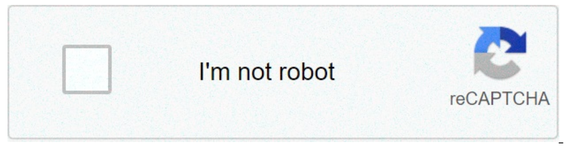

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Shell and tube heat exchanger design pdf

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Heat exchangers shell and tube are a common site in the world of engineering and are one of the two most common types of heat exchanger; The other common type is the plates heat exchanger. The heat exchangers shell and tube have a simple design, robust characteristics and relatively low purchase and maintenance costs. They also have a very high heat transfer rate, even if they require more space than a flat heat exchanger of similar heat exchange capacity. Components of heat exchangers for shell and tubes A heat exchanger shell and tube consists of a series of tubes housed inside a cylindrical container known as "shell". All tubes inside the shell are collectively called a 'pipe package' or 'tube nest'). Each tube passes through a series of baffles and tube sheets (also known as 'pipe stack'). One of the tubes is fixed and one is free to move, this allows thermal expansion as the heat exchanger is heated. Components for shell and tube heat exchangers The fluent medium within the tubes is known as the vehicle â € œLet Tubeâ €. The external scrolling medium of the tubes is known as the half â € œthe shellâ € ž. Each vehicle has an entrance and a discharge. The side medium of the tube is usually selected for the high pressure fluid as each tube can act as a small pressure vessel; It is also cheaper to produce nominal high-pressure tubes that to produce a high pressure shell. Example a shell heat exchanger uses water to cool the oil. The oil is the half side shell, while the water is the half side tube. The oil enters through the upper left entrance and runs through the heat exchanger until you reach the lower right discharge. The water flows through the tubes from the right entrance to the left drain. Single passage heat exchanger How do the heat exchangers work and shell? The video below is an extract from our heat exchangers online video course. The shell and tube heat exchanger is divided into two main systems, called shell side and tube side. Each system has a means of associated flow. In our example, we assume that the shell side contains hot mineral oil that must be cooled, while the tube side contains cooling water. The cooling water enters the heat exchanger and flows through the tubes. Mineral oil enters the heat exchanger and flows into the shell surrounding the tubes. The two fluids do not mix as the tube wall prevents this. Because fluids do not mix directly, an indirect cooling occurs (not a direct cooling). The turbulent flow increases the thermal transfer speed of the heat exchanger and also reduces the probability of dissolved solids that accumulate on the walls of the tube and shell (the turbulent flow has a self-cleaning effect). The turbulent flow inside the tubes is created by inserting tube inserts (also known as 'turbulators') in each of the tubes. The turbulent flow inside the shell is created by Baffle, which are used to direct water through the tubes while traveling through the heat exchanger. Tube inserts (black line in half tube) The heat is exchanged between the two fluids because they are in thermal contact with each other. The oil leaves the heat exchanger plus fresh and the water leaves the heat exchanger hotest. Parallel, Counter and Cross Flow Parallel, Counter and Cross Flow Heat exchangers are available in many shapes and sizes. To make the classification of heat exchangers easier, they are often divided into groups based on design and operating characteristics. Such a feature is the type of flow. There three main flow types, these are parallel, against and cross flow. Due to the design considerations and applications of heat exchangers, it is rare that a heat exchanger is only one of these types of flow, they are usually a combination of different flow types, such as the flow of countercurrent. Parallel flow occurs when both side and side supports of the tube enter the heat exchanger from the same end of the heat exchanger and run at the opposite end of heat heatThe temperature change (Delta T / Ã® "T) through the two mediums is the same for both both increasing or reduce with some quantity. Note that the output temperature for both mediums tends to converge and is not. It is possible to cool below this point even if the input temperature of the colder fluid is lower than the convergence temperature (the temperature of the convergence on the lower graph is of about 80 Â ° C). Flow flow of the flow of the flow of the flow Parallel stream heat flow counter counter counter (also known as against-Flo-Flo-Flo-Flo-Flo-Flo-Flo-Flo-Flo-Flow has two flow means flowing in a counter direction (180 Â ° distant) with each other. Each fluent means enters the heat exchanger at opposite ends and is discharged at the opposite ends. As the cooling means comes out of the counter heat exchanger counter at the end in which the middle Hot enters the heat exchanger, the cooling fluid is approaching the inlet temperature of the hot fluid; This makes the potential delta much greater than that of a parallel heat exchanger. Counter flow heat exchangers are the most efficient type of heat exchanger. Counter flow heat exchanger The cross-flow cross flow heat exchangers have a fluid means that flows perpendicular (at 90 Â °) on the other side of the other. Cross-flow heat exchangers are usually found in applications in which one of the fluids changes state (flow of 2 phases). For example, a condenser of the steam system, in which the steam coming out of the turbine enters the shell side of the condenser, and the cold water flowing into the tubes absorbs the heat from the steam, condensing it into the water. The large volumes of steam can be condensed using this type of heat exchanger flow. Single and multi-step cross-flow heat exchanger A cheap and efficient way to increase heat exchangers efficiency is to bring flowing means in touch with the other more times. Whenever a means passes above the other, the heat is exchanged. When a fluid means passes above the other only once, a pass-asingle heat exchanger is defined. Single passage heat exchanger design When a fluid means passes over the other more than once, a heat exchanger is defined Â ¢ â‚¬ ~ Multi-pass ¢ â‚¬ â "¢. Multi-pass multi-pass heat exchanger in the tubes commonly, the multi-pass heat exchanger reverses the flow in the tubes by using one or more "U" curves in the tubes. The curves "U" allow the fluid to scroll back and forth through the length of the heat exchanger. This type of heat exchanger is known as a U-tube tube heat exchanger and tube. Ã, U-shaped heat exchanger It is also possible to reverse the flow through the pipes using the lower or upper side of the tube beam for a passage and the opposite side for the next pass. So every half of a tube beam is equivalent to a passage. Multi-pass in the shell a second method to get more steps is to insert the deflectors on the shell side of the heat exchanger. These direct the fluid side shell back and forth through the tubes to reach the multi-pass effect. Ã, advantages of multi-pass heat exchanger and disadvantages cheap advantages compared to plate heat exchangers. Relatively simple and easy to maintain design. Suitable for higher pressures and temperatures than plate heat exchangers. The pressure drop (Delta P / Ã® "P) is lower than a plate heat exchanger. Easy to find and isolate loss tubes. The tubes can be" double walls "to reduce the of the seashell side fluid losing in the side fluid of the tube (or vice versa). Easy to install sacrificial anodes. Don't do it easily as plates heat exchangers. Less efficient disadvantages of dish heat exchangers. They require more space to open and remove the pipes. The cooling capacity cannot be increased, but it can be a plates heat exchanger. Annotation partition plate 3D model The partition plate separates the lower and upper half of the heat exchanger. The partition deviates the fluent medium through the tubes. Input / unloading or discharge of the fluid medium flowing through the hoses or hull of the heat exchanger. Accommodation / Shell. Shell. L'alloggio / shell è usato per contenere il mezzo fluid e le parti interne della casa. Serve anche come a strong pezzo strutturale su cui pudeno essere collegati altri pezzi. Piastra di copertura La piastra di copertura viene uszata per sigillare un'estremità della shell and prevent la perdita. Guarnizione Una guarnizione è posizionata tra due superfici metalliche. La guarnizione è solitamente costruita in Carta o gomma ed è “Squeezedâ€TM tra i metalli per creare un sigillo. Il sigillo predictene la perdita. La forma della guarnizione preventedsce anche la perdita attorno alla piastra di partizione. Stazionario TubeSheet La scheda TubeSheet si trova all'interno del guscio e supporta le estremità dei tubi. Il weight dei tubi viene quindi subsequently supportato dai deflettori (a seconda del design). I deflettori dei deflettori sono uszati per cambiare il flusso direzionale del mezzo fluid. La mod della direzione garantisce una distribuzione uniform del calore in tutto lo scambiatore di calore. L'efficienza decreases when il flusso attraverso lo scambiatore di calore non è distributed evenly. I dadi e i bulloni del bullone vengono uszati per la fissaggio di parti dello scambiatore di calore. I bulloni scelti dovrebbero avere una resistenza alla resistenza alla trazione e le caratteristiche di resistenza alla corrosione. I bulloni sono la parte â€ ~ Male "part di un assemblaggio given and bulloni. Dadi and bulloni sono usati per fissare parti dello scambiatore di calore. I dadi scelti dovrebbero avere una resistenza alla resistenza alla trazione e le caratteristiche di resistenza all corrosione. I dadi sono la parte “Female” part of assemblaggio di given and bulloni. Le cravatte Le tiranti vengono uszate come guide per i deflettori per Garante alcun movement rotazionale o assiale dei deflettori. I tubi uno dei medili fluidi flows directly attraverso i tubi mentre gli altri flows turboally all'esterno. Il calore viene scambiato tra i due mezzi a causa della prossimità (il calore viene scambiato tramite conductione alle pareti del tube and poi oltre al supporto esterno). Shell I tubi, i deflettori e le cravatte sono tutti ospitati all'interno del guscio (alloggiamento). It is il conchiglia and il costrutto del tube che dà questo tipo di scambiatore di calore il suo name. • Risorse aggiuntive . org/wiki/shell_and_tube_heat_exchanger https: /www.explainthatstuff.com/how-heat-exchangers-work. html . with/how-heat-exchangers-work. html.

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