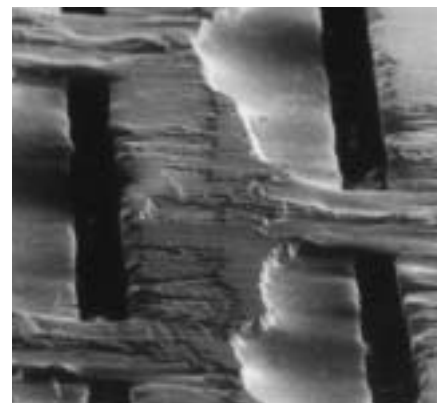
Large low grade centrifugals

The same durability and longevity advantages make LaserScreens particularly suited to the increasing numbers of large, low grade continuous centrifugals being commissioned throughout the industry.

Comparison of 60 micron LaserScreen and chrome-nickel screen at similar magnification after 1350 hours of operation. Note loss of chromium coating and extreme slot enlargement with the chrome-nickel screen.



LaserScreen.



Chrome nickel screen.

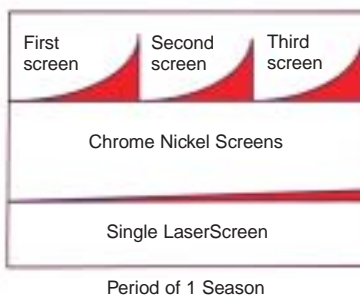


Example of Cost / Benefit Comparison: Screens for Continuous Sugar Centrifugals.

Screen longevity and durability

LaserScreens offer much greater longevity in terms both of absolute hours of operation and of tonnes of sugar processed per screen lifetime. Their service life is generally at least three to four times that of chrome-nickel screens. In most sugar factories LaserScreens typically remain in operation for a full crushing season and in some installations have been used for three seasons and more.

Comparison of final molasses purities.



(Red areas represent sugar lost)

Relative sugar losses

LaserScreens' resistance to slot distortion, and long-term retention of chromium layer and design slot width, results in a decrease in final molasses purity (compared with the use of chrome-nickel screens).

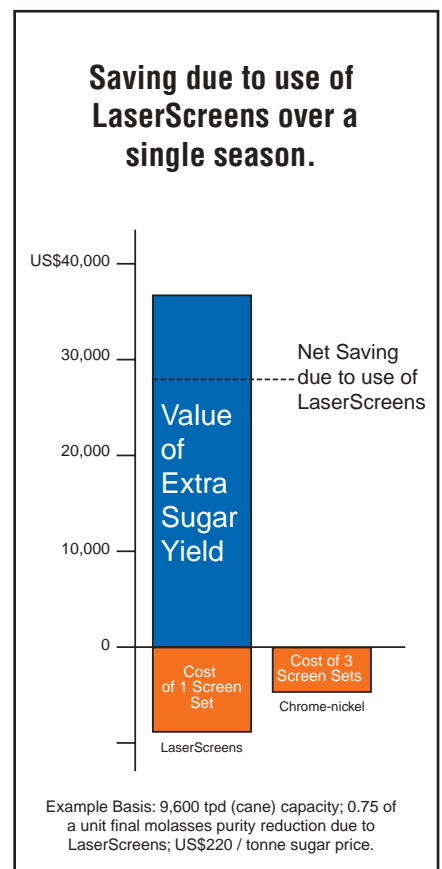
Due to fluctuations in process conditions, it is difficult to monitor this small but valuable decrease in purity. Indeed, this is the reason why badly worn chrome-nickel screens are frequently not identified and removed, until well after substantial sugar crystal loss has already occurred. However careful long-term tests show that the use of LaserScreens results in an average decrease of 0.75 of a unit in final molasses purity. In an average size mill this represents a saving of US\$ 37,000 in improved sugar yield over the course of a season.

Downtime Costs

Downtime costs are greater for chrome-nickel screens as they must be replaced much more often due to wear and damage. In addition to their absolute longevity, LaserScreens can withstand impacts from small foreign objects and large sugar lumps, which would destroy chrome-nickel screens.

Purchase price of screens

The price of LaserScreens is significantly higher than that of chrome-nickel screens, per Set. Nevertheless, the use of LaserScreens is more than justified by their superior longevity and performance.



ActionLaser Pty. Ltd.

ABN 53 003 540 038

Unit 1, 39 King Road
Hornsby
NSW 2077 Australia

PO Box 1926
Hornsby Westfield
NSW 1635 Australia

Tel: +(61-2) 9476 3790
Fax: +(61-2) 9476 6993

Email: admin@actionlaser.com.au
Internet: www.actionlaser.com.au

ActionLaser

Is the exclusive worldwide licensee of technology developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Sugar Experiment Stations Board, Australia.

LaserScreens are available worldwide. Your local distributor is:

