SELEE® CS-X®
Aluminium Cast House

SELEE Corporation developed and introduced reticulated continuous open-pore ceramic foam filters (CFF) for aluminium cast house filtration in 1974. During the 1980's there was widespread market acceptance of SELEE• ceramic foam filtration technology for a broad range of fabricated aluminium products including rigid packaging materials, lithographic sheet, aerospace products (sheet, plate, forgings and extrusions), bright finish trim, condenser tubing, foil, architectural extrusions, foundry alloys and electrical conductor cable and wire.

The subsequent rapid market acceptance and growth of SELEE• CFF technology into aluminium cast houses of all types and levels of sophistication was due to the following reasons:

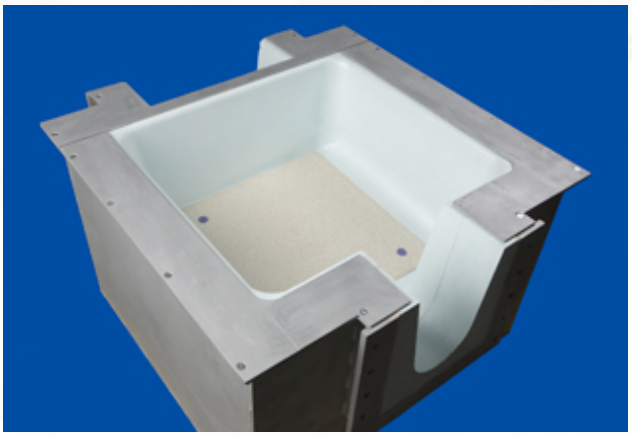
1) Ease of use and operator acceptance
2) Operational flexibility – drain after every cast
3) Low variable operating cost
4) Effective inclusion removal
5) Small footprint requirements (minimal floor space required for installation)

The new SELEE® CS-X® filter is a significant technical advancement over the existing SELEE• phosphate bonded filter as well as phosphate bonded filters from competitor suppliers. The CS-X® filter has the following advantages over the traditional phosphate bonded alumina filters:

1) Improved molten metal corrosion resistance
2) Improved thermal-mechanical properties
3) Improved thermal shock resistance
4) Phosphate-free filter (less reactive, environmentally more "green" filter after use)

SELEE• CS-X® Filters

SELEE• CS-X® Filter Structure



SELEE offers a complete line of standard filter bowls as well as turnkey custom designed filter bowls and pre-heat systems.

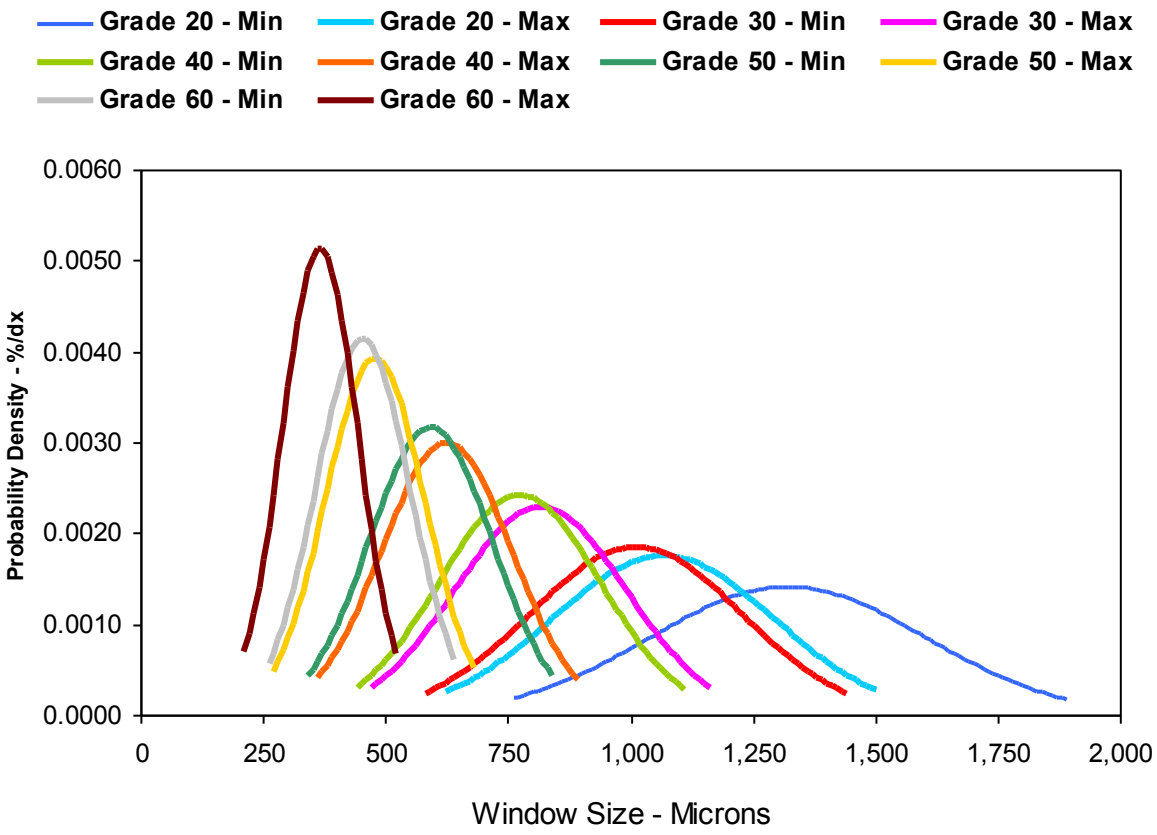
DTA2008-01M, Rev. 4
Rev. Date: Dec 9, 2010

SELEE® CS-X® Filter Description

Filter Material:	Glass bonded aluminosilicate grain
Apparent Density:	2.95 grams/cm^3
Thermal Expansion Coefficient:	5.33 X 10^{-6} / °C (heating to 1350°C)
Macro-porosity:	70 – 80%
Standard Gasket:	Safeseal® Heat expandable at 480°C
Gasket Thickness:	5 ± 1mm
Filter Length/Width Tolerances:	± 2.5mm
Filter Thickness:	50 ± 2 mm
Bevel Angle:	17.5° ± 1.5
SELEE Quality Systems:	ISO 9001

CS-X® Filter Window Size Distribution Graph Showing ± 2 Standard Deviation Spread

SELEE® Window Size Specification Limits	CS-X® Filter Pore Size Grade				
	20	30	40	50	60
Minimum Average - Microns	1,066	815	624	477	365
Maximum Average - Microns	1,320	1,010	773	591	452



Window Diameter Distribution for SELEE• CS-X® filters

Filter Application Information

Filter Sizing: The filter sizing information below should be used as a guideline only. The optimum filter sizing will be dependent on incoming metal cleanliness, metal flow rate and cast duration.

SELEE® Part Number*	Nominal Filter Size, mm	Effective Filter Area, mm^2	Recommend Flow Rate Range, Kilograms/Minute
CSX09YYG	229 X 229 X 50	38,950	27 - 82
CSX12YYG	305 X 305 X 50	74,834	53 - 158
CSX15YYG	381 X 381 X 50	122,331	86 - 258
CSX17YYG	432 X 432 X 50	160,447	113 - 338
CSX20YYG	508 X 508 X 50	227,298	160 - 479
CSX23YYG	584 X 584 X 50	305,763	215 - 645
CSX26YYG	660 X 660 X 50	395,840	278 - 835

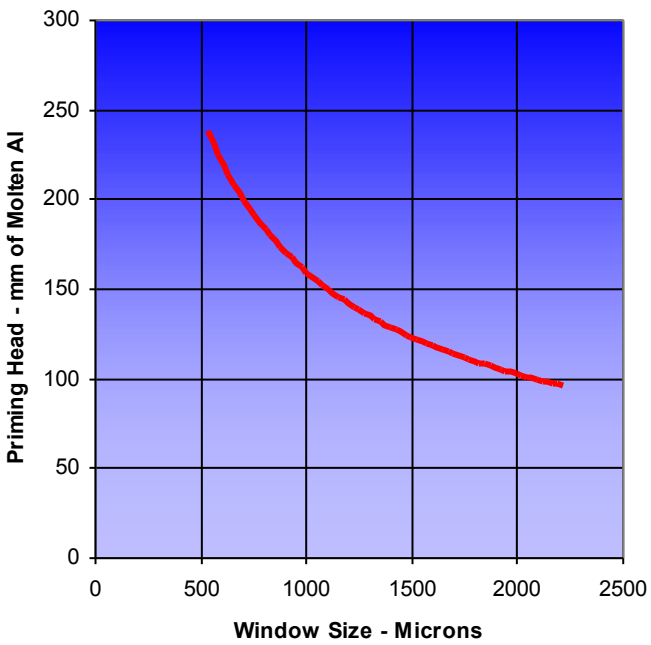
* YY = Pore Size Grade

Filter Priming Head:

A critical metallostatic priming head is required to initiate metal flow through the porous CS-X® filter structure. The critical priming head is dependent on the alloy surface tension, the alloy wetting angle on the filter and filter window size. The table below shows the recommended priming head for standard pore size filters:

Recommended Design Priming Head

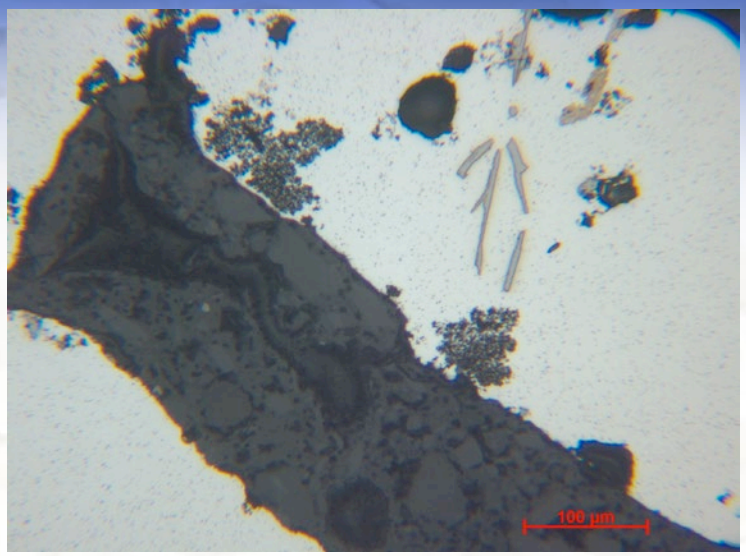
Filter Pore Size	Metallostatic Priming Head - mm
Grade 10	158
Grade 20	183
Grade 30	208
Grade 40	233
Grade 50	257
Grade 60	282



CS-X® Priming Head as a Function of Window Size

Filtration Efficiency:

SELEE® ceramic foam filters remove inclusion particles using a deep bed filtration process. The size of inclusions typically present in molten aluminium are usually significantly smaller (<100-microns) than the window size of the filter (500 to 2,200 microns) and therefore are removed within the filter structure. The CS-X® inclusion removal efficiency is dependent on filter pore size (grade), inclusion size, inclusion type (density, wetting characteristic), and metal velocity through the filter.



Optical photomicrograph of magnesia clusters adhering to the surface of the CS-X® filter. Alloy Type: AA5052

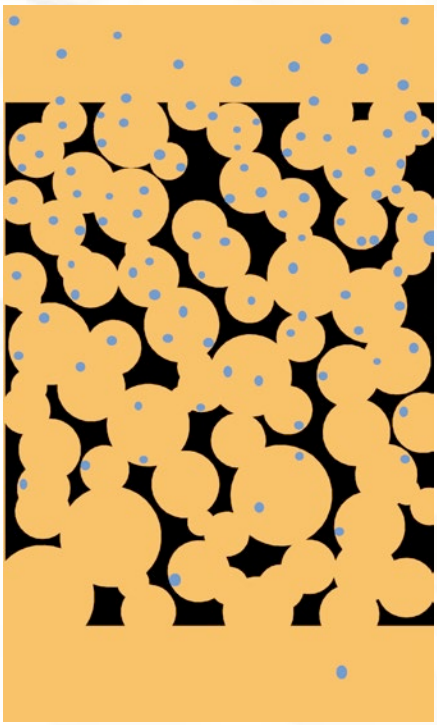
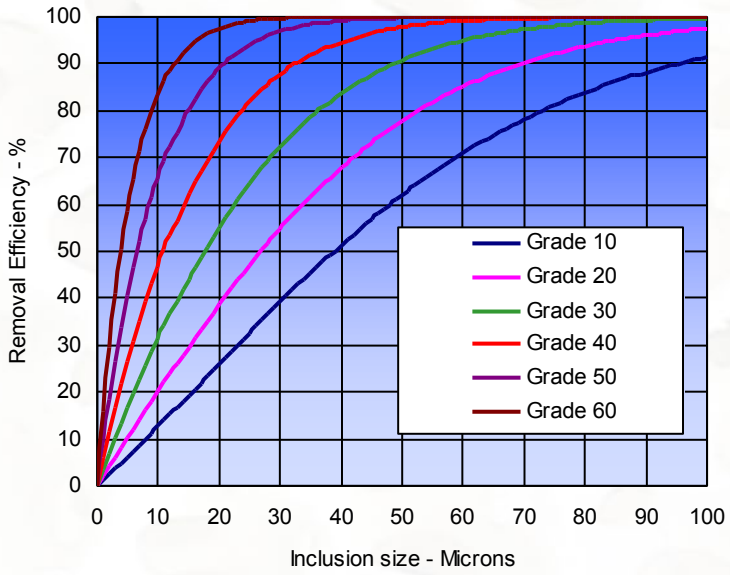


Illustration of depth filtration in a SELEE• CS-X® filter.



Calculated oxide particle removal efficiency of SELEE® CS-X® ceramic foam filters as a function of inclusion particle size and filter pore size (grade).

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DTA2008-01M, Rev. 4
Rev. Date: Dec 9, 2010