

37: Expanded metal grating riffles – 1980s research in Canada



Figure 79. EXPANDED METAL GRATING RIFFLES
 Raised expanded metal grating suitable for using as large expanded metal riffles. (photo: Robin Grayson)

Expanded metal grating was invented in the early 1880s. The first innovative use of expanded metal as riffles in a sluice was by Robert Hodgson Postlethwaite, a British subject at the Risdon Iron and Locomotive Works in San Francisco. He applied for a patent in 1897, awarded 1900 (US #652,900). It was only in the 1980s that the effectiveness as riffles was proved by scientific tests.

1980s tests in Yukon, Canada

Randy Clarkson and Owen Peer [8] tested relatively “coarse” 4lbs/ft² expanded metal grating and finer 1-10H expanded metal mesh. In flume tests, both displayed, “similar deposition and vortex patterns” and the mesh developed “smaller and more numerous vortices”.

They observed that the grating remained firmly in place whereas the mesh warped off the Nomad™ matting causing “excessive scour”.

The grating has to be ‘Raised (R) = Standard (S)’ and not ‘Flattened (F)’. According to Vincent Ruth of Continental Wire Cloth, “the applications that this product dominates would be used when designing something that requires a walking surface.”

Operation

To comply with the Yukon tests, the sluice is tilted at 50 to 106cm per 4-m length of sluice to ensure the grating can generate many small and distinct vortices.

First a roll of unbacked Nomad™ matting is cut to size and unrolled on the floor of the sluice box. If several pieces of matting are used then their ends are closely butted together to avoid a ‘step’. Instinctively the Nomad™ matting is laid with its smooth side downwards, but there is recent anecdotal evidence that putting the smooth side uppermost either makes no difference or is slightly better (source – Zooka of Alaska Gold Forum).

A sheet of expanded metal grating is cut to fit snugly in the sluice box, and secured by metal or wooden chocks. Several sections may be fitted into a sluice box, butted together with no overlap. Each equates to a ‘riffle set’. The grating is inserted with the raised lips facing upstream to serve as riffles.

The riffles are “coarse” 4lbs/ft² raised expanded metal grating identical to 4.0# grating of the Expanded Metal Manufacturers Association (EMMA) ‘standards’, downloadable: www.naamm.org/emma/literature.php.

Expanded metal riffles achieve a very large concentration ratio (i.e. shed vast amounts of black sand to achieve a gold-rich concentrate), as do flat bar riffles and angle-iron (Hungarian) riffles.

Expanded metal grating riffles can maintain the captured black sand in a loose state for a long time, so continuing to be able to recover gold. This enables clean-ups to be needed only once every 24 hours.

Adoption by placer gold miners

Raised expanded metal riffles of grating type are used worldwide by placer miners.

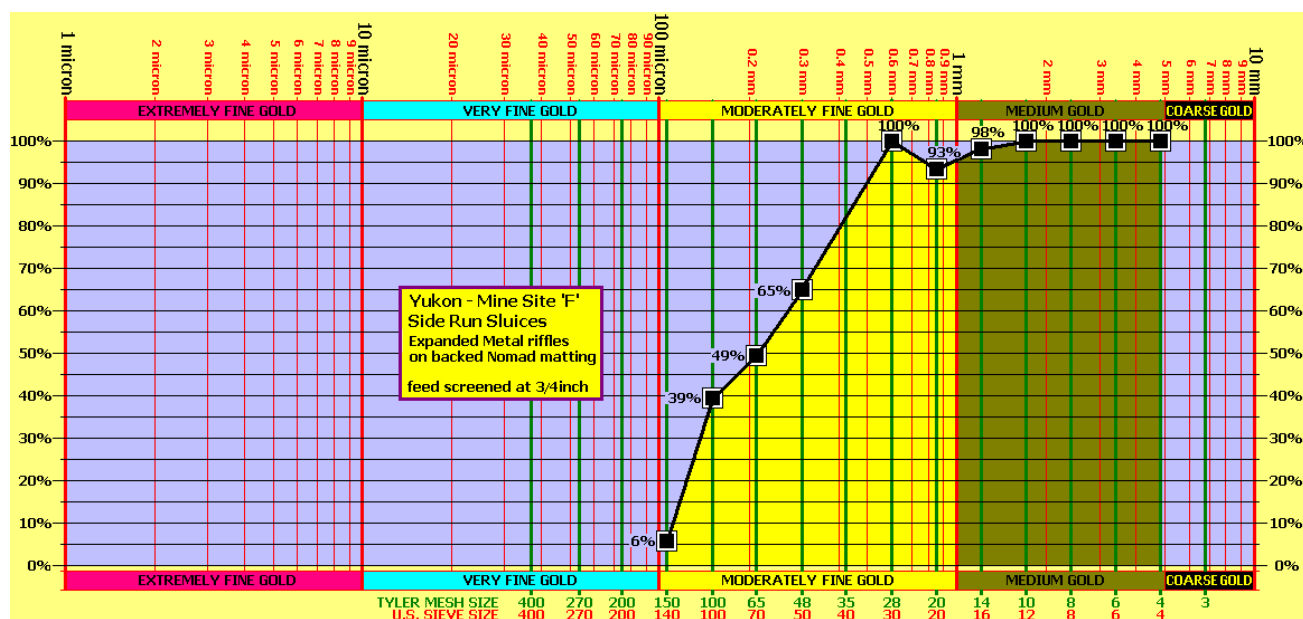


Figure 80. GOLD RECOVERY BY RAISED EXPANDED METAL GRATING ON BACKED NOMAD MATTING – Yukon tests
 Recovery of placer gold by expanded metal grating, type 4lbs/ft² (4.0 grating) on backed Nomad™ matting [86]. (compiler: Robin Grayson)