

REFERENCE

- Afendi, M., Banks, W. M., & Kirkwood, D. (2005). Bubble free resin for infusion process. *Composites Part A: applied science and manufacturing*, 36(6), 739-746.
- Amirkhosravi, M., Pishvar, M., & Altan, M. C. (2019). Void reduction in VARTM composites by compaction of dry fiber preforms with stationary and moving magnets. *Journal of Composite Materials*, 53(6), 769-782.
- Anderson, J. P., Kelly, A. J., & Altan, M. C. (2013). Fabrication of composite laminates by vacuum-assisted resin transfer molding augmented with an inflatable bladder. *Research Gate*.
- Arulappan, C., Duraisamy, A., Adhikari, D., & Gururaja, S. (2015). Investigations on pressure and thickness profiles in carbon fiber-reinforced polymers during vacuum assisted resin transfer molding. *Journal of Reinforced Plastics and Composites*, 34(1), 3-18.
- ASTM, S. (2003). Standard test methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials. ASTM D790. *Annual book of ASTM standards*.
- ASTM, S. (2000). Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials. ASTM D3039 / D3039M. *Annual book of ASTM standards*.
- ASTM, S. (2014). Standard Test Method for Tensile Properties of Plastics. ASTM D638. *Annual book of ASTM standards*.
- ASTM, S. (1994). Standard Test Method for Ignition Loss of Cured Reinforced Resins. ASTM D2584. *Annual book of ASTM standards*.
- ASTM, S. (2008). Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement. ASTM D792. *Annual book of ASTM standards*.
- Begum K. & Islam M.A.(2013) Natural Fiber as a substitute to Synthetic Fiber in Polymer Composites: A Review. *Research Journal of Engineering Sciences*, 2(3), 46-53.

- Bender, D., Schuster, J. and Heider, D., 2006. Flow rate control during vacuum-assisted resin transfer molding (VARTM) processing. *Composites Science and Technology*, 66(13), pp.2265-2271.
- Bodaghi, M., Lomov, S. V., Simacek, P., Correia, N. C., & Advani, S. G. (2019). On the variability of permeability induced by reinforcement distortions and dual scale flow in liquid composite moulding: A review. *Composites Part A: Applied Science and Manufacturing*, 120, 188-210.
- Bolick, R. (2000) 'Composite fabrication via the VARTM process', Triangle Polymer Technologies, Inc / North Carolina A&T State University:, (STTR N064 – 040-0400). Available at: <https://fddocuments.in/document/composite-fabrication-via-the-vartm-process.html>.
- Brouwer, W. D., Van Herpt, E. C. F. C., & Labordus, M. (2003). Vacuum injection moulding for large structural applications. *Composites Part A: Applied Science and Manufacturing*, 34(6), 551-558.
- Bryan P. (2010). Vacuum Assisted Resin Transfer Molding (VARTM) System. Advanced Materials and Technologies Laboratory Mechanical Engineering Department, Virginia Tech Summer.
- Catherine Dierksen, Dr. Daniel Davis, Patrick Klein, Optimization of High Temperature VARTM Process, Final Report, Nanotechnology and Materials Systems REU, summer of 2006
- Changchun, W., Guanghui, B., Yang, W., Boming, Z., & Lijian, P. (2015). Permeability tests of fiber fabrics in the vacuum assisted resin transfer molding process. *Applied Composite Materials*, 22(4), 363-375.
- Chokka, S. K., Ben, B. S., & Srinadh, K. V. (2019). Enhanced Tensile and Wear Properties of CFRP Composites Manufactured Using Vacuum Infusion Process. In *Science Forum* (Vol. 969, pp. 271-277). Trans Tech Publications Ltd.
- Cristaldi, G., Latteri, A., Recca, G., & Cicala, G. (2010). Composites based on natural fibre fabrics. *Woven fabric engineering*, 17, 317-342.

- Dariushi, S., Farahmandnia, S., & Rezadoust, A. M. (2020). An experimental investigation on infusion time and strength of fiber metal laminates made by vacuum infusion process. *Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications*, 1464420720941890.
- Das, S. C., Paul, D., Siddiquee, M. A. B., Islam, J. M., & Khan, M. A. (2016, December). Experimental investigation and analysis of mechanical behavior of jute fabric reinforced polyester composites. In *Proceedings of the International Conference on Mechanical, Industrial and Energy Engineering, KUET, Khulna, Bangladesh* (pp. 26-27).
- Deb, A., Das, S., Mache, A., & Laishram, R. (2017). A study on the mechanical behaviors of jute-polyester composites. *Procedia engineering*, 173, 631-638.
- Dewan, M. W., Hossain, M. K., Hosur, M., & Jeelani, S. (2013). Thermomechanical properties of alkali treated jute-polyester/nanoclay biocomposites fabricated by VARTM process. *Journal of applied polymer science*, 128(6), 4110-4123.
- Dhyani, A. (2008). *VARTM process with some modifications*. Michigan State University.
- El-Chiti, F., Lopez-Anido, R. A., Dagher, H. J., Thompson, L., Muszynski, L., & Hess, P. E. (2005, June). Experimental approach for characterizing VARTM composites using a 3-D digital image correlation system. In *Proceedings of the SEM XII Int. Congress and Exposition on Experimental and Applied Mechanics, Portland, OR*.
- Francucci, G., Rodríguez, E. S., & Vázquez, A. (2012). Experimental study of the compaction response of jute fabrics in liquid composite molding processes. *Journal of composite materials*, 46(2), 155-167.
- Francucci, G., Rodríguez, E.S. and Vázquez, A., (2010). Study of saturated and unsaturated permeability in natural fiber fabrics. *Composites Part A: Applied Science and Manufacturing*, 41(1), pp.16-21.
- Gajjar, T., Shah, D. B., Joshi, S. J., & Patel, K. M. (2020). Analysis of Process Parameters for Composites Manufacturing using Vacuum Infusion Process. *Materials Today: Proceedings*, 21, 1244-1249.

- Gajjar, T., Shah, D., Joshi, S., & Patel, K. (2020). Investigation on Dimensional Accuracy for CFRP Antenna Reflectors Using Autoclave and VARTM Processes. In *Advances in Computational Methods in Manufacturing* (pp. 693-702). Springer, Singapore.
- Gama, B.A., Li, H., Li, W., Paesano, A., Heider, D. and Gillespie, J.W., 2001, November. Improvement of dimensional tolerances during VARTM processing. In *INTERNATIONAL SAMPE TECHNICAL CONFERENCE* (Vol. 33, pp. 1415-1427).
- Gavande, V., & Anand, A. (2020). On the mechanical properties of continuous fiber reinforced thermoplastic composites realized through vacuum infusion. *Journal of Composite Materials*, 0021998320928120.
- Ghabezi, P., Golzar, M. and Jalall, S.R., Effect of Inlet Tube Dimensions on VARTM Mold Filling Time.
- Ghose, S., Watson, K. A., Cano, R. J., Britton, S. M., Jensen, B. J., Connell, J. W., & Lineberry, Q. J. (2009). High temperature VARTM of phenylethynyl terminated imides. *High Performance Polymers*, 21(5), 653-672.
- Goren, A., & Atas, C. (2008). Manufacturing of polymer matrix composites using vacuum assisted resin infusion molding. *Archives of materials Science and Engineering*, 34(2), 117-120.
- Govignon, Q., Bickerton, S., Morris, J. and Kelly, P.A., (2008). Full field monitoring of the resin flow and laminate properties during the resin infusion process. *Composites Part A: Applied Science and Manufacturing*, 39(9), pp.1412-1426.
- Govignon, Q., Kazmi, S. M. R., Hickey, C., & Bickerton, S. (2011, August). Control of laminate quality for parts manufactured using the resin infusion process.
- Grimsley, B. W., Hubert, P., Song, X. L., Cano, R. J., Loos, A. C., & Pipes, R. B. (2001). Flow and compaction during the vacuum assisted resin transfer molding process.

- Heider, D., Graf, A., Fink, B. K., & Gillespie Jr, J. W. (1999, February). Feedback control of the vacuum-assisted resin transfer molding (VARTM) process. In *Process Control and Sensors for Manufacturing II* (Vol. 3589, pp. 133-141). International Society for Optics and Photonics.
- Hindersmann, A. (2019). Confusion about infusion: An overview of infusion processes. *Composites Part A: Applied Science and Manufacturing*, 126, 105583.
- Ho, M. P., Wang, H., Lee, J. H., Ho, C. K., Lau, K. T., Leng, J., & Hui, D. (2012). Critical factors on manufacturing processes of natural fibre composites. *Composites Part B: Engineering*, 43(8), 3549-3562.
- Jae-In KIM. (2019). Prediction of the vacuum assisted resin transfer molding process considering the directional permeability (Doctoral dissertation, 한양대학교).
- Jweeg, M. J., Hammood, A. S., & Al-Waily, M. (2012). Experimental and theoretical studies of mechanical properties for reinforcement fiber types of composite materials. *International Journal of Mechanical & Mechatronics Engineering IJMME-IJENS*, 12(04), 62.
- Kamae, T., Kochi, S., Wadahara, E., Shinoda, T., & Yoshioka, K. (2009). Advanced VARTM System for Aircraft Structures Materials Technologies. *Toray Industries, Inc.*
- Kedari, V. R., Farah, B. I., & Hsiao, K. T. (2011). Effects of vacuum pressure, inlet pressure, and mold temperature on the void content, volume fraction of polyester/e-glass fiber composites manufactured with VARTM process. *Journal of Composite Materials*, 45(26), 2727-2742.
- Kelkar, A. D., & Tate, J. S. (2004). Low cost manufacturing of textile composites using Vacuum Assisted Resin Transfer Molding. *Journal of Manufacturing Technology & Research*, 1.
- Kim, J. I., Hwang, Y. T., Choi, K. H., Kim, H. J., & Kim, H. S. (2019). Prediction of the vacuum assisted resin transfer molding (VARTM) process considering the directional permeability of sheared woven fabric. *Composite Structures*, 211, 236-243.

- Kong, C., Park, H., & Lee, J. (2014). Study on structural design and analysis of flax natural fiber composite tank manufactured by vacuum assisted resin transfer molding. *Materials Letters*, 130, 21-25.
- Kuentzer, N., Simacek, P., Advani, S. G., & Walsh, S. (2007). Correlation of void distribution to VARTM manufacturing techniques. *Composites Part A: applied science and manufacturing*, 38(3), 802-813.
- Kumbhani, C. B., Dave, H. K., & Patel, H. V. (2021). Impact and Flexural Testing of Jute and Flax Fiber Reinforced Composites Fabricated by VARTM Process. In *Advances in Manufacturing Processes* (pp. 411-420). Springer, Singapore.
- Lagardère, M., Park, C. H., & Panier, S. (2014). Permeability of natural fiber reinforcement for liquid composite molding processes. *Journal of Materials Science*, 49(18), 6449-6458.
- Larimore, Z. J., & Holmes Jr, L. R. (2012). *Tailoring Fiber Volume Fraction of Vacuum-assisted Resin Transfer Molding Processed Composite Laminates by Bladder-bag Resin Reservoir* (No. ARL-TN-0510). ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE.
- Lawrence, J. M., Simacek, P., Frey, P., Bhat, P., Gebauer, T., & Advani, S. G. (2007, April). The compaction behavior of fibrous preform materials during the VARTM infusion. In *AIP Conference Proceedings* (Vol. 907, No. 1, pp. 1039-1045). American Institute of Physics.
- Li, W., Krehl, J., Gillespie Jr, J.W., Heider, D., Endrulat, M., Hochrein, K., Dunham, M.G. and Dubois, C.J., 2004. Process and performance evaluation of the vacuum-assisted process. *Journal of composite materials*, 38(20), pp.1803-1814.
- Ma, X., Yang, Z., Gu, Y., Li, Y., Li, M., Zhang, D., ... & Zhang, Z. (2014). Manufacture and characterization of carbon fiber composite stiffened skin by resin film infusion/prepreg co-curing process. *Journal of Reinforced Plastics and Composites*, 33(17), 1559-1573.
- Mathews, P. G. (2005). *Design of Experiments with MINITAB*. Milwaukee^eWisconsin Wisconsin: ASQ Quality Press.

- Maung, P. P., Htet, T. L., & Malysheva, G. V. (2020, January). Simulation and optimization of vacuum assisted resin infusion process for large-sized structures made of carbon fiber-reinforced plastics. In *IOP Conference Series: Materials Science and Engineering* (Vol. 709, No. 2, p. 022041). IOP Publishing.
- Naik, N. K., Sirisha, M., & Inani, A. (2014). Permeability characterization of polymer matrix composites by RTM/VARTM. *Progress in aerospace sciences*, 65, 22-40.
- Nasir, M. A., Khan, Z. M., Nauman, S., Anas, S., Pasha, A., Khalil, S., & Shah, M. (2015). Tensile Strength changeability of Multilayered Composites, fabricated through Optimized" VARTM" Technology, An experimental Approach. *University of Engineering and Technology Taxila. Technical Journal*, 20(4), 55.
- Nauheimer, M., Relan, R., Madsen, H., Thygesen, U. H., Olesen, B., & Kirkeby, K. (2017). A combined experimental and simulation based approach to model the flow-front dynamics in the vacuum assisted resin transfer moulding process. In *2nd International Conference on Lightweight Design of Materials and Engineering Structures (LIMAS)* (pp. 28-35).
- O'donnell, A., Dweib, M. A., & Wool, R. P. (2004). Natural fiber composites with plant oil-based resin. *Composites science and technology*, 64(9), 1135-1145
- Park, C. H., & Woo, L. (2011). Modeling void formation and unsaturated flow in liquid composite molding processes: a survey and review. *Journal of reinforced plastics and composites*, 30(11), 957-977.
- Pishvar, M., Amirkhosravi, M., & Altan, M. C. (2017, November). Applying magnetic consolidation pressure during cure to improve laminate quality: a comparative analysis of wet lay-up and vacuum assisted resin transfer molding processes. In *ASME International Mechanical Engineering Congress and Exposition* (Vol. 58493, p. V014T11A048). American Society of Mechanical Engineers.
- Pishvar, M., Amirkhosravi, M., & Altan, M. C. (2019, August). Fabricating high-quality composite laminates by magnetic compaction. In *AIP Conference Proceedings* (Vol. 2139, No. 1, p. 110004). AIP Publishing LLC.

- Poorzeinolabedin, M., & Parnas, K. L. (2019). Flow correction control with electromagnetically induced preform resting process. *Advances in Manufacturing*, 7(2), 199-208.
- Poorzeinolabedin, M., Parnas, L., & Dashatan, S. H. (2014). Resin infusion under flexible tooling process and structural design optimization of the complex composite part. *Materials & Design*, 64, 450-455.
- Potter, K. D. (1999). The early history of the resin transfer moulding process for aerospace applications. *Composites Part A: applied science and manufacturing*, 30(5), 619-621.
- Prasad, T. M. (2004). Investigation of Vartm Processing of High Temperature RP-46 Resin System.
- Raju, Vinay Rao, S. I. (2014) 'QuEST Global Services'.
- Paul, R., & Dai, L. (2018). Interfacial aspects of carbon composites. *Composite Interfaces*, 25(5-7), 539-605.
- Ricciardi, M. R., Antonucci, V., Durante, M., Giordano, M., Nele, L., Starace, G., & Langella, A. (2014). A new cost-saving vacuum infusion process for fiber-reinforced composites: Pulsed infusion. *Journal of Composite Materials*, 48(11), 1365-1373.
- Rigas, E.J., Mulkern, T.J., Walsh, S.M. and Nguyen, S.P., 2001. Effects of processing conditions on vacuum assisted resin transfer molding process (VARTM).
- Roe, P. J., & Ansell, M. P. (1985). Jute-reinforced polyester composites. *Journal of Materials Science*, 20(11), 4015-4020.
- Ronnie B. Composite fabrication via the VARTM process. *Triangle Polymer Technologies*. Inc / North Carolina A&T State University: 2000.STTR N064 – 040 – 0400.
- Rowe, G. I., Yi, J. H., Chiu, K. G., Tan, J., Mamishev, A. V., & Minaie, B. (2005, May). Fill-front and cure progress monitoring for VARTM with auto-calibrating dielectric sensors. *In Proc., SAMPE 2005 Conference*.
- Saheb, D. N., & Jog, J. P. (1999). Natural fiber polymer composites: a review. *Advances in Polymer Technology: Journal of the Polymer Processing Institute*, 18(4), 351-363.

- Salman, S. D., Sharba, M. J., Leman, Z., Sultan, M. T. H., Ishak, M. R., & Cardona, F. (2015). Physical, mechanical, and morphological properties of woven kenaf/polymer composites produced using a vacuum infusion technique. *International Journal of Polymer Science*.
- Sanjay, M. R., G. R. Arpitha, L. Laxmana Naik, K. Gopalakrishna, and B. Yogesha. "Applications of natural fibers and its composites: An overview." *Natural Resources* 7, no. 3 (2016): 108-114.
- Sanjay, M. R., Madhu, P., Jawaid, M., Senthamaraikannan, P., Senthil, S., & Pradeep, S. (2018). Characterization and properties of natural fiber polymer composites: A comprehensive review. *Journal of Cleaner Production*, 172, 566-581
- Sathishkumar, T. P., Naveen, J. A., & Satheeshkumar, S. (2014). Hybrid fiber reinforced polymer composites—a review. *Journal of Reinforced Plastics and Composites*, 33(5), 454-471.
- Schledjewski, R., & Grössing, H. (2017). Liquid Composite Molding: A Widely Used Group of FRPC Processing Techniques, but still a Challenging Topic. In *Materials Science Forum* (Vol. 879, pp. 1715-1720). Trans Tech Publications Ltd.
- Sharma, S., & Siginer, D. A. (2009, January). VARTM Process Improvement for Repeatable and Improved Mechanical Properties of Composite Laminates. In *ASME International Mechanical Engineering Congress and Exposition* (Vol. 43826, pp. 45-50).
- Shevtsov, S., Zhilyaev, I., Chang, S. H., Wu, J. K., Huang, J. P., & Snezhina, N. (2020). Experimental and Numerical Study of Vacuum Resin Infusion for Thin-Walled Composite Parts. *Applied Sciences*, 10(4), 1485.
- Summerscales, J., & Searle, T. J. (2005). Low-pressure (vacuum infusion) techniques for moulding large composite structures. *Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications*, 219(1), 45-58.
- Sunilpete, M. A., & Cadambi, R. M. (2020). Development of Cost Effective Out-of-Autoclave Technology–Vacuum Infusion Process with Tailored Fibre Volume Fraction. *Materials Today: Proceedings*, 21, 1293-1297.

- Tackitt, K. D., & Walsh, S. M. (2005). Experimental study of thickness gradient formation in the VARTM process. *Materials and manufacturing processes*, 20(4), 607-627.
- Takeda, F., Nishiyama, S., Hayashi, K., Komori, Y., Suga, Y., & Asahara, N. (2005). Research in the application of the VaRTM technique to the fabrication of primary aircraft composite structures. *Mitsubishi Heavy Industries Technical Review*, 42(5).
- Thagard JR, Okoli OI, Liang Z. Resin infusion between double flexible tooling: evaluation of process parameters. *Journal of reinforced plastics and composites*. 2004 Nov;23(16):1767-78.
- Valizadeh, P., Hosseini, S. M., & Alvandi, H. (2012, December). Studying the physical and mechanical behavior of fibre-reinforced epoxy composite, fabricated by VARTM and VB. In *The 3rd International Conference on Composites: Characterization, Fabrication and Application (CCFA-3)*.
- Van Oosterom, S., Allen, T., Battley, M., & Bickerton, S. (2019). An objective comparison of common vacuum assisted resin infusion processes. *Composites Part A: Applied Science and Manufacturing*, 125, 105528.
- Verma, K. K., Dinesh, B. L., Singh, K., Gaddikeri, K. M., & Sundaram, R. (2014). Challenges in processing of a cocured wing test box using vacuum enhanced resin infusion technology (VERiTy). *Procedia materials science*, 6, 331-340.
- Wang, C., Yue, G., Bai, G., Pan, L. and Zhang, B., 2016. Compaction behavior and permeability property tests of preforms in vacuum-assisted resin transfer molding using a combined device. *Measurement*, 90, pp.357-364.
- Williams, C., Summerscales, J., & Grove, S. (1996). Resin infusion under flexible tooling (RIFT): a review. *Composites Part A: Applied Science and Manufacturing*, 27(7), 517-524.
- Williams, G. I., & Wool, R. P. (2000). Composites from natural fibers and soy oil resins. *Applied Composite Materials*, 7(5-6), 421-432.
- Wu, D., Larsson, R., & Rouhi, M. S. (2019). Modeling and Experimental Validation of the VARTM Process for Thin-Walled Preforms. *Polymers*, 11(12), 2003.

- Wu, D., Larsson, R., & Rouhi, M. S. (2019). Modeling and experimental validation of the VARTM process. ICCM22 2019, 1014.
- Xia, C., Shi, S. Q., Cai, L., & Hua, J. (2015). Property enhancement of kenaf fiber composites by means of vacuum-assisted resin transfer molding (VARTM). *Holzforschung*, 69(3), 307-312.
- Yalcinkaya, M.A., Sozer, E.M. and Altan, M.C.(2017). Fabrication of high quality composite laminates by pressurized and heated-VARTM. *Composites Part A: Applied Science and Manufacturing*, 102, pp.336-346.
- Yalcinkaya, M. A, Guloglu, G. E., Pishvar, M., Amirkhosravi, M., Murat Sozer, E., & Cengiz Altan, M. (2018). Pressurized infusion: a new and improved liquid composite molding process. *Journal of Manufacturing Science and Engineering*, 141(1).
- Yalcinkaya, M. A., Sozer, E. M., & Altan, M. C. (2019). Effect of external pressure and resin flushing on reduction of process-induced voids and enhancement of laminate quality in heated-VARTM. *Composites Part A: Applied Science and Manufacturing*, 121, 353-364.
- Yenilmez, B., Senan, M. and Sozer, E.M. (2009). Variation of part thickness and compaction pressure in vacuum infusion process. *Composites Science and Technology*, 69(11-12), pp.1710-1719.
- Yokozeki, T., Yamazaki, W., & Kobayashi, Y. (2015). Investigation into property control of VaRTM composites by resin infusion process. *Advanced Composite Materials*, 24(6), 495-507.
- Yoon, M.K., Baidoo, J., Gillespie Jr, J.W. and Heider, D., 2005. Vacuum assisted resin transfer molding (VARTM) process incorporating gravitational effects: a closed-form solution. *Journal of composite materials*, 39(24), pp.2227-2242.
- Yui, Y., & Tokutomi, H. (2020). U.S. Patent No. 10,618,229. Washington, DC: U.S. Patent and Trademark Office.