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REVIEW OF DOUBLE PIPE HEAT EXCHANGER WITH INSERTS

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ABSTRACT
Heat energy is transfer of heat from one surface to another surface and it is very important to all aspects in day to day life. The heat transfer is takes place by means of heat exchangers. The heat exchangers are used to transfer heat from hot body to cold body and it has been utilized in various industries and engineering applications to improve the performance of the heat exchanger devices. Many researchers attempted to study on the heat transfer and fluid flow in a tube induced with twisted tape inserts with influence on cuts different geometrical shapes and different twist ratio has been reported. Hence the present paper reported the use of different types of twisted tapes fitted in a double pipe heat exchanger to improve the heat transfer and friction factor characteristics of water in tubes induced with twisted tape inserts with different shapes, equal area and same twist ratio will be investigated experimentally and numerically.

KEYWORDS:
Health Care, Delivery System, Rural Health, GIDA, Philippine Health Agenda, Case Study

INTRODUCTION

A heat exchanger is a device which transfers the energy from a hot fluid to a cold with maximum rate and minimum investment and running costs. Nowadays energy crisis plays a major role on human life. Utilizing energy Heat transfer enhancement is the process of improving the performance of a heat transfer system to increasing the heat transfer coefficient. Heat transfer enhancement technology has been widely applied to heat exchanger applications in refrigeration, automobile and process industries like thermal power plants. A liquid coolant is widely used to prevent the overheating of transportation vehicles. From the last two decades, many different techniques were used to enhance the heat transfer coefficient. There are numerous techniques to embellish the heat transfer such as fins, dimples, additives etc. The major challenges to design of heat exchanger are; compactness to achieve a high heat transfer rate and to allow operation of heat exchanger with a small power loss. For heat transfer enhancements in heat exchangers, there are three different methods are used; i.e. active methods, passive method and compound method. Passive techniques, where inserts are used in the flow passage to enhancement of heat transfer are advantageous compared with active method. Because, the insert manufacturing process is simple and these techniques can be easily employed in an existing heat exchanger. Advantages of heat exchanger are; higher heat transfer coefficient, less weight, minimum pressure loss, quick response to load variation, small bulk weight and high efficiency.

The equipment which is employed with transfer of energy, which one state with another state, with help of utmost heat and lower cost. Examples of heat exchanger is intercooler, pre heater, condenser and steam power plant, condenser, evaporators and R &AC, automobile radiators, milk chiller and several industrial applications.

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LITERATURE REVIEW

Some of previous experimental works conducted with tape twisted inserts was given below.

In early study of experimental investigation of tube with inserts of tape are performed Avinesh savekar (2015) to examine the concept with result of twist ratio and Reynolds number, with pitch ratio and Re. It is noted that lowering the twist ratio encourages radial convection while enhancing with Reynolds number. The heat transfer improves owing to a rise in radial convection with a reduction in the twist proportion. The reduced twist value improves heat flow owing increased crosswise fluid flow owing to helically rotating flow route increases. With a rise in the amount of Reynolds, heat transfer improves owing to an rise in axial convection. Increasing heat transfer owing boundary layer disruption causing enhanced heat transfer of convection from fluid to wall. A heat transfer augmentation review of different twist was given by Sarang S Hole (2015) in which stress drops and heat transfer studies are based on a simple along with modified tape insert. A straightforward twisted tape and modified twisted tape inserts mix well, thus work superior under laminar flow. During the fluid swirl, more turbulence is created in the case of twisted tape modified geometry and provides upper heat flow rate compared with smooth tape. The outcome with altered twisted tape is a greater performance for both laminar and turbulent of lower friction factor.

NagaSarada, et,al (2010) was given an experimental work on the improvement of a heat transfer by means of various width of inserts. An experimental investigation increasing turbulent flow in horizontal pipe by means of inserts with working fluid is air. Both the coefficient of heat transfer with decrease in stress is calculated and the outcomes are contrasted with the pipe length and decreased width. The thermal transfer improvement with twisted tape inserts ranged from 36 to 40 percent for complete length compared to simple twisted tape. The main reason for this improvement is the centrifugal force arising from the fluid's spiral movement.

Anil Singh Yadav et,al(2009) was carried the investigation of Effect on heat transfer and pressure drop features within device of half-length tape tabulators. Influence on heat transfer and pressure drop features of the half- length twisted tape insertion in U bend device exchanger. An experimental findings disclosed that twisted tape's heat flow rise was heavily affected by the swirl motion caused by the tape. A substantial increase in the heat transfer coefficient by 40 percent of half-length inserts was shown in this research. The efficiency of heat flow of half-length twisted tape is maximum compared with the simple pipe on an equal mass basis. It is noted the soft tube heat efficiency is better than twisted tape of half length.

Dhamane et al.(2014) investigated the heat transfer characteristics of circular tube with wavy twisted inserts. The reported that the turbulent flow was increased with wavy tape inserts in horizontal pipe with air is working substance. It was found that the enhancement of heat transfer with wavy tape inserts as compared to PTT varied from 12 to 43%. The improvement is due primarily to centrifugal action arising the fluid's twirl movement.

Smith et, al.(2014) studied research of addition twisted arrangements and titanium oxide nano particles distinct levels as heat exchanger working liquid. The greater amount of twisted tape inserts resulted in an increase in heat efficiency resulting from decreasing ground contact, time and vortex flow. An experimental analysis into the features of heat and fluid flow heat exchanger equipped frequently spaced twisted tape components, Smith

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Azmi et al. (2014) has been examined an experimental of nanofluid thermal transfer coefficients of the volume flow through pipe. The studies were carried out at a bulk temperature of 30oC in Re range of 5000 to 25000. The tests are conducted in a tube with various twist ratios. A heat transfer improvement with twist ratio was inversely improved. In SiO2/water nanofluid thermal transfer coefficient at a volume concentration of 3.0 percent was 2.79 percent advanced with same twist ratio. Dewan et.al(2004) has been investigated the increase passive thermal transfer methods. The current article is a review of latest previous advancement with passive enhancement methods and will be used by developers to implement passive heat exchange enhancement methods. The most frequently used passive thermal transfer augmentation instrument is the twisted tape, wire coil, ribs, fins, dimples etc. The twisted tape and wire coil was provided in this because financial heat transfer augmentation instruments are known to exist, according to latest research. In a laminar flow region, the former insert is discovered to be appropriate and the latter is appropriate for turbulent flow.

Saha and Dutta et al (2001) was observed The experimental range of prandtl in a circular pipe with brief length, complete length smooth variable pitch with water ranged from 205 to 518. Friction factor and amount of Nusselt give reduced value for twisted tape of brief length and twisted tape of brief length needs small power of pumping. There is no distinction between multiple twist and single twist on thermodynamic output. With the introduction of any passive augmentation methods, the uniform pitch works better than gradually reducing pith and it provides rise to friction factor and nusselt number.

Jagpreet singh et al (2014) has been studied Inserts the analysis and performance of heat flow increase swirl flow generators. Experimentally researched the impact inserts of various cuts inside single unit inner tube on heat flow and fluid flow of water heating the 500-3000 Re range. The outcome obtained from inserts of various materials was compared.

Abhijit A patil et al (2013) is carried the investigation about the Increase heat transfer in laminar flow using twisted aluminum tape with complete length. Low velocity results in a tiny general heat transfer primarily on motion fluid molecules. The whirl was produced frequently spaced tape inserts and linked by a slender circular rod. Maheshkumar J Patel et, al. (2014) has been analyzed to improve the heat transfer characteristics with metallic wiry sponge and enhancing heat transfer surface twisted tape inserts provide extra heat transfer compared with tube inserts. A Reynolds number augment with raise of nusselt number and reduce of friction factor. NB Dhamane et al (2014) has carried the investigation of tape inserts various pitch in tube. Experiment was carries inserts with steady and various mass flow rates. The amount of Reynolds ranged from 4000 to 9500. The prospective wavy twisted tape inserts as an air working liquid improve heat flow rate a circular pipe. A main reason for the improvement is the centrifugal forces arising from the fluid's spiral movement.

Maughal et, al. (2013) were studied about investigation of heat transfer growth in tube with heating device using twisted tape. The heat flow in exchanger device could be enhanced by using tapes. The entire length of twisted tape augments heat transfer with 8.9 %. Twisted tape holes and baffles of present configuration under perform well compared to the entire length tape.

Snehal S et, al. (2014) has been carried with performance analysis of tape twisted inserts. The experiment performed by three different twisted tape inserts as follows twisted tape and two different angles twisted tape. Experimental investigation of improvement effectiveness, circular pipe heat transfer properties equipped with tape of twist proportion was explored. The swirl flow is noted to help reduce the thickness of the margin layer with warm water stream and boost the exterior pipe. The tape twist generates the secondary fluid motion and enlarge the transfer of heat of convection. The

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heat exchanger with angle 45-degree annular twist tape led in the greatest Nusselt number rise over simple twisted tape inserts.

Anil singh yadav et al (2009) has done the experimental work on the effect tape tabulators with half of the length. In this experiment The swirling flow was implemented through the half of length tape internal test tube. Compared to without tape, results acquired from heat exchanger twisted tape inserts. The findings showed that the heat transfer rise of the twisted tape inserts was heavily affected by means of vortex flow caused by tape.

A U Ahamd et al (2006) worked on the experimental investigation of heat transfer in tube with inserts. The Reynolds number various from the range 9500 to 20000 For both the porous and tube. A findings show the tape inserts, coefficient of heat transfer was 2.5 times better, the heat fluctuation was 1.4 better, friction factor was 2.24 superior than simple soft pipe inserts.

Deepali Gaikwad et al (2014) was carried the investigation of heat transfer improvement of heat exchanger using wire brush inserts. The research disclosed the tape wire brush inserts supplied important heat flow improvement

corresponding rise, but also a slight boost pressure drop. The thermal transfer acquired the pipe twisted metal inserts is greater than the simple pipe due to the turbulence created and the swirling flow produced.

Patnala snakara Rao et al (2014) has been analyzed the numerical investigation of heat transfer increase by helical twisted tape inserts in heat equipment. A number of Reynolds varied from 4000 to 20000. Wherever greater heat transfer rates are needed regardless of pressure drop, tape by lower twist proportion could be employed for this procedure. It is possible to use greater twist of reduced pressure drop and mild heat transfer rate.

Suhas V Patil et al.[2011] has been carried the investigation of Increased heat transfer in swirl flow generators equipped with pipe. This article, importance is placed on works by means of heat transfer improvement. A properly combine bulk and thus works improved by laminar, since the thermal resistant by laminar does not restricted with small area. A outcome as well demonstrates that inserts are additional efficient when considering no pressure reduces. Square tubes heat transfer was discovered significantly higher than the circular pipe. The square and rectangular duct thermodynamic efficiency compared to using only twisted tape for laminar flow.

Ashwini K. Burse et al (2015) has conducted the experimental evaluation of the heat transfer augmentation inserts. The thermo-hydraulic efficiency of above inserts relies different variables such as flow conditions, pipe geometry and settings of inserts. The outcome as well demonstrates that if there is absence of pressure drop regarded, twisted tape insert is more efficient. In twisted tape was efficient up and about a range of Reynolds. It’s also found in turbulent flow, insert was not efficient because it obstructs flow by consequently increases pressure drop.

Kurhade Anant Sidhappa et al (2016) was conducted the investigation by Experimentally studied heat flow characteristics using copper wavy inserts with circular holes in forced convection. Neeraj kumar Nagayach et, al. (2012) as conducted the review of heat transfer growth in a specified shape of duct. Eiamsard et al (2014) has been estimated heat flow of performance assessment in a heat exchanger tube with opposite/parallel wing twisted tape. The thermohydraulic concert is recorded in pipe that

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contains a customized tape with structures. The research seeks explore provide the typical bent tape with superior thermohydraulic performance and heat transfer rate.

Zhu JD et, al.(2015) has been evaluated with the numerical study on heat transfer by twisted tape inserts inside tube. Enhanced convective heat transfer impact single insert, the numerical study on the single phase double twisted tape and triple inserts in heat exchange tube. The second order FVM method was used and wall surface enhancement equations were to analyze the heat flow performance air inside a tube heat exchange process. Shasank et al(2013) with aim if investigating the heat transfer, heat transfer coefficient and friction factor characteristics in double pipe heat exchanger. The enhancement is improved different material inserts. The Reynolds number various with the range from 4000 to 13000 and three different materials are used as aluminium. The heat transfer enhancement was taken with 1.58 times increased copper inserts compared with the other two material used.

Anucha Saysroy et al (2018) has been recorded the tubular rectangular cut inserts with alternative axes. It can observed use by ARC-TTs results in more disordered streamlines and higher turbulent intensity than that of the classical tape. The numerical data also show heat transfer and friction loss diminish as Length of cut ratio (LR) and Width of cut ratio (WR) increase while thermal performance factor shows reverse trend. In the studied range, utilizing ARC-TTs offers thermal performance factor up to 1.5. The figure 2.1 shows the different geometry of tape.

Varun et, al.(2016) was analysed about the augmentation tube with inserts. A review of the job performed in region of heat flow increase by tapes was conducted in current research. The earlier studies (based on the literature study) were discussed on different kinds of twisted tapes. These studies show that future twisted tapes study will bring more thermal exchanger systems growth. It is also possible to develop the optimum shape tapes based on maximizing heat flow and minimizing friction with regard to the fluid used in the scheme.

Rajeshbabu et al (2015) was examined the numerical simulation of CFD analysis with heat transfer augmentation in a circular tube fitted with regularly spaced using passive techniques. According to results of Kumar and Prasad the experimental work (2000) the heat transfer of tape solar water heater could enlarged between 17 and 71% which discussed with plain tube. The information also shows it is possible to increase the pressure drop by between 87 and 132 percent compared to the same situation operating plain solar water heater. Hong and bergles et al.(1976) predicting the experimental studied on the basic fluid with electrically heated. The heat transfer augmentation carried in the experimental work with laminar flow regions.

Rao and Sastri et al. (1995) carried the experimental analysis of the heat transfer coefficient and friction factor characteristics the rotation inserts were studied. The results observed from the experimental data heat flow improvement was augmented through rotation of inserts match up to the experimental results of plain tube inserts.
Zimparov et al (2001) experimental work obtained the results of the heat transfer with spiral corrugated pipes combined tape inserts. The experiments were carrying out Reynolds range from 3000 to 60000 and spiral angle with varying the twist ratio. The results shows with coefficients and friction coefficients are superior to plain tube. Date and Saha et,al. (1990) by explain Navier and energy equation presenting the heat flow under laminar.

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Saha et, al. (2001) examined the work of heat transfer and nusselt number characteristics of the insert. The predicted friction factor was in superior conformity with xperimental data. Du plessis and Kroger et, al. (1984) The evaluation of heat transfer characteristics and improvement a smooth pipe with tape inserts. They constructed correlated expression of heat transfer with laminar flow.

Manglik and Bergles et al (1993) studied the experimental investigation on heat transfer characteristics for a tube fitted with tape inserts. A study was carried with the three different twist ratio of working fluid water, ethylene glycol steady wall temperature. The data obtained and calculated the Nusselt value and friction value. The flow of heat enhancement was carried flow of tube and secondary flow of the fluid. Lokanath (1997) Experimental data under laminar flow by a horizontal pipe equipped twisted half of length of tape by consistent heat flux circumstances were recorded. The researcher discovered half of length bands to be additional effective of entire length twisted bands. Saha and Chakraborty et al.(1997) observed the experimental carried by regularly spaced tape inserts. It has concluded the pumping power with lager number of twist gives enhanced performance by the single revolve twisted tape inserts. Dae et al (2007) has been discussed the effects of mechanical vibrations on critical heat flux vertical annulus tubes.

Hejazi V (2010) has conducted an experimental analysis and investigation of tape with tube fitted. The work carried with condensation of heat flow enhancement characteristics and it was evaluated the heat transfer coefficient and nusselt number. Patil (2000) heat flow and friction factor performance of smooth pipe by twisted bands changing width from 11 to 22 mm correspondingly were researched. It has found tape thickness of 18 mm and 10 mm in that order, by decreased thickness inserts provide 15-58% lesser friction than complete thickness tapes and small decline by Nusselt amount noted by 4-20%.

Eid and Gomaa et al. (2009) conducted the experimental study of heat flow enhancement by active methods of by the vibration of the fins. The thin planner thins heated by electric heater and vibrated the fins. They conduct the experiment with different frequency; the results identify the high frequency furnish higher heat transfer enhancement comparatively than the low frequency.

Vincente et al. (2002) have been analyzed with results of the experimental examination of the performance in dimpled pipe under the laminar stream. The experimental result shows friction factor 10 to 30% was increases than the smooth tubes. San and huang et al. (2006) was observed the hydraulic behavior of the dimpled pipe with help of the height. An experimentally investigated enhancement of crosswise ribs circular tube as air is main working liquid. A Reynolds value range with 4608 to 12936.

Michael J Lawson et al (2009) were investigated using delta winglets to augment heat rates on exchanger device for tube surface fines. Delta winglets placed on fins were observed to increase heat transfer by means pipe wall 45 percent with consequent 19 percent boost a pressure redcution. Zeitoun et al (2003) presented the analysis advanced convective laminar flow in longitudinal fins supplied by tube. They found that the fins are arranged inside finned pipes, heat transfer rate was enhanced as well as friction factor coefficient is reduced. Deepali Gaikwad et al (2014) was carried the investigation of heat transfer enhancement for double pipe heat exchanger using twisted wire brush inserts.

Cui and Tian et al (2010) was examining theoretically and practically of pressure fall with edge fold tape inserts. The numerical examination of KE turbulence model was carried. As results shown an

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experimental investigation was as compared with numerical analysis well bonded the heat transfer rate. Kaliakatsos et al (2016) has been investigated that the CFD analysis of the heat movement with tape inserts increases coefficient of convective heat flow by creating a swirling movement that determines an advanced heat rate. However, by varying amount of Reynolds and heat transfer, contact area of pipe supplied with inserts was explored using the water as fluid.

Experimental studies on the circular tube fitted with different cut twisted tape inserts:

Bodius Salam et, al. (2013) paper statements were conducted on the experimental investigation for evaluating pipe wall improvement of water effectiveness by turbulent motion in circular pipe equipped cut with rectangular tape inserts. A Reynolds value ranged between 10,000 and 19,000 with variations in heat flux between 14 and 21 kW/m2 of soft pipe and and 21 to 41 kW/m2 for tube with inserts. It was discovered that heat transfer improvement efficiencies ranged from 1.9 to 2.3 and increased by means of rise in the amount by Reynolds. P. Murugesan et. al. (2011) in his research present an effect of V-cut twisted tape insert on heat transfer, friction factor and thermal performance factor characteristics in a circular tube were investigated for three twist ratios y=2.0, 4.4 and 6.0) and three different combinations of depth and width ratios (DR=0.34 and WR=0.43, DR=0.34 and WR=0.34, DR=0.43 and WR=0.34) and examined for different ratios y=2, 4 and 6 and distinct grouping of depth and thickness ratios. This document says that with reducing twist ratios and growing depth ratio, total nusselt number and total friction factor of pipe with (VTT) augment. Compared with simple tape, V-shape cut provided greater performance as well as thermal efficiency.

Pratik P Ganorkar et al(2015) has investigation about the enhancement of heat flow in tube by means of elliptical shape cut inserts. Improve heat exchange devices efficiency to reduce material expense and heat transfer surface area. For twist ratio, the elliptical cut twisted tape inserts were explored for heat flow, friction with efficiency factor features in pipe.

Al Amin et.al (2013) is experimental investigation carried the enhancement of a rotating twisted tape inserts. Twisted tape generates the secondary flow of a swirl flow, which encourages higher mixing and heat transfer coefficients. According to the research, the findings indicated the heat flow rate was significantly affected system flow. At elevated RPM of twisted tape and fluid rate of flowing, superior heat flow rate has been achieved.

PV Durga Prasad (2014) Analyzed inquiry exchanger device trapezoidal cut inserts. There is an effort augment heat flow with heat exchangers. The findings indicate that with an rise in the amount of Reynolds, the average amount of Nusselt increases. The average Nusselt proportion of entire tube by trapezoidal cut inserts of H / D as 5 under a same amount of Reynolds is increased by 34.24% relative to water.

MJ Patel et,al. (2014) carried out enhance performance of exchanging device with inserts. As result concludes that tape inserts in a fluid tube will improve the device performance. A heat transfer speed in heat exchanger will increased by increasing a contact region of twisted tape with cutting, drill hole, parabolic cutting and much more etc. If you insert metallic wire sponge twisted tape, which helps to raise the heat rate.

Anil singh yadav et al (2014) has done Experimental work on the impact on performance features with half of length tape tabulators a double U bend exchanger. As result swirling motion is implemented in this experiment using half of length tape positioned internal test tube. Compared to

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those without tape, revealed acquired from heat exchanger with tape inserts. A U Ahmad (2006) has studied an experimental investigation of absorbent warped tape in a tube with inserts. A Reynolds value variant from the range 9500 to 20000. The findings show the absorbent inserts, the normal coefficient of heat flow was 3.6 time better, heat fluctuation was 2.53 greater, friction factor was 2.25 times greater than simple soft pipe inserts.

P. Murugesan et al (2011) has been examined performance features tape inserts using U cut were researched. Experimental investigation of circular pipe thermal performance enhancement features prepared with (PTT) and (UTT). In order to guarantee the validation of experimental outcomes, the experimental information collected from plain pipe along with PTT were confirmed with conventional relationship. As result show that in the pipe equipped through UTT enhancement improvement factor considerably greater than through PTT.

Sami D Salman et al (2013) has been numerically discussed about the numerical analysis heat exchanger behavior in tube by QCTT (Quadratic cut twisted tape) inserts. The result examined the QCTT inserts with 2.73, 3.51, 4.89 and variety of engrave depths 0. 4,3.0 and 3.5 were generated for simulation. Mughal A et al(2013) was experimentally investigated augmentation of heat flow in tube with insert tapes. In this paper full length twisted tape and fins was employed to enhance the performance. The end result shows full length twisted tape performs more augmentation method compared with other kind like baffles & cut.

Sami D (2013) mathematically evaluated of heat transfer and friction factor characteristics in tube with VCTT (V- cut twisted tape) inserts with twist ratio 2.93 and depth of cut 0.49 cm was studied in laminar stream. The combined effect of general whirl flow through tape and commotion produced by different cuts by means of bottom of tape resulting in disturbance to improved fluid amalgamation between fluid and wall surface. Tabatabaeikia et al (2014) were analyzed Enhancement of heat transfer using various twist inserts. This article provides an overview of early research on improving thermal system efficiency by using various types of inserts. Louvered narrow piece insert have enhanced reverse flow purpose than ahead one. In most instances resulted in greater effectiveness except for twisted perforated tape and twisted tape. Combining different tube with artificial roughness has yielded promising outcomes. Amnart Boonloi et al (2016) has evaluated the turbulent forced convection and heat transfer characteristics in tube with geometrical change tape. The FV (Finite volume method) technique and normal algorithm is performed for present studies. The fluid arrangement with heat flow conduct, the numerical findings are recorded and compared to the soft pipe and frequent twisted tape. It is discovered that owing to generated by means of tape, the modified-twisted tape offers a greater than straight pipe. A flows of the horizontal vortex assist boost mixing of fluids. The twisted tape's rectangular punched holes may decrease the heating system's pressure loss. Srinivas (2015) was examined the effect of heat transfer and friction factor characteristics with helical coil device. The forced convection heat transfer studied shell and coil with copper oxide nano particle was used enhance performance characteristics. Sami D Salman et al(2014)has been measured heat transfer characteristics enhancement by laminar nano fluids with PCTT inserts. The numerical investigation were carried the heat transfer with copper- water fluids with vortex configuration with computational fluid dynamics. In the present work many types' vortex whirl flow generators are used. tape through distinct proportion were used for the classical cut. The findings indicate that improvement caused by inserts improves the twist proportion by reduces depth of cut.

Chang et al. (2007) has been proved by working on turbulent heat transfer pipe equipped with tape. Serrations of both sides with tape of twisted proportion of 1.36, 1.38, 2.31 or upper of square ribs by

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means of the same rib field and rib elevation. Saha (2001) conducted the heat transfer with tape place in elements in swirl flow motion. The varying width of the tape and diameter of the tape shows by increasing the width gave the better performance than the lower thickness of tape. Rao and Sastri et al. (1995) carried the experimental analysis of the heat flow coefficient; friction characteristics for rotation tubes were studied. The results pragmatic from data for enhancement were increased with rotation of the twisted tape inserts. Sami D Salman (2014) has discussed in performance of heat and fluid flow characteristics implemented in pipe equipped by horizontal strip inserts. This present paper analyses heat transfer characteristics under constant heat flux. The PTT of twistratio is 2.96 and 3.61 are used to investigate the heat transfer analysis.

Naveen S (2017) has been discussed that the numerical analysis of double tube by means of tapes with twisted condition with various model of tape was used to investigate the heat transfer analysis, plain, Jagged and V cut with various twist ratio 1.0 and 4.0. Kumar V (2006) has been discussed that the drop of pressure and transfer of heat characteristics studied through the helical heat coil exchanger. The exchanger enhancement was augmented by way of the enhance the Reynolds value. Zhi Min Lin et al (2009) has been observed that enhancement of heat with transfer of convective techniques circular tube by twisted ape inserts. As heat transfer from higher temperature to lower temperature fluid were generates swirl flow and inferior flow of tube side.

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