

72: PopandSon sluice – 2000s research in USA



Figure 146. POPANDSON SLUICE
Carrying a standard over-the-shoulder PopandSon sluice in the Gobi Desert of Mongolia. (photo: Robin Grayson)

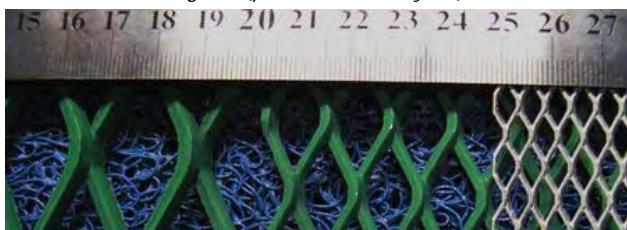


Figure 147. RANGE OF RIFFLE SIZES
The large, medium and tiny raised expanded metal mesh in a 'standard' PopandSon sluice. (photo: Robin Grayson)

The PopandSon sluice was invented in 2005 by Steve and Jason Gaber (PopandSonminers of Alaska Gold Forum AGF) in Washington State. The PopandSon sluice is a development of the innovative Damn Fine Sluice™ (DFS) invented by Phil Hontz of New Mexico and made by the Damn Fine Equipment Co (www.damnfinesluice.com) in the 1990s. The DFS is a simple cheap device consisting of a smooth slick plate followed by a section of tiny raised expanded metal mesh fitted on matting, all set in a short sluice-box. This is part of relentless effort by recreational miners in North America to recover fine gold using small sluices for small dredges, high bankers and clean-ups.

Steve and Jason Gaber conducted bench tests with tungsten (W) powder and gold (Au) tracers [193] in a version of the PopandSon sluice consisting of an aluminium sluice-box lined with simple thin ribbed rubber followed by unbacked Nomad™ matting with style #3/16 aluminium raised expanded metal mesh fitted on top.

Operation

Initial testing with chunky tungsten powder as tracer suggested by Steve Bryce (Zooka of AGF) indicated high percentage gold recovery at fast flows and feeds.

Using 100-200 mesh placer gold tracer run over 88.9cm of style #3/16 raised expanded mesh clamped on unbacked Nomad™ matting resting on ribbed rubber mat and sloped at 16mm per metre length, achieved nearly 100% recovery. At a steeper slope of 36.5mm per metre, gold recovery was 95-97%. The steeper slope allowed a much higher feed rate.

The test sluice has two sections of sluice liner, each about 43cm long. The top section is the primary test bed, and the end section is to scavenge gold in the tailings of the top section. For recovery of 100-200 mesh gold (74-149µ) the best performance of the top section was 92-94% using style #3/16 expanded metal mesh, but fell to 86% using style #1/2 expanded metal mesh.

For 200-325 mesh gold (44-74µ) at a gentle slope of 16mm per metre length, the recovery was only 65% in the top section but 85% for both sections.

Steve and Jason Gaber suggest a "fairly large drop-off in recovery efficiency somewhere below 200 mesh (44 microns)".

Experimental work is limited to narrow sluices (6.5 inches = 165mm) for recreational miners and clean-ups. Yet the PopandSon sluice might be scaled-up for industrial wash-plants if four issues are solved: a) screening feed to about 2mm; b) preventing warping; c) preventing surging; and d) reducing water – for each m³ of loose placer water usage is very high – 19.6m³ for steep angle.

Adoption by placer gold miners

Expanded metal riffles of tiny mesh are increasingly popular amongst recreational placer gold miners, and have potential for artisanal miners and mining companies.

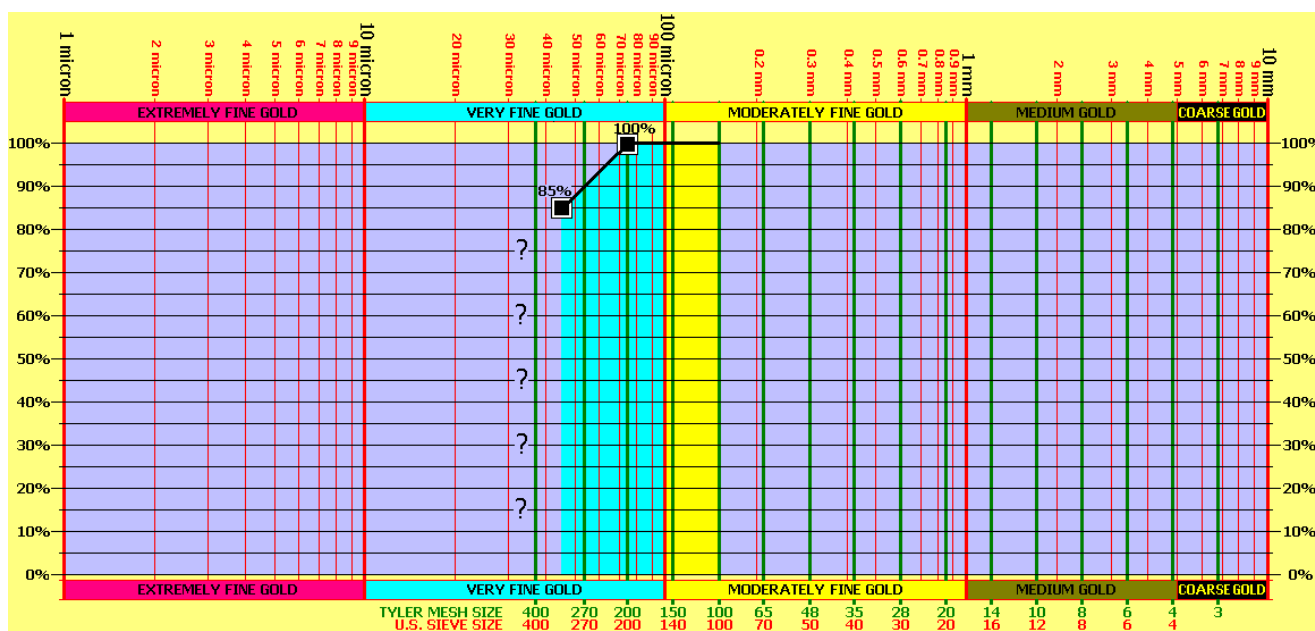


Figure 148. GOLD RECOVERY BY POPANDSON SLUICE
Recovery of placer gold by the PopandSon sluice based on bench tests with gold and tungsten tracers [193]. (compiler: Robin Grayson)