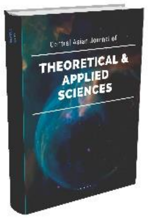

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To Study the Processes of Heat Transfer from Walls

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Abstract: *In this article, the processes of flowing heat flow at different homogeneous temperatures over time are modeled, the issues of reducing the energy consumption of heat lost are considered. Also on the basis of this model, it was possible to select the optimal values of the design of the walls and indicators such as thickness.*

Keywords: *Thermal conductivity, density, temperature, heat dissipation, heat transfer coefficient, Newton-Rixman law.*

Today, at the present stage of the development of World Civilization, due to the increase in demand for energy, the constant increase in energy prices, as well as the decrease in energy resources and pollution of the surrounding air, the wide introduction and use of energy resources is an urgent task. Therefore, special attention is paid to the development of new energy resources that are efficient and require minimal economic costs.

The world is conducting scientific research aimed at creating energy systems that ensure the continuity of hydrodynamic and thermal processes, take into account the optimization of control and management schemes, the necessary heat exchange processes for the development of technological, constructive and regime parameters, use in heat supply systems, efficient devices. Studies aimed at increasing efficiency and developing new modern structures, as well as improving their methods of heat calculation, are considered one of the most important issues [1-3].

The transfer of heat from a hot environment to a cold environment through a separating solid wall between them is called a heat transfer. In various heat exchangers used in any industry, the heat exchange between the heat carriers is carried out by heat transfer. If the separating wall should conduct heat well, it is made of a material with a high thermal conductivity. In other cases, for example, if it is necessary to reduce heat dissipation, the wall is made of a material whose thermal insulation properties are good.

The amount of heat given to the wall from the boiling heat carrier (hot medium) is determined by the Newton-Rixman formula:

$$Q = \alpha_1 F (t_1 - t_{dev1}) \qquad (1)$$

here: α_1 - coefficient of heat transfer from a hot heat carrier to the wall surface at which the temperature is t_1 ; F-the surface of the flat wall.

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The heat flow transmitted through the wall by the method of thermal conductivity is determined from the following equation:

$$Q=\frac{\chi}{б}F(t_{dev_1}-t_{dev_2}) \quad (2)$$

The amount of heat transferred from the second surface of the wall to the cold environment:

$$Q=\alpha_2 F(t_{dev_1}-t_{dev_2}) \quad (3)$$

here: α_2 - coefficient of heat transfer from the second surface of the wall to the cold environment.

Since the heat transfer process under consideration goes in a stationary order, the more heat the wall receives, the more it transmits. We solve the above equations with respect to the temperature difference:

$$\left.\begin{aligned} t_1-t_{dev_1} &= \frac{Q}{\alpha_1\cdot F} \\ t_{dev_1}-t_{dev_2} &= \frac{\delta}{\chi}\frac{Q}{F} \\ t_{dev_2}-t_2 &= \frac{Q}{\alpha_2 F} \end{aligned}\right\}$$

Heat flow by adding equations to the equation

$$Q=F(t_1-t_2)/\left(\frac{1}{\alpha_1}+\frac{\delta}{\chi}+\frac{1}{\alpha_2}\right) \quad (4)$$

or we determine the density of the heat flux:

$$q=(t_1-t_2)/\left(\frac{1}{\alpha_1}+\frac{\delta}{\chi}+\frac{1}{\alpha_2}\right) \quad (5)$$

When calculating the critical equations, the physical parameters of the liquid are obtained from the data tables according to the determining temperature. As a rule, this temperature, the average temperature of the liquid is obtained. As a determining measure for Circular pipes, its diameter, the diameter equivalent to complex cross-sectional channels, and its length is obtained when washing the plate with a stream. Modeling research of various physical phenomena can be carried out either directly on the object itself or on its Model. The Model and the process taking place in it provide a theory of similarity of conditions that must be satisfied. The possibilities of applying the theory of similarity to experiments are incredibly large.

Calculation of heat transfer through a flat wall can be carried out using the surface density of the heat flow [4-8].

To study the temperature flowing through a solid wall, the following formula is used.

$$d_z\rho C_p\frac{\partial T}{\partial t}+d_z\rho C_p\bar{U}\nabla T+\nabla\bar{q}=d_zQ+q_0+d_zQ_{ted}.\bar{q}=-d_zk\nabla T.$$

Issue setting: when the external temperature is -14 ^{o}C, the hona temperature is required to be 20 ^{o} C. Heat dissipation in this process occurs mainly from external barrier structures[9-10].

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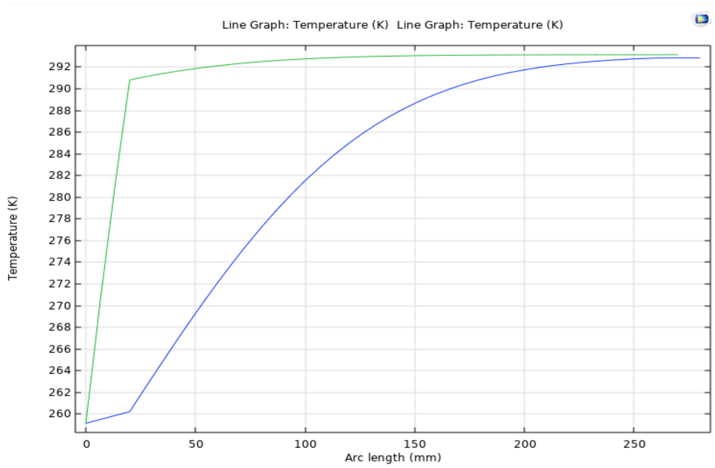
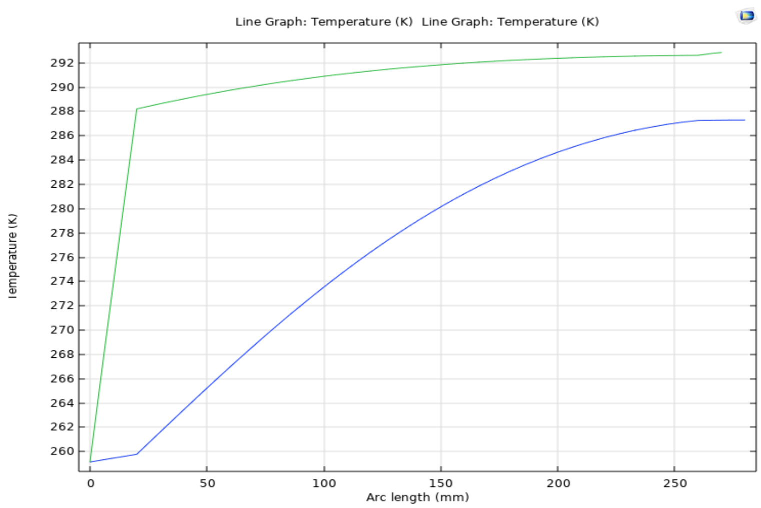
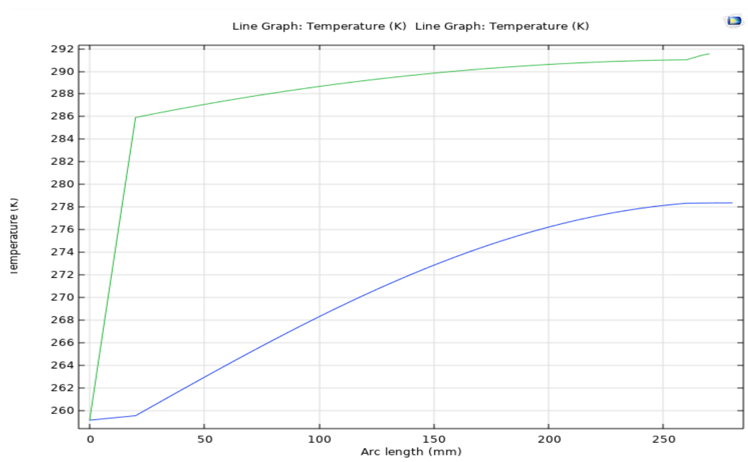


1-Fig. Read the heat through the walls in 4 hours



2-Fig. Read the heat through the walls in 12 hours



3-Fig. Read the heat through the walls in 24 hours

Summarizing this graph, it follows that the heat flow over time changes in the isolated state of the external walls.

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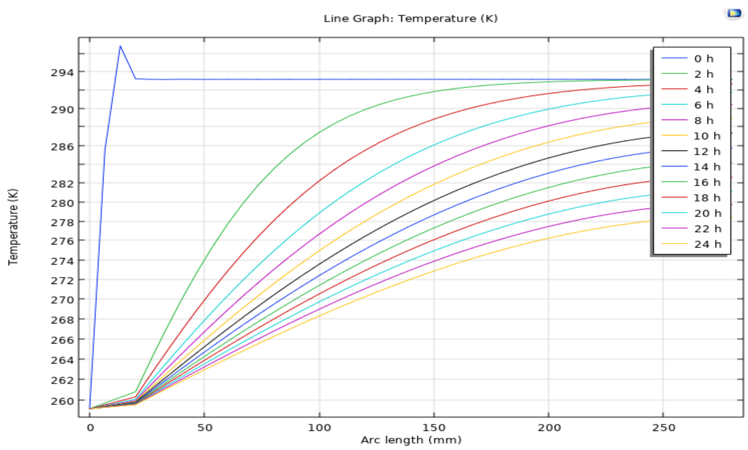

7-Fig. Flow of heat through an insulating wall for a day

Conclusion: spending for the heating system by reducing the heat dissipation can be reduced; the cost of laying can be reduced, which leads to the savings in the amount of money spent and products, and the introduction of a relatively high-quality and more reliable heating system in the mains.

References

1. Abdukarimov, B. A., & Kuchkarov, A. A. (2022). Research of the Hydraulic Resistance Coefficient of Sunny Air Heaters with Bent Pipes During Turbulent Air Flow. Journal of Siberian Federal University. Engineering & Technologies, 15(1), 14-23.
2. Abdukarimov, A., Noor, I. S. M., Mamatkarimov, O., & Arof, A. K. M. (2021). Influence of charge carrier density, mobility and diffusivity on conductivity–temperature dependence in polyethylene oxide–based gel polymer electrolytes. High Performance Polymers, 09540083211052841.
3. Uktamaliyev, B. I., Abdukarimov, A. A., & Mamatkarimov, O. O. (2021). Ionic Conductivity and Dielectric Constant of a Solid Polymer Electrolyte Containing Salts Litf2 and Mgtf2. CONVERTER, 2021(7), 897-902.
4. Abobakirovich, D. A. B., Sodiqovich, A. Y., & Abduvahob o'g, M. X. A. (2021, May). STUDY OF HEAT SUPPLY SYSTEMS WORKING ON THE BASIS OF TRADITIONAL AND RENEWABLE ENERGY SOURCES. In E-Conference Globe (pp. 140-145).
5. Abdukarimov, B. A., O'tbosarov, S. R., & Tursunaliyev, M. M. (2014). Increasing Performance Efficiency by Investigating the Surface of the Solar Air Heater Collector. NM Safarov and A. Alinazarov. Use of environmentally friendly energy sources.
6. Abbasov, E. S., Abdukarimov, B. A., & Abdurazaqov, A. M. (2020). Use of passive solar heaters in combination with local small boilers in building heating systems. Scientific-technical journal, 24(3), 32-35.
7. Abdukarimov, B., Abbosov, Y. S., & O'tbosarov, S. R. (2020). Hydrodynamic Analysis of Air Solar Collectors. Int. J. Adv. Res. Sci. Eng. Technol, 7(5), 13545-13549.
8. Abobakirovich, A. B. (2019). O'Gli Mo'Minov Oybek Alisher, and Shoyev Mardonjon Ahmadjon O'G'Li.". Calculation of the thermal performance of a flat solar air heater." Достижения науки и образования, 12, 53.

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9. Mamatkarimov, O. O., Khamidov, R., & Abdukarimov, A. (2019). The relative current change, concentration, and carrier mobility in silicon samples doped nickel and at pulse hydrostatic pressure. Materials Today: Proceedings, 17, 442-445.
10. Abdukarimov, B. A. (2021). Improve Performance Efficiency As A Result Of Heat Loss Reduction In Solar Air Heater. *International Journal of Progressive Sciences and Technologies*, *29*(1), 505-511.
11. Abdukarimov, B., O'tbosarov, S., & Abdurazakov, A. (2021). Investigation of the use of new solar air heaters for drying agricultural products. In *E3S Web of Conferences* (Vol. 264, p. 01031). EDP Sciences.
12. Madaliev, M. E. U., Maksudov, R. I., Mullaev, I. I., Abdullaev, B. K., & Haidarov, A. R. (2021). Investigation of the Influence of the Computational Grid for Turbulent Flow. *Middle European Scientific Bulletin*, *18*, 111-118.
13. Madaliev, M. E. O., & Navruzov, D. P. (2020). Research of νt-92 turbulence model for calculating an axisymmetric sound jet. *Scientific reports of Bukhara State University*, *4*(2), 82-90.
14. Мадрахимов, М. М., & Абдулҳаев, З. Э. (2019). Насос агрегатини ишга туширишда босимли сув узатгичлардаги ўтиш жараёнларини ҳисоблаш усуллари. *Фарғона Политехника Институти Илмий–Техника Журнали*, *23*(3), 56-60.
15. Arifjanov, A., Otaxonov, M., & Abdulkhaev, Z. (2021). Model of groundwater level control using horizontal drainage. *Irrigation and Melioration*, *2021*(4), 21-26.
16. ugli Mo‘minov, O. A., Maqsudov, R. I., & qizi Abdukhalilova, S. B. (2021). Analysis of Convective Finns to Increase the Efficiency of Radiators used in Heating Systems. *Middle European Scientific Bulletin*, *18*, 84-89.
17. Mo'minov, O. A., Abdukarimov, B. A., & O'tbosarov, S. R. (2021). IMPROVING SUPPORT FOR THE PROCESS OF THE THERMAL CONVECTION PROCESS BY INSTALLING REFLECTIVE PANELS IN EXISTING RADIATORS IN PLACES AND THEORETICAL ANALYSIS. In *Наука и инновации в строительстве* (pp. 47-50).
18. Madraximov, M. M., Abdulkhaev, Z. E., & ugli Inomjonov, I. I. (2022). Factors Influencing Changes In The Groundwater Level In Fergana. *International Journal of Progressive Sciences and Technologies*, *30*(2), 523-526.
19. Madraximov, M., Yunusaliev, E., Abdulhayev, Z., & Akramov, A. (2021). *Suyuqlik va gaz mexanikasi fanidan masalalar to'plami*. GlobeEdit.
20. Мадхадимов, М. М., Абдулхаев, З. Э., & Сатторов, А. Х. (2018). Регулирования работы центробежных насосов с изменением частота вращения. *Актуальные научные исследования в современном мире*, (12-1), 83-88.
21. Xamdamaliyevich, S. A., & Rahmankulov, S. A. (2021, July). INVESTIGATION OF HEAT ANSFER PROCESSES OF SOLAR WATER, AIR CONTACT COLLECTOR. In *E-Conference Globe* (pp. 161-165).
22. Mirsaidov, M., Nosirov, A., & Nasirov, I. (2020). Spatial forced oscillations of axisymmetric inhomogeneous systems. In *E3S Web of Conferences* (Vol. 164, p. 02009). EDP Sciences.
23. Nosirov, A. A., & Nasirov, I. A. (2021). Natural and Forced Vibrations of Axisymmetric Structure Taking into Account the Viscoelastic Properties of the Base. *Middle European Scientific Bulletin*, *18*, 303-311.

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24. Erkinjonovich, A. Z., Mamadaliyevich, M. M., O'G'Li, S. M. A., & Egamberdiyevich, T. N. (2021). Farg'ona Shahar Yer Osti Sizot Suvlarining Ko'tarilish Muammosi Va Yechimlari. *Oriental renaissance: Innovative, educational, natural and social sciences*, *1*(3), 138-144.
25. Мадрахимов, М. М., Абдулҳаев, З. Э., & Ташпулатов, Н. Э. (2019). Фарғона Шаҳар Ер Ости Сизот Сувлари Сатҳини Пасайтириш. *Фарғона Политехника Институти Илмий–Техника Журнали*, *23*(1), 54-58.
26. Рашидов, Ю. К., Орзиматов, Ж. Т., & Исмоилов, М. М. (2019). Воздушные солнечные коллекторы: перспективы применения в условиях Узбекистана. In *Экологическая, промышленная и энергетическая безопасность-2019* (pp. 1388-1390)
27. Рашидов, Ю. К., Исмоилов, М. М., Рашидов, К. Ю., & Файзиев, З. Ф. (2019). Определение оптимального количества расчётных слоев многослойного водяного стратификационного аккумулятора теплоты при расчете саморегулирующегося активного элемента. In *Экологическая, промышленная и энергетическая безопасность-2019* (pp. 1372-1376).
28. Madraximov, M. M., Abdulkhaev, Z. E., & Orzimatov, J. T. (2021). GIDRAVLIK TARAN QURILMASINING GIDRAVLIK HISOBI. *Scientific progress*, *2*(7), 377-383.
29. Rashidov, Y. K., & Orzimatov, J. T. (2022). SOLAR AIR HEATER WITH BREATHABLE MATRIX ABSORBER MADE OF METAL WIRE TANGLE. *Scientific-technical journal*, *5*(1), 7-13.
30. Mamatisaev, G. I., & Abdullaeva, I. (2021). Effective Solutions of Water Resources. *CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES*, *2*(12), 253-259.
31. Usarov, M., Usarov, D., & Mamatisaev, G. (2021, May). Calculation of a Spatial Model of a Box-Type Structure in the LIRA Design System Using the Finite Difference Method. In *International Scientific Siberian Transport Forum* (pp. 1267-1275). Springer, Cham.
32. Usarov, M. K., & Mamatisaev, G. I. (2020, November). Calculation on seismic resistance of box-shaped structures of large-panel buildings. In *IOP Conference Series: Materials Science and Engineering* (Vol. 971, No. 3, p. 032041). IOP Publishing.
33. Jovliev, O. T., Khujakulova, M. K., Usmonova, N. A., & O'tbosarov, S. R. (2021). Modeling the Theory of Liquid Motion Variable on the Way Flow. *Middle European Scientific Bulletin*, *18*, 455-461.
34. Абдукаримов, Б. А., Муминов, О. А., & Утбосаров, Ш. Р. (2020). Оптимизация рабочих параметров плоского солнечного воздушного обогревателя. In *Приоритетные направления инновационной деятельности в промышленности* (pp. 8-11).
35. Bekzod, A. (2020). Relevance of use of solar energy and optimization of operating parameters of new solar heaters for effective use of solar energy. *IJAR*, *6*(6), 16-20.
36. Madraximov, M. M., Nurmuxammad, X., & Abdulkhaev, Z. E. (2021, November). Hydraulic Calculation Of Jet Pump Performance Improvement. In *International Conference On Multidisciplinary Research And Innovative Technologies* (Vol. 2, pp. 20-24).
37. Hamdamalievich, S. A., & Nurmuhammad, H. (2021). Analysis of Heat Transfer of Solar Water Collectors. *Middle European Scientific Bulletin*, *18*, 60-65.
38. Madraximov, M., Yunusaliev, E., Abdulhayev, Z., & Akramov, A. (2021). *Suyuqlik va gaz mexanikasi fanidan masalalar to'plami*. GlobeEdit.

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39. Акрамов, А. А., Шарифов, А., Умаров, У. Х., Хокиев, М. К., & Ахмедов, М. Ф. (2020). Эффекты суперпластификаторов в бетонной смеси. *Политехнический вестник. Серия: Инженерные исследования*, (1), 139-143.
40. Умурзакова, М. А., Усмонов, М. А., & Рахимов, М. Н. (2021). АНАЛОГИЯ РЕЙНОЛЬДСА ПРИ ТЕЧЕНИЯХ В ДИФФУЗОРНО-КОНФУЗОРНЫХ КАНАЛАХ. *Экономика и социум*, (3-2), 479-486.
41. Аббасов, Ё. С., & Умурзакова, М. А. (2020). РАСЧЕТ ЭФФЕКТИВНОСТИ ПЛОСКИХ СОЛНЕЧНЫХ ВОЗДУХОНАГРЕВАТЕЛЕЙ. In *Современные проблемы теплофизики и энергетики* (pp. 7-8).
42. Salyamova, K. D., & Turdikulov, K. K. (2021, May). Stress state of an earth dam under main loads considering data from field observations. In Journal of Physics: Conference Series (Vol. 1926, No. 1, p. 012004). IOP Publishing.
43. АБДУЛҲАЕВ, З., & МАДРАХИМОВ, М. (2020). Гидротурбиналар ва Насосларда Кавитация Ҳодисаси, Оқибатлари ва Уларни Бартараф Этиш Усуллари. Ўзбекгидроэнергетика" илмий-техник журнали, 4(8), 19-20.
44. Kh, T. K. (2021). Strength Evaluation of the Charvak Earth Dam in a Plane Formulation. Middle European Scientific Bulletin, 18, 424-434.

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