



CODE WISE

BUILDING SAFETY
AND SUSTAINABILITY
An Informational Newsletter

November 19, 2007

9

Volume

Letter from the Building Official

It has been over a year since the last issue of Code Wise and during this period, improvements have occurred on many fronts: Our staffing levels have been brought in line with current capacity requirements, we have refined service delivery processes toward meeting our customers' expectations for quality and timeliness, we are approaching the launch point for our wireless inspection as well as electronic plan review projects, and we are actively developing green building programs. Most of these gains have been achieved through aligning operational with strategic goals; of which an article on this subject is available within the "Department Publications" section of the "Building" page at www.PimaXpress.com.

During this period the Division's name has changed from "Building Codes" to "Building Safety & Sustainability" to note the shift in emphasis from enforcement of traditional safety codes to sustainability ones including adoption of the *2006 International Energy Conservation Code* and the development of incentive-based green building programs.

Another regulatory shift occurred on January 1st of this year, the effective date for the *ICC Performance Code for Buildings and Facilities* local adoption which allows for performance-based alternative to any prescriptive code items. We are hoping this will result in innovation through facilitating the ability for designers to submit non-traditional and more sustainable concepts.

Welcome to this new Code Wise issue and my thanks go out to our dedicated staff for the articles contained herein.

Yves Khawam,
Chief Building Official

FIRE PARTITIONS

Fire partitions are 1-hour fire-resistive rated wall assemblies that enclose an exit access corridor, separate tenant spaces in covered malls, dwelling units and sleeping units and separate elevator lobbies from a floor. Openings in fire partitions must be properly protected, and the total area of openings in a fire partition is not limited.

Although fire partitions must normally be supported by construction having a comparable fire-resistance rating, in buildings of Type IIB, IIIB and VB construction, Section 708.4 does not require such supportive construction for walls separating sleeping units, tenant spaces in malls and tenant exit access corridor walls.

The term “fire partition” is defined in Section 702 as a partition designed to restrict the spread of fire with protected openings. As such, a corridor wall that is not required to be fire-resistance rated in accordance with Table 1017.1 would not be considered a fire partition. This is especially important when considering the continuity provisions of Section 708.4, which would not be applicable. The same is true for other sections of the code that eliminate the fire-resistive rating requirement or reduce the fire-resistive rating of the wall assembly when equipped with a sprinkler system through-out.

The continuity provisions of Section 708.4 require fire partitions to extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above, and securely attached thereto. If the partitions are not continuous to the sheathing, deck or slab, and where constructed of combustible construction, the space between the ceiling and the sheathing, deck or slab above must be fire-blocked or draft-stopped in accordance with Sections 717.2 and 717.3 at the partition line. Of course there are exceptions as outlined in the code.

This is a key feature of a fire partition that distinguishes it from a fire barrier. Unlike fire partitions, there are no circumstances under which a fire barrier wall is permitted to terminate at a rated ceiling.

Fire barrier wall assemblies must be continuous from the top of a fire-resistance-rated floor/ceiling assembly to the bottom of the floor or roof slab/deck above and fire barriers limit the number of openings.



(Continued on page 7)

What's "SPECIAL" about Special Inspections?

Chapter 17 "Structural Tests and Special Inspections" of the International Building Code defines Special Inspection as "Inspections required of materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards". It is the responsibility of the owner to employ the Special Inspector, who is approved by the Pima County Building Official. This article will concern itself with Residential Special Inspections.

Since home designs have become more complex than the simple boxes that they were not many years ago, requiring special design and engineering, special inspection has become a regular part of residential construction. A residential builder might expect to have one or more of several special inspections required on their project. Some of the most common would be epoxy or expansion anchors, structural masonry, post tension foundation systems, grading, fill and compaction, or special wall systems such as Insulated Concrete Forms (ICF). All of these special inspections are over and above the prescriptive requirements of the International Residential Code. Special Inspection may be a requirement of either the project's Engineer of Record or the manufacturer of a building material or product. The Special Inspection requirements for a project are listed on the back of the white permit card (not the yellow inspection hard card) and listed as "Special Conditions" with a notation indicating when the final "Special Inspection Report" is due. For example P2F indicates the final report is due "prior to final inspections" and P2I indicates "prior to intermediate inspections" It should be noted that the "Prior 2" requirement places a hold on inspections. These holds prevent the scheduling of inspections, especially finals, until complete and compliant documentation is submitted to the Building Official.

Epoxy or Expansion Anchor special inspections are a requirement of the manufacturer to insure proper installation, assuring performance of the product to the manufacturer's specifications. The special inspector will verify the depth and size of the drilled hole, that it is free of dust and debris, the right size, type and spacing of the anchor being used is installation per the engineer's specifications. Specifications will vary between manufacturers. ICC Evaluation Reports are required to be on site for verification of compliance with each manufacturer's specifications for installation.

Special inspection requirements for Structural Masonry will assure the proper size and placement of reinforcing steel, sampling and testing of concrete and grout, the proper proportions for site-prepared mortar, and the proper placement and consolidation (vibration) of grout in clear and clean masonry cells. When ICF special inspections are required the inspections are very similar to those for Structural Masonry.

Post Tension Foundation special inspections are generally done in 3 stages. The first inspection is for the placement of the tensioning cables, reinforcing steel, framing anchors, forms and utilities. Then continuous observation of concrete placement and consolidation (vibration) around the tensioning cable anchors, along with the preparation, or observation of concrete cylinder samples for compressive testing. Finally, the cable tensioning is observed and each cable elongation is recorded. The final report would also include the results of the concrete compression testing.

Most post tension foundations are designs based on information found in a site specific soils report. This report would be the result of a soils investigation performed by a licensed Arizona Geotechnical Engineer. The special inspection requirements for placement and compaction is determined by the Geotechnical Engineer's report.

When fill under the building slab exceeds 24 inches, compaction testing is required. Fill and compaction is typically done in layers, as each layer is placed and compacted a "nuclear moisture/density test" is the most common test performed. Prior to any compaction testing of this type it is necessary for the "testing lab" to take a sample of the fill material; this is known as a "proctor sample" and is used to establish a baseline for density testing at the site. Different materials will have different readings, so be sure to have a proctor sample taken before scheduling a compaction test.

The difference between a county inspector and the special inspector is the county inspector inspects the phase of work once it is complete, the special inspector observes the work while it is being performed. It is important to remember that the role of the special inspector is to observe, document and report. Should the special inspector find work that does not comply with the plans and specifications, it is their duty to notify the superintendent, the engineer and the owner that work is not in compliance with the contract documents. Special inspections are not permitted for the convenience of the contractor in lieu of county inspections.

In June of 2006 Pima County Building Safety and Sustainability established a Standard Operating Procedure to provide guidelines for Building Staff and related Special Inspection performance, management, approval and enforcement. This document is available at the website PimaXpress.com on the "Building" page about three quarters of the way down the right side.

It is no longer necessary to submit the pre approval certificate that was previously required. The list of approved Special Inspectors is available on the web site just below the Standard Operating Procedure for special inspection as directed above. For the final report the approved registrant will submit a cover letter with the name and address of the project, the activity number, the inspections included in the final report, along with statement of compliance, the registrant's seal, and copies or a summary of the field reports.

Last but not least, once the Special Inspection Final Report is submitted to the Building Official it may take as long as 48 hours to review the report and release the inspection hold. Generally Special Inspection Reports are reviewed and inspection holds lifted within a day, however, this may not always be the case based on fluctuating workloads. Once the "Final Frame" inspection has been approved, all special inspections have been performed, then the final Special Inspection Report should be submitted as soon as possible to avoid possible delays.



Cody Says

I didn't know I had to do special inspections!! There is nothing about it on my inspection card.

When the permit was issued the Public Service staff member asked the applicant to please read and sign the permit card. On the back of the white permit card is a list of "**Special Conditions**". This is where special inspection conditions are listed along with any other conditions on the permit. These are the conditions of the permit. The yellow inspection card only lists the inspections that will be performed by the Pima County inspector. It is the responsibility of the owner, not the contractor, to employ a "Special Inspector" to schedule and satisfy the requirements indicated in the list of "Special Conditions".

PIMA COUNTY GREEN BUILDING PROGRAM

Not long ago, our ancestors built their homes using local materials, available labor, and regional building practices that responded to the area climate and culture. Wood-framed, multi-story houses with huge windows and sweeping views were as foreign to the desert landscape as the igloo. However, in the last century, advances in transportation and technology combined with cheap energy expanded the palette of designers and builders beyond the restrictions of the past. Advances such as air conditioning have transformed cities in the southwest from winter refuges to year-round major metropolises. Materials are now shipped across the globe, making it possible to build an endless array of building types and styles- from log cabins to skyscrapers – anywhere in the world. When the building type doesn't fit the climate, adding additional heat or air conditioning has been the standard for transforming it into a cozy abode.

This freedom to build outside the constraints of our environment has not come without a cost. Transporting materials over long distances contributes to excessive energy use, contributes to green house gas production and contributes to the deterioration of local markets, as local industries are pushed out of business by cheaper products produced by foreign competition.

Cheap energy and labor have many other indirect costs as well. Buildings designed to remain comfortable solely by large inputs of fossil fuels often waste as much as 50% of the energy they consume through inefficient air handling systems and wasteful technologies. Materials that could be recycled are instead discarded, which increases costs and requires unnecessary extraction of limited natural resources. Many new homes are constructed far from downtown areas, and residents are connected to necessities only by highways. The result is congested roadways, increased social isolation, and tremendous expenditures for maintenance and expansion of infrastructure. In an age where the limits of the earth's resources are already being stressed by the demands of human population growth, these practices are not wasteful and expensive, they are simply unsustainable.

About a decade ago, enlightened members of the construction industry, government agencies, and concerned consumers began to take note of the excessive environmental, economic and social effects of constructing our buildings without regard to our environmental limitations. The result of this movement – usually called “green building”, began to take hold and is now entering into mainstream construction practice.

The underlying concept of sustainability is the basis of all green building. Sustainability is often defined as:

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Sustainability through green building practices is achieved by attending to several areas of impact:

Location and linkages to needs and services

-Energy efficiency, reducing energy consumption, and renewable energy use

-Water efficiency, including rainwater harvesting and gray water reuse

-Materials, including local materials and recycled content

-Indoor air quality

-Sustainable site development practices

The most common way to encourage green building practices is the development of a green building program specific to a municipality or area, or to simply adopt one of the existing rating systems. In the home building market, dozens of municipalities have created their own programs and two national rating systems are currently nearing completion: the LEED for Homes program of the US Green Building Council (LEED stands for Leadership in Energy and Environmental Design) and the NAHB (National Association of Home Builders) Model Green Home Building Guidelines.

Over the last few years, the growth of green building has become truly astounding. An NAHB report released in early June, 2007 reported a more than 50 percent increase since 2004 in the number of green homes “certified by voluntary, builder-supported green building programs around the country”. In order to promote green building practices appropriate to our Sonoran Desert location, the Pima County Department of Development Services has initiated development of its own residential green building program, one that will draw from the best of the national standards and also focus on strategies particularly appropriate to our area. There will be an added emphasis on water conservation, attention to traditional desert construction techniques (such as adobe or masonry), and increasing the use of our abundant solar energy. Some of these issues may not receive adequate attention in existing rating systems because they must be adaptable to a wide range of climates and building practices. The Pima County Green Building Program will begin as an incentive program geared to the residential market, and will offer incentives to builders that apply for a residential permit under the program. We are looking forward to initiating this program in the next few months.

One incentive is for developers to be able to label their green built homes as certified under the Pima County program, and to use the label in their advertising. Existing residential green building programs have a variety of names they award to certified homes: “Green Built Home”, “Earth Craft House” “Green Choice Home”, and BEST (Building Energy Efficient Structures Today), are just a few of the designations awarded in various green home programs throughout the country.

The Pima County Green Building Program is looking for help in naming our county program. The prize: eternal bragging rights and our gratitude!!

If you have an idea for a name for our program’s certified homes, please email your suggestions to susan.buchan@dsd.pima.gov .

Cody Says



I need these conditions cleared; I have to get final inspections tomorrow!!

This is a common statement heard by Building Safety staff either over the counter or on the phone. What is really being said is “drop what you are doing for someone else and rectify this situation caused by a lack of planning”. In most circumstances when the “Final Frame” inspection has been completed, all the special inspections have been completed and the final Special Inspection Report can and should be submitted to Pima County. At this point there is plenty of time to resolve any issues that might arise, and still not delay the Final Inspections and Occupancy. Good planning on the part of the contractor and owner can prevent delays at the end of the project.

New Chief Enforcement Inspector

Building Safety Enforcement has a New Chief Inspector. Bob Chandler has taken the position vacated by John Huntley. Bob is now in his third year with Pima County, where he had been working in the Plan Review section. We may point out, that he is not connected with the “Bigfoot” monster truck. Bob previously worked for the City of Sierra Vista in the Building division for six years. Prior to this, he worked in the construction industry for nineteen years, beginning as an “Onsite Lumber Transportation Specialist”, and ending up as a Building Contractor.

The Building Safety Enforcement unit is primarily responsible for enforcing the provisions of the sections of the IBC that involves building construction performed without permits. The unit investigates complaints regarding these items. If construction is found to be in violation the unit “encourages” the violator to obtain the necessary permits. They use many tools at their disposal to do this. Once the permits are obtained, this unit performs all of the required inspections to bring the violation into compliance with the code.

The Building Safety Enforcement unit is also tasked with enforcing the provisions of the International Property Maintenance Code. This involves investigating complaints of vacant building that are unsecured, or in disrepair to the point that they become dangerous to inhabit. Additionally, when property is littered with debris or in some manner rendered a danger to the public, this unit investigates and “encourages” violators to remedy the situation.

The Building safety Enforcement unit works closely with the other units in the Building Safety Division, as well as other Pima County divisions and departments to coordinate and resolve violations that may involve others.

Cody Says



I need Special Inspections for my project, where do I find a Special Inspector?

A list of approved Registrants is on the Pima County Development Services web site, PimaXpress.com. At the top of the page find the navigation button for the Building page and click it. Once on the Building page scroll down about $\frac{3}{4}$ of the way in the right column and find the “List of Approved Special Inspectors”. When this document is opened the Registrant will be listed in the first column, the name of the firm in the next column and all the following columns indicate which areas of Special Inspection they have expertise in and are approved for. An R indicates residential inspections only; a C indicates commercial and residential inspections.

2005 NATIONAL ELECTRIC CODE



INTERESTING 2005 NEC CHANGES

ARTICLE 210.63 has added a new exception where evaporative coolers no longer require a service receptacle.

ARTICLE 210.52 (D) has added a new exception where the required GFCI receptacle for the bathroom vanity may be mounted on the side or face of the base cabinet not over 12 inches below the countertop.

ARTICLE 210.8 (A) (7) has been revised to require that all 125 volt 15 or 20 amp receptacles within 6 ft of a bar sink, laundry tray or utility sink will be GFCI protected.

ARTICLE 314.30 is a new article on Handhole enclosures. This states that the handhole enclosures shall be designed and installed to withstand all loads likely to be imposed.

Sub article (A) deals with sizing the enclosure.

Sub article (B) covers the wiring entries into the enclosure. This requires underground raceways and cable assemblies to extend into the enclosure but there is no requirement that they be connected to the enclosure.

Sub article (C) requires that where enclosures without bottoms are installed, all enclosed conductors and any splices or terminations that are present shall be listed as suitable for wet locations.

Sub article (D) is about the covers to the enclosures. The cover shall have markings to indicate the function of the enclosures. Handhole enclosure covers shall require the use of tools to open or shall weigh over 100 lbs. Also, all exposed conductive surfaces and metal covers shall be bonded.



Cody Says

Inspection requests. It shall be the duty of the person doing the work authorized by a permit to notify the “AHJ” (Building Official) that such work is ready for inspection. It shall be the duty of the person requesting any inspections required by this code to provide access to and means for inspection of such work

Barriers for Residential Swimming Pools, Spas and Hot Tubs

Code compliant barriers in accordance with 2006 IRC, Appendix G, Section AG105, are required to fully enclose swimming pools, spas and hot tubs in Pima County. There are a number of ways to provide a barrier for outdoor pools, spas, and hot tubs. These include wood and metal fences, stone and masonry walls. The adjacent walls of the house can be used as part of the barrier, or the entire barrier if the pool, spa or hot tub is located indoors.

Barrier Requirements

A. The top of the barrier must be at least 48 inches above grade, and the bottom of the barrier must have no more than 2 inches of clearance above installed base. These measurements are to be taken from the exterior side of the fence opposite the pool.

B. The barrier shall be constructed so that a 4 inch sphere cannot pass through at any point.

C. When using solid barriers such as masonry or stone walls, no indentations or protrusions are allowed beyond tooled joints.

D. Where the barrier is composed of horizontal (top, middle and bottom rails) and vertical members (posts and pickets) and the distance between the tops of the horizontal members is **less than 45 inches**, the horizontal members must be located on the pool side of the barrier and the vertical members shall have spaces that do not exceed **1-³/₄ inches** in width. If there are cutouts in the vertical members, the spacing within the cutouts shall not exceed **1-³/₄ inches**.

E. Where the barrier is composed of horizontal (top and bottom rails) and vertical members (posts and pickets) and the distance between the tops of the horizontal members is at least **45 inches or more**, the vertical members shall have spaces that are **less than 4 inches**. If there are cutouts in the vertical members the spacing within the cutouts shall not exceed **1-³/₄ inches**.

F. Chain link fencing can be used with a maximum mesh size of **2-¹/₄ inches**, or with slats that are attached at top or bottom that reduce the opening to no more than **1-³/₄ inches**.

G. Diagonal type fencing, such as lattice fencing can be used as long as the openings do not exceed **1-³/₄ inches**.

Gate Requirements

A. All access gates are part of the barrier, need to comply with Section AG105.2.8, and shall be equipped to accommodate a **locking device and locked**.

B. Pedestrian access gates must open outward, away from pool be self-closing and self latching. All other access gates (vehicular, maintenance, etc.) must be self-latching and are to be locked when not in use.

C. The release mechanism (latch) for the gate shall be located **at least 54 inches** above the bottom of the gate or if **less than 54 inches**, the following apply:

1. The latch shall be located on the pool side of the gate and be **at least 3 inches** below the top of the gate; and
2. The gate and barrier cannot have an opening larger than **1/2 inch** within **18 inches** of the latch.

Barriers for Residential Swimming Pools, Spas and Hot Tubs

Dwelling walls used as a Barrier

The walls and doors of your residence can be used to meet part of the barrier requirements when one of the following conditions are met:

- A. The pool shall be equipped with a powered safety cover that complies with ASTM F 1346; or
- B. Doors with direct access to the pool from the dwelling shall be equipped with an listed audible alarm (UL2017) that meets the following four conditions:
1. The alarm is capable of being heard through out the house during normal household activities.
 2. The alarm must activate within **7** seconds and sound for at least **30** seconds after door is opened
 3. The alarm shall automatically reset under all conditions
 4. There shall be a touch pad or switch to temporarily deactivate the alarm for single openings.
- The deactivation shall not be for more than **15** seconds and the deactivation switches must be located **at least 54** inches above the threshold of the door; or
- C. Other means of protection, such as self-closing doors with self-latching devices that afford the same protection as the cover or alarm above, may be accepted upon approval by the governing body.

Above-Ground Pool

When using an above-ground pool structure as the barrier with a minimum height of **48** inches, or where the barrier is mounted on top of the pool and a ladder or steps are the means of access;

1. The ladder or steps must be capable of being secured, locked or removed to prevent access; or
2. The ladder or steps must be surrounded by a barrier that complies with the barrier requirements in Section AG105.

Barrier Exceptions

Spas and hot tubs with a lockable safety cover that complies with ASTM F 1346 as listed in section AG107, shall be exempt from barrier provisions.



Cody Says : “BEWARE OF CONDENSATION”

Condensation can form on a duct when the temperature of the air in the duct is near the dewpoint of the air around the duct. The application of insulation with a vapor barrier covering prevents the duct from “sweating” by preventing moisture vapor from penetrating the insulation and reaching the duct surface. Duct sweating (condensation formation) is typically a problem for cooling ducts that pass through unconditioned areas where the humidity is not controlled. Condensation can cause insulation damage, corrosion, or duct failure, and the accumulated water can cause damage to the building. Condensation can also occur inside of ducts, such as when ducts conveying warm, moist air from a bathroom exhaust pass through an attic space or similar unconditioned area. Condensation in duct interiors can degrade the duct, promote mold and fungus growth and cause structural damage.

PORTAL FRAME WALL BRACING

Portal frames are an alternate braced wall panel that can be used adjacent to a door or window openings. The single portal frame (one braced wall panel) can be just 16" wide on one side (for one story construction) and on the other side have a double 2X4 post.

The double portal frame (two braced wall panels) requires a 16" wide wall segment on each side (one story construction).

The portal frames are a new addition to the building codes in the 2006 IRC. See Section R602.10.6.2 For complete information. See the following details for installation requirements. Where wall space is limited, like at garages and view rooms, these braced wall panels are a good option from standard bracing.

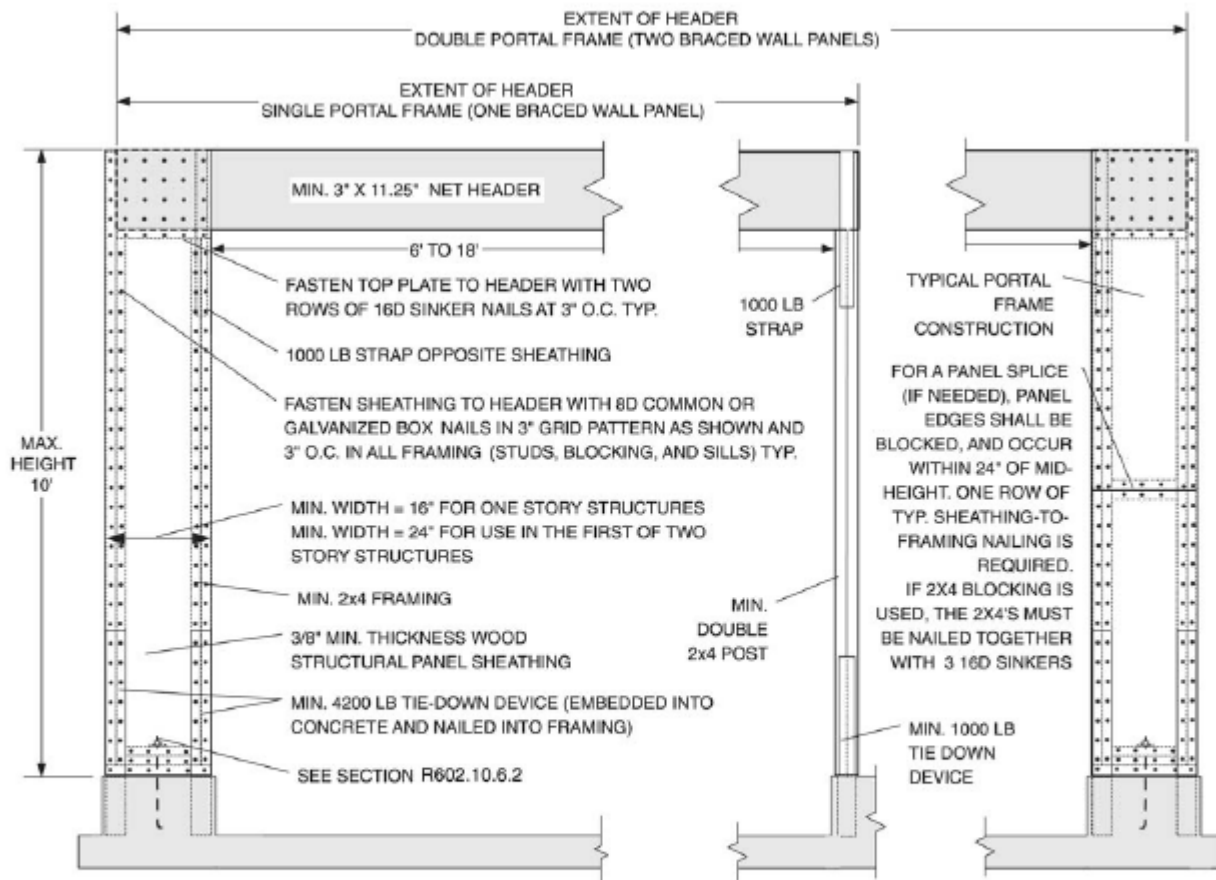


FIGURE R602.10.6.2
ALTERNATE BRACED WALL PANEL ADJACENT TO A DOOR OR WINDOW OPENING

Pima County Board of Supervisors

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**Questions about your project?
Call the Building Codes Division
and talk to a Plans Examiner.
(520) 740-6490**

**The
2007 Fall Education Institute
Will be held in TUCSON, ARIZONA
The week of October 29th
thru November 2**



**Visit the AZBO web site at:
www.azbo.org
A complete listing of the courses and
course descriptions is available on the
website.**

Happy Halloween!



CODES in Effect in Pima County

CODE

**International Residential Code (IRC-2006) AMENDED
International Building Code
(IBC-2006)AMENDED**

2006 INTERNATIONAL FUEL GAS CODE

International Mechanical Code (IMC- 2006) AMENDED

2006 (AMENDED)International Energy Conservation Code

International Property Maintenance Code

**AZ STATE PLUMBING CODE OR 2006 INTERNATIONAL PLUMBING CODE
(AMENDED)**

2005 National Electrical Code-NFPA 70 (AMENDED)

2006 PIMA COUNTY/CITY OF TUCSON SUSTAINABLE ENERGY STANDARD

Outdoor Lighting Code

Inclusive Home Design

2006 WILDLIFE-URBAN INTERFACE CODE

Copies of these codes are available at the main branch of the Tucson-Pima County Library.

Help-Line 791-4010

Purchase on line at:
www.ICCSAFE.org

Ph. 1-888-422-7233

Useful Telephone	Numbers
PC Bldg. Codes and Plan Review	740-6490
PC Bldg. Codes FAX	740-6555 740-6888
Inspection Request-IVR	740-6970
Building Inspectors between 7AM and 7:30AM	292-2255 293-5657
PC Zoning Enforcement	740-6470
Zoning Information	740-6450
Public Service	740-6510
City of Tucson	791-5550

Prepared by the **Plans Review Staff** of the BUILDING SAFETY AND SUSTAINABILITY Division of Development Services Department.

Carmine DeBonis, Director, Carla Blackwell, Deputy Director Development Services, Yves Khawam , Chief Building Official

The information provided herein is for information only and is not to be interpreted as superceding the codes as adopted by Pima County but should only be used as an aid in understanding the requirements of those codes to facilitate compliance.