

**FILED**  
1/14/2014  
THOMAS G. BRUTON  
CLERK, U.S. DISTRICT COURT

UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF ILLINOIS  
EASTERN DIVISION

ROBERT THOMAS, SCOTT PATRICK  
HARRIS, MICHAEL BELL, SANDRA  
PALUMBO, FRANK KARBARZ, and  
THOMAS DAVIS on behalf of Themselves  
and all others similarly situated,

Plaintiffs,

vs.

LENNOX INDUSTRIES, INC.,

Defendant.

CASE NO.: 1:13-cv-07747

JURY TRIAL DEMANDED

**AMENDED CLASS ACTION COMPLAINT**

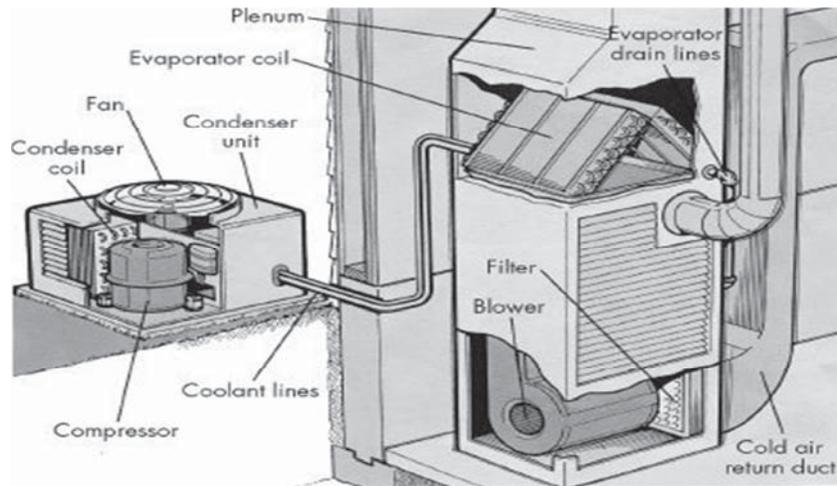
Plaintiffs Robert Thomas, Scott Patrick Harris, Michael Bell, Sandra Palumbo, Frank Karbarz, and Thomas Davis individually on behalf of themselves and others similarly situated bring this Amended Class Action Complaint against Defendant Lennox Industries, Inc. (“Lennox”) and in support allege as follows:

**NATURE OF THIS ACTION**

1. Lennox is a large manufacturer of heating, ventilation, and air conditioning products for residential use in the United States. Defendant manufactures and sells consumer central air conditioning units under its own trade name (hereinafter the “Lennox ACs”).

2. Air conditioners, including Lennox ACs, contain a component known as an evaporator coil, which is an essential component to the system. Inside the evaporator coil, refrigerant (such as Freon, Puron, etc.) absorbs heat from the air passing over a tube and acts as a heat exchange, thereby cooling the home’s air.

3. This diagram depicts a standard AC unit setup:



<http://www.howstuffworks.com/how-to-maintain-an-air-conditioner.htm>

4. Air conditioner manufacturers such as Lennox have traditionally manufactured evaporator coils using copper tubing. However, copper coils are uniquely vulnerable to a type of degradation known as “formicary corrosion.” Exhibit A.

5. Formicary corrosion is caused by a chemical reaction between molecules known as volatile organic compounds and the copper tubes, and results in microscopic tunnels within the tubing which causes the coil to leak refrigerant. Id.

6. Volatile organic compounds are a large group of carbon-based chemicals that are given off from a host of common household products and activities. For example, volatile organic compounds are given off by composite wood furniture and flooring, carpeting, cleaning and disinfecting products, air fresheners, cosmetics, and numerous other consumer products. Id.

7. Formicary corrosion is a particularly insidious defect in an evaporator coil because the resultant leakage is difficult to detect, and usually results in consumers being forced to repeatedly refill their air conditioners with refrigerant, often at significant cost, which only works to mask the defect for a period of time, until the Coil fails.

8. Air conditioner manufacturers have begun to recognize copper coils' unique vulnerability to formicary corrosion as changes in housing and consumer behavior made formicary corrosion more prevalent and recognizable. Exhibit B. For example, modern houses are typically made more energy efficient by improved sealing of windows and doors, which results in less heated/cooled air escaping the home. A natural and foreseeable result of this increase in energy efficiency is that volatile organic compounds tend to accumulate in the home's air.

9. A number of HVAC contractors have publicly expressed concern over the increasing incidence of formicary corrosion in air conditioning units. Exhibit C.

10. There are reasonable design and manufacturing techniques available to air conditioner manufacturers to lessen or even prevent incidence of formicary corrosion. For example, evaporator coils can be manufactured from aluminum, which is not susceptible to formicary corrosion, or copper coils can be coated with a polymer sealant or tin plating. Other air condition manufacturers utilize these types of techniques and as a result have virtually eliminated the incidence of formicary corrosion in their air conditioners. Exhibit D.

11. Despite being aware of the susceptibility of copper coils to formicary corrosion, the increasing incidence of formicary corrosion, and the available remedies at its disposal, Lennox continued to design and manufacture its ACs using copper evaporator coils (referred to herein as "Lennox Coils" or "Coils"), Lennox continues to fix failed Coils with similarly defective Coils and Lennox has failed to take any of the known steps that are available to reduce the susceptibility of the copper in the Lennox Coils to formicary corrosion.

12. Lennox Coils are defective because they are manufactured with materials that, within the industry, are well known to be prone to formicary corrosion, which makes the Lennox

Coils unreasonably susceptible to premature rupture and refrigerant leaks under normal use and conditions.

13. Lennox has not informed its customers of the Lennox ACs susceptibility to formicary corrosion. Lennox knew, or reasonably should have known, that the Coils in its air conditioners were unreasonably susceptible to formicary corrosion and thus defective, but has failed or refused to inform consumers or initiate other similar action.

14. Lennox has not informed its customers of the causes of formicary corrosion, even when replacing failed Coils, which would allow customers to make an informed decision about their risks.

15. When a defective coil leaks to the point that it eliminates the Lennox AC's ability to provide cold air within the warranty period, Lennox's standard practice is to replace the refrigerant in the unit, not the defective coil. Such a remedy, however, is only temporary and stop-gap in nature, and does not address the inherent defect in the Lennox AC. Once a consumer's warranty is expired, they are left with a defective product that requires a new evaporator coil, but no remedy offered by Lennox.

16. Even if Lennox replaces the defective coil in a Lennox AC within the warranty period, the replacement coil is equally susceptible to formicary corrosion and likely to prematurely rupture and leak refrigerant under normal use.

17. As Lennox has known of the Lennox ACs' defects and has failed to timely honor its express and implied warranties, the warranty has failed of its essential purpose, and the limitations therein are null and void. Further, the limitations contained in the limited warranty are not conspicuous.

18. Despite knowing of the defects in the Lennox ACs, Lennox has not notified all purchasers, builders, and/or homeowners with the Lennox ACs of the defect nor provided uniform relief.

19. Plaintiffs and Class Members have not received the value for which they or their builder bargained when the Lennox ACs were purchased. There is a difference in value between the Lennox ACs as warranted and the Lennox ACs containing the defect.

### **THE PARTIES**

20. Plaintiff Robert Thomas (“Plaintiff Thomas”) at all relevant times hereto, has been a citizen and resident of DuPage County, Illinois. Plaintiff owns a Lennox AC which had a Coil that failed, which Plaintiff paid to replace.

21. Plaintiff Scott Patrick Harris (“Plaintiff Harris”) at all relevant times hereto, has been a citizen and resident of South Carolina. Plaintiff Harris owns a Lennox AC which had a Coil that failed, which Plaintiff Harris paid to replace.

22. Plaintiff Michael Bell (“Plaintiff Bell”) at all relevant times hereto, has been a citizen and resident of Pennsylvania. Plaintiff Bell owns a Lennox AC which had a Coil that failed, which Plaintiff Bell paid to replace.

23. Plaintiff Sandra Palumbo (“Plaintiff Palumbo”) at all relevant times hereto, has been a citizen and resident of Florida. Plaintiff Palumbo owns a Lennox AC which had a Coil that failed, which Plaintiff Palumbo paid to replace.

24. Plaintiff Frank Karbarz (“Plaintiff Karbarz”) at all relevant times hereto, has been a citizen and resident of Texas. Plaintiff Karbarz owns a Lennox AC which had a Coil that failed, which Plaintiff Karbarz paid to replace.

25. Plaintiff Thomas Davis (“Plaintiff Davis”) at all relevant times hereto, has been a citizen and resident of California. Plaintiff Davis owns a Lennox AC which had a Coil that failed, which Plaintiff Davis paid to replace.

26. Defendant Lennox Industries, Inc. is a Delaware corporation with its corporate headquarters located at 2140 Lake Park Blvd., Richardson, Texas 75080.

### **JURISDICTION AND VENUE**

27. This Court has jurisdiction over this action pursuant to 28 U.S.C. § 1332(d) because there are more than 100 class members and the aggregate amount in controversy exceeds \$5,000,000, exclusive of interest, fees, and costs and at least one Class member is a citizen of a state different from Defendants.

28. Lennox transacts business in Illinois, advertises and markets its products in Illinois, disseminates the afore-described representations and deceptions throughout Illinois, and derives substantial income from the sale of products in Illinois.

29. Pursuant to 28 U.S.C. § 1391, venue is proper in this Court because a substantial part of the events, omissions and acts giving rise to the claims herein occurred in this District. Additionally, venue is appropriate for the claims arising out of Illinois’ Consumer Fraud Act because the statute applies to any company engaging in any of the activities regulated by the Act within the State of Illinois.

### **CLASS ALLEGATIONS**

30. Plaintiffs bring this class action pursuant to Federal Rule of Civil Procedure 23(a), (b)(2), (b)(3) and/or (c)(4) on behalf of the following nationwide consumer classes (the “Classes”):

All persons residing in the United States who purchased a Lennox AC containing a Lennox Coil, primarily for personal, family, or household purposes.

All persons residing in the United States who purchased a Lennox AC containing a Lennox Coil, primarily for personal, family, or household purposes, and who paid to replace a Lennox AC evaporator coil.

31. Plaintiff Thomas also seeks to represent subclasses defined as all members of the Classes who reside in Illinois (“the Illinois Subclasses”).

32. Plaintiff Harris also seeks to represent subclasses defined as all members of the Classes who reside in South Carolina (“the South Carolina Subclasses”).

33. Plaintiff Bell also seeks to represent subclasses defined as all members of the Classes who reside in Pennsylvania (“the Pennsylvania Subclasses”).

34. Plaintiff Palumbo also seeks to represent subclasses defined as all members of the Classes who reside in Florida (“the Florida Subclasses”).

35. Plaintiff Karbarz also seeks to represent subclasses defined as all members of the Classes who reside in Texas (“the Texas Subclasses”).

36. Plaintiff Davis also seeks to represent subclasses defined as all members of the Classes who reside in California (“the California Subclasses”) (collectively, with the above, the “Subclasses”).

37. Subject to additional information obtained through further investigation and discovery, the foregoing Classes may be expanded or narrowed by amendment or amended complaint. Specifically excluded from the Classes is any entity in which Defendants had a controlling interest or which has a controlling interest in Defendants, and Defendants’ legal representatives, assigns, and successors.

38. Members of the Classes are so numerous that joinder is impracticable. While the exact number of Class members is unknown to Plaintiffs, it is believed that the Classes are comprised of thousands of members geographically disbursed throughout the United States and that the Subclasses are comprised of at least hundreds of members geographically disbursed throughout each state. The Classes and Subclasses, however, are readily identifiable from information and records in the possession of Lennox.

39. Common questions of law and fact exist as to all members of the Classes. The critical questions of law and fact common to the Classes that will materially advance the litigation is whether the Coils in Lennox ACs are inherently defective, whether they are not of a good and merchantable quality and/or do not perform according to the reasonable expectations of consumers and whether Lennox deceived consumers under the common law and statutory consumer protection laws identified in the pleadings. The resolution of these common questions of law and fact will, in turn, drive the resolution of the litigation.

40. Additional common legal and factual questions that will also drive the resolution of the litigation include, but are not limited to:

- a) Whether Lennox ACs are defectively designed or manufactured;
- b) Whether Lennox Coils (*i.e.*, made of copper) are defectively designed and/or manufactured;
- c) Whether Lennox knew or reasonably should have known about the defects prior to distributing them to Plaintiffs and Classes;
- d) Whether Lennox concealed from or failed to disclose to Plaintiffs and Classes the defect;
- e) Whether Lennox breached express warranties relating to Lennox ACs;
- f) Whether Lennox breached the implied warranty of merchantability under applicable state law;

- g) Whether Lennox breached the implied warranty of fitness under applicable state law for a particular purpose;
- h) Whether the terms of Lennox's written warranties relating to Lennox ACs were unconscionable or failed their essential purpose;
- i) Whether Lennox was unjustly enriched by receiving monies in exchange for air conditioners that were defective;
- j) Whether Lennox should be ordered to disgorge all or part of the ill-gotten profits it received from the sale of defective Lennox ACs and Coils, including replacement Coils;
- k) Whether Plaintiffs and Classes are entitled to damages, including compensatory, exemplary, and statutory damages; and
- l) Whether Lennox should be enjoined from selling and marketing the defective Lennox ACs.

41. Plaintiffs' claims are typical of the members of the Classes as all such claims arise out of Lennox's conduct in designing, manufacturing, warranting, marketing and selling the defective Lennox ACs and Lennox's conduct in concealing the defect in Lennox Coils from Plaintiffs and Classes.

42. Plaintiffs will fairly and adequately protect the interests of the Classes because Plaintiffs have no interests antagonistic to, or in conflict with, the Classes that Plaintiffs seeks to represent. Furthermore, Plaintiffs has retained counsel experienced and competent in the prosecution of complex class action litigation including but not limited to consumer class actions involving, *inter alia*, breach of warranties, product liability and design defects.

43. The class action mechanism is superior to other available means for the fair and efficient adjudication of the claims of all Class members. Besides the predominance of questions common to all Class members, individual Class members lack resources to undertake the burden and expense of individual prosecution of these claims against a large corporate defendant like Lennox, especially in comparison with the maximum individual recovery to which each Class

member would be entitled. Individualized litigation increases the delay and expense to all parties and multiplies the burden on the judicial system presented by the complex legal and factual issues of this case. It also presents a potential for inconsistent or contradictory judgments. In contrast, the class action device presents far fewer management difficulties and provides the benefits of a single adjudication, economy of scale, and comprehensive supervision by a single court on the issue of Lennox's liability.

**FACTS SPECIFIC TO PLAINTIFFS**

44. Plaintiffs were not told, nor did Lennox disclose, that Lennox ACs contained Lennox Coils that were defective, because they were unreasonably susceptible to formicary corrosion and failure, which would cause the air conditioning units to cease cooling or leak.

45. Plaintiffs did not and could not reasonably have discovered the defects at the time of purchase or delivery, nor known of the omitted material information regarding the defective coil in the Lennox ACs.

46. As a matter of practice, when a Coil fails due to formicary corrosion, Lennox requires its authorized dealers/service technicians to obtain the failed Coil from the AC owner and return it to Lennox as part of its warranty protocol; otherwise Lennox will not credit the dealer/technician for the work done. In this way, Lennox maintains exclusive control over all evidence relating to the (defective) failed Coils, failure rates and in particular root cause analysis of copper Coil failures

47. Plaintiffs purchased Lennox ACs rather than other available AC products. Had Plaintiffs known that Lennox ACs contained defective Coils, Plaintiffs would not have purchased Lennox ACs.

**Thomas**

48. In January 2009, Plaintiff Thomas purchased a Lennox Merit Series 13ACX air conditioner, containing model number C33-36C-2-4 coil from Golden Seal Heating & Air (“Golden Seal”) in Saint Charles, Illinois, an authorized Lennox dealer.

49. Plaintiff Thomas was not told, nor did Lennox disclose, that Lennox ACs contained Lennox Coils that were defective, because they were unreasonably susceptible to formicary corrosion and failure, which would cause the air conditioning units to cease cooling or leak.

50. In April, 2009, the air conditioner was installed in Plaintiff Thomas’ home, and at that time he was given for the first time a document titled “Lennox Quality Care Program Equipment Limited Warranty” (the “Lennox Warranty”). Exhibit E.

51. In May 2011, Plaintiff Thomas’ Lennox AC ceased cooling. A Golden Seal service technician replaced the refrigerant, but did not diagnose the problem.

52. On or about May 2012, Plaintiff Thomas’ Lennox AC again ceased cooling. A Golden Seal service technician again replaced the refrigerant, but did not diagnose the problem.

53. In August 2013, Plaintiff Thomas’ Lennox AC again ceased cooling. A Golden Seal service technician could not recharge it with refrigerant, and diagnosed the problem as a leaking coil. On information and belief, Plaintiff Thomas’ Coil failed due to formicary corrosion.

54. Plaintiff Thomas notified Lennox of the problems with the evaporator coil shortly after the problem was identified. Lennox refused to cover the cost of labor, and covered only the cost of replacing the Lennox Coil.

55. As a result, Plaintiff Thomas paid approximately \$400 for diagnostics and labor to replace his failed Lennox Coil.

**Harris**

56. In June 2008, Plaintiff Harris purchased a new home which included two Lennox air conditioners, containing model number cx3436-1-6f-2 Coils.

57. Plaintiff Harris did not receive any warranty documents at the time of purchase.

58. In August 2011, one of Plaintiff Harris' Lennox AC ceased cooling. A technician from Brother Heat and Air, a licensed Lennox dealer and installer, replaced the refrigerant at a cost of \$877, but did not diagnose the problem.

59. In July 2012, Plaintiff Harris' same Lennox AC again ceased cooling. A service technician from Dan King's One Hour Air Conditioning replaced the refrigerant at a cost of \$138, but did not diagnose the problem.

60. On or about September 5, 2012, Plaintiff Harris' same Lennox AC again ceased cooling. A service technician from Dan King's One Hour Air Conditioning replaced the refrigerant at a cost of \$399, but did not diagnose the problem.

61. On or about September 21, 2012, Plaintiff Harris' same Lennox AC again ceased cooling. A service technician from Dan King's One Hour Air Conditioning diagnosed the problem as a leaking coil. On information and belief, Plaintiff Harris' Coil failed due to formicary corrosion.

62. Lennox refused to cover the cost of labor, and covered only the cost of replacing the Lennox Coil.

63. As a result, Plaintiff Harris paid approximately \$900 for diagnostics and labor to replace his failed Lennox Coil.

**Bell**

64. In February 2012, Plaintiff Bell purchased a Lennox XP16 Elite Series heat pump / air conditioner, containing model number CBX32MV-048-230-6 coil from Peters Associates in Philadelphia, Pennsylvania, an authorized Lennox dealer.

65. In February, 2012, the air conditioner was installed in Plaintiff Bell's home, and at that time he was given for the first time a copy of the Lennox Warranty.

66. On or about July 23, 2013, Plaintiff Bell's Lennox AC ceased cooling. A Peters Associates service technician replaced the refrigerant, but did not diagnose the problem.

67. On or about July 26, 2013, a Peters Associates service technician replaced the refrigerant, and diagnosed the problem as a leaking Coil.

68. On information and belief, Plaintiff Thomas' Coil failed due to formicary corrosion.

69. Lennox refused to cover the cost of labor, and covered only the cost of replacing the Lennox Coil.

70. As a result, Plaintiff Bell paid approximately \$717 for diagnostics and labor to replace his failed Lennox Coil.

**Palumbo**

71. In December 2008, Plaintiff Palumbo purchased a Lennox 14HPX Heat Pump air conditioner, containing model number CBX26UH-042-230-1 Coil.

72. Plaintiff Palumbo's Lennox AC was installed in January 2009 as part of her new home construction.

73. On or about July 2010, Plaintiff Palumbo's Lennox AC ceased cooling. In September, 2010, a service technician from Marlin James, Inc. diagnosed the problem as a

leaking coil and replaced the refrigerant at a cost of \$390.00. On or about June 2011, Marlin James, Inc. replaced the coil in Plaintiff Palumbo's Lennox AC. Lennox covered the part and labor in this instance.

74. On or about July 2012, Plaintiff Palumbo's Lennox AC again ceased cooling. Marlin James, Inc. again replaced the coil in Plaintiff Palumbo's Lennox AC. Lennox covered the part and labor in this instance.

75. On or about September 2013, Plaintiff Palumbo's Lennox AC again ceased cooling. A service technician from One Hour Air performed a leak check at a cost of \$655.00 and found a leak in the coil. The technician replaced the refrigerant at a cost of \$196.00

76. Lennox informed Plaintiff Palumbo that it will not cover the labor for the replacement of the newest Coil, which is estimated to be approximately \$400.00.

77. On information and belief, Plaintiff Palumbo's Coils failed due to formicary corrosion.

#### **Karbarz**

78. In April 2007, Plaintiff Karbarz purchased and installed a Lennox 14ACX Merit Series air conditioner, containing model number CBX26UH-18-230-01 Coil from Air Team, LTD.

79. On or about June 2009, Plaintiff Karbarz's Lennox AC ceased cooling and was diagnosed with a leaking coil.

80. Plaintiff Karbarz paid \$517 in labor to replace the failed coil.

81. On or about May 2013, Plaintiff Karbarz's Lennox AC again ceased cooling.

82. Plaintiff Karbarz paid \$179 to replace the refrigerant in his Lennox AC.

83. On or about September, 2013, Plaintiff Karbarz's Lennox AC again ceased cooling.

84. Plaintiff Karbarz paid \$2,260 for a new air handler which contained a new coil.

85. On information and belief, Plaintiff Karbarz's Coils failed due to formicary corrosion.

### **Davis**

86. In August, 2010, Plaintiff Davis purchased two Lennox Signature Collection 15 GCSX units containing Lennox Coils from Palm Desert Heating & Air Conditioning, who also installed the units.

87. Plaintiff Davis first saw a copy of the Lennox Warranty at the time of purchase.

88. In June 2013, one of Plaintiff Davis's Lennox ACs ceased cooling. In August 2014, a service technician from Palm Desert Heating & Air Conditioning diagnosed the problem as a leaking coil and refilled the unit with refrigerant. Plaintiff Davis paid \$65.00 for the service call.

89. On August 16, 2013, Plaintiff Davis contacted Lennox, who denied there was a problem with the coil.

90. On September 26, 2013, Breeze Air Conditioning replaced the Lennox Coil at a cost of \$2,200.00.

91. On information and belief, Plaintiff Davis's Coil failed due to formicary corrosion.

**FACTS COMMON TO THE CLASS/CLAIMS**

92. Upon information and belief, Defendants have sold, directly or indirectly (through dealers and other retailer outlets), thousands of Lennox ACs containing copper-made Coils, in the states of Illinois, South Carolina, Pennsylvania, Florida, Texas, and California to homeowners, developers, contractors or subcontractors.

93. According to Lennox's website, there are hundreds of authorized dealers of the Lennox ACs within 100 miles of Plaintiffs' homes.<sup>1</sup>

94. Upon information and belief, Lennox designed, manufactured, marketed, advertised, warranted and sold, through distributors, the Lennox ACs to Plaintiffs and Classes and their builders, contractors, subcontractors or agents. Lennox ACs were installed on Class members' structures.

95. Lennox Coils are defective because they are unreasonably susceptible to formicary corrosion and break prematurely during normal use, resulting in the failure to prevent the leakage of refrigerant.

96. Lennox expressly and impliedly warranted, via its user manuals, website, brochures, specifications, or models that Lennox ACs are fit for the ordinary purpose in which such goods are used.

97. On its website, Lennox represented:

For more than a hundred years, Lennox has set the standard for home comfort with innovative heating, cooling and indoor air quality products. We stand behind those products with industry-leading warranty coverage designed to protect your investment and ensure your peace of mind.<sup>2</sup>

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<sup>1</sup> <http://www.lennox.com/locate/default.asp> (last visited December 16, 2013)

<sup>2</sup> <http://www.lennox.com/support/warranty.asp> (last visited October 21, 2013)

98. Lennox states in its brochure that “Every component in the 13ACX is designed for exception durability and easy maintenance year after year. Every unit is built solid inside and out and thoroughly tested before leaving the factory. And once it’s installed, Lennox’ industry-leading warranty coverage adds another layer of protection for your investment.” Exhibit F.

99. Lennox continues to make false representations about the quality and fitness of the Lennox ACs including, but not limited to:

Reliable performance, ideal comfort and money-saving energy efficiency all come together in one perfect packet in the Merit Series 13ACX air conditioner. Its dependable scroll compressor and high-efficiency outdoor coil work together to keep your home comfortable and your energy costs under control.

Exhibit F.

100. The bargaining power between Plaintiffs and Class members on the one hand and Lennox on the other hand was grossly unequal and any limitations on the warranty are substantially one-sided, making such limitations unconscionable.

101. Contrary to its representations, the Lennox ACs are not of a merchantable quality, not fit for their intended use, and are defective.

102. The representations made by Lennox were false or misleading and Lennox knew or should have known at the time they made them that they were false or misleading.

103. All air conditioners use refrigerant in a closed-loop system designed to take advantage of a physical law known as phase conversion to provide cool air. When liquid is converted into gas, the process results in the absorption of heat. Refrigerants are substances that change phase at relatively low temperatures.

104. All air conditioners contain the following three major components: a compressor, a condenser, and an evaporator. In central air conditioners used for household purposes, the compressor and the condenser are located outside a consumer’s house. The compressor

compresses the refrigerant into high pressure gas which then travels to the condenser where it is cooled into high pressure liquid.

105. The evaporator for central air conditioners is usually located within the consumer's house and includes of a series of coils known as "evaporator coils." The liquid refrigerant is fed into the evaporator coils where it experiences a pressure drop that results in the refrigerant converting from liquid to gas. This phase conversion absorbs heat from the hot indoor air circulated over the evaporator coils by a fan, which cools the air. The cool air is then blown through the house via ducts.

106. Like all central air conditioners used for residential purposes, the Lennox ACs at issue contain evaporator coils. However, Lennox evaporator coils render the Lennox ACs unfit for their ordinary purpose because they are unreasonably susceptible to formicary corrosion, resulting in the loss of refrigerant due to leakage, which reduces and ultimately eliminates the Lennox ACs' ability to provide cold air.

107. The defective Lennox Coils render the Lennox ACs unfit for the ordinary purpose for which they are used because the loss of refrigerant reduces and/or eliminates the Lennox ACs' ability to provide cool air.

108. The defective coils in the Lennox ACs caused Plaintiffs the Class to suffer damages, including, but not limited to, the difference in value of the Lennox ACs as warranted and the Lennox ACs they received with defective Coils, loss of use of their Lennox ACs, labor costs, repair costs, and replacement refrigerant costs. The defective evaporator coils were the direct, proximate, and foreseeable cause of damages incurred by Plaintiffs and Class members .

109. Had the Lennox ACs been properly manufactured or free from design defects, Plaintiffs and the Classes would not have suffered the damages complained of herein.

**TOLLING AND ESTOPPEL OF STATUTES OF LIMITATION**

110. Plaintiffs are within the applicable statute of limitations for the claims presented because Plaintiffs did not discover the defect, and could not reasonably have discovered the defect until approximately August 2013. Further, Lennox and its agents affirmatively misrepresented the root cause of the problem by claiming that the ACs needed refills of Refrigerant, rather than disclosing that the Coils were defective because they were made of copper and unreasonably susceptible to formicary corrosion, and that the Coils had failed due to formicary corrosion. Plaintiffs also assert that this action has been filed within all applicable time frames from the date of initial installation of the Air Conditioners.

111. Lennox is estopped from relying on any statutes of limitation by virtue of its acts of fraudulent concealment, which include its concealment from Plaintiffs and Classes that its Lennox ACs were defective, while continuing to market the Lennox ACs as suitable for ordinary use, and by its affirmative misrepresentations as set forth above.

112. Although Lennox was aware that Lennox Coils were defective, it took no steps to warn Plaintiffs and Classes of the defect. Rather Lennox continued to sell its defective Coils to Plaintiffs and Classes and continues to “fix” and replace failed Coils with similarly defective Coils.

113. The defects in the design or manufacture of the Lennox ACs were not detectible to Plaintiffs or members of the Classes until they manifested themselves when the defective evaporator coils cracked and caused the Lennox ACs to stop cooling.

**THE PURPORTED WARRANTY LIMITATIONS ARE VOID AND INVALID**

114. Lennox provides the Lennox Warranty to purchasers of Lennox ACs subsequent to the time of purchase. A Lennox warranty is attached as Exhibit E.

115. The Lennox Warranty purports to disclaim and exclude certain warranties and damages, stating:

“Lennox makes no express warranties other than the warranty specified above. All implied warranties, including the implied warranties of merchantability and fitness for a particular purpose, are excluded to the extent legally permissible. Should such exclusion or limitation of the warranty be unenforceable, such implied warranties are in any event limited to a period of one (1) year. Liability for incidental and consequential damages is excluded.

Id.

116. Lennox also expressly purports to limit its warranty such that “Lennox will not pay labor involved in diagnostic calls, or in removing, repairing, servicing, or replacing parts. Such costs may be covered by a separate warranty provided by the installing contractor. Id.

117. The above warranty limitations and exclusions fail their essential purpose because the Lennox ACs contained coils that were defective at the time Plaintiffs and members of the class acquired their Lennox ACs.

118. The above warranty limitations also fail of the essential purpose because no remedies offered by Lennox give purchasers of Lennox ACs the benefit of their bargain, *i.e.* a merchantable air conditioner.

119. The limitation of damages is ineffective because the Lennox ACs are sold to consumers with Coils that are unreasonably susceptible to formicary corrosion, which none of Lennox’s limited remedies sufficiently address. The Lennox Warranty fails its essential purpose, and Plaintiffs and Classes are entitled to a remedy under the Uniform Commercial Code.

120. The purported disclaimer of warranties is also ineffective because Lennox does not provide the Lennox Warranty to purchasers of Lennox ACs before or at the time of purchase. Consumers only learn of such purported disclaimers at the time of installation of their Lennox AC, and such limitations cannot be considered to be a part of the bargain.

**COUNT I**  
**Express Warranty**  
**(On Behalf of Plaintiffs, the Classes, and Subclasses)**

121. Plaintiffs re-allege and incorporate each and every allegation set forth above as if fully written herein.

122. Plaintiffs bring this claim on behalf of the Class, or, in the alternative on behalf of the Subclasses.

123. Lennox expressly warranted via its user manuals, website, brochures, specifications, and/or models that the Lennox ACs are fit for the ordinary purpose in which such goods are used.

124. Lennox's express warranties were part of the basis of the bargain between Lennox and Plaintiffs and members of the Classes.

125. Lennox breached its express warranties because the Lennox ACs were not fit for the ordinary purpose in which they are used and because they were not free from defects in materials and workmanship that affect performance under normal use and maintenance. Specifically, the Lennox ACs are defective because the Coils are unreasonably susceptible to formicary corrosion and failure, and thus improperly or prematurely crack and break under normal use, rendering them unfit for their ordinary purpose. Lennox also breached its express warranty by refusing to repair the Lennox ACs and/or by "fixing" failed Coils with similarly defective replacement Coils (*i.e.*, made of copper).

126. Plaintiffs and members of the Classes relied upon the representation or warranty that they would be supplied Lennox ACs and Coils, and/or replacement Coils, free of defects.

127. Plaintiffs and members of the Classes notified Lennox of the breach.

128. Plaintiffs and members of the Classes sustained injuries and damages as a result of the breach because (a) they paid a price premium due to the misrepresentations and omissions of material fact in the packaging, marketing, advertising on the Lennox ACs; (b) the Lennox ACs did not have the attributes or value promised, and/or (c) they paid out of pocket to replace a failed Coil, which was replaced with a similarly defective Lennox Coil.

129. The limitations on Lennox's express warranty are unconscionable or fail in their essential purpose.

130. Plaintiffs and members of the Classes are entitled to the full remedies provided under Article 2 of the Uniform Commercial Code as adopted by Plaintiffs' various states, as well as all other applicable remedies.

**COUNT II**  
**Implied Warranty of Merchantability**  
**(On Behalf of Plaintiffs, the Classes and Subclasses)**

131. Plaintiffs re-allege and incorporate each and every allegation set forth above as if fully written herein.

132. Plaintiffs bring this claim on behalf of the Class, or, in the alternative on behalf of the Subclasses.

133. Lennox is a merchant who sold air conditioning units to Plaintiffs and the Classes for residential use.

134. A warranty that goods shall be merchantable and fit for the ordinary purposes for which such goods are used is implied in a contract for their sale if the seller is a merchant with respect to goods of that kind.

135. Lennox's implied warranty that the Lennox ACs were merchantable was part of the basis of the bargain between Lennox and Plaintiffs and members of the Classes.

136. Lennox breached the implied warranty of merchantability because the Lennox ACs were not of merchantable quality or fit for their ordinary and intended use and because they contained a defect at the time of their sale that resulted in, and continues to result in, leaking of Refrigerant and failure of the product, when used in a normal, foreseeable and customary way.

137. The defects at issue are latent defects. Plaintiffs and members of the Classes could not have known about their Lennox ACs' propensity for failure.

138. Plaintiffs and members of the Classes notified Lennox of the breach.

139. Plaintiffs and members of the Classes sustained injuries and damages as a result of the breach.

140. The exclusions and/or limitations on Lennox's implied warranties are unconscionable and/or fail their essential purpose.

141. As a direct and proximate result of Lennox's breach of the implied warranty of merchantability, Plaintiffs and members of the Classes have suffered damages in amount to be determined at trial including direct monetary losses incurred by Plaintiffs and members of the Classes in connection with attempted repair of the Lennox ACs and/or the price premium paid for the Lennox ACs, or such further damage to be proven at trial.

142. Plaintiffs and members of the Classes are entitled to the full remedies provided under Article 2 of the Uniform Commercial Code as adopted by Plaintiffs' various states, as well as all other applicable remedies.

**COUNT III**  
**Implied Warranty of Fitness for a Particular Purpose**  
**(On Behalf of Plaintiffs, the Classes and Subclasses)**

143. Plaintiffs re-allege and incorporate each and every allegation set forth above as if fully written herein.

144. Plaintiffs bring this claim on behalf of the Classes, or, in the alternative on behalf of the Subclasses.

145. Lennox sold and promoted the Lennox ACs, which it placed into the stream of commerce. Lennox knew or had reason to know of the specific use, *i.e.*, home cooling, for which the Lennox ACs were purchased, and it impliedly warranted that the Lennox ACs were fit for such use.

146. Plaintiffs and Class members reasonably relied upon the expertise, skill, judgment and knowledge of Lennox and upon its implied warranty that the Lennox ACs were fit for the purpose and use of cooling homes.

147. Through the conduct alleged herein, Lennox has breached the implied warranty of fitness for a particular purpose. The defectively designed Lennox ACs were not fit for the particular purpose for which they were purchased by Plaintiffs and Class Members to perform. The Plaintiffs and Classes purchased the Lennox ACs for a particular purpose of being able to cool their homes. Lennox knew that the Plaintiffs and Class Members were purchasing the Lennox ACs for this purpose and marketed the products for this particular purpose.

148. Plaintiffs and Class Members relied on Lennox's misrepresentations by purchasing the Lennox ACs.

149. Lennox knew or had reason to know that Plaintiffs and Class members were influenced to purchase the Lennox ACs through Lennox's expertise, skill, judgment and knowledge in furnishing the products for their intended use.

150. The Lennox ACs were not fit for their particular intended use because the design or manufacturing defects alleged herein render them incapable of properly providing cool air to Plaintiffs and Class members' homes as they contain defective evaporator Coils which are

unreasonably susceptible to formicary corrosion, which causes them to crack and break under normal use.

151. Lennox's actions, as complained of herein, breached their implied warranty that the Lennox ACs were fit for such use, in violation of Uniform Commercial Code §2-315 and the common law of Illinois, as well as the common law and statutory laws of others states.

152. Moreover, the limitations on Lennox's implied warranties are unconscionable and/or fail their essential purpose.

153. Plaintiffs and Class members have incurred damages as described herein as a direct result of the failure of Lennox to honor its implied warranty. In particular, Plaintiffs and Class members would not have purchased the Lennox ACs had they known the truth about the defects; nor would they have suffered the collateral effects and damages associated with these defects.

**COUNT IV**  
**Illinois Consumer Fraud and Deceptive Business Practices Act,**  
**815 ILCS 505/1, *et seq.***  
**(On behalf of Plaintiff Thomas and Illinois Subclasses)**

154. Plaintiff Thomas re-alleges and incorporates each and every allegation set forth above as if fully written herein.

155. Plaintiff Thomas asserts this claim individually and on behalf of the Illinois Subclasses.

156. The Illinois Consumer Fraud and Deceptive Business Practices Act, 815 Ill. Comp. Stat. 505/1, *et seq.*, prohibits unfair methods of competition and unfair and deceptive acts or practices, including among other things, "the use or employment of any deception, fraud, false pretense, false promise, misrepresentation or the concealment, suppression or omission of any material fact, . . . whether any person has in fact been misled, deceived or damaged thereby."

157. Throughout the Class Period, Defendant conducted “trade” and “commerce” within the meaning of 815 ILCS 505/1(f) by its advertising, offering for sale, and sale of Lennox ACs.

158. 815 ILCS. 505/1(b) of the Illinois Consumer Fraud and Deceptive Business Practices Act defines the term “merchandise” to include Lennox ACs.

159. 815 ILCS. 505/1(c) of the Illinois Consumer Fraud and Deceptive Practices defines the term “person” to include Defendant.

160. 815 ILCS 505/1(e) of the Illinois Consumer Fraud and Deceptive Practices Act defines the term “consumer” to include Plaintiffs and the other Illinois Subclass members.

161. Defendants’ acts and practices, alleged herein, constitute unfair, deceptive, and/or fraudulent business practices in violation of the Illinois Consumer Fraud and Deceptive Business Practices Act, including but not limited to, Defendants’ sale of defective Lennox ACs.

162. Defendant intended for Plaintiffs and Subclass members to rely on its aforementioned deceptive acts and practices, and such deceptive acts and practices occurred in the course of conduct involving trade or commerce.

163. Plaintiffs and the Subclass were exposed to such misrepresentations and were deceived.

164. Defendant’ violation of the Illinois Consumer Fraud and Deceptive Business Practices Act caused Plaintiffs and Subclass to sustain substantial and ascertainable losses of money and/or property and other damages because they were induced to purchase or paid a price premium due to the false and misleading advertising and marketing of Lennox ACs and/or Defendant’s failure to disclose the defects of said products, and/or paid to replace defective Coils.

165. Indeed, their purchases are of significantly diminished value because the Lennox AC's do not perform their sole function without the need for costly repair.

**COUNT V**

**South Carolina Unfair Trade Practices Act,  
S.C. Code Ann. § 39-5-20 *et seq.*  
(On behalf of Plaintiff Harris and South Carolina Subclasses)**

166. Plaintiff Harris re-alleges and incorporates each and every allegation set forth above as if fully written herein.

167. Plaintiff Harris asserts this claim individually and on behalf of the South Carolina Subclasses.

168. The South Carolina Unfair Trade Practices Act, S.C. Code Ann. § 39-5-20 *et seq.* prohibits “[u]nfair methods of competition and unfair or deceptive acts or practices in the conduct of any trade or commerce.” S.C.Code Ann. § 39-5-20.

169. Throughout the Class Period, Defendant conducted “trade” and “commerce” within the meaning of S.C.Code Ann. § 39-5-20 by its advertising, offering for sale, and sale of Lennox ACs.

170. Defendant's acts and practices, alleged herein, constitute unfair, deceptive, and/or fraudulent business practices in violation of the South Carolina Unfair Trade Practices Act, including but not limited to, Defendants' sale of defective Lennox ACs.

171. Defendant's unfair and deceptive acts and practices, alleged herein, have adversely affected the public interest.

172. Defendants intended for Plaintiff Harris and South Carolina Subclass members to rely on its aforementioned deceptive acts and practices, and such deceptive acts and practices occurred in the course of conduct involving trade or commerce.

173. Plaintiffs and the South Carolina Subclass were exposed to such misrepresentations and were deceived.

174. Defendant's violation of the South Carolina Unfair Trade Practices Act caused Plaintiff Harris and the South Carolina Subclass to sustain substantial and ascertainable losses of money and/or property and other damages because they were induced to purchase or paid a price premium due to the false and misleading advertising and marketing of Lennox ACs and/or Defendant's failure to disclose the defects of said products, and/or paid to replace defective Coils.

175. Plaintiff Harris' and the South Carolina Subclass' purchases are of significantly diminished value because the Lennox AC's do not perform their sole function without the need for costly repair.

#### **COUNT VI**

**Pennsylvania Unfair Trade Practices and Consumer Protection Law,  
73 Pa. Stat. Ann. § 201-1, *et seq.*  
(On behalf of Plaintiff Bell and South Carolina Subclasses)**

176. Plaintiff Bell re-alleges and incorporates each and every allegation set forth above as if fully written herein.

177. Plaintiff Bell asserts this claim individually and on behalf of the Pennsylvania Subclasses.

178. The Pennsylvania Unfair Trade Practices and Consumer Protection Law 73 P.S. Sec. 201-1 *et seq.* (PUTPCP), prohibits “[u]nfair methods of competition and unfair or deceptive acts or practices in the conduct of any trade or commerce. 73 Pa. Stat. Ann. § 201-3 (West).

179. Throughout the Class Period, Defendants conducted “trade” and “commerce” within the meaning of PUTPCP by its advertising, offering for sale, and sale of Lennox ACs.

180. Defendants' acts and practices, alleged herein, constitute unfair, deceptive, and/or fraudulent business practices in violation of the PUTPCP, including but not limited to, Defendant's sale of defective Lennox ACs.

181. Defendant intended for Plaintiffs and the Pennsylvania Subclass members to rely on its aforementioned deceptive acts and practices, and such deceptive acts and practices occurred in the course of conduct involving trade or commerce.

182. Plaintiffs and the Subclass were exposed to such misrepresentations and were deceived.

183. Defendants' violation of the PUTPCA caused Plaintiff Bell and the Pennsylvania Subclass to sustain substantial and ascertainable losses of money and/or property and other damages because they were induced to purchase or paid a price premium due to the false and misleading advertising and marketing of Lennox ACs and/or Defendant's failure to disclose the defects of said products, an/or paid to replace defective Coils,

184. Plaintiff Bell and the Pennsylvania Subclass' purchases are of significantly diminished value because the Lennox AC's do not perform their sole function without the need for costly repair.

**COUNT VII**

**Florida Deceptive and Unfair Trade Practices Act,**

**Fla. Stat. §§ 501.201-501.23**

**(On behalf of Plaintiff Palumbo and Florida Subclasses)**

185. Plaintiff Palumbo re-alleges and incorporates each and every allegation set forth above as if fully written herein.

186. Plaintiff Palumbo asserts this claim individually and on behalf of the Florida Subclasses.

187. The Florida Deceptive and Unfair Trade Practices Act, Fla. Stat. §§ 501.201-501.23*et seq.*, (“FDUTPA”) prohibits “[u]nfair methods of competition, unconscionable acts or practices, and unfair or deceptive acts or practices in the conduct of any trade or commerce....” Fla. Stat. § 501.204(1) (2001)

188. Defendant’s acts and practices, alleged herein, constitute unfair, deceptive, and/or fraudulent business practices in violation of the FDUTPA, including but not limited to, Defendant’s misrepresentations and omissions in the sale of defective Lennox ACs.

189. Defendant intended for Plaintiffs and Subclass members to rely on its aforementioned deceptive acts and practices, and such deceptive acts and practices occurred in the course of conduct involving trade or commerce.

190. Plaintiff Palumbo and the Florida Subclasses were exposed to such omissions and misrepresentations and were deceived.

191. Defendant’s violation of the FDUTPA caused Plaintiff Palumbo and Florida Subclasses to sustain substantial and ascertainable losses of money and/or property and other damages because they were induced to purchase or paid a price premium due to the false and misleading advertising and marketing of Lennox ACs and/or Defendant’s failure to disclose the defects of said products, and/or paid to replace defective Coils.

192. Plaintiff Palumbo and the Florida Subclasses’ Lennox AC’s are of significantly diminished value because the Lennox AC’s do not perform their sole function without the need for costly repair.

**COUNT VIII**

**Texas Deceptive Trade Practices-Consumer Protection Act,  
Tex. Bus. & Com. Code Ann. § 17.46  
(On behalf of Plaintiff Karbarz and Texas Subclasses)**

193. Plaintiff Karbarz re-alleges and incorporates each and every allegation set forth above as if fully written herein.

194. Plaintiff Karbarz asserts this claim individually and on behalf of the Texas Subclasses.

195. The Texas Deceptive Trade Practices-Consumer Protection Act, Tex. Bus. & Com. Code Ann. § 17.41 *et seq.*, (“TDTPCPA”) declares unlawful “False, misleading, or deceptive acts or practices in the conduct of any trade or commerce...” Tex. Bus. & Com. Code Ann. § 17.46 (West)

196. Defendant’s acts and practices, alleged herein, constitute false, misleading, and/or deceptive business practices in violation of the TDTPCPA, including but not limited to, Defendant’s misrepresentations and omissions in the sale of defective Lennox ACs.

197. Defendant intended for Plaintiffs and Subclass members to rely on its aforementioned deceptive acts and practices, and such deceptive acts and practices occurred in the course of conduct involving trade or commerce.

198. Plaintiff Karbarz and the Texas Subclasses were exposed to such omissions and misrepresentations and were deceived.

199. Defendant’s violation of the TDTPCPA caused Plaintiff Karbarz and Texas Subclasses to sustain substantial and ascertainable losses of money and/or property and other damages because they were induced to purchase or paid a price premium due to the false and misleading advertising and marketing of Lennox ACs and/or Defendant’s failure to disclose the defects of said products, and/or paid to replace defective Coils.

200. Plaintiff Karbarz and the Texas Subclasses' Lennox AC's are of significantly diminished value because the Lennox AC's do not perform their sole function without the need for costly repair.

**COUNT IX**  
**Unfair and Unlawful Practices**  
**(Cal. Bus. & Prof. Code § 17200 *et seq*)**  
**(On behalf of Plaintiff Davis and California Subclasses)**

201. Plaintiff Davis repeats the allegations contained in the foregoing paragraphs as if fully set forth herein.

202. Plaintiff Davis brings this claim individually and on behalf of the California Subclasses

203. Plaintiff Davis brings this statutory claim pursuant to Cal. Bus & Prof. Code § 17200, which prohibits unfair competition and the type of deceptive representations made by Lennox regarding the Lennox ACs.

204. Under Cal. Bus. & Prof. Code § 17200, any business act or practice that is unethical, oppressive, unscrupulous, and/or substantially injurious to consumers, or that violates a legislatively declared policy, constitutes an unfair business act or practice.

205. Lennox has engaged in unfair, unlawful, and fraudulent business acts or practices as set forth above.

206. **Unfair.** Lennox's conduct constitutes an unfair business act or practice because Lennox's practices have caused and are likely to cause substantial injury to Plaintiff Davis and the California Subclasses, which injury is not reasonably avoidable as alleged herein, and is not outweighed by any countervailing benefits to consumers.

207. **Unlawful.** Lennox's acts and practices are unlawful because they violate (1) Cal. Bus. & Prof. Code § 17500 *et seq*, and (2) the Consumer Legal Remedies Act, Cal. Civil Code § 1750 *et seq*.

208. Lennox fraudulent representations and omissions about the Lennox ACs are an act or practice in the conduct of trade or commerce.

209. These representations and omissions impact the public interest.

210. Lennox's representations and omissions about the Lennox ACs are deceptive, unfair and fraudulent because Lennox knew, or should have known, the statements were misrepresentations of the Lennox ACs' actual capabilities.

211. Plaintiff and members of the Class suffered economic injury as a direct and proximate result of Lennox's conduct, including but not limited to, the price paid for the purchase of a compatible phone to replace the class member's Galaxy SII.

212. Lennox committed deceptive acts or practices within the meaning of the above statute by engaging in the acts and practices alleged herein.

213. Plaintiff Davis seeks an order of this Court awarding restitution, injunctive relief, and all other relief allowed under § 17200, *et seq*, plus attorneys' fees, and costs.

**COUNT X**  
**False Advertising**  
**(Cal. Bus. & Prof Code § 17500 *et seq*)**  
**(On behalf of Plaintiff Davis and California Subclasses)**

214. Plaintiff Davis repeats the allegations contained in the foregoing paragraphs as if fully set forth herein.

215. Plaintiff Davis brings this claim individually and on behalf of the California Subclasses

216. Lennox is a "person" as defined by Cal. Bus. & Prof. Code § 17506.

217. Lennox falsely advertised the performance, uses, benefits, characteristics, quality, grade and standard of the Lennox ACs.

218. Lennox's misrepresentations and omissions as described above were likely to and did in fact deceive Plaintiff Davis and members of the California Subclasses.

219. Plaintiff Davis relied upon Lennox's material misrepresentations and omissions to his detriment in that she would not have paid the same price for an air conditioner which was uniquely susceptible to formicary corrosion and would require additional refrigerant and coil replacement.

220. The above-described false and misleading advertising conducted by Lennox continues to the time of this filing and represents an ongoing threat to the general public.

221. Lennox has been unjustly enriched as a result of the above-described conduct.

222. Plaintiff Davis seeks an order of this Court pursuant to Cal. Bus. & Prof. Code §§ 17203 and 17535 (a) Requiring Lennox to immediately cease the unlawful, unfair, and/or fraudulent business acts and/or practices and false and misleading advertising described herein; (b) enjoining Lennox from continuing to misrepresent and qualities of its Lennox ACs; (c) requiring Lennox to replace any Lennox Coils with coils which are not subject to formicary corrosion; and (d) providing full restitution and damages to Plaintiff Davis and any member of the California Subclasses, plus interest, costs, and attorneys' fees.

**COUNT XI**  
**Unfair or Deceptive Acts or Practices**  
**(Consumer Legal Remedies Act, Cal. Civ. Code § 1750 *et seq.*)**  
**(On behalf of Plaintiff Davis and California Subclasses)**

223. Plaintiff Davis repeats the allegations contained in the foregoing paragraphs as if fully set forth herein.

224. Plaintiff Davis brings this claim individually and on behalf of the California Subclasses based on Lennox's breach of the Consumer Legal Remedies Act ("CLRA"), Cal. Civ. Code § 1750 *et seq.*

225. Plaintiff was a "consumer" as that term is defined in Cal. Civ. Code § 1761(d) at all times relevant to the Complaint.

226. The Lennox ACs purchased by Plaintiff Davis and the California Subclasses constituted "goods" as that term is defined in Cal. Civ. Code § 1761 (a) at all times relevant to the Amended Complaint.

227. Lennox constituted a "person" as that term is defined in Cal, Civ. Code § 1761(c) at all times relevant to the Amended Complaint.

228. Plaintiff Davis the California Subclasses' purchase of the Lennox ACs constituted a "transaction" as that term is defined in Cal. Civ. Code § 1761(e) at all times relevant to the Amended Complaint.

229. Lennox provided "services" to Plaintiff and the class within the meaning of Cal. Civ. Code § 1761(b).

230. The CLRA provides, inter alia, "[the following unfair methods of competition and unfair or deceptive acts or practices undertaken by any person in a transaction intended to result or which results in the sale or lease of goods or services to any consumer are unlawful:

subsection (a)(5) [r]epresenting that goods... have... characteristics, uses, benefits...which they do not have;...subsection (a)(7) [r]epresenting that goods...are of a particular standard, quality or grade...if they are of another;...and subsection of (a)(9) [a]dvertising goods ...with intent not to sell them as advertised. Cal. Civ. Code §§ 1770(a)(5), (7) and (9).

231. Lennox violated the CLRA because it makes uniform written representations that regarding the characteristics, uses, benefits, standards, and quality of the Lennox ACs that represent the Lennox ACs have standards, qualities, or grades which they do not have. Lennox made these representations with intent to sell the Lennox ACs without the qualities it had represented.

232. Lennox did not disclose that Lennox ACs contain coils uniquely susceptible to formicary corrosion.

233. The information Lennox misrepresents, conceals, and/or does not disclose to consumers is material in that a reasonable consumer would have considered them important in deciding whether to purchase, or whether to pay the stated price for, a Lennox AC.

234. Plaintiff Davis reasonably and justifiably acted or relied to his detriment upon the undisclosed facts as evidenced by her purchase of the Lennox AC. Had Plaintiff Davis known of the material omissions described above, she would not have purchased a Lennox AC, or only agreed to pay less for it.

235. Plaintiff Davis seeks an order of this Court pursuant to Cal. Civ. Code § 1780 (a)(2) enjoining Lennox's conduct described above, and requiring Lennox to

replace the Lennox Coils with coils not susceptible to formicary corrosion, plus attorneys' fees and costs.

236. Plaintiff Davis has notified Lennox in writing of its particular violations of Cal. Civ. Code § 1770 pursuant to Cal Civ. Code § 1782 and made a demand for corrective action. By agreement, Plaintiff sent this notice to Defendant by electronic mail care of Defendant's counsel. See Exhibit G. Accordingly, Plaintiff reserves the right to seek damages for violation of Cal. Civ. Code § 1770 pursuant to Cal Civ. Code § 1780(a) upon expiration of the 30 day requirement found in Cal Civ. Code § 1782.

**COUNT XII**  
**Unjust Enrichment**  
**(On Behalf of Plaintiffs, the Classes and the Subclasses)**

237. Plaintiffs re-allege and incorporate each and every allegation set forth above as if fully written herein.

238. Plaintiffs bring this claim on behalf of the Classes or, in the alternative on behalf of the various state Subclasses.

239. Plaintiffs and members of the Classes conferred a benefit upon Lennox. Namely, Plaintiffs and Class members paid money for ownership of their Lennox ACs.

240. Lennox retained that benefit.

241. Lennox retained that benefit under circumstances that make it inequitable for Lennox to retain it without paying the value thereof. Specifically, Lennox retained that benefit despite the fact that the Lennox ACs contained defective Coils.

242. Plaintiffs purchased the Lennox ACs from a Lennox's agent, in part, because of Lennox's advertisements, marketing and product claims, and a result, a relationship between the

parties has been created even though Plaintiffs did not purchase Lennox ACs directly from Lennox.

243. As set forth above, Lennox misrepresented the relevant Lennox ACs as free from design defect through its marketing, advertising, product packaging, and print publications specifically designed to entice Plaintiffs, Class Members, builders, contractor and others to buy Lennox ACs.

244. Because Lennox's retention of the non-gratuitous benefit conferred on it by Plaintiffs and Class members is unjust and inequitable, Lennox must pay restitution to Plaintiffs and class members for its unjust enrichment, as ordered by the Court.

**COUNT XIII**  
**Fraudulent Concealment**  
**(On behalf of Plaintiffs, the Classes and Subclasses)**

245. Plaintiffs re-allege and incorporate each and every allegation set forth above as if fully written herein.

246. Plaintiffs bring this claim on behalf of the Classes or, in the alternative on behalf of the various state Subclasses.

247. Lennox knew or should have known that the Coils were defective in design, were not fit for their ordinary and intended use, and performed in accordance with neither the advertisements, marketing materials and warranties disseminated by Lennox nor the reasonable expectations of ordinary consumers.

248. Lennox fraudulently concealed from and/or intentionally failed to disclose to Plaintiffs and the Class that the Coils are defective.

249. Lennox had exclusive knowledge of the defective nature of the Coils at the time of sale. The defect is latent and not something that Plaintiffs or Class members, in the exercise of reasonable diligence, could have discovered independently prior to purchase, because it is not feasible.

250. Lennox had the capacity to, and did, deceive Plaintiffs and Class members into believing that they were purchasing Coils free from defects.

251. Lennox undertook active and ongoing steps to conceal the defect. Plaintiffs are aware of nothing in Lennox advertising, publicity or marketing materials that disclosed the truth about the defect, despite Lennox's awareness of the problem.

252. The facts concealed and/or not disclosed by Lennox to Plaintiffs and the Class members are material facts in that a reasonable person would have considered them important in deciding whether to purchase (or to pay the same price for) the Coils.

253. Lennox intentionally concealed and/or failed to disclose material factors for the purpose of inducing Plaintiffs and the Class to act thereon.

254. Plaintiffs and the Class justifiably acted or relied upon the concealed and/or non-disclosed facts to their detriment, as evidenced by their purchase of, or replacements using, the Coils.

255. Plaintiffs and Class members suffered a loss of money in an amount to be proven at trial as a result of Lennox's fraudulent concealment and nondisclosure because: (a) they would not have purchased the ACs on the same terms if the true facts concerning the defective Coils had been known; (b) they paid a price premium due to they would be free from defects; and (c) the ACs did not perform as promised. Plaintiffs also would have initiated this suit earlier had the defect been disclosed to them.

256. By reason of the foregoing, Plaintiffs and the Class members suffered, and continue to suffer, financial damage and injury.

**COUNT XIV**  
**Declaratory Relief, 28 U.S.C. § 2201**  
**(On Behalf of Plaintiffs, the Classes and Subclasses)**

257. Plaintiffs repeats the allegations contained in the foregoing paragraphs as if fully set forth herein.

258. Plaintiffs brings this claim on behalf of the Classes, or, in the alternative on behalf of the Subclasses pursuant to 28 U.S.C. § 2201.

259. There is an actual controversy between Plaintiffs and the classes on one hand, and Lennox on the other regarding the marketing and sale of the Lennox ACs.

260. Pursuant to 28 U.S.C. § 2201, this Court may “declare the rights and legal relations of any interested party seeking such declaration, whether or not further relief is or could be sought.”

261. Lennox marketed and sold, and continues to market and sell, Lennox ACs with defective Coils, while concealing this defect from consumers.

262. Lennox has acted or refused to act on grounds that apply generally to the Declaratory Relief Class, so that final injunctive relief or corresponding declaratory relief is appropriate respecting the Class as a whole within the meaning of Fed. R. Civ. P. 23(b)(2). Plaintiffs seeks declaratory relief, ruling that:

- a. Lennox ACs containing copper Coils are defective because they are unreasonably susceptible to formicary corrosion;
- b. certain provisions of Lennox’s warranty are void as unconscionable;

- c. Lennox must notify AC owners of the defect;
- d. the durational limitations on the warranty are removed;
- e. Lennox will reassess all prior warranty claims and pay the full cost of repairs and damages;
- f. Lennox will pay the cost of inspection to determine whether any Class Member's Coils need replacement; and
- g. any limitation of damages or disclaimer or warranty by Lennox with regard to Lennox Coils are void.

**REQUESTS FOR RELIEF**

WHEREFORE, Plaintiffs, on behalf of himself and others similarly situated, seeks judgment against Defendant as follows:

- A. For an order certifying the Classes and/or Subclasses and/or issue class(es) under Rule 23 of the Federal Rules of Civil Procedure and naming Plaintiffs as Class Representative and his attorneys as Class Counsel to represent the Class and Subclass members;
- B. For an order finding in favor of the Plaintiffs and the Classes on all counts asserted herein;
- C. For an order awarding damages in an amount to be determined by the Court or jury;
- D. For prejudgment interest on all amounts awarded;
- E. For an order of restitution and all other forms of injunctive and/or equitable relief;
- F. For an order awarding Plaintiffs and Classes reasonable attorneys' fees and expenses and costs of suit; and
- G. For all further relief, as the Court deems appropriate.

**DEMAND FOR JURY TRIAL**

Plaintiffs hereby demand a trial by jury on all claims so triable.

Dated: January 9, 2014

Respectfully submitted,

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ACCA CONSUMER EDUCATION SERIES

# What Causes Formicary Corrosion & How Is It Stopped?

## What is formicary corrosion?

It is corrosion that occurs in copper based alloys. Due primarily to appearance, and the fact that it appears like ant nests in the copper under magnification it is often referred to as ants nest corrosion. If you see corrosion it is probably not formicary corrosion, because it is not generally visible without magnification. A second nickname for formicary corrosion is pinhole corrosion due to the small size of the actual holes in the copper. However, you may see some gray, black, or blue discoloration on the copper's surface where the corrosion is found. Your professional contractor will be able to verify the type of corrosion found, but may need to have the original equipment manufacturer's (OEM) lab examine the coil before a final determination of cause can be made.

## What causes it and how common is this?

Formicary corrosion is caused by a chemical reaction requiring three parts: oxygen, water, and an organic acid. If any of the three parts are removed there can't be any further formicary corrosion. Formicary corrosion only occurs in copper based alloys and HVAC coils are often made of copper. According to studies formicary corrosion is only responsible for approximately 10% of early copper coil failures in the HVAC industry.

## How can an OEM tell that formicary corrosion damaged my HVAC coil?

The coil needs a magnified inspection to be sure. Then, based on whether the "ants nesting" started on the inside or outside of the copper tubing, the location of the organic acids can be determined.

Formicary corrosion can attack from inside of the coil if there are manufacturing problems with the copper that allows an organic acid into the closed and pressurized HVAC system. However, in 90% of the cases where formicary corrosion is found, coil damage is caused by organic acids in the air that is cooling or heating your home.

## Where do the organic acids come from?

Organic acids like formic and acetic are found in many household products. The EPA regulates volatile organic compounds (VOCs) in the air outside. However, the EPA has found that exposure in homes can be greater than what is recommended for safety. VOC producing products can be as diverse as building materials like plywood and caulk to normal household cleaning solvents, vinegar, and even makeup. A list of common household products that can contain organic acids linked to formicary corrosion was included in one industry research report as follows: adhesives, cabinets, countertops, foam insulation, laminates, oil based paints, paneling, particle board, plywood, silicone caulking, wallboard, wallpaper, vinyl flooring, latex paint, vinegar, cosmetics, disinfectants, deodorizers, tobacco smoke, wood smoke, and cleaning solvents

## That sounds like everything, can the source be narrowed down?

Maybe. Look for organic acid sources from the lists in the previous question's answer, especially near the HVAC's return opening. When searching for the most likely source, don't forget the obvious; are any of the items on the list used regularly? If so, the labels should be checked for organic acids. There may not be one main source.

Unfortunately, according to Department of Energy sponsored research done by the Lawrence Berkeley National Laboratory on newly constructed homes: there were elevated levels of formaldehyde, acetic acid, and acetaldehyde present in the homes. The good news is the effect of the off gassing in the construction related products may decrease over time. The bad news is it is suspected that tighter home envelopes that increase energy efficiency may be making the problem worse.

## Will formic and acetic acid off gassing hurt humans or pets that breathe it?

Yes, in amounts over 5 parts per million parts in the air you or your pets may experience irritation of the nose, eyes, throat, and upper respiratory tract. Higher concentrations can cause central nervous system effects and damage to the lungs and eyes.

## If I can't remove the source of the formicary corrosion what other options do I have?

One solution would be to have your professional HVAC contractor, install a heat recovery ventilation system (HRV) or an energy recovery system (ERV) with a designed outside airflow exchange rate. It is still scientifically unproven that increasing the number of air changes aids in stopping formicary corrosion. However, the EPA recommends increasing ventilation when using VOCs. Additionally, it seems obvious that continuously removing and replacing the air would help reduce the quantity of organic acids whenever the outside air has a lower level. Once there is enough fresh air brought in, to achieve 5 parts per million of organic acids in the air or less, it will be deemed safe to breath by OSHA standards.

ACCA is the nationwide nonprofit association of professional heating, ventilation, air conditioning, and refrigeration contracting businesses. For more than 40 years, ACCA has provided education and research in support of efficient, safe and healthy heating and cooling systems. We invite you to visit us at [www.acca.org](http://www.acca.org).



## ComforTools™

ComforTools help consumers make informed choices about indoor heating and cooling systems. ComforTools promote energy conservation, indoor air quality, and safe, healthy homes and buildings.

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[www.americancoolingandheating.com](http://www.americancoolingandheating.com)

[service@americancoolingandheating.com](mailto:service@americancoolingandheating.com)

## UNIGUARD™ alloy to help fight Formicary Corrosion

ClimateMaster and Luvata have joined forces in the continued fight against formicary corrosion. Luvata, one of the world's largest air coil suppliers, has introduced an air coil built using copper alloy 422, trade-named UNIGUARD™, which through testing has shown to have increased resistance to formicary corrosion. ClimateMaster is excited to offer residential customers the option of building units with UNIGUARD™ air coils. To provide even added protection, the UNIGUARD™ air coils will be e-coated.



### Coil Construction

Copper tube - Aluminum plate fin coils, used for over 70 years, are the most reliable, easily repairable, and highest performance coils on the market. These coils consist of a round copper tube and flat plate fin design. Over the years, a variety of tube enhancements, fin designs, and fin spacing have been employed to improve heat transfer. Copper / aluminum coils have proven to last for decades and can still serve as an effective and reliable product; however, recently there have been reports of formicary corrosion affecting copper tube air coils in some limited geographic regions. Unfortunately, this problem has proven to be unpredictable as to if and where it strikes.

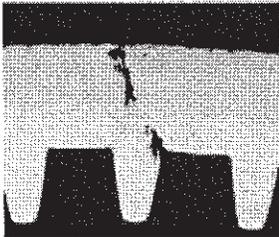


Figure 1: Copper Alloy 122

### Formicary – Drivers to recent awareness

In recent years the number of complaints of air coil leaks has been increasing in the indoor coils of AC systems, the primary form of cooling in the residential market for the U.S. Luvata's recent study has indicated that a majority of the heat exchanger coil failures were due to some type of corrosion. Many factors, including tighter homes and new types of building materials are contributing to increased occurrences. The frustrating part is that this problem may strike some while leaving others alone.

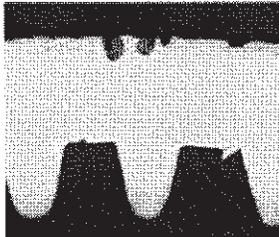


Figure 2: Copper Alloy 422

### Formicary Corrosion – What is it?

Formicary corrosion only occurs in copper based alloys and in the presence of organic acids, moisture, and oxygen. The corrosion has a unique characteristic that appears as a wandering pit (see figure 1). The pits are very small and require a microscope to view. Magnified 125 times, the corrosion is evident after only seven days of accelerated formicary corrosion testing. The UNIGUARD™ copper alloy 422 without e-coat is more resistant to corrosion and after 180 days of accelerated testing, only slight surface pitting has occurred (see figure 2).

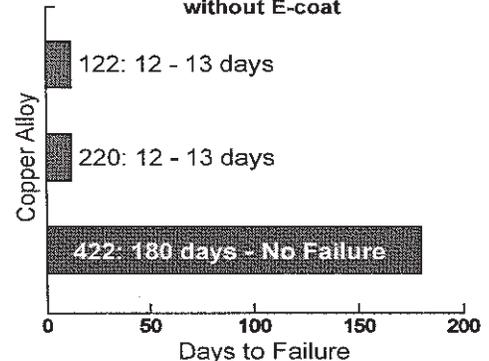
### 422 alloy – Independent testing<sup>1</sup>

Luvata worked in cooperation with a leading 3rd party corrosion-testing lab that developed the industry standard for accelerated formicary corrosion testing. This lab performed testing on the new UNIGUARD™ 422 and leading copper alloys; 122, 220. Uncoated UNIGUARD™ was found to be at least 25 times more effective against formicary corrosion than the standard alloys.

ClimateMaster recommends the UNIGUARD™ air coil option be considered in areas where there is a higher than normal air coil failure rate due to formicary corrosion.

<sup>1</sup> This brochure is not intended to warrant or guaranty any specific level of performance, which can vary greatly depending on the field conditions in which products may be applied.

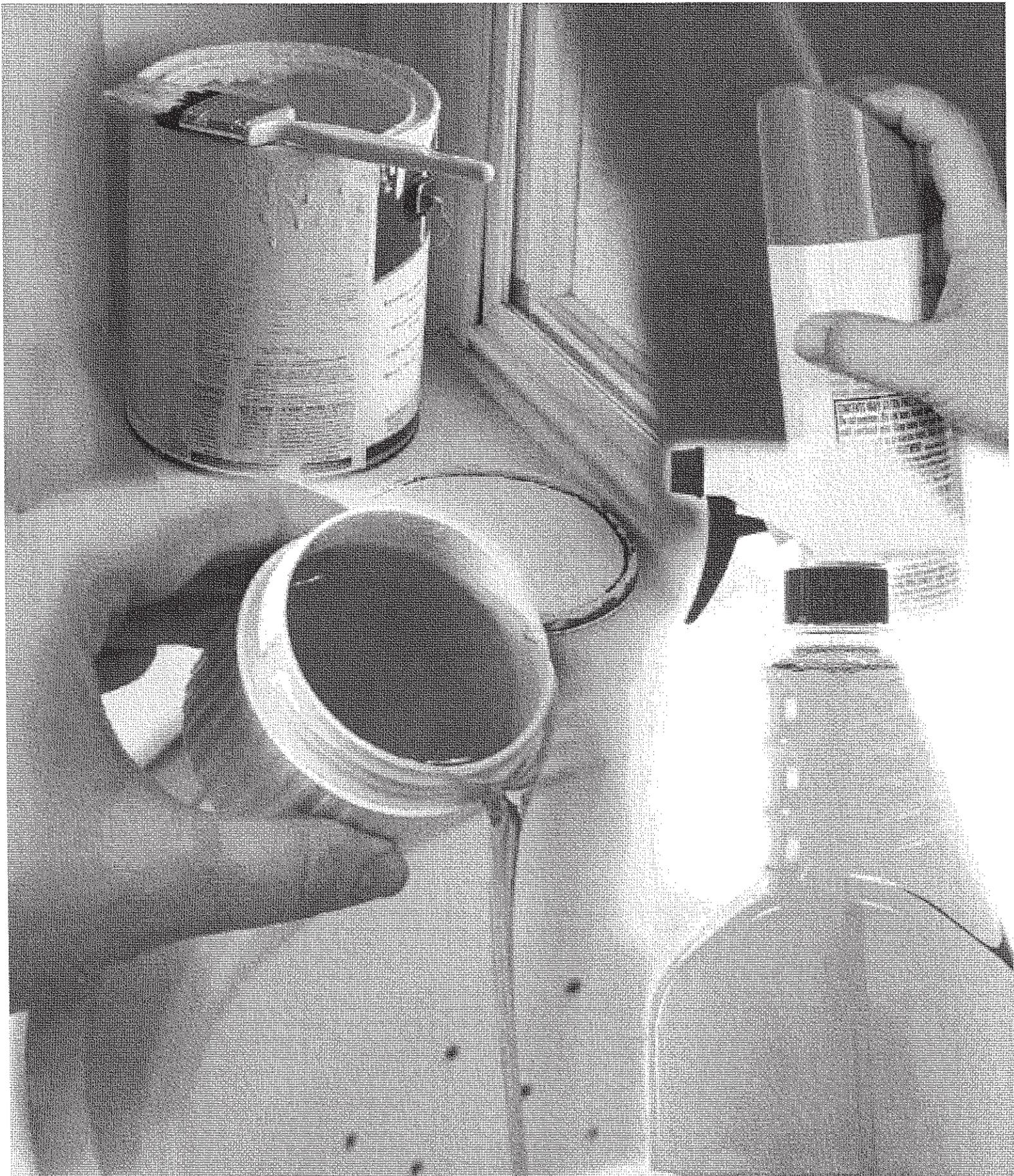
### 180 Day Accelerated Formicary Corrosion Test without E-coat



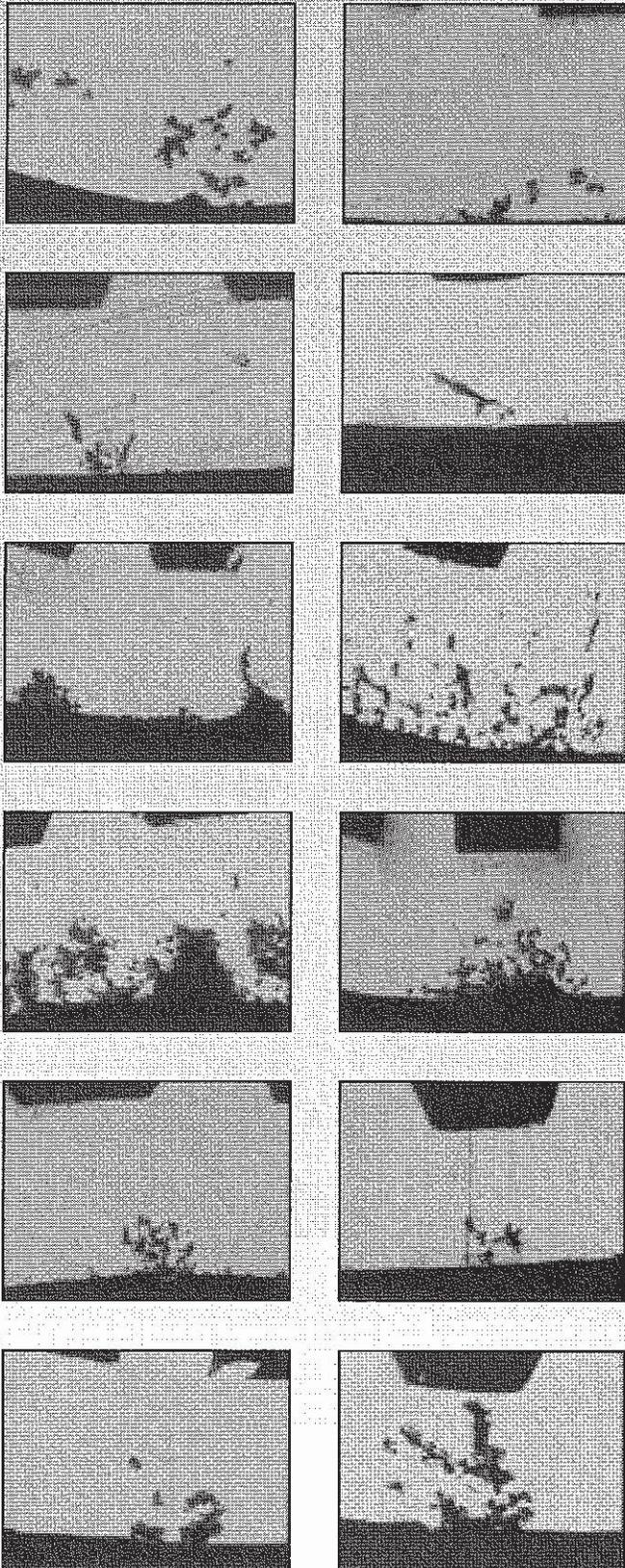


# Indoor Coil Corrosion

Industry Research Report - Identifying Common Sources



## Fin Pack Leaks – Formicary Corrosion



## Introduction

Indoor coil corrosion failures are an issue in the HVAC industry today. Although the occurrence rate of these failures is low nationwide, some geographic areas have experienced higher incidence rates. For instance, some homes experience multiple failures while those around them have none. Failures are typically characterized by leaks that form in the fin pack area of the coil after one to four years of installation and use.

This issue exists industry-wide. A competitive study has shown identical corrosion failure leaks in all coil brands investigated. The photos at left show magnified tubing cross-sections from failed coils. The progression of the corrosion is from the exterior of the tube inward, eating away at the copper, until penetration occurs and a leak results. **Due to the corrosion process, some photos look better than others, but all corroded through the tube causing a leak at that point. All coils failed in the time period characteristic of such a failure.**

### Manufacturers represented in photos:

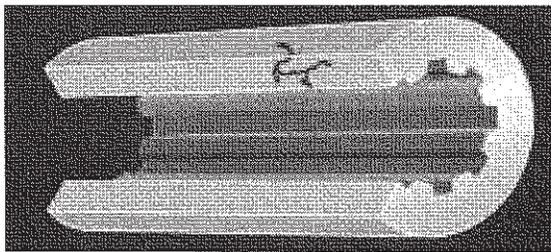
- ADP
- Airpro (Coleman)
- American Standard
- Aspen
- Bryant
- Goodman
- JCP
- Janitrol
- Rheem
- Superior
- Trane
- York

## Corrosion Mechanisms

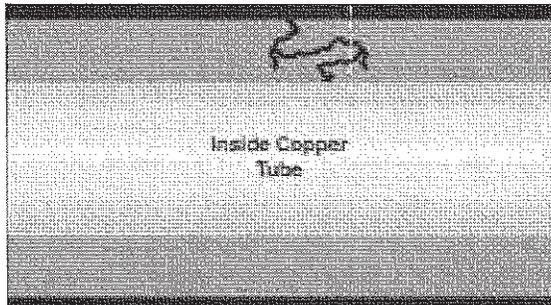
There are many potential causes of coil leaks in indoor coils, ranging from manufacturing or process-related defects to copper corrosion. Additionally, there are several different corrosion mechanisms that can affect copper tubing. The following discussion focuses on pitting corrosion failures of indoor coils.

There are two main forms of pitting corrosion found in indoor coils: (1) general pitting; and (2) formicary corrosion, sometimes called "ant's nest" corrosion.

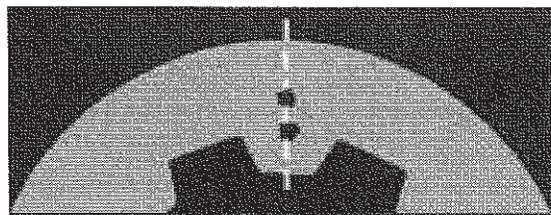
### Illustration of Typical Corroded Tube



3-D representation of corrosion through tube



Side view of leak



Cross-section showing portion of corrosion (leak)

The illustrations above depict the characteristics of the corrosion process: at top, how a single leak might perforate the copper tube; center, where that tube might be cross-sectioned; and bottom, how the final cross-sectioned piece would look magnified.

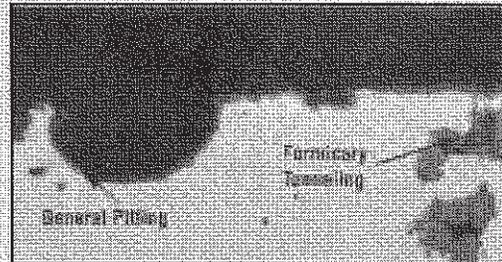


Fig. 1 General Pitting and Formicary Corrosion

General pitting corrosion is caused by aggressive anion attack on the copper tube. An anion is a negatively charged chemical species. Due to this negative charge, anions aggressively search for positively charged species called cations. Copper is an abundant source of cations. Large pits resembling bite marks characterize the footprint of general pitting. These pits can often be observed with the human eye. Chlorides are the most common source of the aggressive anions known to cause general pitting corrosion.

### Common household substances that may contain chlorides include:<sup>1-3</sup>

- Aerosol sprays
- Carpeting
- Degreasing and detergent cleaners
- Dishwasher detergents
- Laundry bleach
- Fabric softeners
- Paint removers
- Tub and tile cleaners
- Vinyl fabrics
- Vinyl flooring
- Wallpaper

Formicary corrosion, on the other hand, appears as multiple tiny pinhole leaks at the surface of the copper tube that are not visible to the human eye. Upon microscopic examination, the formicary corrosion pits show networks of interconnecting tunnels through the copper wall, hence the association with ants' nests. The agents of attack involved in this corrosion mechanism are organic acids.

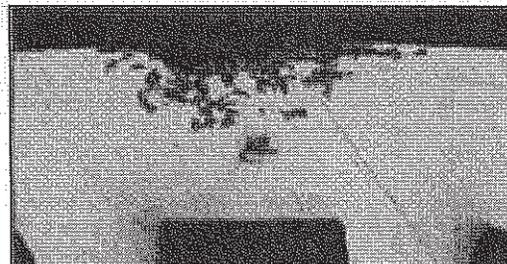


Fig. 2 Formicary Corrosion Tunneling

There are many possible sources of organic acids, which are volatile organic compounds (VOCs), in both the coil application and coil production environment. The most common organic acids are formic and acetic acids. Formaldehyde can be converted to formic acid and then to formate in moisture. Acetic acid is converted to acetate in water. All of these compounds are aggressive to copper, resulting in the ant's nest corrosion footprint.

#### Common household sources that may contain formic acid, formaldehyde, or formate include:<sup>1-7</sup>

- Building materials
  - Adhesives
  - Cabinets
  - Carpets
  - Countertops
  - Foam insulation
  - Laminates
  - Paints (latex and oil based)
  - Paneling
  - Particle boards
  - Plywood
- Cosmetics
- Disinfectants and deodorizers
- Tobacco and wood smoke

#### Typical household sources of acetic acid or acetate include:<sup>1-7</sup>

- Building materials
  - Adhesives
  - Cabinets
  - Carpets
  - Countertops
  - Foam insulation
  - Laminates
  - Paints (oil based)
  - Paneling
  - Particle boards
  - Plywood
  - Silicone caulking
  - Wallboard
  - Wallpaper
- Cleaning solvents
- Vinegar

There are three conditions required for formicary corrosion to occur:<sup>7</sup>

- The presence of oxygen
- The presence of a chemically corrosive agent (organic acid)
- The presence of moisture

If multiple corrosive agents are present, the result will be multiple corrosion footprints, as depicted in Fig. 1 (page 3), which shows both general pitting and formicary corrosion.

## Research Findings

### Environmental Factors

The fact that many manufacturers are experiencing identical failures shows that external environmental factors are playing a role. While each manufacturer has a different assembly process and multiple sources of raw materials, a chemical analysis of materials used can identify the presence of corrosive agents.

Bryant has scrubbed its manufacturing processes, materials and environment, including all oils and lubricants, to ensure corrosive agents are not present in the production environment.

While the potential sources of agents that can cause pitting corrosion in indoor coils are numerous, there is increasing evidence showing the home environment to be a primary contributor to coil corrosion. The trend in home construction is to improve energy efficiency by making homes "tighter." This decreased ventilation results in higher concentration levels of indoor contaminants. In addition, environmental refrigerant mandates now heighten the awareness that all leaks be located and repaired.

**There is increasing evidence showing the home environment to be a primary contributor to coil corrosion.**

### Research Study

A recent study was conducted to measure the volatile organic compound concentrations and emission rates in new manufactured and site-built houses.<sup>8</sup> The E.O. Lawrence Berkeley National Laboratory performed this research with the support of the U.S. Department of Energy.

This study shows that many materials used in the construction of new houses emit VOCs, including formaldehyde. Plywood, engineered wood products such as flooring and cabinetry, latex paint, and sheet vinyl flooring have been identified as major sources for these compounds. Measurements of acetic acid, formaldehyde, and acetaldehyde concentrations taken inside homes in this study were significantly higher than levels measured outside the homes. These elevated emission rates were seen to persist over a period of at least nine months while these homes were being studied. In fact, the measured levels of acetic acid increased during the study.

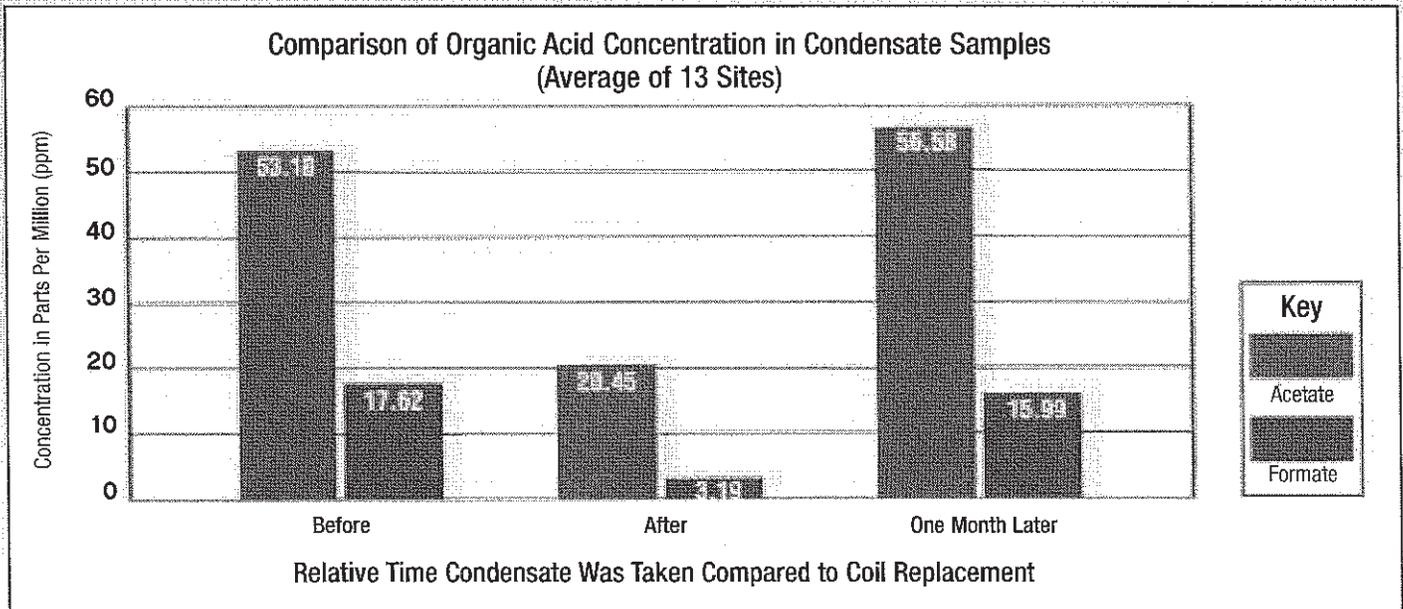
Another study specifically investigated the emission rates of wooden products in test chambers.<sup>9</sup> This testing supports the theory that wood is a source of organic acids, especially formic and acetic acids.

In addition, building materials, including woods and furniture, are generally the main sources of volatile organic compounds in the indoor environment.

## Condensate Analysis

As part of Bryant's efforts to research this problem, coil condensate sampling was performed at coil failure sites. The analysis of these samples confirmed the presence of significant levels of formate and acetate in the household environments. These samples were collected just prior to coil replacement and immediately after the coils were replaced. Additional samples were then taken at some sites during follow-up assessments a month later.

The following chart shows the average trend of acetate and formate levels from 13 sites located in the Houston, Mobile, St. Louis, Indianapolis and Memphis areas. The levels are elevated prior to coil replacement. When condensate is drawn immediately from the new coil, the levels decrease dramatically. Finally, after a short period of operation, the levels return to previously elevated levels. These measurements are also an indication that the corrosive agents are not tied to the new replacement coils because the condensate samples drawn directly off the new coils show decreased levels of acetate and formate. After the coil has been installed for a period of time, the levels of these agents once again reflect the operating environment of the coil. Identifying the sources of agents that cause these failures is certainly a step toward resolving this problem.



## Conclusions

There is increasing evidence linking the primary cause of indoor coil leak failures to agents present in the household environment. Significant levels of corrosive agents known to cause these failures have been quantified in indoor condensate sampling during recent studies. The trend toward decreased home ventilation rates likely contributes to the elevated levels of indoor contaminants. In addition, increased environmental awareness to identify and fix refrigerant leaks will continue to focus attention on these indoor coil failures as an industry issue.

Bryant has conducted extensive field and laboratory testing and research efforts to identify an effective method of preventing coil failures caused by agents in the household environment.

## The Bryant Solution

Today, Bryant is proud to announce a product enhancement consisting of DuraCoat™, a tin plating of the copper hairpins in evaporator coils. No other manufacturer in the industry presently has an acceptable solution to the Indoor Coil Corrosion issue, making Bryant the choice for worry-free comfort.

Because formicary corrosion is not a national phenomenon, these new coil products will be available under separate model numbers on a "build to order" basis.

Note that not only will there be a split system line of residential DuraCoat™ coils, but there will also be DuraCoat™ Copper Coils available for the Small Package Product (SPP) offerings. RCD will also have DuraCoat™ Copper Coil – replacement coils for past SPP products now installed in the field.



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**Coil Corrosion**

Formicary Corrosion | Rev Corrosion | Tell Us About Your Coil Leak

**Formicary Corrosion**

Recently we have encountered an unusually high number of indoor cooling coils developing leaks, typically between one and three years from installation. We have actually replaced more leaking coils in 2011 than the entire time Bailey's Heating & Air, Inc. has been in business-over three decades. We were so concerned by this alarming trend that we invited a factory representative from Lennox (the main brand we were selling at the time, and subsequently the source of nearly all our leaking coils) to come visit seven homes with identified leaks. After the visit, Lennox sent us literature claiming that the leaks are caused by formicary corrosion.

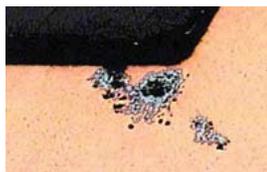


Fig. 1 (Formicary Corrosion)

Formicary corrosion, also called "ant nest corrosion" due to its resemblance to ant burrows (see Figure 1 for a cross-section of corroded copper), is a form of metallic corrosion resulting from the chemical reaction between a mixed-metal coil's copper tubing, aluminum fins, moisture, and off-gassed volatile organic compounds from inside your home (such as cleaning products and other chemicals).

Our own experience with coil leaks (or rather, the hitherto lack thereof) motivated us to do some research of our own. Figure 2 shows the location of five leaks discovered in a three-year old coil after pressurizing it to 300 PSI test pressure and placing it in a dunk tank. Figure 3 is a picture of the corrosion found when we cut out a section of this coil, removed the fins, and examined the copper tubing under a microscope; as you can see, there is extensive and deep corrosion all over the copper. For comparison, we did the same to a twenty three-year old coil, figure 4, that had no previously identified leaks, and found a normal amount of corrosion for its age, but still nothing comparable to that found in the newer, three-year old coil.

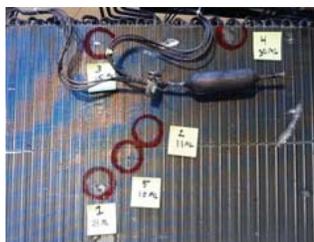


Fig. 2 (Coil With 5 Leaks)



Fig. 3 (Corrosion Magnified 40X)  
3 year old R410a Coil

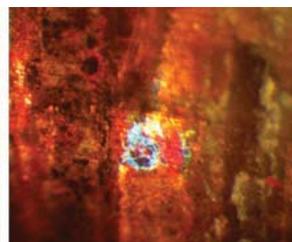


Fig. 4 (Corrosion Magnified 40X)  
23 year old R22 Coil

Our findings so far have been consistent with our experiences from the 35 years we have been in business, installing tens of thousands of systems. Despite what Lennox claims, the air inside your home has changed little over those 35 years, yet only recently have leak issues arisen. The sole common denominator amongst our leaking coils is R-410A refrigerant. Beginning in 2010, legislation phasing out manufacturing of equipment using R-22 went into effect, and even as early as four years ago, manufacturers were choosing to make higher-efficiency equipment for use with R-410A refrigerant rather than R-22.

Manufacturers maintain that R-410A cannot be the cause of these leaks because the corrosion is forming on the outside of the tubing rather than the inside, where the refrigerant runs. However, given that the only variable which has changed over time is the use of R-410A, we suspect that differences between it and R-22 (its use of synthetic oil and higher pressure, for example) correlates directly with the corrosion causing the coil leaks. Given that there is no replacement for R-410A refrigerant, leaks caused by such would be a costly problem for many manufacturers- it's no wonder that they are turning a blind eye toward what we hypothesize is the real cause.

Let's look at this from you, the customer's, point of view. If it is truly the chemicals in the air inside your home causing the formicary corrosion, then replacing coils solves nothing, as we have not changed the air in your home. Won't the leaks reoccur? What happens when your warranty expires? Will you have to come up with thousands of dollars to replace these coils when they are out of warranty?

We here at Bailey's are understanding why things are happening by doing something that we have never done before. As discussed above, we have begun new procedures and tests to help quickly identify leaking coils. Now, when we service a piece of equipment, regardless of whether it is R-22 or R-410A, Lennox or another brand, we are taking water samples from the condensation off of each coil and testing them to record their pH levels. By the end of next summer, thanks to these pH analyses and other data we are compiling, we will have a more complete understanding of this problem and possibly some solutions, or at least more proof of what is really causing the leaks. We have also constructed our own in-house testing facility to diagnose failed products, identify the issue, test solutions, and keep ourselves on the forefront of technology when it comes to our customers, the products they have purchased, and their comfort.

One of the most important changes we have made as a result of our research and investigation is switching which brands we sell. We are now Trane Comfort Specialists- in fact, we are the only Trane dealer in the Modesto, Turlock, Tracy and Stockton area. We became a TCS dealer because we now feel Trane has the best equipment on the market, particularly due to the fact that they are one of the only two manufactures who manufacture the majority of their coils from solely aluminum (thus avoiding the corrosion problem found in copper-aluminum coils). Trane had the foresight to realize the problem posed by mixed-metal coils and smartly avoided it by changing their coil manufacturing to aluminum.

To sum up, I personally believe that manufacturers are being incredibly short-sighted. The manufacturers are blaming formicary corrosion on only one component of a complex process, and even if they were correct, they offer no recourse to prevent the corrosion in the first place, nor an explanation as to why this corrosion is so prevalent and extensive only in systems installed in the past few years. We here at Bailey's believe you deserve better, and we are taking steps to make sure that the products we install provides trouble free service for the years to come. In closing, I would like to say that we appreciate all our customers putting their trust in our company over the years. We continue to work our hardest to ensure that you are receiving the best equipment and information that is available.

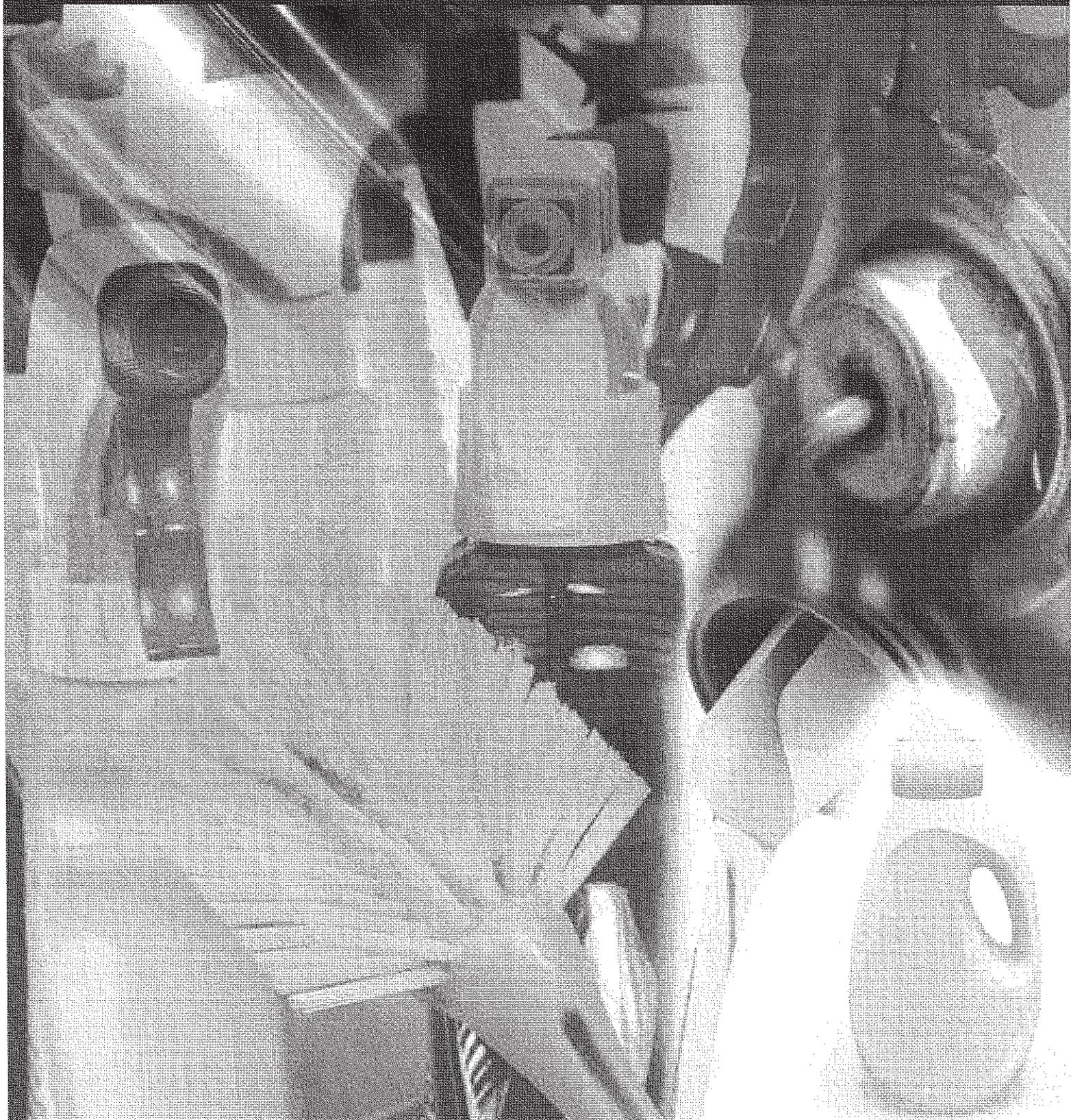
Mitch Bailey

# Indoor Coil Corrosion

Industry Research Report



turn to the experts 



Identifying Common Sources

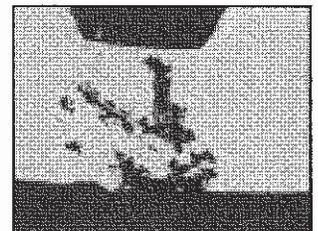
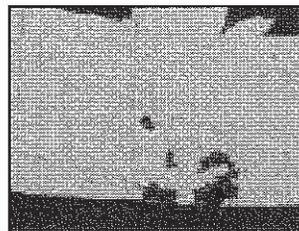
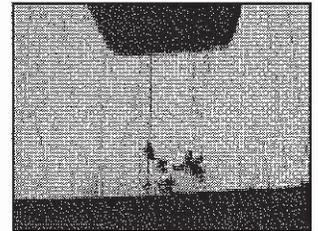
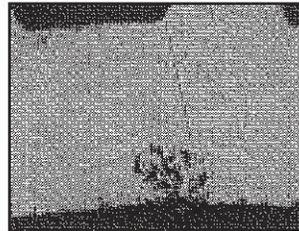
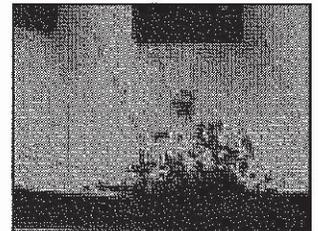
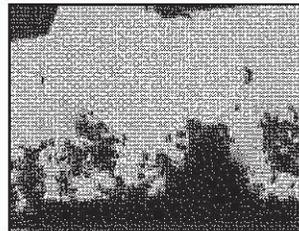
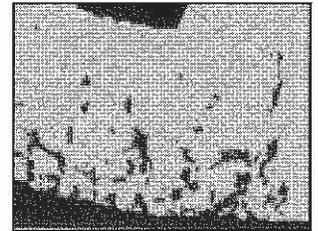
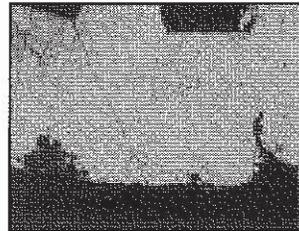
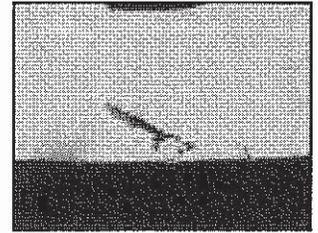
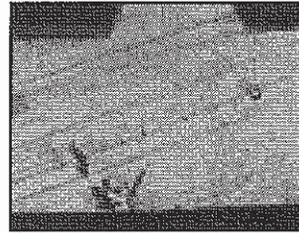
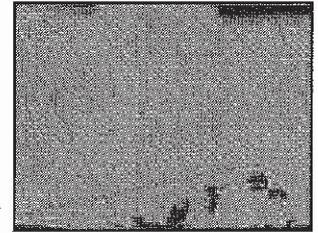
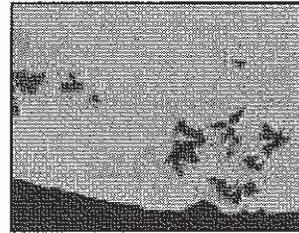
## Introduction

Indoor coil corrosion leading to coil failure is an issue that affects coils manufactured by the entire HVAC industry today. A leading cause of coil corrosion is formicary acid, an organic acid that can be formed in the home. Although the occurrence rate of these failures is low nationwide, some geographic areas have experienced higher incidence rates. For instance, some homes experience multiple corrosion-related failures while those around them have none. Failures are typically characterized by leaks that form in the fin pack area of the coil after one to four years of installation and use.

Carrier was the first to identify formicary corrosion and provide our dealers with an effective solution. With the aluminum coil, we are incorporating advanced manufacturing techniques to provide the next generation solution to formicary corrosion.

Formicary corrosion affects coils industry-wide. A competitive study has shown identical corrosion failure leaks in all coil brands investigated. The photos at right show magnified tubing cross-sections from failed coils. The progression of the corrosion is from the exterior of the tube inward, eating away at the copper, until penetration occurs and a leak results. Due to the corrosion process, some photos look better than others, but all corroded through the tube causing a leak at that point. All these coils failed in the time period characteristic of such a failure.

## Fin Pack Leaks – Formicary Corrosion



Manufacturers represented  
in photos:

- ADP
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- American Standard
- Aspen
- Carrier
- Goodman
- ICP
- Janitrol
- Rheem
- Superior
- Trane
- York

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There are many potential causes of coil leaks in indoor coils, ranging from manufacturing or process-related defects to corrosion of the metal. Additionally, there are several different corrosion mechanisms that can affect copper tubing. The following discussion focuses on pitting corrosion failures of indoor coils.

There are two main forms of pitting corrosion found in indoor coils: (1) general pitting; and (2) formicary corrosion, sometimes called "ant's nest" corrosion.

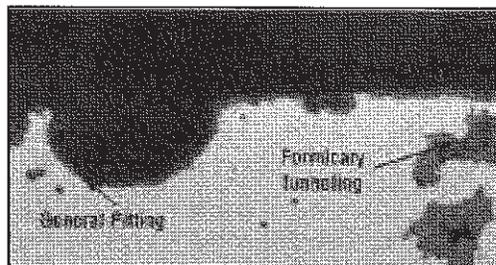
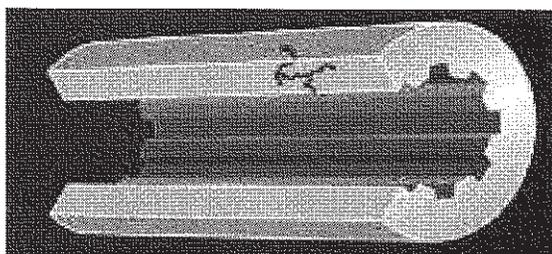


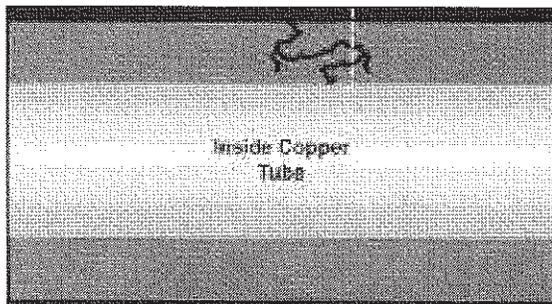
Fig. 1 General Pitting and Formicary Corrosion

General pitting corrosion is caused by aggressive anion attack on the copper tube. An anion is a negatively charged chemical species. Due to this negative charge, anions aggressively search for positively charged species called cations. Copper is an abundant source of cations. Large pits resembling bite marks characterize the footprint of general pitting. These pits can often be observed with the human eye. Chlorides are the most common source of the aggressive anions known to cause general pitting corrosion.

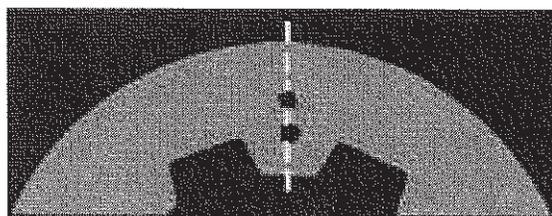
### Illustration of Typical Corroded Tube



3-D representation of corrosion through tube



Side view of leak



Cross-section showing portion of corrosion (leak)

The illustrations above depict the characteristics of the corrosion process: at top, how a single leak might perforate the copper tube; center, where that tube might be cross-sectioned; and bottom, how the final cross-sectioned piece would look magnified.

Common household substances that may contain chlorides include:<sup>14</sup>

- Aerosol sprays
- Carpeting
- Degreasing and detergent cleaners
- Dishwasher detergents
- Laundry bleach
- Fabric softeners
- Paint removers
- Tub and tile cleaners
- Vinyl fabrics
- Vinyl flooring
- Wallpaper

Formicary corrosion, on the other hand, appears as multiple tiny pinhole leaks at the surface of the copper tube that are not visible to the human eye. Upon microscopic examination, the formicary corrosion pits show networks of interconnecting tunnels through the copper wall, hence the association with ants' nests. The agents of attack involved in this corrosion mechanism are organic acids.

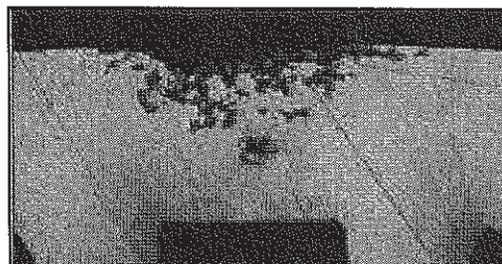


Fig. 2 Formicary Corrosion Tunneling

## Research Findings

### Environmental Factors

The fact that coils made by many manufacturers are experiencing identical failures shows that external environmental factors are playing a role. While each manufacturer has a different assembly process and multiple sources of raw materials, a chemical analysis of corroded coils can identify the presence of corrosive agents.

Carrier has thoroughly inspected its manufacturing processes, materials and environment, including all oils and lubricants, to ensure corrosive agents are not present in the production environment.

The evidence suggests the home environment is the primary contributor to coil corrosion. The trend in home construction is to improve energy efficiency by making homes "tighter." This decreased ventilation results in higher concentration levels of indoor contaminants.

**The evidence suggests  
the home environment is the primary  
contributor to coil corrosion.**

### Research Study

A year 2000 study was conducted to measure the volatile organic compound concentrations and emission rates in new manufactured and site-built houses.<sup>8</sup> The E.O. Lawrence Berkeley National Laboratory performed this research with the support of the U.S. Department of Energy.

This study shows that many materials used in the construction of new houses emit VOCs, including formaldehyde. Plywood, engineered wood products such as flooring and cabinetry, latex paint, and sheet vinyl flooring have been identified as major sources for these compounds. Measurements of acetic acid, formaldehyde, and acetaldehyde concentrations taken inside homes in this study were significantly higher than levels measured outside the homes. These elevated emission rates were seen to persist over a period of at least nine months while these homes were being studied. In fact, the measured levels of acetic acid increased during the study.

There are many possible sources of organic acids, which are volatile organic compounds (VOCs), in both the coil application (i.e. the home) and coil production environment. The most common organic acids are formic and acetic acids. Formaldehyde can be converted to formic acid and then to formate in moisture. Acetic acid is converted to acetate in water. All of these compounds are aggressive to copper, resulting in the ant's nest corrosion footprint.

Common household sources that may contain formic acid, formaldehyde, or formate include:<sup>17</sup>

- Building materials
  - Adhesives
  - Cabinets
  - Carpets
  - Countertops
  - Foam insulation
  - Laminates
- Tobacco and wood smoke
  - Paints (latex and oil based)
  - Paneling
  - Particle boards
  - Plywood
- Cosmetics
- Disinfectants and deodorizers

Typical household sources of acetic acid or acetate include:<sup>17</sup>

- Building materials
  - Adhesives
  - Cabinets
  - Carpets
  - Countertops
  - Foam insulation
  - Laminates
  - Paints (oil based)
- Vinegar
  - Paneling
  - Particle boards
  - Plywood
  - Silicone caulking
  - Wallboard
  - Wallpaper
- Cleaning solvents

There are three conditions required for formicary corrosion to occur:<sup>7</sup>

- The presence of oxygen
- The presence of a chemically corrosive agent (organic acid)
- The presence of moisture

If multiple corrosive agents are present, the result will be multiple corrosion footprints, as depicted in Fig. 1 (page 3), which shows both general pitting and formicary corrosion.

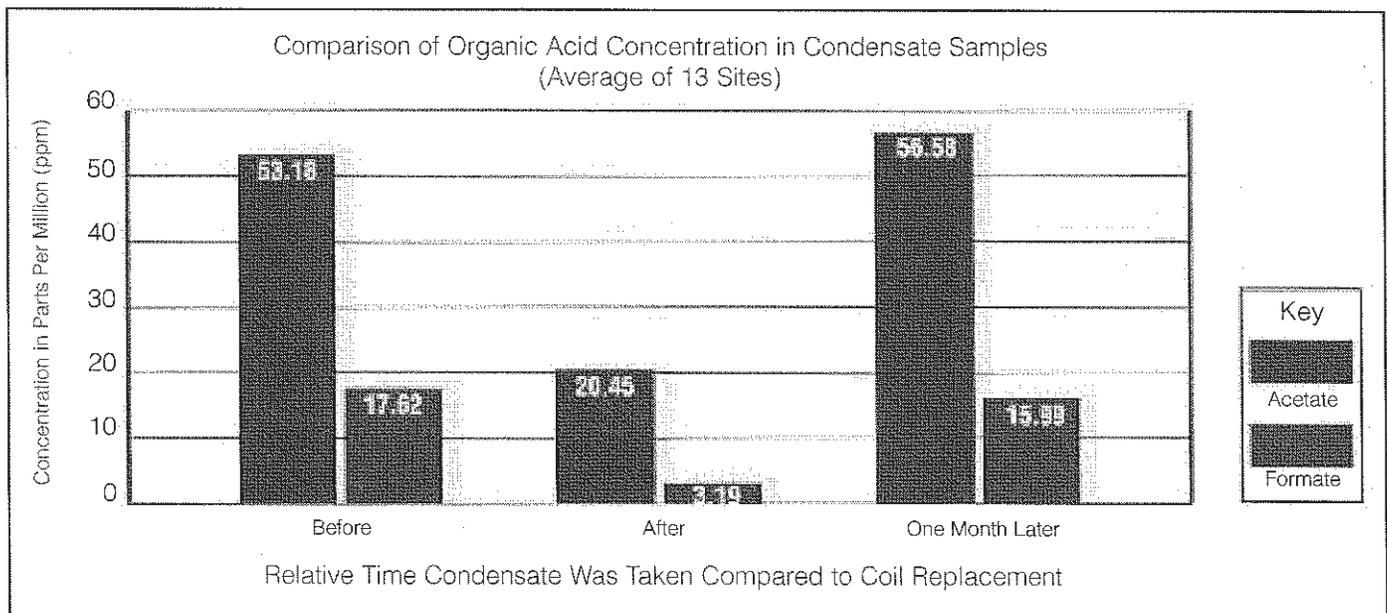
Another study specifically investigated the emission rates of wooden products in test chambers.<sup>9</sup> This testing supports the theory that wood is a source of organic acids, especially formic and acetic acids.

In addition, building materials, including woods and furniture, are generally the main sources of volatile organic compounds in the indoor environment.

### Condensate Analysis

As part of Carrier's efforts to research this problem, coil condensate sampling was performed at coil failure sites. The analysis of these samples confirmed the presence of significant levels of formate and acetate in the household environments in which the corroded coils were installed. These samples were collected just prior to coil replacement and immediately after the coils were replaced. Additional samples were then taken at some sites during follow-up assessments a month later.

The following chart shows the average trend of acetate and formate levels from 13 sites located in the Houston, Mobile, St. Louis, Indianapolis and Memphis areas. The levels are elevated prior to coil replacement. When condensate is drawn immediately from the new coil, the levels decrease dramatically. Finally, after a short period of operation, the levels return to previously elevated levels. These measurements are also an indication that the corrosive agents are not tied to the new replacement coils because the condensate samples drawn directly off the new coils show decreased levels of acetate and formate. After the coil has been installed for a period of time, the levels of these agents once again reflect the operating environment of the coil.



## The Carrier® Solution

Today, Carrier is proud to offer aluminum coils designed to resist the effects of formicary corrosion as well as many other forms of coil corrosion. As with virtually all of our products, these coils are backed with our 10-year parts limited warranty. Carrier was the first HVAC manufacturer to deliver an acceptable solution to the indoor copper coil corrosion issue, providing yet another example of our industry leadership in developing indoor comfort technology.

Our aluminum evaporator coil is significantly more resistant than traditional copper and equal to tin-plated coils to corrosive agents found in the home that cause formicary corrosion.

Aluminum coils provide enhanced durability and reliability:

- Testing to ensure durability and reliability: Running coils through more than 44,000 cooling cycles and over 2.5 years of accelerated corrosion testing
- Burst testing up to 2100 psi
- Each coil is leak checked in a helium leak chamber, allowing the detection of leaks as small as 0.1 ounces per year, prior to leaving the factory
- Aluminum to copper transitions are designed to resist corrosion attacks through the selection of specific alloys for fillers, joint geometry and location. Transition joints are also fatigue tested over 250,000 times with hydraulic fluids and jar tested in mixed acids as determined from 1,000 condensate samples from across the country to ensure their durability and reliability

Advantages of aluminum coils include:

- Aluminum protects against formicary as well as various other types of corrosion, preventing rusty tube sheets and pinhole leaks, while providing comfort and peace of mind to the homeowner
- The selection of tube enhancements matching current tube performance allows Carrier to maintain the same dimensions and performance of current copper and tin-plated copper coils
- Aluminum to Copper transition of the suction and liquid lines mean the installer will braze copper to copper in the field using standard procedures

- Each coil is tested with pressurized helium allowing the detection of leaks as small as 0.1 ounces per year prior to leaving the factory
- Aluminum coils are easier to handle and transport because they weigh less than copper coils
- Aluminum coils are being phased in throughout our product line with sizing for virtually all new and existing Carrier installations
- Ten-year warranty provides added value in areas not affected specifically by formicary corrosion

## Conclusions

There is increasing evidence linking the primary cause of indoor coil leak failures to agents present in the household environment. Significant levels of corrosive agents known to cause these failures have been quantified in indoor condensate sampling. The trend toward decreased home ventilation rates likely contributes to the elevated levels of indoor contaminants.

Carrier has conducted extensive field and laboratory testing and research efforts to identify an effective method of preventing coil failures caused by agents in the household environment.

## The IAQ Solution

As a part of a total home defense against formicary corrosion, you can also recommend Carrier fresh air ventilators. A properly matched Carrier HRV or ERV will help minimize the opportunity for formicary corrosion to develop by continually exhausting stale, indoor air and its potentially corrosive agents outside. At the same time, the customer will enjoy the benefits of a consistent infusion of fresh, outdoor air into the home.

## A Complete Line of New and Replacement Coils

Carrier offers a comprehensive family of Performance™ series aluminum evaporator coils for split-system residential and RCD. In addition to models that match our current product line, we offer replacement coils for systems currently in the field.

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## Fight Formicary Corrosion

*By Peter Elliott Corrosion & Materials Consultancy, Inc.*

This little understood type of corrosion can quickly pit copper heat-transfer surfaces.

Formicary, or ant's nest, corrosion is a little known phenomenon except to those who have experienced it first hand. It may best be described as micro-pitting in that the surface pits generally are so fine that they cannot be seen by the unaided eye. The first realization of a problem usually comes too late - in the form of a leaking tube.

More instances of formicary corrosion have been recorded during the past ten years than ever before. This reflects investigators' greater awareness of the phenomenon; prior cases probably were blamed on other causes. Attack has been attributed to the growing use of synthetic lubricating oils that were introduced as refrigerant fluids changed some years ago, or to vaporous species derived from the immediate surroundings, including volatiles from process fluids or from woods used in building materials.

This type of corrosion most commonly appears in copper tubing in air conditioning and refrigeration equipment and has been reported in heat pumps. It, however, also can occur in process equipment, including heat exchangers, coolant piping, freezers, commercial chiller units, water-cooled boilers and fuel-cell heat exchangers.

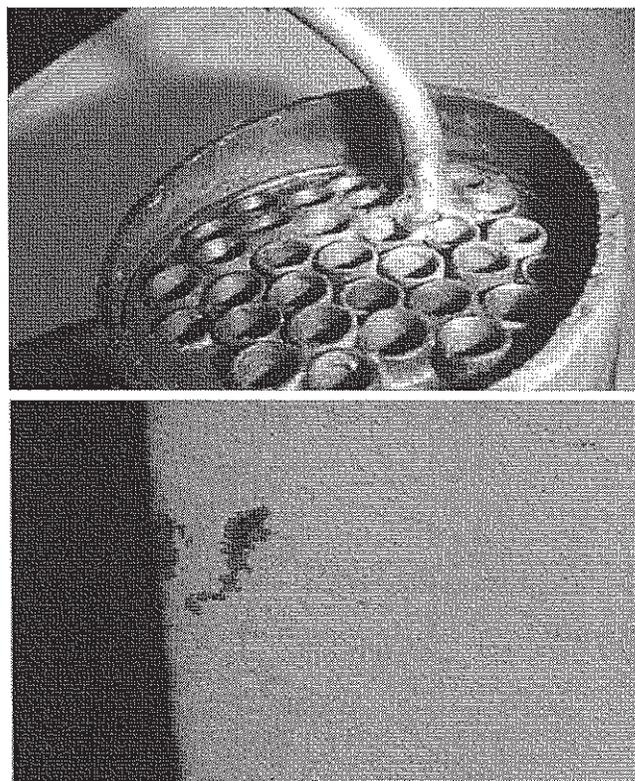
The time to failure can be as short as weeks, not years. For instance, the 3/16-inch diameter copper refrigerated heat exchanger bundle shown in Figure 1 leaked within weeks; formicary attack was found in similar unused units.<sup>1</sup>

Damage most commonly appears in copper tubing but alloys may also be susceptible to attack. At least one case of formicary corrosion has been reported in a commercial

heat exchanger made with cupronickel tubes. Selected metallurgical sections do not always show complete penetration because formicary "tunnels" are so fine that they may be ground away in preparing the section. There are no reported cases of formicary attack in other metals.

Damage typically is found in shielded areas (crevices) in closed heat exchanger bundles or between copper tubing and aluminum fins in heating/ventilation/air-conditioning (HVAC) systems. Formicary corrosion occurs when

**Figure 1. Formicary corrosion occurred within eight weeks of service, with localized micro-pitting "tunnels" advancing into the copper tubing (unetched section, 500X magnification).**



## Fight Formicary Corrosion *Continued*

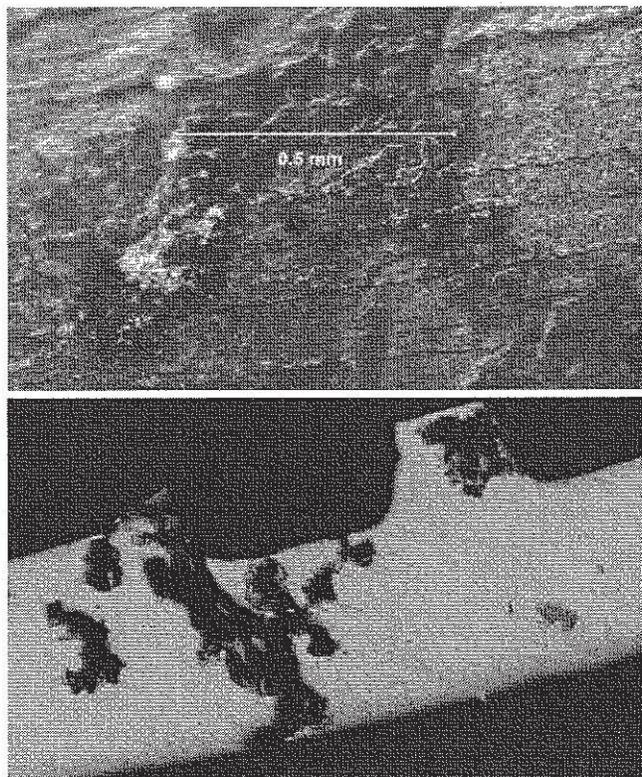
air, moisture and certain organic compounds are present, with crevices the most likely sites for attack to initiate and propagate. Crevices favor corrosion processes because attack probably is exacerbated by differences in oxygen concentration (differential aeration). Access to evaluate attack generally is hindered by the heat exchanger or coil geometry; helium-sensing devices are useful to locate pinhole leaks.

Formicary pits in copper are miniscule as shown in Figure 2a compared with those caused by aqueous solutions containing chlorides. The latter pits are easy to see and may show copper corrosion products. By contrast, the copper surface adjacent to a formicary pit typically is discolored with surface films of various hues from purple/red-brown to dark gray.<sup>1-3</sup>

### The Sources

Formicary corrosion pits form when certain residual organic compounds degrade in the presence of air and moisture to produce carboxylic acids such as formic and acetic acid. Chemical sources of formicary corrosion include chlorinated organic compounds

Figure 2. Copper tubing exhibits (a) surface pit on its inside diameter and (b) through-wall formicary "tunnels" (125X magnification).



(trichloroethane, trichloroethylene, etc.) or hydrolysis products from the decomposition of, for example, esters or aldehydes and alcohols. Sources of corrodent include synthetic lubricating oils used for forming and joining copper tubes, degreasers and detergent cleaners, inhibited antifreeze solutions, brazing or soldering fluxes, volatile substances from building materials (e.g., in woods used in roof spaces subject to seasonal high humidity), foods and food processing (such as vinegar, vegetable oil dressings and liquid smoke), certain adhesives and some insulation barriers.

Attack starts at some local discontinuity on the metal surface, such as a defect or small scratch in the surface oxide or metal; the process continues as a self-propagating randomly distributed pattern of "tunnels" that may ultimately penetrate through the metal section as shown in Figure 2b. The term "ant's nest corrosion" stems from the similarity of the morphology to an ant's nest.

Stagnant shielded conditions such as crevices in assembled coils favor the onset of formicary corrosion. Clean and dry surfaces will be free from formicary attack; local stresses in the metal and grain size may contribute to attack.

The role, if any, of bacterial corrosion in formicary attack is not clear. In general, micro-organisms do not grow prolifically on copper. However, some organisms in stagnant conditions can oxidize carbon sources to carbon dioxide and water to obtain energy through a tricarboxylic acid cycle that produces carbon compounds. If the tricarboxylic acid cycle is not completed, organic acids (predominantly citric acid) are released into the environment. It is not known if these acids contribute to formicary corrosion.

It generally is agreed that formicary corrosion requires the presence of a low-molecular-weight organic compound, as well as air and moisture. Removing any of these should eliminate the problem.

## Fight Formicary Corrosion *Continued*

### Control Measures

It generally is agreed that formicary corrosion requires the presence of a low-molecular-weight organic compound, as well as air and moisture. Removing any of these should eliminate the problem.

Formicary corrosion attack increases at higher temperatures, especially if the corrodent source (organic compound) is thermally degraded to yield a carboxylic species. In laboratory tests, suspect fluids generally are hydrolyzed (refluxed at about 105 °C for 48 hours) before aqueous extracts are analyzed for carboxylic species.<sup>4</sup> Selecting substances with low carboxylic content (typically below about 20 mg/L for the as-hydrolyzed products) should minimize or eliminate the problem in service. For more confidence in the anticipated service performance, conduct additional long-time (up to three months) testing of the copper tube with vapors of the candidate fluid or substances that are present on the surfaces of the subject component, with metallurgical evaluation of the metal section after testing.

Despite better understanding of formicary corrosion, effective and economic cures are still lacking. Research

Success in dealing with formicary attack, like many other forms of corrosion, depends upon awareness - with control, rather than elimination, the realistic goal.

that started in Japan<sup>3</sup> has continued to gain momentum worldwide as the phenomenon has garnered more recognition. The most recent comprehensive study, directed towards a screening test for formicary corrosion, was supported by the Air Conditioning and Refrigeration Technology Institute.<sup>4</sup> Palliative measures under consideration include the use of lubricating fluids with lower carboxylic content, hydrophobic coatings that reduce the effects of humidity and more-corrosion-resistant alloys.

Success in dealing with formicary attack, like many other forms of corrosion, depends upon awareness - with control, rather than elimination, the realistic goal. \*

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# LENNOX QUALITY CARE PROGRAM EQUIPMENT LIMITED WARRANTY

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## FAILURE TO MAINTAIN YOUR EQUIPMENT WILL VOID THIS WARRANTY.

### COVERED EQUIPMENT

The following Lennox heating and cooling equipment is covered by this Limited Warranty:

**Gas Furnaces:** G40DF, G40UH, G41UF, G43UF.

**Unit/Duct Heaters:** LF24 and TUA (30,000 to 75,000 btuh units).

**Electric Heat Sections:** ECB26.

**Condensing Units:** 10ACC, 10ACE, 13ACC, 13ACD, 13ACX, 14ACX.

**Heat Pump - Outdoor Units:** 10HPB, 12HPB, 13HPD, 13HPX, 14HPX.  
Coil: CR33.

### FIVE (5) YEAR COVERAGE -- RESIDENTIAL APPLICATIONS

The covered equipment and covered components are warranted by Lennox for a period of five (5) years from the date of the original unit installation, when installed in a "Residential Application." (A Residential Application is a single-family dwelling which includes homes, duplexes, apartments and condominiums.) If, during this period, a covered component fails because of a manufacturing defect, Lennox will provide a free replacement component to the owner through a Lennox dealer or other licensed service contractor. The owner must pay shipping charges and all other costs of warranty service.

### ONE (1) YEAR COVERAGE -- NON-RESIDENTIAL APPLICATIONS

Covered equipment and covered components are warranted by Lennox for a period of one (1) year from the date of the original unit installation when installed in a "Non-Residential Application." (Non-Residential Applications include all properties which were not defined as Residential Applications in the definition above.) If, during this period, a covered component fails because of a manufacturing defect, Lennox will provide a free replacement component to the owner through a Lennox dealer or other licensed service contractor. The owner must pay shipping charges and all other costs of warranty service.

### EXTENDED COVERAGE

This Lennox limited warranty provides extended coverage on the components outlined below. The extended warranty coverage begins with the date

of the original unit installation and represents the total warranty period for the specific component.

**Heat Exchangers:** G40DF, G40UH, G41UF, G43UF -- Twenty (20) years-- Residential Applications.

LF24, TUA (Aluminized) -- All applications) -- Ten (10) years.  
LF24, TUA (Stainless) -- All applications) -- Fifteen (15) years.

**Heat Exchangers:** G40DF, G40UH, G41UF, G43UF -- Ten (10) years -- Non-Residential Applications.

**Compressors:** 10ACC, 10ACE, 13ACC, 13ACD, 13ACX, 14ACX, 10HPB, 12HPB, 13HPD, 13HPX, 14HPX Units Installed in Non-Residential Applications -- Five (5) years.

**NOTE - If the date of original installation cannot be verified, the warranty period will be deemed to begin six (6) months after the date of manufacture.**

### COMPONENT AVAILABILITY

In the event that a component covered by this warranty is no longer available, Lennox will, at its option, provide a free suitable substitute component or allow the owner to purchase an equivalent new Lennox unit at a reduced price of 20 percent of the Lennox list price in effect on the date of the failure. The owner must pay shipping charges and all other costs of warranty service.

### EXCLUDED COMPONENTS

The following components are not covered by this warranty: cabinets, cabinet pieces, air filters, driers, refrigerant, refrigerant line sets, wiring, fuses and unit accessories.

### REPAIRS

All repairs of covered components must be made with authorized service parts by a licensed professional service contractor (or equivalent).

### CARE OF EQUIPMENT

This new Lennox unit must be properly installed, operated and maintained by a licensed professional installer (or equivalent) or service agency in accordance with the unit installation, operation and maintenance instructions provided with each Lennox unit. Failure to provide maintenance per Lennox instructions will void this warranty. The owner may be asked to provide written documentation of annual and other periodic preventive maintenance.

**WARRANTY PROCEDURE**

When warranty parts are required:

- 1 - Be prepared to furnish the following information:
  - a - Complete model and serial number.
  - b - Proof of required periodic maintenance, installation date and location.
  - c - An accurate description of the problem.
- 2 - Call a local Lennox dealer or contractor.
- 3 - If the installing dealer is unable to provide warranty parts, check the yellow pages for another Lennox dealer in the area. Refer to the Lennox Industries Inc. website at [www.lennox.com](http://www.lennox.com) to locate a dealer in the area, or contact:
  - Lennox Industries, Inc.
  - P.O. Box 7999900
  - Dallas, TX 75379-9900
  - 1-800-9LENNOX (1-800-953-6669)

**WARRANTY LIMITATIONS**

- 1 - Lennox will not pay labor involved in diagnostic calls, or in removing, repairing, servicing, or replacing parts. Such costs may be covered by a separate warranty provided by the installing contractor.
- 2 - This warranty is void if the covered equipment is removed from the original installation site.
- 3 - This warranty does not cover damage or defect resulting from:
  - a - Flood, wind, fire, lightning, mold, or installation and operation in a corrosive atmosphere, or otherwise in contact with corrosive materials (including chlorine, fluorine, salt, recycled waste water, urine, fertilizers, or other damaging substances or chemicals).
  - b - Accident, or neglect or unreasonable use or operation of the equipment, including operation of electrical equipment at voltages other than the range specified on the unit nameplate (includes damages caused by brownouts).
  - c - Modification, change or alteration of the equipment, except as directed in writing by Lennox.
  - d - Operation with system components (indoor unit, outdoor unit and refrigerant control devices) which do not match or meet the specifications recommended by Lennox.

- e - Operation of furnaces with return air temperatures of less than 60°F (16°C) or operation of a furnace field installed downstream from a cooling coil.
- f - Operation of a system containing R410A refrigerant without the required filter drier. All systems containing R410A refrigerant must include a filter drier. The filter drier must be replaced when compressor replacement is necessary.
- g - Use of contaminated or alternate refrigerant.

The installation of replacement parts under the terms of this warranty does not extend the original warranty period.

Lennox makes no express warranties other than the warranty specified above. All implied warranties, including the implied warranties of merchantability and fitness for a particular purpose, are excluded to the extent legally permissible. Should such exclusion or limitation of the warranty be unenforceable, such implied warranties are in any event limited to a period of one (1) year. Liability for incidental and consequential damages is excluded. Some states do not allow limitations on the duration of an implied warranty or the exclusion or limitation of incidental or consequential damages, so the limitations or exclusions may not apply to the owner.

Lennox will not pay electricity or fuel costs, or increases in electricity or fuel costs, for any reason whatsoever, including additional or unusual use of supplemental electric heat. This warranty does not cover lodging expenses.

Lennox shall not be liable for any default or delay in performance under this warranty caused by any contingency beyond its control.

This warranty gives the owner specific legal rights, and the owner may also have other rights which vary from state to state.

**NOTE TO CUSTOMER**

Please complete information below and retain this warranty for your records and future reference.

Unit Model Number: \_\_\_\_\_ Date: \_\_\_\_\_  
 Serial Number: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Installing Contractor: \_\_\_\_\_



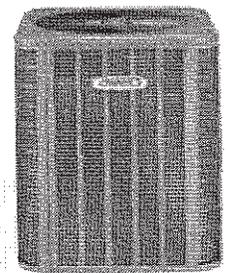
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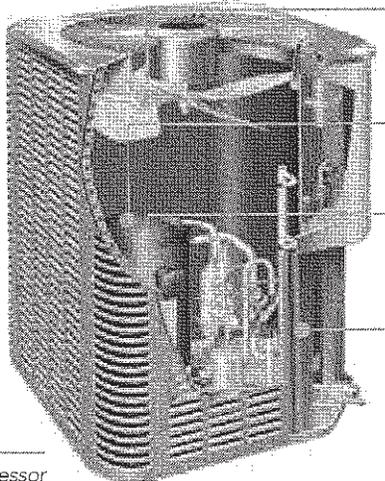
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### Built for lasting quality

Every component in the 13ACX is designed for exceptional durability and easy maintenance year after year. Every unit is built solid inside and out and thoroughly tested before leaving the factory. And once it's installed, Lennox' industry-leading warranty coverage adds another layer of protection for your investment.

### Efficient, economical cooling



**Direct-Drive Fan** – Precision-balanced direct-drive outdoor fan is designed to provide quieter operation and longer product life.

**Dependable Scroll Compressor** – Provides reliable and efficient operation.

**High-Efficiency Outdoor Coil** – Provides exceptional heat transfer and low air resistance for high-efficiency operation.

**PermaGuard™ Cabinet** – Heavy-gauge, galvanized steel construction, louver coil guard, baked-on powder finish and durable zinc-coated steel base provide long-lasting protection against rust and corrosion.

10-year limited warranty on the compressor and all remaining covered components.\*



13ACX meets or exceeds 13.00 SEER\*\*  
(Seasonal Energy Efficiency Ratio)

\*Online equipment registration at [www.lennoxregistration.com](http://www.lennoxregistration.com) is required within 60 days of installation (except in California and Quebec) or Lennox' base warranty will apply. Applies to residential applications only. See actual warranty certificate for details.

\*\*Actual system efficiency may vary depending on the exact system match. Efficiencies are representative of a single AHRI Most Popular matched combination. Always verify actual system efficiencies through AHRI or by visiting AHRI ratings database at [www.ahridirectory.org](http://www.ahridirectory.org).

### Merit® Series 13ACX Specifications

Model	018/024	030/036	042	048	060
Dimensions HxWxD (in)	25-1/4 x 24-1/4 x 24-1/4	29-1/4 x 24-1/4 x 24-1/4	29-1/4 x 28-1/4 x 28-1/4	33-1/4 x 28-1/4 x 28-1/4	29-1/4 x 28-1/4 x 28-1/4
HxWxD (mm)	641 x 616 x 616	743 x 616 x 616	743 x 718 x 718	845 x 718 x 718	743 x 718 x 718

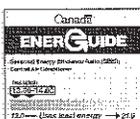
Note: Due to Lennox' ongoing commitment to quality, all specifications, ratings and dimensions are subject to change without notice.



Lennox is proud of the fact that these products have earned the Good Housekeeping Seal.



Proper sizing and installation of equipment is critical to achieve optimal performance. Split system air conditioners and heat pumps must be matched with appropriate coil components to meet ENERGY STAR® criteria. Ask your Lennox Dealer for details, or visit [www.energystar.gov](http://www.energystar.gov)



This NAHB Research Center Green Approved mark is your assurance that a product is eligible for points toward National Green Building Certification. Visit [www.GreenApprovedProducts.com](http://www.GreenApprovedProducts.com) for more details.



Innovation never felt so good.®

For a complete list of the registered and common law trademarks owned by Lennox Industries Inc., please visit [www.lennox.com](http://www.lennox.com).

## COMPLEX LITIGATION GROUP LLC

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January 8, 2014

### VIA ELECTRONIC MAIL

Lennox Industries, Inc.  
c/o Robert Elkin  
Mckool Smith, P.C.  
300 Crescent Court Suite 1500  
Dallas, TX 75201  
Email: [relkin@mckoolsmith.com](mailto:relkin@mckoolsmith.com)

**Re: *Notification and Pre-Lawsuit Demand Pursuant to California Civil Code §1782  
Concerning Defective Air Conditioners***

To Lennox Industries, Inc.:

Please be advised that this law office represents Thomas Davis (“Complainant”) in the above referenced matter. All further communications intended for my client must be directed through this office. Furthermore, this demand letter is meant to comply with the requirements of *California Civil Code* §1782 on behalf of Complainant.

Complainant purchased two Lennox Signature Collection 15GCSX air conditioner units on or about August, 2010 for use in his home in Indian Wells, California. On or about June 2013, one of Complainant’s units ceased cooling, and a service technician diagnosed the problem as a leaking coil. On information and belief, Complainant’s coil failed as a result of formicary corrosion. The coils Lennox Industries, Inc. uses in its air conditioners are uniquely susceptible to formicary corrosion because they are manufactured out of copper.

On or about August 16, 2013, Complainant contacted you and explained the situation, at which time you denied there was a problem with the coil. On or about September 6, 2013, Complainant had the coil replaced in his unit at a cost of \$2,200.00.

Lennox Industries, Inc  
January 8, 2014  
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Despite being aware of the susceptibility of copper coils to formicary corrosion, the increasing incidence of formicary corrosion, and the available remedies at your disposal, you continue to design and manufacture your air conditioners using copper evaporator coils. Further, you continue to fix failed coils with similarly defective coils and have failed to take any of the known steps that are available to reduce the susceptibility of the copper in your coils to formicary corrosion. These facts were not properly disclosed to consumers prior to their purchase of your air conditioners. As such, Complainant believes that this business practice violates California consumer protection statutes.

Complainant requests that Lennox Industries, Inc. remedy this situation on a class-wide basis by providing restitution to all consumers who own Lennox air conditioners containing copper coils. Additionally, Lennox should further cease its misleading practices in whatever context they occur.

Pursuant to California Civil Code §1782(a)(1), Complainant further provides notice that he believes Lennox Industries, Inc. has violated, and continues to violate, the Consumers Legal Remedies Act (“CLRA”), and specifically *California Civil Code* §1770, in at least the following respects:

- (1) §1770(a)(5) - representing that the air conditioners at issue have characteristics, uses and benefits which they do not have;
- (2) §1770(a)(7) - representing that the air conditioners at issue are of a particular standard, quality, or grade when they are of another; and
- (3) §1770(a)(9) – advertising goods with intent not to sell them as advertised.

Furthermore, pursuant to *California Civil Code* §1782(a)(2), this letter not only serves as notification of your alleged violations of §1770 as outlined above, but also Complainant’s demand for rectification of such violations on a class-wide basis. This letter also serves as the thirty (30) day notice and demand requirement under §1782 for damages. In other words, should Lennox Industries, Inc. continue to fail to rectify the situation on a class wide basis within thirty (30) days of receipt of this letter, Complainant will amend his complaint to request actual damages, plus punitive damages, interest, attorneys’ fees and costs for Lennox Industries, Inc.’s violations of *Civil Code* §1770. Thank you for your anticipated cooperation and we look forward to hearing from you at your earliest convenience.

Very truly yours,

s/Zachary A. Jacobs  
Zachary A. Jacobs