

**Second Edition**

# KITCHEN & BATH PRODUCTS and MATERIALS

Cabinetry • Equipment • Surfaces



Ellen Cheever, CMKBD, ASID, CAPS



**KITCHEN & BATH**  
**PRODUCTS AND MATERIALS**



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MATERIALS**

Cabinetry, Equipment, Surfaces

*Second Edition*

ELLEN CHEEVER, CMKBD, ASID, CAPS

**WILEY**

**NKBA**<sup>®</sup>  
National Kitchen & Bath Association

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National Kitchen & Bath Association  
687 Willow Grove Street  
Hackettstown, NJ 07840  
Phone: 800-THE-NKBA (800-843-6522)  
Fax: 908-852-1695  
Website: NKBA.org

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# About the National Kitchen & Bath Association

The National Kitchen & Bath Association (NKBA) is the only nonprofit trade association dedicated exclusively to the kitchen and bath industry and is the leading source of information and education for professionals in the field. Fifty years after its inception, the NKBA has a membership of more than 55,000 and is the proud owner of the Kitchen & Bath Industry Show (KBIS).

The NKBA's mission is to enhance member success and excellence, promote professionalism and ethical business practices, and provide leadership and direction for the kitchen and bath industry worldwide.

The NKBA has pioneered innovative industry research, developed effective business management tools, and set groundbreaking design standards for safe, functional, and comfortable kitchens and baths.

Recognized as the kitchen and bath industry's leader in learning and professional development, the NKBA offers professionals of all levels of experience essential reference materials, conferences, virtual learning opportunities, marketing assistance, design competitions, consumer referrals, internships, and opportunities to serve in leadership positions.

The NKBA's internationally recognized certification program provides professionals the opportunity to demonstrate knowledge and excellence as Associate Kitchen & Bath Designer (AKBD), Certified Kitchen Designer (CKD), Certified Bath Designer (CBD), and Certified Master Kitchen & Bath Designer (CMKBD).

For students entering the industry, the NKBA offers Accredited and Supported Programs, which provide NKBA-approved curriculum at more than 55 learning institutions throughout the United States and Canada.

For consumers, the NKBA showcases award-winning designs and provides information on remodeling, green design, safety, and more at [NKBA.org](http://NKBA.org). The NKBA Pro Search tool helps consumers locate kitchen and bath professionals in their area.

The NKBA offers membership in 11 different industry segments: dealers, designers, manufacturers and suppliers, multi-branch retailers and home centers, decorative plumbing and hardware, manufacturer's representatives, builders and remodelers, installers, fabricators, cabinet shops, and distributors. For more information, visit [NKBA.org](http://NKBA.org).



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# Preface

A key ingredient in any successful new kitchen or bathroom project is the right match between the client's dreams, the project budget, the construction of the dwelling and the materials, equipment, and surfaces specified by the design professional.

New manufacturing methods, engineering innovations, and technological advancements continually impact the materials, equipment, and surfaces available to kitchen and bathroom planners. Therefore, a book on products for residential kitchens and bathrooms must be updated periodically. This is what the National Kitchen & Bath Association (NKBA) has undertaken in conjunction with John Wiley & Sons, Inc., in the second edition of this volume.

In this revised edition, we have maintained the organization found in the original edition. Seven major chapters cover the choices available to professionals.

Chapter 1 details the kitchen and bathroom cabinet industry. In addition to identifying cabinet manufacturing systems, extensive information has been added detailing storage systems integrated into cabinet interiors. This information extends beyond kitchen ideas and includes storage systems for entertainment and refreshment areas, utility rooms, and home offices.

New information about cabinet case construction materials is highlighted. Information about working veneers has been expanded as well. The Kitchen Cabinet Manufacturers Association (KCMA) Responsible Resource Management Program and the association's Certification Program are detailed.

We have included a review of cabinet manufacturers' imperial (inches/feet) and metric (millimeters/centimeters) dimensioning systems. While this information is useful, we recommend designers work closely with their chosen manufacturer to understand the cabinet sizing system the specific supplier has embraced.

Chapter 2 details appliance types and planning considerations. New information has been added to explain new heat transference methods, and point-of-use specialized appliances. Because of major innovations taking place within the ventilation category of appliances, extensive material has been added about this topic as well.

Chapter 3 covers fixture materials. In addition to new materials being used for kitchen sinks, bathroom lavatories, and other bathroom fixtures, construction and fabrication information, and ideas about how and where to use new materials are a part of this second edition.

Chapter 4 covers fixture design and planning considerations. Information has been added in the section covering new engineering technologies that have dramatically improved water

usage of kitchen and bathroom fixtures. Additionally, extensive new graphics have been added to demonstrate the product choices available today.

In Chapter 5, the topics of fitting materials and engineering are covered. New information about fashionable finishes for faucetry has been highlighted. Hands-free methods of operations for faucets are explained as well.

Chapter 6 covers bathroom fitting design and engineering. Water conservation is, once again, an important topic covered in this section. The technology behind new showering fixtures is included.

Chapter 7, our final chapter, focuses on surface materials. Expanded details about domestic and imported ceramic and porcelain products are discussed. New materials are explained: concrete and glass, for example. The information on laminate surfaces now includes a discussion of the new high-definition finishes.

The overall volume is written to help new designers begin their professional path as well as to provide a resource for experienced designers interested in updating their existing knowledge about newly launched products or products recently reengineered.

Designers are encouraged to reference additional information through the resources available on the Internet. Because of the ever-changing landscape of materials, products, and surfaces available, time set aside for purposeful research should be a weekly exercise for the design professional.

We hope the material in this volume assists designers as they creatively lay out a kitchen or bathroom solution and begin the selection and specification tasks of recommending the materials, equipment, surfaces, and the products necessary to transform a beautiful drawing into a hardworking kitchen or restful and relaxing bathroom space.

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The author wishes to also recognize several professional colleagues whose contributions made this book possible.

When I published my first book in 1978, *Beyond the Basics: Advanced Kitchen Design*, I began my acknowledgments by saying, "The creation of this book is the result of the cooperation and contributions of many talented people." Some 36 years later as I complete this volume, I feel the same sentence is appropriate.

It would not have been possible for me to complete this work without the help of my team; they deserve a special expression of gratitude and recognition. Thank you for helping me write this book and for being my friends.

Cathy Snyder has served as my associate for 25 years. She has transcribed, edited, and proofed every sentence I have ever written over all those years. Additionally, she has managed my office and organized my activities.

Karen Dorion, CKD, has transformed my design concepts into accurate drawings for the past 20 odd years as well. I dream, she creates. From training program diagrams, to project documents Karen has ensured accuracy in my work.

Pete Giorgi, CMKBD, and the Giorgi Kitchens and Designers management team has given me an opportunity to continue to practice as a residential kitchen and bath designer. This work has helped me maintain a real-world practical approach in my writing and teaching endeavors.

One last person I would also like to recognize and thank is Johanna Baars. As the NKBA publications specialist, she has been responsible for managing this massive project from concept to reality. It has been a pleasure to work with such a talented, organized, and pleasant professional.



# Cabinetry



One of the largest components of a residential kitchen or bathroom is the storage system planned for the space. An organized storage area is also important in laundry rooms, hobby centers, home offices, closets, and dressing rooms.

*Learning Objective 1: Describe the differences between frame and frameless cabinetry as it relates to case construction material and sizing differences.*

*Learning Objective 2: Recognize some of the sources offering interior storage systems.*

*Learning Objective 3: Explain the difference between cabinet doors or fronts constructed from solid woods versus veneer surfacing materials.*

*Learning Objective 4: Provide a comprehensive listing of planning concerns when working with vendors.*

*Learning Objective 5: Outline the key categories of the KCMA Certification Program process and the KCMA Environmental Stewardship Program.*

*Learning Objective 6: Identify typical cabinet configurations and available sizing for kitchens, bathrooms, and other home storage centers.*

Design professionals in the kitchen and bathroom industry may be representatives of specific manufactured cabinet companies or may have a referral relationship with area showrooms that represent different cabinet companies. Some design professionals, known as *independent kitchen designers*, do not align themselves with any specific cabinet company. They develop plans based on generic cabinet specifications and then invite their clients to source products from kitchen dealerships representing large manufacturing companies or smaller local manufactured cabinetry.

Within the cabinet industry, broad categories are used to identify the configuration of the cabinet, the availability of custom sizing, the sophistication of interior cabinet accessory systems, and the variety of finishes and architectural accouterments offered by the producer.

In North America, kitchen cabinets historically were built by local cabinet or woodworking shops and were created for each project. Today, a great majority of kitchen cabinet systems is produced in highly sophisticated manufacturing facilities, both in North America and internationally. There are sizing differences between cabinets built in the United States and those built in Canada and internationally.

As a design professional, you may work for a retail organization representing specific cabinet manufacturers or directly for a cabinet manufacturer or distributor. You may work for a company that actually fabricates cabinets in a woodworking shop. Or you may be familiar with cabinets in general sense but focus your work on creating a generic space plan.

Regardless of how you interact with the cabinet source, it is important that you are familiar with:

- How the cabinets are built
- The functional hardware available for various cabinet components
- The special-purpose storage systems integrated inside cabinetry
- Materials used on the exterior of the cabinetry
- Door and front styles typically offered by manufacturers
- The industry's efforts to responsibly manage these resources

## CABINET TYPES

Regardless of the type of business you are affiliated with, in North America cabinet specifiers work with four broad categories. Within each of these, the quality levels, production costs, retail selling price, delivery schedules, and reliability factors vary. The following stock, semi-custom, custom, and millwork cabinetry definitions apply to the United States. (What is called a semi-custom cabinet in the United States is called a custom cabinet in the international community.)

### Stock

Stock cabinet manufacturers offer a full range of cabinets in specified sizes designed to meet the needs of most consumers at a cost-effective price. They offer the most popular door styles, finishes, and accessories with limited modifications, and the cabinets may be in stock at cabinet distributors, home centers, and lumberyards. Because stock cabinets are produced in quantity, the cabinet manufacturers cannot stop their assembly lines for special units; therefore, their catalogs generally reflect the entire product offering.

This type of manufacturing method provides the specifier good value because of the economies of manufacturing. The biggest advantages of stock cabinetry are its availability, specified quality level, and consistency of service from large, stable manufacturers. Stock cabinets offer an excellent product for a project that has budget or time constraints. Because styles and special sizes are limited, you should investigate the breadth of the line before designing with the product.

However, designers need not forgo creative cabinet design when using stock cabinets. Once you are familiar with the line, consider adapting specific case types to usage ideas appropriate for the project you are working on. For example, use wall cabinets as shallow base units by adding a toe-kick.

Stock cabinets do vary in quality levels. Some lines use doors of mismatched or lower-quality woods. They may use thin laminates or actual paper products to simulate wood on finished sides. The parts of the case may be glued together with no mechanical fasteners, which is not as durable a method of case construction as combining both glue and mechanical fasteners. Make sure you carefully compare the construction of the stock cabinets you are considering for the project you are designing. One line may be just right for a laundry room application, while a sturdier product may be required for the adjacent kitchen. The cabinets shown in Figure 1.1 are an example of stock cabinets.

### Semi-Custom

Semi-custom cabinets are produced by both stock and custom manufacturers. This type of product is produced on an assembly-line basis, but the offerings include more interior fittings



**FIGURE 1.1** A kitchen using stock cabinets  
 Courtesy of Wellborn Cabinet, Inc.

in the form of accessories and some custom cabinet size possibilities. Typically, a wider finish and style palette is offered as well.

This product combines the advantage of an assembly-line process with the ability to create limited custom cabinet sizes. Traditionally, semi-custom products also offer more door styles and finishes.

Semi-custom cabinets come in a wide variety of quality and price levels. Because they may be high on style but limited in their size offerings, review the manufacturer's catalog carefully before beginning the design process. The cabinets shown in Figure 1.2 are an example of semi-custom cabinets.



**FIGURE 1.2** A kitchen using semi-custom cabinets  
 Courtesy of Wellborn Cabinet, Inc.



**FIGURE 1.3** A kitchen using custom cabinets

Courtesy of Plain & Fancy Custom Cabinetry

International cabinet producers who focus on finely engineered specific styles—used to define their cabinet branding—neither recommend nor offer extensive customization. Therefore, the manufacturing definition of semi-custom defines their highest level of product offering.

## Custom

Custom cabinet manufacturers make one kitchen at a time. The cabinets are not produced until the kitchen has been designed and all details are finalized. Custom cabinets may be made by a local fabricator or in a large manufacturing facility. Generally, these manufacturers publish a specifications manual listing a range of specific cabinet sizes, but special sizes are available for a perfect fit. One-of-a-kind, handmade specialty pieces, such as mantel hoods, turned-wood posts, curved/angled cabinetry elements, and free-standing furniture pieces are also available.

These totally custom *built-to-order* cabinets are considered *furniture-grade* cabinet systems. The cabinets shown in Figure 1.3 are an example of custom cabinets. Manufacturers of such cabinets generally offer the latest in functional hardware, technology, construction methods, and case materials and the most extensive array of accessories available. These companies offer new, trendsetting styles and finishes to the market. Custom cabinets have a longer lead time than stock or semi-custom offerings. Much like custom furniture, an 8- to 20-week delivery time is to be expected.

## Millwork Cabinetry

Cabinetry defined as *millwork* is produced just as custom cabinets are. In addition, millwork companies produce their own panel stock as well as the cabinet door collection offered. This allows for grain that is more sophisticated and color matching throughout the kitchen exteriors and for additional paneling that may be used within the nonstorage sections of the room. The cabinetry pictured in Figure 1.4 is an example of millwork. The millwork house also may offer elaborately constructed custom furniture pieces that are assembled prior to finishing within the manufacturing facility and shipped as one entire piece.



**FIGURE 1.4** A kitchen using millwork cabinetry

*Design by Pietro A. Giorgi, Sr., CMKBD, and Ellen Cheever, CMKBD, ASID, CAPS, Giorgi Kitchens & Designs. Photo by Peter Leach*

## International Definitions of Kitchens

- Custom-made, English “bespoke” or “one-off” kitchen: A set of cabinets made specifically for one client or one project.
- Fitted kitchen: A set of cabinets sized and scribed to the room, allowing the cabinetry to become part of the woodwork of the house.
- Unfitted kitchen: A set of cabinets that are not scribed to the walls, ceiling, or floor of the room. Although they are secured to the wall for stability, they appear more like furniture than casework.

## RESPONSIBLE RESOURCE MANAGEMENT IN THE CABINET INDUSTRY

Because forests provide numerous environmental benefits, it is essential that we protect and sustain them. They moderate climate change, improve air quality, aid in water conservation, and preserve biodiversity. In order to maintain these benefits and ensure that forests meet long-term human needs, it is vital we practice sustainable forestry.

Sustainable forestry practices ensure that the resources removed from forests are at a level the forests are capable of renewing without damaging their future prosperity. Sustainable practices preserve the environment and valuable forest resources. In addition to sustainable forestry, most certification programs support selective harvesting.

Selective harvesting is the practice of periodically removing mature trees in order to allow young trees to grow. Trees that are near their death or have grown to an unproductive diameter can stunt younger trees from growing properly. By periodically harvesting

particular trees, forest regeneration is improved. Selective harvesting leads to a healthier forest, thus preserving the environment and the social benefits forests provide. This practice of selective harvesting is also referred to as “a managed forest” or “managing the forest.”

## From Forest to Cabinets: Protecting the Environment while Creating Beautiful Kitchens and Bathrooms

Within the global community, the United States is envied for its natural wood resources; according to the US Forest Service, approximately one-third of our nation’s land area is forestland. Canada is also a nation rich in wood natural resources.

Within North America, about one-third of all our forests are considered hardwood forests, with 90 percent of them located in the eastern United States. Hardwood trees require from 50 to 120 years to reach a harvestable size. Approximately 50 percent of the lumber produced is not useable for kitchen, bath, or other fitted room cabinetry because it contains characteristics not accepted in furniture.

In today’s foresting industry, managed forestlands are far more the norm than unmanaged lands. The industry is working feverishly to grow trees fast enough to be harvested to meet the demand for hardwoods while managing forests for future yield. The term “old growth” refers to large trees that have grown in natural forests. Smaller, younger trees are grown on farms specifically to be harvested for the furniture, cabinetry, and building industries.

What does managed forestry mean to the kitchen or bathroom designer? From a design standpoint, logs harvested from managed forests can have a different appearance than those from *old-growth* logs. Therefore, it is almost impossible to create new cabinetry that has the same aesthetic as antique furniture. The width of wood planks available today and the acceptability of certain wood characteristics have changed. Equally if not more important is the fact that the lack of oversight in the harvesting of veneers and wood products elsewhere in the world have led conservationists to develop certifications attesting to the responsible resource management of all types of wood producers: notably, cabinet manufacturers. Responsible designers specify products that have recognized certification.

### Certified Wood

Over 50 certification programs worldwide address the many types of forests around the world. In addition to both US and Canadian government programs, two important certification programs specifically relate to kitchen cabinetry: the Forest Stewardship Council (FSC) and the Environmental Stewardship Program (ESP) managed by the Kitchen Cabinet Manufacturers Association (KCMA).

For the purposes of this volume on kitchen and bathroom materials, we focus on the KCMA ESP. Additional information can be gathered at [www.kcma.org](http://www.kcma.org) as well as KCMA’s website, [www.GreenCabinetSource.org](http://www.GreenCabinetSource.org).

### KCMA Environmental Stewardship Program

In all categories of materials for residential kitchens, there are products that are considered green. The KCMA developed the Environmental Stewardship Program (ESP), which holds the cabinet industry to higher standards than other environmental programs because of its holistic approach to manufacturing, examining the process from growth and harvesting of raw materials to manufacturing the end product (see Figure 1.5).



**FIGURE 1.5** Kitchen Cabinet Manufacturers Association Environmental Stewardship Program

Since the program's inception in 2006, the ESP certification requirements have been based on currently attainable materials and have been amended as new, improved materials became available. In January 2012 the criteria were changed to address formaldehyde emission limits.

The KCMA ESP takes a holistic approach to environmental stewardship, providing companies with tangible ways to support sustainability in areas of air quality, product resource management, process resource management, environmental stewardship, and community relations. The program is a point-based evaluation system, with companies qualifying for official ESP certification by accumulating 80 out of a possible 105 points in five categories. Full details of the program can be reviewed at [www.kcma.org/Professionals/Environmental\\_Stewardship\\_Program](http://www.kcma.org/Professionals/Environmental_Stewardship_Program).

## Responsible Resource Management Criteria

*Reprinted Courtesy of the Kitchen Cabinet Manufacturers Association*

Following is an overview of the responsible resource management criteria.

### **Air quality**

- Mandatory requirement: 100 percent of particleboard, medium-density fiberboard, and plywood used in the cabinets must meet the formaldehyde emission level of the California Air Resources Compwood ATCM [airborne toxic control measure] and must be third-party certified to meet low-formaldehyde-emission standards.
- 75 percent of cabinets must be finished in the United States or Canada. Finishes can emit no greater hazardous air pollutants than allowed by local plant operating permits.

### **Product resource management**

- 80 percent of particleboard and medium-density fiberboard used in cabinets must contain 100 percent recycled or recovered fiber content.
- Manufacturers earn points if they have kitchen cabinets that are also chain-of-custody (COC) certified through a recognized sustainable forestry program.
- Hardwoods, softwoods, and plywood purchased are COC certified through a recognized sustainable forestry program.
- Hardwood and softwood lumber are certified-sourcing certified through a recognized sustainable forestry program.
- Manufacturers utilize an annual, written training plan to educate their hardwood suppliers of their preference for purchasing certified lumber.

### **Process resource management**

- Manufacturer has a comprehensive recycling program for process wastes.
- Manufacturer has a program for tracking and reducing process wastes with documented goals and reports.
- Manufacturer uses processed byproducts to generate alternative energy.
- Manufacturer has a documented energy conservation program.

### **Environmental stewardship**

- Manufacturer is required to have a written policy stating a firm commitment to environmental quality.
- Manufacturer has an environmental management system.
- Manufacturer reviews environmental practices and policies of its key vendors and contractors.

(continued)

- Manufacturer has a documented program that promotes the use of renewable/recycled materials.

#### **Community relations**

- Manufacturer demonstrates community involvement and leadership through service or charitable organizations.
- Manufacturer observes all federal, state, and local environmental requirements.

**Mandatory requirement:** ESP participant agrees to report to KCMA within 60 days of any local, state, or federal citation in excess of \$50,000 per violation, explaining the circumstances of the citation or violation. Such citation or violation could lead to termination from the program.

Points are awarded for meeting each of these criteria. Manufacturers must earn at least 80 of a possible 105 points and must earn points from each category to be certified.

Available at [www.greencabinetsource.org/Learn\\_about\\_ESP/Certification\\_Requirements](http://www.greencabinetsource.org/Learn_about_ESP/Certification_Requirements)

### **Debate around the Dangers of Formaldehyde**

Both clients and designers are worried about the formaldehyde emission risk in cabinets manufactured outside the United States as well as within our borders. The ESP certification was updated in 2012, restricting materials to only those that had low-formaldehyde-emitting levels.

There are two general schools of thought regarding the danger of formaldehyde emissions.

- One group of experts believes that formaldehyde is a toxic material that should be eliminated. There are cabinet materials that are formaldehyde-free.
- A second group of experts believes that products can emit very low levels of formaldehyde and be considered safe for the vast majority of users.

KCMA has published the following informational overview of wood products and the emissions of formaldehyde.

## **WOOD & EMISSIONS**

*Wood products, such as those used in cabinets, can emit low amounts of formaldehyde*

Formaldehyde, a naturally occurring chemical present in human breath, is widely used. It has been studied extensively and is typically encountered in the home in low levels. Like many other chemicals, if encountered in high levels, it can have negative health effects. Most people have no reaction to low-level formaldehyde emissions, but a small percentage of the population has acute sensitivity to it and other chemicals.

All wood species, and therefore all wood products, contain and emit small amounts of formaldehyde. An oak tree, for example, emits 9 parts per billion (ppb) of formaldehyde. It follows that any wood cut from that oak tree also contains small amounts of formaldehyde, as do all wood products. Formaldehyde also is found naturally in a wide range of fruits, vegetables, mushrooms, seafood, meats, and coffee.

*(continued)*

All cabinetmakers use composite wood in the construction of cabinets. It is an essential material for industry products extending the yield from the harvest of trees, making cabinetry more affordable. Composite wood generally is made with small amounts of urea formaldehyde adhesives in order to achieve durability and performance expected by consumers in the difficult kitchen environment that varies exposure to extreme heat, cold, diverse cooking products (mustard, ketchup, alcohol, and the like), detergents, water and heavy usage.

### Action to Manage Formaldehyde Exposure in the Home

If you are among those with known sensitivities to formaldehyde, the US Department of Health and Human Services (HHS) recommends that consumers do the following to prevent exposure to formaldehyde:

1. Use lower-emitting pressed wood products, such as those that are labeled CARB (California Air Resources Board) compliant, or made with ultra-low-emitting formaldehyde (ULEF) or no-added formaldehyde (NAF). **Cabinets displaying the KCMA Environmental Stewardship Program (ESP) certification seal are required to use 100 percent CARB compliant pressed wood.** Beginning 2013, all pressed wood sold in the US must be CARB compliant. The CARB product emission standards are the lowest in the world.
2. Increase ventilation, particularly after bringing new sources of formaldehyde into the home. Open windows and use fans to bring in fresh air. The kitchen and bath generally already are the best ventilated rooms in a house with frequent air exchanges the norm.
3. Use air conditioning and dehumidifiers to maintain moderate temperature and reduce humidity levels.
4. Studies have shown that readily available laminated products are among the lowest emitters of formaldehyde.

**KCMA ESP certified cabinetry meets the HHS guidelines for managing formaldehyde exposure.** A recent study of formaldehyde by the National Academy of Sciences stated that the emission levels to which most consumers would be exposed are well below thresholds that would cause harm. This would include ESP certified cabinets.

From GreenCabinetSource.org, the website of the Kitchen Cabinet Manufacturers Association ([www.greencabinetsource.org/Manufacturing/Wood\\_and\\_Emissions](http://www.greencabinetsource.org/Manufacturing/Wood_and_Emissions))

Designers should base their specifications on the client's level of sensitivity to formaldehyde emissions and request for formaldehyde-free products. Designers also should take a proactive role in continuing their education around this important issue that faces our industry, staying abreast of new research and/or product innovations.

### KCMA CERTIFICATION PROGRAM

In addition to responsible resource management certification, KCMA has managed a Performance Testing and Certification Program for cabinet construction.

While many good-quality cabinets are not certified, in some markets and situations it is important to end users to have certified cabinets. Therefore, it is important for you as a

designer to be aware of the certification requirements for cabinet construction and durability. Cabinets and bathroom vanities bearing the KCMA Certification have met or exceeded the necessary requirements and are recommended by KCMA.

You should also be aware of the KCMA certification requirements (see “About the KCMA Certification Program”) so you can recommend cabinets that meet or exceed these standards of manufacturing to your clients.

## About the KCMA Certification Program

*Reprinted Courtesy of the Kitchen Cabinet Manufacturers Association*

KCMA sponsors the nationally recognized voluntary testing and certification program for cabinets, ANSI/KCMA A161.1, Performance and Construction Standard for Kitchen and Vanity Cabinets. The program is referenced by US government agencies, architects, builders, remodelers, and other specifiers. Cabinets that comply and bear the KCMA certification seal [see Figure 1.6] are recognized in the marketplace as quality products able to perform after a rigorous battery of tests simulating years of typical household use.



**FIGURE 1.6** ANSI/KCMA logo  
Courtesy of Kitchen Cabinet  
Manufacturers Association

Tests are performed by approved third-party independent laboratories. Samples for testing are selected in an unannounced visit to the manufacturing plant.

- The KCMA Certification Program assures the specifier or user of kitchen cabinets and bath vanities that the cabinet bearing the blue and white seal complies with the rigorous standards set by the American National Standards Institute (ANSI) and sponsored by the Kitchen Cabinet Manufacturers Association (KCMA). Further, the cabinet is an exact duplicate of samples that have been independently tested for conformance to ANSI/KCMA A161.1-2000.
  - The KCMA Certification Program is open to all cabinet manufacturers. Manufacturers may certify one, several, or all of their cabinet lines. Because of this option, only those lines certified are listed in the annual KCMA Directory of Certified Cabinet Manufacturers.
  - Compliance with ANSI/KCMA standards is assured by initial cabinet testing, periodic unannounced plant pick-up and testing, and additional testing resulting from complaints. All testing is performed by an experienced independent laboratory.
- These cabinets also comply with the provision of Paragraph 611-1.1, “HUD Minimum Property Standards—Housing 4910.1” 9/8/86.
  - Companies not licensed with the KCMA Certification Program may not claim or imply conformance with these standards for their products. KCMA, as the proprietary sponsor, reserves the right to question any claims of conformance and to test the products of any manufacturer making such claims. Should KCMA discover that a manufacturer is falsely representing that his products meet these standards, KCMA will take appropriate legal action.

## Requirements Cabinet Must Meet to Earn the KCMA Certification Seal

- All cabinets must be fully enclosed with backs, bottoms, sides, and tops on wall cabinets; and backs, bottoms, and sides on base cabinets, with certain specified exceptions on kitchen sink fronts, sink bases, oven cabinets, and refrigerator cabinets.
- All cabinets designed to rest on the floor must be provided with a toe space at least two inches deep and three inches high.
- All utility cabinets must meet the same construction requirements as base and wall cabinets.
- Doors and drawers must be properly aligned, have means of closure, and close without excessive binding or looseness.
- All materials must ensure rigidity in compliance with performance standards.

*(continued)*

- Face frames, when used, must provide rigid construction.
- For frameless cabinets, the ends, tops/bottoms, and back shall be of thickness necessary to provide rigid construction.
- Corner or lineal bracing must be provided at points where necessary to ensure rigidity and proper joining of various components.
- All wood parts must be dried to a moisture content of 10 percent or less at time of fabrication.
- All materials used in cabinets must be suitable for use in the kitchen and bath environment where they may be exposed to grease, solvents, water, detergent, steam and other substances usually found in these rooms.
- All exterior exposed surfaces and edges, except the edges of end panels and the edges of back panels, shall be free of saw marks and other imperfections and shall be filled and sanded, edge-banded, or otherwise finished to ensure compliance with the performance standards.
- All exterior exposed parts of cabinets must have nails, staples set, and holes filled.
- All exposed construction joints must be fitted in a workman-like manner consistent with specifications.
- Exposed cabinet hardware must comply with Builders Hardware Manufacturing Association finishing standards.

### Test Cabinets Must Pass to Earn the KCMA Certification Seal

- All shelves and bottoms are loaded at 15 pounds per square foot, and loading is maintained for seven days to ensure that there is no excessive deflection and no visible sign of joint separation or failure of any part of the cabinets or the mounting system.
- Mounted wall cabinets are gradually loaded to 600 pounds without any visible sign of failure in the cabinet or the mounting system.
- To test the strength of base-front joints, a load of 250 pounds is applied against the inside of cabinet-front stiles for cabinets with drawer rail, or 200 pounds is applied for cabinets without drawer rail, to ensure reliable front joints that will not open during stress in service or during installation.
- To test the ability of shelves, bottoms, and drawer bottoms to withstand the dropping of cans and other items, a three-pound steel ball is dropped from six inches above the surface. After the test, the drawer must not be damaged and must operate as before the test with no visible sign of joint separation or failure of any part of the cabinet or mounting system.
- To test the ability of cabinet doors and connections to withstand impacts such as children may cause in falling against a cabinet, a 10-pound sandbag is used to strike the center of a closed cabinet door and repeated with the door opened to a 45-degree angle. The door must operate as before the test and show no damage or sign of separation or failure in the system.

### Two Drawer Tests Required

- To test the ability of drawers and drawer mechanisms to operate with loading during normal use, drawers are loaded at 15 pounds per square foot and operated through 25,000 cycles. The drawers must then remain operable with no failure in any part of the drawer assembly or operating system, and drawer bottoms must not be deflected to interfere with drawer operation.
- To test the ability of the drawer-front assembly to withstand the impact of closing the drawer under normal use, a three-pound weight is dropped 8 inches against the drawer assembly. After 10 drops, there must be no evidence of looseness or structural damage to the drawer-front assembly that impairs operation.

### Two Door Operation Tests Measure Durability

- To test the ability of doors, hinges, and means of attachment to withstand loading, 65 pounds of weight is applied on the door. The weighted door is slowly operated for 10 cycles from 90 degrees open to 20 degrees open and returned to the 90-degree position. The door must remain weighted for 10 minutes, after which the door and hinges must show no visible signs of damage, and connections between cabinet-and-hinge and door-and-hinge must show no sign of looseness.

(continued)

- To test the ability of doors, door-holding devices, hinges, and attachment devices to operate under the stress of normal use, doors are opened and closed through a full 90-degree swing for 25,000 cycles. At the test's conclusion, the door must be operable, the door-holding device must hold the door in closed position, hinges must show no visible signs of damage, connections between cabinet-and-hinge and door-and-hinge must show no sign of looseness, and other specifications must be met.

### Four Finish Tests Conducted

- These tests create, in accelerated form, the cumulative effects of years of normal kitchen conditions of pre-finished cabinets. Cabinet finishes are inspected to ensure that stringent standards of appearance are also met. To test the ability of the finish to withstand high heat, a cabinet door is placed in a hotbox at 120 degrees Fahrenheit and 70 percent relative humidity for 24 hours. After this test, the finish must show no appreciable discoloration and no evidence of blistering, checks, or other film failures.
- To test the ability of the finish to withstand hot and cold cycles for prolonged periods, a cabinet door is placed in a hotbox at 120 degrees Fahrenheit and 70 percent relative humidity for one hour, removed and allowed to return to room temperature and humidity conditions, and then placed in a coldbox for one hour at -5 degrees Fahrenheit. The cycle is repeated five times. The finish must then show no appreciable discoloration and no evidence of blistering, cold checking, or other film failure.
- To test the ability of the finish to withstand substances typically found in the kitchen and bath, exterior exposed surfaces of doors, front frames, drawer fronts and end panels are subjected to vinegar, lemon, orange and grape juices, tomato catsup, coffee, olive oil, and 100-proof alcohol for 24 hours and to mustard for one hour. After this test, the finish must show no appreciable discoloration, stain, or whitening that will not disperse with ordinary polishing and no indication of blistering, checks, or other film failure.
- To test the ability of the finish to withstand long periods of exposure to a detergent and water solution, a cabinet door edge is subjected to exposure to a standardized detergent formula for 24 hours. The door edge must then show no delamination or swelling and no appreciable discoloration or evidence of blistering, checking, whitening, or other film failure.

Available at [www.kcma.org/Homeowners/Performance\\_Testing\\_and\\_Certification\\_Program](http://www.kcma.org/Homeowners/Performance_Testing_and_Certification_Program)

## Industry Acceptance of the KCMA Environmental Stewardship Program

In 2007, the National Association of Home Builders and the International Code Council collaborated to establish a nationally recognizable standard definition of green building. ANSI has approved the National Green Building Standard (NGBS). This standard references KCMA's ESP and awards points for attaining such certification for kitchen cabinetry. This endorsement satisfied the rigorous ANSI requirements for balance and openness. The NGBS remains the only *green* standard recognized by ANSI.

## CABINET SIZING SYSTEMS: IMPERIAL AND METRIC

Because the cabinet industry is an international one, there are two common methods of sizing cabinets: the English Imperial system, based on inches, and the International Metric Standard. Cabinets produced in the United States use the English Imperial system and, therefore, build cabinets in inch dimensions. Cabinets produced in other parts of the world use metric dimensioning.

Sometimes metric cabinets are referred to as *32 mm* or *System 32* cabinets. The term "32" refers to the basic metric sizing of all these cabinets: All the holes, hinge fittings, cabinet