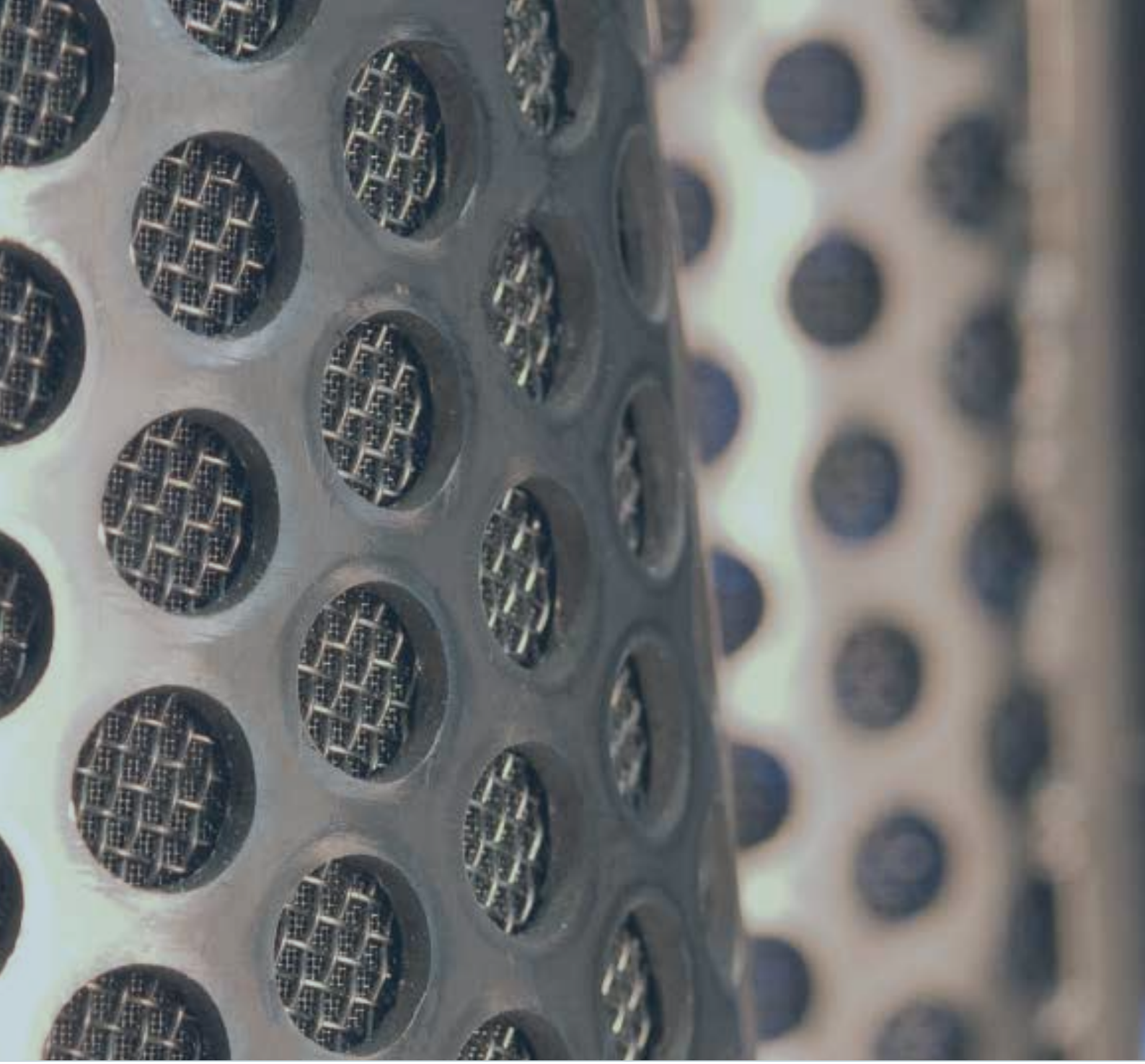

Guidelines For Strainers

Heatric

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INTRODUCTION

This document provides an introduction and some general best practise guidelines for strainers installed as protection for Heatric Printed Circuit Heat Exchangers (PCHEs). It covers the most common strainers used in current process oil and gas applications in the industry. In some applications, the working fluids or cooling mediums are clean; thus, a strainer is not recommended for installation due to the lack of particulates or debris in the process.

Strainers typically provide a single barrier to the process equipment and have a fixed opening (e.g. 0.5mm perforated holes). Any debris is retained at various points in the material, and the strainer element eventually becomes loaded and has to be replaced or cleaned.

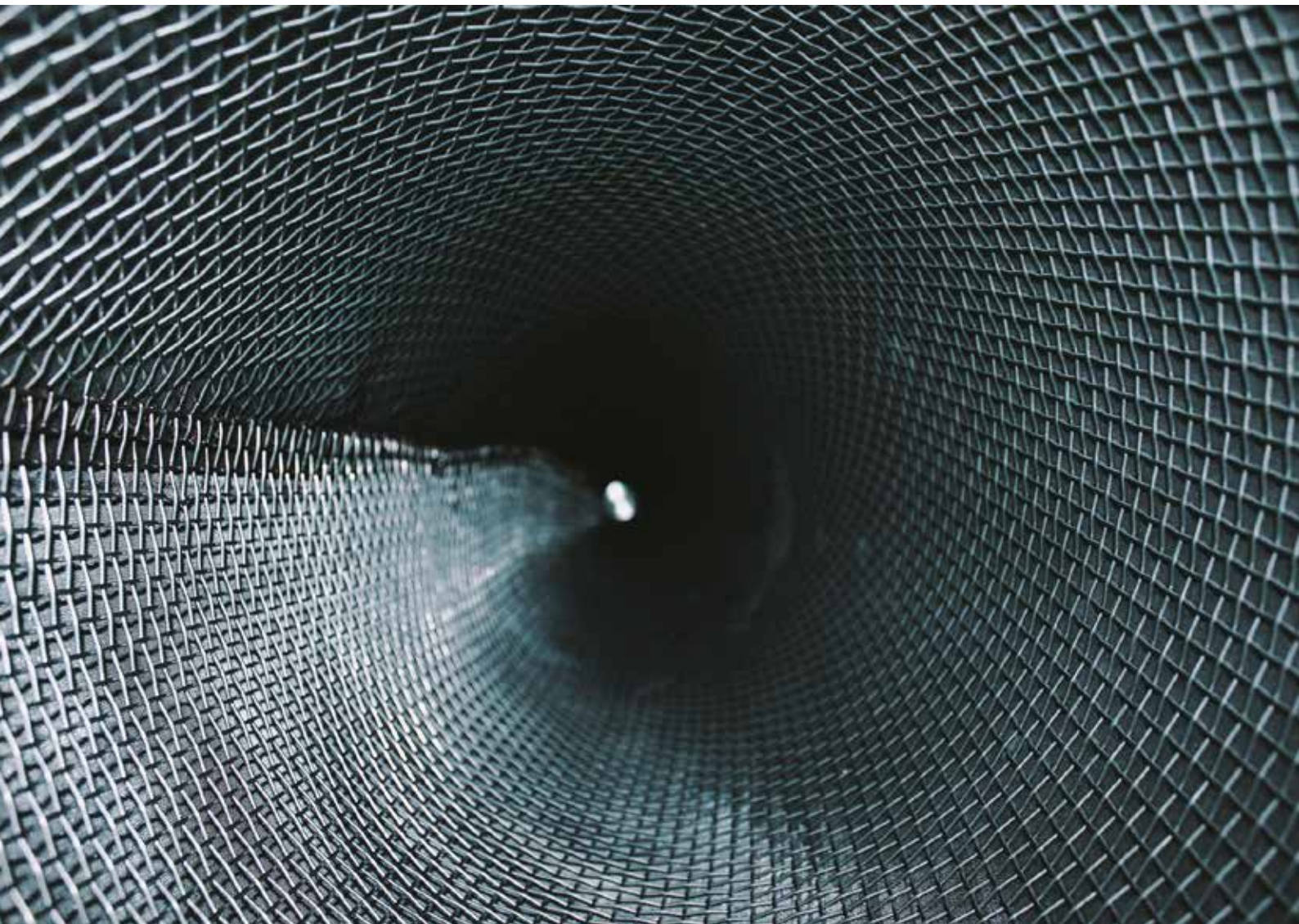
Heatric strainers are designed and manufactured in-house with considerations for sizing, solids content, pressure drop and process conditions; to provide the best protection for installed Heatric PCHEs. It is always recommended to seek expert advice from Heatric on the respective strainer for each application.

FILTRATION SIZE

The common purpose of a strainer is to act as a filter; removing debris from any process stream to protect the small channels of a Heatric PCHE core. Strainer elements are available with a range of filtration sizes from as large as 10mm perforations down to 25 micron (0.025mm) fine woven wire mesh. Correct selection of the filtration size is vital - and should relate to the maximum particle size that downstream equipment (e.g. pumps) are capable of handling. If the filtration size is too large, then escaping debris could seriously affect the performance of downstream equipment. A filtration size that is too small could result in increased maintenance to clean the strainer and/or increased pressure drop, which can be detrimental to the downstream process.

STRAINER UNIT SIZING

There is no rule that the strainer size should be equal to the line size. The strainer size should be determined from the potential dirt volume that the heat exchanger unit expects to retain and the maximum allowable pressure drop for the strainer. An undersized strainer will result in increased maintenance to continually clean the elements. In the worse instances it can create pressure drop problems in a process stream; potentially damaging other static equipment.

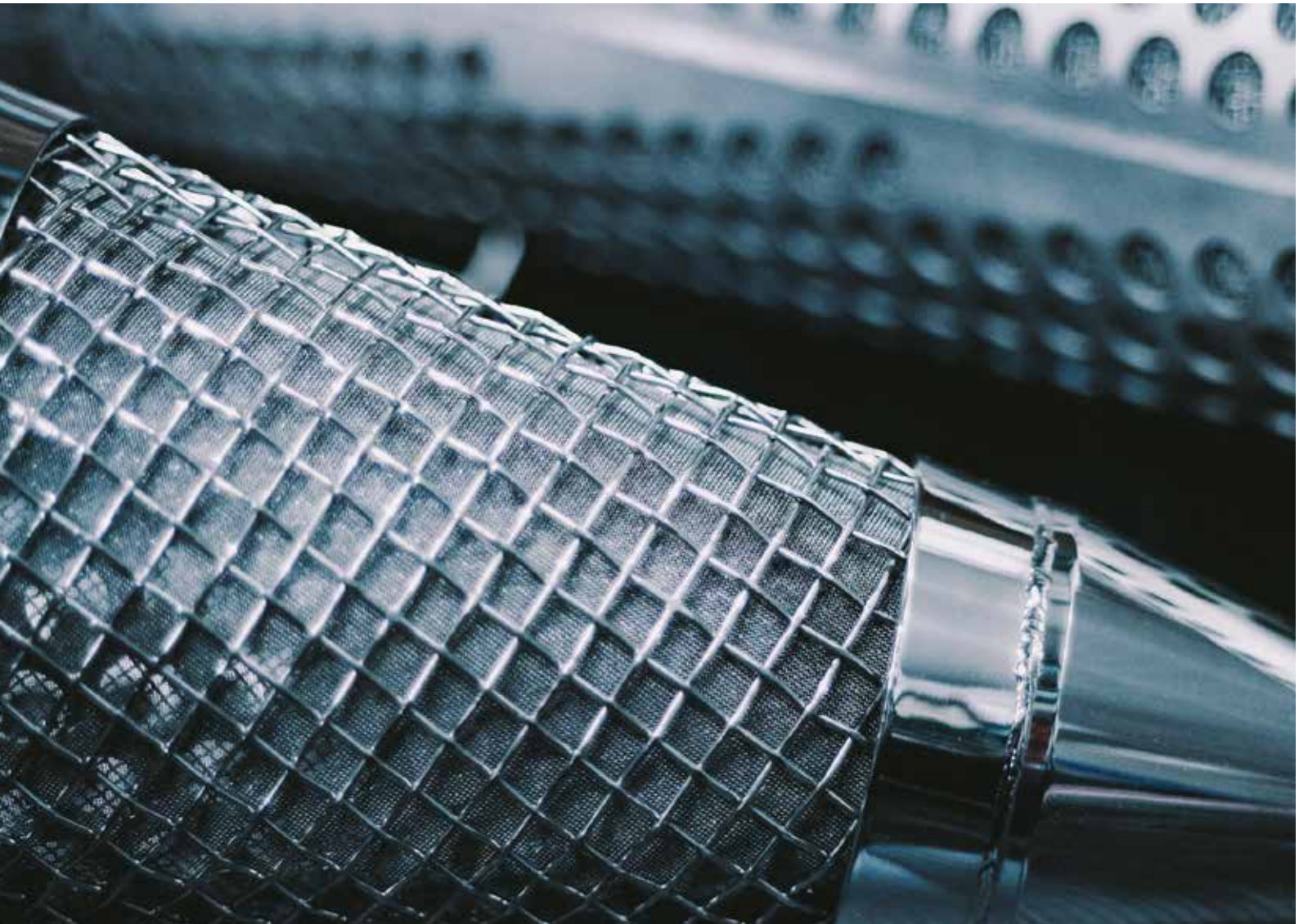


SPECIFICATION REQUIREMENTS

The following information is fundamental to ensure the correct specification of strainer equipment for its intended purpose.

STRAINER MESH COMPARISON GUIDE

Mesh Size	Micron Rating	Gap Size mm	Gap Size inch
20 Mesh	740 microns	0.74 mm	0.030 in
30 Mesh	500 microns	0.50 mm	0.020 in
40 Mesh	400 microns	0.40 mm	0.015 in
60 Mesh	250 microns	0.25 mm	0.010 in
80 Mesh	200 microns	0.20 mm	0.008 in
100 Mesh	150 microns	0.15 mm	0.006 in
120 Mesh	125 microns	0.125 mm	0.005 in
150 Mesh	10 microns	0.10 mm	0.0039 in
200 Mesh	76 microns	0.076 mm	0.0030 in
300 Mesh	50 microns	0.05 mm	0.0020 in



SOLIDS CONTENT

Although it is difficult to obtain realistic information on the potential solids content of a stream, it is critical when considering the sizing of the strainer body. The element should be sized to adequately to cater for the potential solids loading expected from the process stream. Where the solids loading is expected to be particularly high, duplex (2 x 100%) strainers, self-cleaning type or automatic backwash strainers should be used to make the process of cleaning quicker and easier.

MAXIMUM ALLOWABLE PRESSURE DROP

Downstream equipment such as pumps that require protection by strainers are normally also dependent upon a minimum head pressure in order to function correctly. It is therefore important that the maximum allowable pressure drop for the strainer is determined to ensure that the design of the strainer will not present problems to downstream process equipment.

MAXIMUM DESIGN PRESSURE/TEMPERATURE RANGE

As with all piping equipment, it is important to specify the design pressure and temperature range. Although design temperatures and pressures are covered in piping classes, these details generally cover a range of potential applications and do not necessarily address the specific requirements of individual process lines. It is important for each strainer that the specific design conditions are provided.

MATERIALS

Strainer materials should reflect the materials specified for the pipeline. This information is provided in the relevant piping class which normally also provides details on the relevant Material Data Sheet (MDS). It is standard practice for the MDS requirements to cover pressure retaining parts such as the strainer body and cover, but not items such as the strainer element. The element material should be of similar, or better, material standard to the body.

DIRECTIVES AND CE MARKING

Heatric always design and manufacture strainers to the required regional requirements, such as Pressure Equipment Directive (PED) for European installations. Furthermore, in Europe, Heatric strainers may be subject to CE Marking requirements in line with the guidelines presented by the PED. The fluid and size/volume of the strainer will determine as to whether CE Marking is required or not. CE Marking requirements are covered as necessary in accordance with the applicable directives. Automatic backwash strainers must also comply with other directives including; the Machinery Directive (522), FEA-M, and - since 2003 - it is mandatory for any electrical equipment operating in hazardous areas to comply to the ATEX Directive.

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