CROFT
ENGINEERING SERVICES
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DIXON RINGS

The performance of structured packing with the ease of random packing

When reactant columns are packed with 1/8" Dixon rings, the resultant properties are remarkable. A large specific surface area in such a small volume (typically 2500 m^2/m^3 compared to the well-known 15mm Raschig ring with a surface area of 311m^2/m^3)[1] together with optimised differential flow rates between the different chemicals passing through the column, facilitates exceptional separation efficiency.

Introduction

Originally designed in 1946, by Dr George Olaf Dixon of ICI, the Dixon Ring is based on the design of cross partition packing (or Lessing ring) but uses wire mesh to form the rings. Since first being used, Dixon rings have found specific markets where high efficiency mass transfer and exceptionally low pressure drops are required. Initially Dixon rings were handmade which restricted production capacity and obviously affected the price. Croft has now developed a fully automated process which can manufacture the woven wire packing material in a cost efficient way with the ability to produce high volumes very quickly. Dixon rings can be manufactured in sizes as small as 1.5mm but are typically requested as 3mm and 6mm components.

The information presented here is based largely on publicly available information on the performance of the rings and is taken from several sources indicating a range of potential operating conditions and performance characteristics.

Performance Principles

The enhanced performance of Dixon rings is due to the behaviour of a liquid as it flows over the mesh. Under the right conditions, the liquid will wet the mesh material and give an extremely high surface area for mass transfer. This principle can be used to dramatically increase the effectiveness of many mass transfer operations used for absorption, distillation, stripping etc. At the same time as increasing the mass transfer rate, the pressure drop through a column is kept to a minimum.

Figure1- Standard Lessing Ring[2]

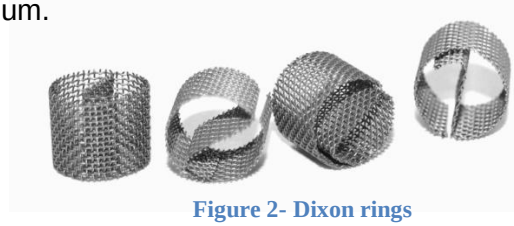

Figure 2- Dixon rings

Comparison with other Packing Materials

The use of a mesh material is similar in principle to the use of traditional standard packing. However, by using Dixon rings it is possible to have the performance benefits of a structured packing type system with the ease of use of random packing. The same considerations for liquid and vapour contact and distribution will be required as for random packing when Dixon rings are used.

Typical physical characteristics[3]

Size mm	Surface area m^2/m^3	Void space %	Packing Factor/litre	Specific Weight kg/m^3
1/16	3,550	90.73	102,200	1150
1/8	2,378	90.98	24,400	570
1/4	900	94.63	2,965	420

Performance

The data shown below clearly indicates the efficiency of Dixon rings. As with any packing, specific testing is relation to your application is recommend.

Typical performance characteristics

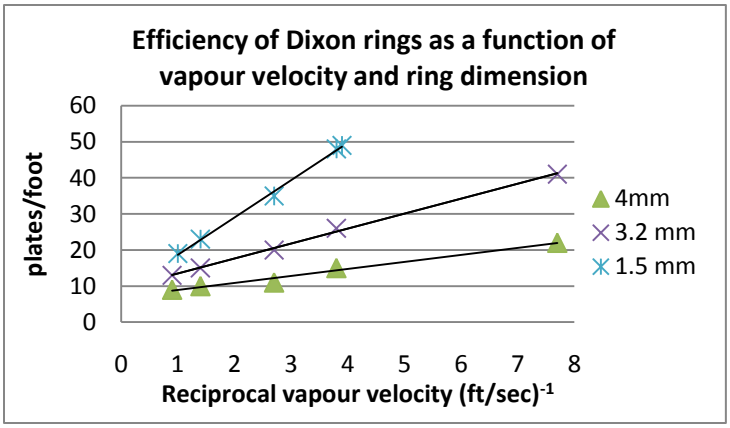

Figure 1- Graph showing the performance of Dixon rings in Distillation[4]

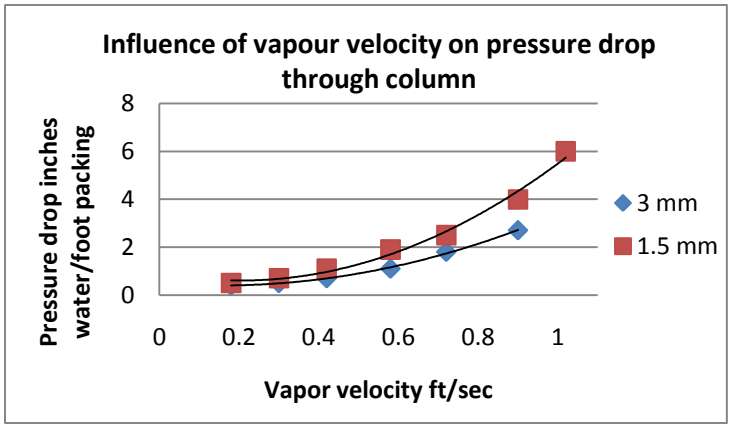

Figure 4- Graph showing performance of Dixon rings in Distillation[4]

Croft the background

Croft was founded by two brothers in 1986 and the design and manufacturing team at Croft has proved a crucial factor in bringing this technology to market in a cost efficient way and they now look forward to using the knowledge gained to help customers like you use Dixon rings as part of your manufacturing process. In addition to manufacturing random column packing materials Croft has established a strong reputation in the innovative use of wire mesh and perforated plate, to manufacture bespoke filters to serve diverse markets in a vast range of applications.

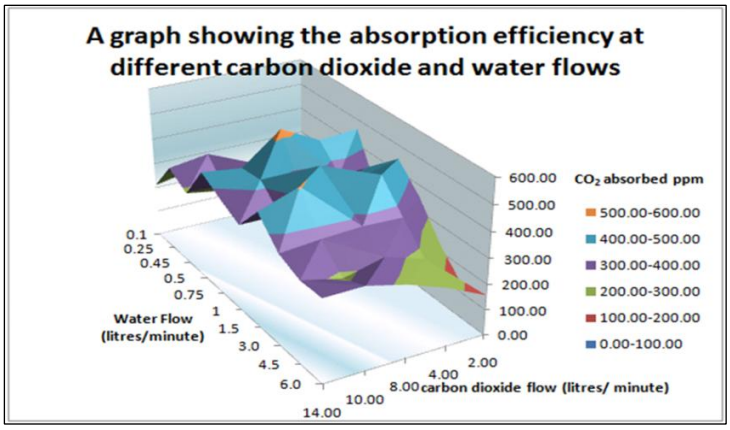

Figure 5- Graph showing performance of Dixon rings in counter current absorption[3]

Uses of Croft's Dixon rings

Crofts' Dixon rings are used worldwide including India and Spain in a variety of applications from distillation of Tritium to Bio Diesel manufacture to extraction of Galantamine from Daffodils to make Alzheimer's treatments. Dixon rings can exceed the performance of other random packing though having an extremely low pressure drop, low HETP together with large surface area making them ideal for use in an immense range of applications.

With increasing regulations on atmospheric emissions, a growing opportunity for Dixon rings is in emissions control through packed scrubbers. Replacing existing less efficient packing with superior Dixon rings with low HETP, can save on the large capital cost of having to replace the whole column.

For more information please view our website www.filters.co.uk/dixonrings.php, watch our videos on Dixon rings. "Dixon rings an Introduction" and "A technical introduction to Dixon rings" which can be found on our website.

Or contact us

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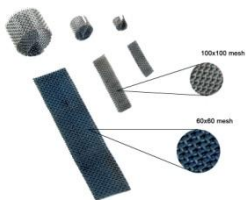

Figure 3-Dixon rings both preformed and formed.

Figure 2-Dixon rings in a Vernier gauge

1 http://raschig-rings.com/metal-packing/, 2 http://www.iwao.co.jp/cpp/ctower.html, 3 Croft Laboratory measurements ,4 Dixon O.G. 1948. High Efficiency laboratory fractionation I Gauze rings packing and flooding techniques for laboratory column. Journal of the Society of Chemical Industry (J.S.C.I), 68(3), 88-91