‘Y’-STRAINERS- DO THEY HAVE ANYTHING IN COMMON?

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‘Y’-strainers are utilised in many industrial processes where they mechanically remove debris from fluid flow by means of a perforated or wire mesh only or perforated and wire mesh straining element. They are used in pipelines to protect pumps, meters, control valves and other process equipment. Y-strainers are named after their shape, with the inlet and outlet aligned to the pipeline and the ‘tail’ containing the filter element which is usually removable for cleaning of debris or through the addition of a blow down valve the strainer can be flushed without stopping the fluid flow. The filtration range used by Y-strainers is large from coarse filtration (in) to fine filtration (50µm). The Y-strainer filter housing material of choice is usually application specific, with cast iron for systems not subject to high shock loadings, bronze for high salt content, carbon and stainless steel for high pressure and temperature conditions. However, whilst the Y-strainer filter housing can have a defined inlet/ outlet size the associated filter element can vary widely. A customer, a dairy company, utilises a number of Y strainers in their pipework but have found that there is a wide variation in filter element overall size between their Y-strainers in same diameter pipework. We have therefore investigated the variation in design and size of 6 different 2” Y-strainer housings and their associated filters elements and tested the pressure drop across these Y-strainers with their original element and an in-house design filter element to determine if there is an optimal Y-strainer filter housing design and favourable placement for the filter element.

One particular strainer had a higher pressure drop across the Y-strainer than all other strainers tested at all flow rates when empty. This suggested that the overall design of this housing led to a disturbance in the fluid flow through the filter housing as the increased pressure drop occurred at all flow rates from 80 l/min to 195 l/min. The 6 Y-strainers were then tested on the flow rig with their original filter elements. One Y-strainer was supplied with an ill-fitting filter element which had sufficient movement to allow debris to pass. Two Y strainer housings and elements had significantly decreased pressure drop across the filters at all flow rates. When tested with the same filter element (in-house design) the pressure drop across the filters was less than that compared to with the supplied element in most of the filter housings. One particular Y strainer demonstrated the least amount of resistance with either filter element. This design allowed a larger volume of fluid in the filter element chamber. These results demonstrate that directed flow to the filter element in conjunction with an increased volume in the filtration chamber delivered the most efficient Y-strainer design of those tested.