

**THE TRIAL COURT
COMMONWEALTH OF MASSACHUSETTS**

Hampden, ss:
No. 07CV1817

Housing Court Department
Western Division

ALTON KING,

Plaintiff,

v.

RICHARD McCULLOUGH, JR., et al,

Defendants.

**FINDINGS, RULINGS, AND ORDER
FOR ENTRY OF JUDGMENT**

1. **BACKGROUND.** The plaintiff homeowner Alton King filed claims against the defendant contractors Richard McCullough, Jr. and Richard A McCullough, Inc. (collectively “McCullough”) for alleged defective installation of a heating, ventilation, and air conditioning (“HVAC”) system. In turn, McCullough filed a third-party complaint against the subcontractor Dee Services, Inc. (“Dee”), the designer and installer of the HVAC system, for indemnification.
2. On December 14, 2009, King and McCullough filed a stipulation of dismissal, in which King dismissed all claims against McCullough. After hearing on February 8, 2010, the court allowed King’s motion to amend its complaint to add claims against Dee for breach of contract, breach of the implied covenant of good faith and fair dealing, breach of express warranty, and breach of implied warranty of habitability.¹ The matter came before me for a multi-day bench trial. Based on the evidence and the credibility of witnesses, the following Findings, Rulings and Order are to enter:

¹ As part of a settlement agreement, McCullough assigned to King any and all rights and remedies it had against Dee with respect to the HVAC system.

3. **FINDINGS:** On or about January 18, 2001, King entered into a contract with McCullough for the construction of a single family home located at 49 Memery Lane, Longmeadow (“the home” or “the house”). McCullough subcontracted with Dee for the HVAC work in the home.
4. In or around September, 2003, King informed McCullough that he wished to use Supertherm, a ceramic paint, as insulation in the home, rather than the traditional fiberglass insulation with a vapor barrier. Although McCullough strongly advised against its use as insulation, King, a sales representative for Supertherm, insisted; McCullough, however, declined to move forward unless King signed a waiver relative to the Supertherm. On September 5, 2003, King entered into a hold harmless agreement with McCullough, in which King waived all claims as against McCullough with respect to the insulation, drywall and painting work at the home.
5. On or about October 22, 2003 King completed a REScheck form, which is required as part of the building permitting process. The REScheck form is a summary of the heat load to the house, and demonstrates to officials compliance with the energy conservation requirements of the State Building Code (“the Code”). The form itself calls for the calculations of the thermal resistance of the insulation system, also known as “R-value.” On the form, King produced R-values that complied with the Code, with an approximate R-value of 19 for the walls and 30 for the ceiling.²
6. In November, 2003, King received an evaluation of the home by Craig Marden of

² McCullough was not the only individual resistant to use of the Supertherm paint. In fact, the Town’s Building Inspector initially declined to provide a Certificate of Occupancy (“CO”) for the home because of King’s use of the Supertherm in the home. At some point, however, King provided the Inspector with information on the paint, after which the Inspector agreed to issue the CO.

Conservation Services Group (“GCS”), a green construction expert, for purposes of receiving an Energy Star rating. Following his inspection, Marden advised King that he was highly skeptical of the Supertherm’s insulating value, and that if King moved forward with its installation in the home, he would likely experience high utility bills; additionally Marden advised that there was the potential for cold interior surfaces.

7. Paul Tetro is a manager of Dee, and was responsible for designing and overseeing installation of the HVAC system in the King home. Tetro designed the system by inputting data into the Manual-J software, a preferred method for calculating HVAC specifications. Specifically, the software requires the input of the R-value for the insulation in the home. R-value is an integral factor in the design of an HVAC system, and it was imperative that Tetro have accurate R-value calculations. Tetro utilized the R-value figures given to him by King, for the Manual -J computations.

8. Tetro and his team from Dee installed an HVAC system based on Tetro’s design.³ The system itself consisted of the air conditioner and boiler units in the basement, an air diffuser which was also in the basement, a “main trunk” air duct which ran from the basement to the attic, a “duct run” along the length of the attic, and a system of “branch ducts” which carried the air to the individual rooms in King’s house. In the individual rooms throughout the home, the supply and return vents were situated relatively close and parallel to one another. The total cost of the system designed by Dee was approximately \$28,000.

9. On or around June 20, 2004, the home was finally completed and ready for occupancy;

³ The testimony and evidence varied as to the exact size of the Dee HVAC system, placing at anywhere between 50,000 and 120,000 BTUs—a range which undisputedly met all Code requirements.

King moved into the new home soon thereafter. Right away, King began experiencing problems with the temperature regulation in the home, particularly in the rooms on the second floor of the house. During the summer months, the temperature on the second floor of the home was close to 90° F. During the winter months, the second floor temperatures descended below 60° F. While the temperatures in the winter months remained cool on the second floor, the attic above was quite warm.

10. At some point, King added an addition onto the home. In the addition, King used the traditional fiberglass insulation, rather than the Supertherm used throughout the remainder of the home. At trial, the defendant introduced pictures taken during the winter months which showed that the snow on the roof of the main portion of the home had melted; meanwhile, there was no melting of snow on the roof over the addition of the home. Additional photographs showed that there was no melting of snow on the roofs of other similar homes neighborhood homes. Based on the expert testimony presented at trial, the court is satisfied that this was more likely than not due to a significant lack of thermal insulation in the home.

11. Believing the HVAC system responsible for the temperature problems, King contacted Dee. In response, Tetro and other Dee employees came to the home to investigate the system, and made several repairs, including a resealing of the duct work in certain areas. After a multitude of complaints and repair requests, however, Dee determined that the temperature problems in the home were not related to the HVAC system. Rather, Tetro informed King that the temperature problems were caused by inadequate insulation. Tetro concluded that unless more traditional insulation was “blown into” the home, Dee would no longer continue to respond to King’s complaints and repair requests. King disagreed with Tetro’s assessment and asked him

to leave the home, after heated exchange.

* → 12. At some point, King hired engineer Curt Freedman, of C.M.F. Engineering, Inc., to evaluate the HVAC system. After examining the entire system, Freedman evaluated the thermal insulation throughout the home. In addition to his normal evaluation of the system, Freedman took a sample of the actual Supertherm material used in the home and performed a "hotbox test," a standard method for testing thermal performance. Specifically, the hot box test verifies the R-value of the installed insulation system. Based on his assessment, Freedman determined that the R-value of the Supertherm was essentially zero, rather than the calculations submitted by King. An R-value of zero meant that the Supertherm had virtually no impact on heat retention in the home; further, Freedman found that an R-value of zero requires a system of 350,000 BTUs, a system significantly larger than the one installed by Dee.⁴ Unless and until the R-values were brought up to Code, Freedman informed King that the temperature problems could not be resolved.⁵

* → 4 The relationship between King and Freedman has been less than cordial since its inception. In fact, King, dissatisfied with the services of Freedman, refused to pay Freedman's bill. In 2007, Freedman prevailed on a small claims action against King for payment of his services. The plaintiff urges the court to find Freedman's assessment of the HVAC system biased due to their past antagonism towards each other. I find, however, Freedman's testimony entirely credible and that it is based solely on his professional opinion, and that he was not motivated by the prior personal history between the parties.

* → 5 At the trial, Freedman replicated the hot box test, over the objection of King. King objected to its use based on his assessment that the Supertherm sample used by Freedman was tainted, in that it was taken from the bottom of the paint pan. Therefore, he argues, it is not accurate depiction of the R-value of the insulation material. I disagree. The specimen was taken from the bottom of the paint pan was from the same batch of Supertherm used on King's walls and was significantly thicker than the paint application on the walls; further, an additional coating of Supertherm was added to the hotbox prior to the demo. Because the sample used in the box was thicker than that applied, common sense dictates that it would have provided more insulation to the hotbox, not less. King's second objection, based on a failure to follow good scientific practices, will be addressed separately below.

13. In or around October, 2005, King contracted with yet another entity, Wings Testing & Balancing (“Wings”), to perform a testing of the HVAC’s fan system. Wings concluded that the fan system was undersized and inadequate, and therefore making it impossible for the system to maintain space temperatures within the home. Wings recommended that King contract with a design engineer to study and conditions and develop a plan for modifying the system.

14. In May, 2006, King commissioned EWS Plumbing and Heating Incorporated (“EWS”) to evaluate the system. EWS determined that the duct work was roughly one-size too small and poorly sealed and insulated. It found that no air flow could be felt coming into the rooms at the vent entry point. In addition, it found that the supply and return vents were located too close to one another.

15. To assist in designing a system that would correct the perceived deficiencies, King contracted with an engineering firm, Reinhardt Associates. Engineer Thomas Sullivan evaluated the Dee system and determined that the HVAC system installed actually met Code requirements and that it should have worked. Overall, however, he felt that the system was insufficient. Specifically, Sullivan found that the overall air handling system was insufficient, that the duct work was too small, that the duct runs were too long, and that the fans simply could not move the air to anywhere in the building that was required. Moreover, Sullivan felt that the close proximity of the supply and return vents in the rooms caused additional problems: that when the air did make it to the rooms, all the air coming off of one side of the supply vent went immediately in to the return vent.

16. Based on his assessment, Sullivan designed a system that placed the supply and returns on opposite sides of the room, with the supply on the exterior wall and return on interior wall.

The new design system included a separate air handling system in the attic to service the second floor. In addition, Sullivan included air distribution for the now finished basement, something which was not contemplated by the Dee System. In designing the system, Sullivan assumed the minimum Code requirements for insulation, or an R-value of 19 for the walls and 30 for the ceiling.⁶

17. In or around May, 2010, EWS removed much of the old distribution system, and then installed a new system based on Sullivan's specifications. The EWS system was significantly larger than the Dee system—approximately 200,000 BTUs by some estimates—and cost slightly over \$100,000 installed.⁷

18. Shortly before trial, Matthew Cole of Wings came back to the home to evaluate the new EWS system. Based on his assessment, Cole found that the air distribution in the home had greatly improved. King testified that he was now much more comfortable in his home.

19. In addition to King and Sullivan, the plaintiff presented the testimony of Michael Anthony, a designer and sales representative of EWS; Matt Cole, Owner of Wings; and Gary Stalheski, President of EWS. Testifying for the defendant were Freedman; Tetro; Bruce Harley, Technical Director of CSG; and William Towsley, a registered professional engineer.

20. **DISCUSSION:** King argues that the Dee system was designed to fail, in that its air distribution system was undersized and failed to adequately move the air into and around the individual rooms in the home. Because the design was flawed, he contends that he was required

⁶ Sullivan testified that even assuming that the insulation throughout the home was inadequate, he would still find the air distribution system ineffective in that it simply did not have enough "oomph" and could not meet the heating and cooling demands of the home.

⁷ EWS had previously bid on the completion of the initial HVAC system, with an installation estimate of \$55,000 to \$65,000.

to remove much of the Dee system, and replace it with a larger, more efficient system. He seeks the full reimbursement of the replacement of the Dee system. The question for the court's consideration is whether the Dee system failed to meet industry standards and practices, and as a result King suffered damages. King has failed to meet his burden.

21. King's experts testified that the main problems with the air distribution system were that the duct work was "one size too small"; that the duct work was improperly insulated, and possibly leaking; and that the supply and return vents were situated too close together. As a result, they contend that the entire system required replacement. There are several problems with this conclusion, however.

22. First, although Sullivan testified that the system was not powerful enough to move air up through the main trunk into the ductwork, which was then too small to accommodate the necessary air flow to heat and cool the home, he also testified that the Dee system met all of the Code requirements and industry standards, and "should have" worked. In other words, Sullivan found that the heating and cooling loads of the Dee system were exactly what they should have been given the specs of the home, and that the problem was simply the size and length of the ductwork. Instead of designing an overhaul of the duct work, however, Sullivan recommended the wholesale replacement of the Dee system—a system which by Sullivan's own testimony met all Code requirements—with a system which nearly doubled the size of the heating and cooling loads.⁸ Though King did not provide sufficient evidence upon which I could find that the duct work was too small to heat and cool the house, even if it were "one size too small" King



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It may also be that the heating and cooling loads of the EWS system fails to comply with the Code, which requires that the installed systems not exceed 125% of the design loads. 780 CMR 6106.4.3.1.1.

provided insufficient evidence that this could result in the total dissipation—as King argues—of hot air before it reached the second floor vents.

23. Second, Stahelski testified that the heat generated by the boiler dissipated out of the duct work before it could reach the rooms. He additionally testified that the reason for the dissipation of snow on the roof of King's home could have been due to duct leakage. I have a hard time rectifying these two statements. If the system was too small to move the air up to the rooms on the second floor, and the air was additionally leaking out of the duct work before it even reached the rooms, then how could it be that the air could have made it to the duct run in the attic in the first place? Further, Tetro made repairs to duct leakage found in the system, and King presented no probative evidence, other than conjecture, that there was appreciable duct leakage in the system.

24. I have similar difficulty with King's argument that the close proximity of the return and supply vents was responsible for further loss of air circulation. King's contention that the system was unable to even get the air to the rooms in the first instance, such that there was no palpable air flowing from the supply vent, directly conflicts with his argument that the location of the return vent was responsible for any additional heating and cooling loss. Again, if it is true, as King contends, that the air was unable to make it to the individual rooms in the first instance, then it is simply impossible for me to conclude that vent location caused further problems and that it was necessarily required that they be relocated.

25. King relies heavily here on Sullivan's testimony that best practices calls for the return and supply vents to be located on opposite ends of a room, as this provides optimal circulation. Even were I to assume this statement to be true, which I do for purposes of this decision, it does not

necessarily follow that Tetro's placement of the vents close together was a design flaw and responsible for poor air distribution in the home. Dee provided ample evidence, including the testimony of Towsley and Tetro, that the placement of the supply vents provided greater aesthetic appeal, and that while the placement of the return and supply vents on the inner and outer walls, respectively, is likely ideal, it was not necessary to achieve proper air circulation in the home.

* → 26. Finally, based on the evidence presented, I find it is entirely plausible that had King's house been insulated with traditional material, that a significant portion of the heat generated by the boiler and the cold air generated by the air conditioner would have remained in the home.⁹ Furthermore, it is quite possible that good insulation would have improved the air distribution, for the absence of abnormally hot or cold temperatures inside the home would not have influenced the travel of the heated or cooled air generated in the basement as it moved through the duct work.

27. **ORDER.** Based on the foregoing, judgment shall enter in favor of the defendant, Dee Services, Inc.

So entered this 26 day of June, 2011.

Robert G. Fields, Associate Justice

* → ⁹ Freedman's hot box test, repeated during the trial, presented additional compelling evidence of the lack of insulation provided by Supertherm. King objected at trial to the admissibility of the hot box test based on its purported noncompliance with scientific standards pertaining to the construction of hot boxes. I find both that King failed to meet his burden on said objection and find that the test revealed with very stark and persuasive results that Supertherm had virtually no ability to prevent penetration of high temperatures when heat was applied on one side of it.