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*Interviewer:* I'm Pam Cole with the Pacific Northwest Laboratory and I'd like to welcome you today to today's code commentator webinar series on COMcheck Basics. We hold these webinars the second Thursday of every month at the same time, so keep a watch out on the building energy codes program training page at [www.energycodes.gov](http://www.energycodes.gov) as topics get added. And if you have any suggestions, of topics that you think would be of interest to others and yourself you can submit them through our help desk or through the e-mail provided.

So our speakers today are myself and Bob Schultz both from PNNL. And we appreciate you taking the time out with us to go over the basics of COMcheck and tune into our webinar today. And I'm going to go ahead and let Bob begin the presentation after I go over a couple more of the learning objectives.

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So for COMcheck the software itself, really for today's webinar we're going to go over the basics of how COMcheck works. So we're going to give an overview of the basic functions and how COMcheck calculates compliance for the building envelope, for interior and exterior lighting, and then how mechanical systems and plants and service water heating can be entered into the program.

You'll be able to identify construction specifications needed to complete a compliant calculation in the software and you'll be able to learn how to enter building envelope, lighting, and mechanical components into the program. We'll also be able to help to understand how the compliance reports are created and what those compliance reports entail.

So I'm going to go ahead and turn it over to Bob Schultz and he's going to run through the basics and then we show a demo of the software and end the presentation with a Q&A at the end. Go ahead, Bob, I'll let you begin.

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*Bob Schultz:* Hello there, whether it's morning or afternoon, I'm hoping to have a good presentation here and cover, again, the basics of the COMcheck software. There are a lot of details down in the compliance process that we will necessary have to skip over for the

presentation to fit into the time slot. But hopefully, you can come away with a pretty good working knowledge of the tool.

It would be a good idea at some point in time to take a look at the energy codes in detail in their published form to get a full understanding of what all is involved.

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We only cover one or two pathways through the energy code, there are other pathways, I'll touch on this shortly.

In the overall scheme of getting compliance approval with the energy code there's really kind of a three-stage process involved that we see on this slide. There's the demonstrating compliance process on the left where you enter all your data and determine the compliance and generate a report. Then you pass that along to your jurisdiction and code official who is supposed to review that report against the project plans and determine that all the data and assemblies specified are consistent.

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And in many jurisdictions there are inspections that take place on the building. There are different stages of inspection. In theory, they can take the reports that we generate and go out in the field and verify through inspection that not only is an assembly per plans but is also installed as you acknowledged they would be.

So just know we're on the left most portion of this overall process and the full breadth of it is much more involved than just COMcheck is concerned.

The next slide is going to speak to the COMcheck compliance methods. As I mentioned, each energy code has a number of ways that allow you to demonstrate compliance, one is the prescriptive option.

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That's generally a straightforward table lookup for an assembly if you have a wall you need to put in this much insulation. If you have a ceiling with attic space, you have to put in this much insulation and so forth.

The more involved way to demonstrate compliance is through the energy cost budget or performance simulation. That typically requires a third party get involved or a professional modeler gets involved with running a performance, building performance simulation engine. That's a much more involved and detailed method.

The middle pathway or what we call the middle pathway is the tradeoff option. And this is a fairly simple process to implement from a user of COMcheck; it's a little more involved in the developer of the software to get it to work correctly.

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But we think that this targets the greatest percentage of the user community out there and we wanted to be of assistance to as many people as we could.

So presently, we're only supporting the tradeoff option in COMcheck, particularly for the new construction. There is a prescriptive determination in COMcheck for alterations projects and I'll address that in subsequent slides. But please realize that the energy codes give you more options than what COMcheck supports but we think most of the user community will be interested in the tradeoff methodology.

When I speak to the tradeoff methodology, I'm really speaking to just the envelope tradeoff method. COMcheck will not do tradeoffs with HVAC equipment –

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or lighting systems it will only exercise tradeoff opportunities in the envelope structure. And what do we mean by the envelope? The envelope is the boundary of your building project that separates a conditioned space from an unconditioned space.

Over the years, the methodology used to compute or determine the tradeoff option and compliance outcome it's changed, 90.1 standard up until 2010 used a set of regression equations that approximated the performance or building energy loads for a building envelope.

Think of it this way, you will have a proposed design that you specify in COMcheck –

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and that will be one building. And then we take that same building design and apply the building energy code requirements to come up with a second building called the baseline or code building. We calculate an energy performance factor and energy report cost for each of those buildings and if your building performs better as a function of this regression equation determination method than the code building then you pass, it's pretty much that simple.

Now 2013 of ASHRAE 90.1 comes along and introduces a whole new way of determining the envelope compliance tradeoff process or methodology. And that method involves a performance simulation tool called EnergyPlus.

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Again, it's still just an envelope tradeoff methodology but we will set defaults for the lighting loads, the miscellaneous plug loads, and HVAC systems for the performance simulation of your proposed design and the baseline code building design and evaluate those two similarly with just again the envelope tradeoff outcome reporting.

2015 IECC is somewhat of a companion code to the 90.1 2013 in that as one of its alternatives, it allows you to use 90.1 2013 as an alternative. So that's why I say it's kind of a companion tool, if you don't get the results you want out of 2015 IECC or you hit a roadblock –

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in getting compliance through that energy code as an alternative it allows you to use 90.1 2013.

But 2015 on its own level for envelope tradeoff determination uses a very much more simple way of determining compliance and that is through a total UA process. And a UA value is determined by taking the U factor or the thermal conductivity of the building assembly and multiplying that by the area and then the total UA is the sum of all those UAs. And if you're proposed total UA is less than the code UA, you pass that's the basic test for compliance there.

2015 IECC also introduced two other levels of compliance you must meet and they have to do with fenestration.

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I'll show you a little more of an example of that downstream but just know for now that you also have to pass the average, area

weighted average U factor for fenestration. And each fenestration assembly you have has to meet these solar heat gain co-efficient requirements prescriptively.

So 2015 IECC has a three-pronged criteria for determining compliance. 90.1 23 does a simulation, performance simulation determination and all the other codes rely on the older, 90.1 regression equation that's found in appendix C of the standard.

You can get very different results depending on which code you use. So I urge you or encourage you to explore that further on your own.

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Project types that we support are new construction types, additions, and alterations. New construction projects will be determining energy code compliance via the tradeoff method or if you're an Oregon based user we offer the prescriptive alternative for them.

For additions, we again use the tradeoff compliance method and again, Oregon has the prescriptive.

For alteration projects, we simply provide the prescriptive compliance. And again, prescriptive compliance means every assembly has to meet code requirements on its own basis, there's no tradeoff occurring between assemblies.

Lighting compliance is generally a lot simpler to determine.

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You do have mandatory requirements related to controls and switching but the essence of meeting compliance involves determining what your allowed wattage is and that's based on the area types you specify for your interior lighting or exterior lighting. And then when you entered your fixtures and apply those to the different area types if the proposed wattage in total for your building is less than the allowed wattage you pass or comply with the basic requirements pertaining to wattage.

Mechanical and service hot water compliance is a little more problematic to demonstrate compliance via the software. We do allow you and ask you to put your systems and plant types –

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whether that's cooling plants or heating plants and your service water heat systems into the software. We'll ask you at general setup the characteristics or questions about those systems and present the minimum efficiency requirements that will be imposed. There are also some other worksheet type requirements that we enable in the software they relate to the economizer requirements, fan power limitations, and of course, there's a long list of mandatory requirements that are purely qualitative in nature and are presented through the requirements tab, which I'll present downstream, and that show up in your inspection checklist.

So what I encourage all users to do or how they should process of a new project through COMcheck is to view it in steps or stages of data entry.

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Start at the project screen level and then add your building envelope components, lighting, mechanical, and finally, address the requirements tab before you even consider going to your report.

This will enable all the downstream dependencies to be enforced, that is, things that are enforced in mechanical or lighting will depend on you specifying the project stream in full and in its final form. So it's always more efficient to build your project inter COMcheck in that manner.

What you need or planned or will have to be available for fully specifying a project are, of course, the energy code that is required by your jurisdiction. You'll need to know your project location and have your site information available as in address so your code official knows where this is being built.

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Area take off for your envelope assemblies, again, this is the envelope boundary assemblies, this is the boundary that separates your condition from unconditioned space.

Installation R-values for those assemblies, fenestration performance data will be needed. Lighting fixture details including what space types or area types those are applied to. And your HVAC system details and service water heating details will be necessary.

Our website is [www.energycodes.gov](http://www.energycodes.gov) this is where you can go to get access to our software and along the right hand column there is a link for the COMcheck tool.

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You would click into that hyperlink to get to where you'd download the desktop version or access the web version. We do have two versions of the software as shown here. The desktop and web version are equal in functionality I so far as we can make them that way. There are a couple features that I might point out later on that are in the desktop that don't exist in the web.

But as we develop these in the future, we will slowly be putting all the extra features of the desktop into the web version or that's our plan. But the two should be producing the results similarly and to facilitate sharing of projects you can interchange –

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or load the project data file you create in the desktop up to the web application or go the other direction and download from the web application to your desktop.

If you have several people contributing to the specification of your project in COMcheck, this is a means to share the file with them either on the desktop or the web. We encourage you to register as a user, you can save files to your account, you could then share your login credentials so another user could access that file or download it if you entered data and share it with another user that then can upload it to their account.

Moving forward, we'll speak real briefly to some of the features or visual clues we put in the software.

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This is generally showing the – and all the screenshots subsequently are going to be showing the desktop presentation but the web version is very similar.

Red text objects should indicate the cell needs attention and means it's an invalid number, for example.

The blue type cell objects simply mean more data is needed and it will be updated once that data's provided so a TBD is a to be determined we don't have enough data to compute the envelope compliance in the example shown on the second line.

Green generally means that you got a passing metric score on your compliance determination. These types of metrics are provided down at the bottom, --

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second to bottom panel of the desktop, we call that the compliance bar. A status bar at the very bottom of the screen is available to assist in getting you to put in the missing data or inform you about the outcome of the compliance determination. This status bar content should be content sensitive so if you're on the envelope tab or viewing the mechanical tab the messaging is specific to what you're looking at.

The other tools in the desktop application are common to most desktop applications. They include the menu tool at the very top of the screen and the toolbar.

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I won't go through all the menu options because they're pretty generic and self-explanatory but there a few worth mentioning. The code menu you see second from the right is one of the most important that's where you will go to pick what energy code to enforce in your project. You will see what your selection is in the very top most panel or the title bar so that whether you're on the project tab or any other tab this is always front and center for you to know.

The options menu I'll show a slide of in the next screen, but that too is somewhat context sensitive on the tab that you're displaying. Options within that menu are going to be enabled or disabled depending on the tab.

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So if you're in the envelope tab the option to enable orientation, for example, will be enabled. Or if you're in the interior lighting tab the allowances alternative will be enabled.

The edit button has a feature called preferences at the bottom of it. If you're a frequent user or a power user of COMcheck, you might find this useful. It will allow you to set preferences that are applied every time you start the application. These include things like the file options, code, and location, names to include on a report and signature lines, e-mail address, things of that order.



I spoke briefly to the options menu; this is a quick view of what would be presented to you if you were accessing the options menu from the envelope tab, --

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orientation, projection factor would likely be in place, visible transmittance. These are alternative inputs for a lot of the codes. Some of the codes, especially the newer ones actually do require these inputs, orientation in particular is a requirement for the 90.1 2013 and the 2015 IECC.

Exemptions and allowances are generally optional and I won't go into those in too much because they get fairly involved but again, I urge you and encourage you to explore that.

I'm going to now show you the project screen and we'll touch on each of the main panels that you see in the project screen. And now, again, --

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I always tell users to try to populate the screens that come up or these different tabs starting the upper left and moving to the lower right. That will be the most efficient way to enter data. Now there will be an occasion where after entering something in say mechanical or lighting you choose to go back and change something else in the software like maybe one of these compliance options, but generally speaking, that's a good way to flow through your data specifications and inputs.

Again, the first thing you'd want to do is set that energy code. This one is set to 2015 IECC as shown in the title bar and that's done through the menu code, code menu option.

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This slide for code and location demonstrates the number of energy codes we're supporting. On the national level, we only support three national codes at any given time. As a new code comes on board, the older one will drop off. This is intentional and intended to encourage jurisdictions to advance their required code to one of the more recent national energy codes.

As you see here, there's half a dozen different state or provincial energy codes supported. These are generally more stringent than a national code and have been provided to these states to encourage adoption of more advanced energy codes in their local jurisdictions.

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The location input is of very important use. I will show you shortly where that plays into what requirements get applied but you'll want to set the code and the location before anything else. This is set to Montanan and Bozeman; note that in the city drop down list not all cities in that state will be presented. There's only a subset of the cities for which we have the necessary weather data to determine energy code compliance. So if your city is not included in that list, you are to pick a location that most closely approximates the climate zone for your area.

We've since recently added what climate zone number or designation this location is so if you are a user that refers back to the energy code –

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then you can then see which one is being applied. This happens to be 6B and there is a table specific to 6B in the 90.1 code, in another one a column in the IECC codes that refers to climate zone 6B.

The next input you would satisfy is the new construction addition and alterations choice and I have already spoken to hat a little bit earlier especially with respect to alterations, the new and addition project types are more or less self-explanatory.

Alterations, a little more detail on that, the intent here is to only include the assemblies that are going to remain after your project is complete and they're only those assemblies that are being altered. You don't have to put your old building in there –

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the compliance will be determined on a pass/fail basis and that is applicable to envelope and lighting. Again, mechanical is mostly a qualitative determination and a review by your code official to see that those things meet on a prescriptive basis.

Compliance options in the project screen. This is only applicable and only displayed when the IECC codes are being used, in particular, 2012 and 2015 IECC. If you're in a jurisdiction or a locality that is in warmer climate zones the air barrier options won't be exposed. So some of these inputs will be code dependent and location dependent.

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The efficiency option, this is a requirement of the IECC that requires you to pick one additional efficiency option for your building. In 2012, there were three different options, the high performance power, so you had to have the equipment that was a bit more than the baseline requirement in terms of efficiency. The second option was a reduced lighting power so you would have a little tighter lighting power density applied in the lighting compliance determination in onsite renewable energy.

In 2015 they added three new options as shown in this slide and I won't go into the details on what each of these are, I encourage you to refer to the energy code language specifically to get all the details or help system that's on board.

Air barrier options are really, there's a set of three that allow you to pick and choose which method you want to comply with.

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And again, those details can be found in our help system online or through the energy code.

Project details is the next input you'd want to provide and this will help to inform the code official that's reviewing your project where your project is, who's building it, who the designer is. The hope is that with this information the code official can direct questions more efficiently to the person with the likely answer.

The big and important place next to focus on in the project screen is the area type inputs. And there are three tabs within this tab for specifying areas.

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There is going to be an input for building envelope area types, another one for interior lighting areas and method, and another called exterior lighting areas. You have to address each one of these independently.

The implications of this input are quite important and should be noted. The building envelope area types you specify will be used in the envelope trade off methodology. Every envelope assembly you specify in the envelope tab will need to be assigned to one of these building types. When you do that, then the software knows which actual requirement from the energy code to apply towards that building envelope type.

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If you're using 2013, that is 90.1 2103 it will also help us to know then which other defaults to apply towards the building performance simulation. So this is a very important project specification to get correct. In this case, I've added three different types and provided the area for it. I've provided area description to help my code official know generally, what that office is pertaining to, and I've specified the space conditioning type.

Note that semi-heated is only available in the 90.1 codes that's not a distinction that's recognized in the IECC based codes.

The next tab of the area type input on the project screen pertains to interior lighting method and area types.

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And what you have to pay attention to here is not only the area types that are going to be applied but what method do you want to use? The first one that's listed is the building area method and if you choose that then the building envelope area types that you've already specified will be used in your interior lighting method compliance determination. And I will show you how the two methods differ in the slide coming up.

The space by space method would be used if you want to represent your interior lighting areas in more granular detail and fine tune, if you will, the lighting power density that gets applied to those different use or area categories.

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So when I say the lighting power density I'm speaking to this right most column called watts per square foot.

I'm going to flip to the next slide where we see what the distinction is between these two methods in terms of lighting power density with exactly the same building area type specified. In the upper left graphic, I have the office, library and parking garage specified but notice the lighting power density is there. If I choose to use the space-by-space method or area category method, I've got the same building specified but I've broken out of my office areas to enclosed and open plan and the library is more refined to be described as a reading area and parking garage is a garage area.

Notice the LPD or the lighting power density differences; I'm getting a lot more flexibility on my office space than I would if I just used the areas as described in the building envelope area type.

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So this might be somewhat of a “what if” game you play with the methods for your particular project. One method might favor your project more than the other or vice versa.

Exterior lighting area types is pretty similar to the interior lighting. That does require that you first specify a zone for your building project. This then filters out the types of areas that you can include in the actual exterior lighting areas in the bottom graphic.

Note that there will be a lot of different types of units, --

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not a lot, but a number of different types of units applicable to these exterior lighting areas. They can be linear feet or square feet, it might be ATM stations you just have to pay attention to what the unit's field or column really shows you to know what to put in the quantity field.

Again, we put the lighting power density in the second to right most column. The tradeable column is important to know in the sense that if it says yes then the allowed wattage you're given for this area type, if you don't use it all it's tradable to another exterior lighting area. If tradable says no, then you can't use the unused or the allowance you're granted that's in surplus or net of your proposed wattage is not to be used in any of the other exterior areas.

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That's a distinction from interior lighting.

So to jump through some quick examples, tradable areas are allow for unused allowable power to be traded and these include driveways and entryways and they're generally length or area type exterior spaces. Non-tradable are use it or lose it and they typically are associated with façade lighting, building façade lighting, or ATM stations or those are two examples.

So the next slide is a project screen that's been fully specified albeit in a super simplistic way. I've got my energy code set to 90.1 2010 its set in Bozeman, Montana, 6B is the climate zone. I've got

a new construction project, I've put in the project details for the code official's benefit –

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and I've specified it's a retail building of 5,000 square feet, it's considered nonresidential in its space conditioning type. So that would complete the inputs for the project screen.

Jumping over to the envelope tab or folder, you'll come into it and it's going to look like this when it's got no data yet entered. This is actually specific to a 90.1 2013 energy code and that's a little bit different than all the other energy codes. It's different in the sense that there's a check compliance button down on the bottom. This then means that when you want to update the envelope compliance you actually have to check that or click on that box to invoke the performance simulation to run.

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Depending on your project details, this could take a minute, or two minutes, three minutes, it depends on your PC CPU and the level of detail in your project. But there is a period of time required to compute the result and bring it back so we didn't want to do that dynamically or programmatically every time you changed a value because that would just bog down the software too much. So you have to make your changes and then opt to check envelope compliance, as you want it checked. All the other show codes will determine the compliance metric instantaneously when you change a data value.

The first order of business I suggest to users for your envelope inputs is to consider the opaque assemblies.

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The opaque assemblies are just what they imply, the roof, they're things that don't have the fenestration units in them. A roof, exterior wall, some exterior walls, base, and some floors. This is showing you a fully specified envelope where I've got the roof listed first with all relevant data input and as you click on adding assembly, construction detail submenus may appear depending on your selection.

In the case of a metal building standing seam type roof you will have to specify what the construction detail is over in the, what is that, the 1, 2, 3, 4, 5, 6<sup>th</sup> column and that will inform us what kind of insulation layup you are installing in this roof.

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You will want to also specify or make sure that the building area type assigned to this roof is correct. I only had one building area type specified for my project so it will by default assigned that building area type. If I had more than one, you would be obliged to specify which on this roof belongs to.

The other point I would like to emphasize is the distinction between cavity and continuous insulation. Cavity insulation is any of the insulations that are in the plane of the assembly but that are interrupted by structural members.

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This includes metal building roof assemblies that are sandwiched between the, and compressed between the roof deck material and the structural member. Even though that might look like a blanket spanning over that structural member, if it's compressed such that there's a thermal bridging going on that is not considered continuous insulation it's considered cavity insulation. Continuous insulation is truly an unbroken installation across the whole plane of the assembly. So try to be thoughtful on the values you're entering in those two cells with respect to thermos bridging going on.

Fenestration is the next assembly type I want to introduce and that type of input is entered through what we call a fenestration performance detail dialogue.

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You will have three options for specifying that information. The first option pertains to site built certified products for commercial use only that are NFRC certified. This will, if you have such a product you will have a CPD ID that the NFRC community has provided to you and you can enter that to do a table lookup against that ID and get the performance data programmatically to the software.

Most people lined up are working with the product performance evaluated in accordance with NFRC that's the second option. You can pull this performance data typically off a label, a window product that's built by a manufacturer and a lot of residential windows will fit this option nicely.

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The third option is the energy code default and this is available because the energy codes require that if you don't have a labeled fenestration unit you're obliged to use the energy code default. And when you use those, please know that they are not very good performance values so you would have to use better performing assemblies if you are going to overcome the poor performance of your fenestration. So I encourage you to find and get a labeled product for your fenestration so you can take advantage of better performing data on your fenestration.

In the 2015 IECC, I mentioned that there were two additional criteria related to the fenestration that must be met. You have to meet or beat the area weighted average U factor for your fenestration.

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And this is not across the full spectrum of all your windows but by category. So if I have all fixed fenestration vertical fenestration then I have to meet or beat the 0.36 U factor. If I have other types of windows like operable ones then I've got to meet both of those independently. The first one has to be meet the 0.36 and the operable has to meet or beat the 0.43 U factor.

You also have to meet the SHGC prescriptively and that means every assembly has to satisfy the maximum allowed presented in this dialogue. This dialogue is available through your view menu and in glazing requirements when you have this energy code enforce.

SHGC will be dependent on the orientation of your fenestration and whatever projection factor you have specified for that fenestration unit.

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So in summary, this would be what a completed envelope table looks like it's a very simple square looking building. And because it's 2013, I haven't clicked and it says TBD down in the envelope button I have not yet clicked the check envelope compliance to get it update but that would be the next step in determining whether my envelope passes.

Note if you have walls or windows that are on the same orientation and have the same performance specifications for them, you can combine those walls and windows into a single wall or single



window by adding the gross area together and entering the performance data one time.

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Again, they have to have equal performance data and/or be on the same orientation in building area type.

Gross area means what it says. For walls, do not subtract the area of your windows in that wall and treat it was gross area.

Slabs is another one I'll point out. It's subtle but you'll see that the units are really in feet. That's linear feet or perimeter length of slab while all the other assemblies are in square feet of input. This allows us to calculate the F factor rather than the U factor for the slab and incorporate that into the tradeoff methodology.

Moving on, we'll speak now to the lighting compliance. Note you have qualitative type requirements that can't be measured in the software like control requirements, switching requirements, efficiency requirements;

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you have to meet those through demonstration in your plans and in installation. Otherwise, you're really trying to specify your proposed connective power such that it's less than the allowed power for interior lighting and exterior lighting.

I mentioned that if you want to take advantage of additional allowances you have to be using this space by space or area category method.

Pole building will allow you take exemptions but there are no allowances directly associated with interior lighting if you're using the building envelope area type or whole building method.

Exterior lighting I mentioned the distinction between tradeable and non-tradeable so I won't elaborate on that.

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The next slide will show what an interior lighting screen looks like and this is a fully populated screen and it's showing a 44 percent compliance metric but let's latch on some of the key points to note on it. Remember back in the project screen we had to pick a method well I chose the area category method, I've given you a little graphic in the upper left to show you what that project input

looked like and I had common spaces for offices specified along with retail and I put another one for restrooms.

These area types now will be mapped to the interior lighting table. You will see that on row 1, 5, and 7. For each of those rows then we do some accounting for your benefit and tell you what the allowed wattage is and what your proposed wattage is for each one of those area types.

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And then we tally that across all the area types to give you a building total. This is really what your goal is is to come up with a proposed wattage less than the allowed wattage and that's what makes up the 44 percent passing.

To enter fixtures for any area type you would select the area type of concern and then you would add fixtures by going up to the add fixture button and picking from a set of inputs.

The inputs that you would add for fixtures are based on this list of fixture categories. There's the linear, fluorescent, compact fluorescent, HID, these will have submenus associate with them to sort of prepopulate the fixture rows in the lighting table for your benefit, but you will have to put some additional information. How many of these fixtures do you have, what's the fixture wattage, the number of lamps, for example, would be specified by the user.

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The next screen on this we'll just touch briefly on, exemptions and allowances that are available for lighting. If you claim an exemption then the proposed wattage will be reduced by the calculated value of that exemption. This might pertain to things like exit signs or special visual display needs for medical facilities, that type of thing.

Allowances will allow us to calculate some additional bump in the allowed wattage. Generally, this pertains to things like retail lighting and specialty merchandise lighting. I'm going to show a slide now that demonstrates or shows you what the general listing of these two types of allowances and exemptions are. The left most list gives you a set of exemptions to choose from –

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and the right most one shows you what types of allowances are available. These are code dependent so not all of these may appear

in every code. If you pick an allowance, you generally will then be asked what the square footage of the area being lit is for that allowance, it's generally not the whole area type that you've got the fixture added to it's usually a display case or sconce or something more focused in your space use type.

Exterior lighting we'll jump to next and that's very similar into the interior lighting you'll have mandatory requirements, and again, inputs will be based on code. The code that's specified will be the exemptions. The areas you specify in the project screen for exterior lighting shown in this slide are the same ones that will appear in the exterior lighting table.

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It's just like the interior lighting. We will do the work of tabulating and accounting for the proposed wattage on each row that reflects an exterior lighting area. And we'll tell you what the allowed wattage is to know which ones are under code and which ones are over code.

If it's non-tradeable and in violation, you'll be given some red text to show you that. You can't take some surplus from another area and apply it to that that has to be satisfied more prescriptively, if you will.

Jumping over to mechanical systems next, there will be a limited means to determine compliance at least metrically; I've noted that several times.

[00:54:00]

So we're asking you for the basic characteristics of your system and we will present the required system efficiency that represents the minimum or maximum that you have to meet.

These systems will be your standard set of mechanical systems that are out there in the code and you can look to those to see how those are understood. The plant will include heating and cooling plants and then there's service water heating represented in the software.

Take note that there's also a button called fan systems this will give you access to a fan library where you are obligated to specify each and every fan system that will be included and hooked to a HVAC system or plant equipment.

[00:55:00]

The selections you make in the mechanical systems and in the table will help us filter out the mandatory requirements that appear in the requirements tab and on your inspection checklists. We would like to be more aggressive on this filtering because there are so many of them, but presently we're constrained to what we can incorporate into this design of the table, we're hoping to improve on this in the future to cut down on the volume and be more specific to the system that you've got specified.

This is a quick look at the types of systems that are represented on the heating side and the cooling side. Once you have one or more of these choices selected, and you can pick just one, just the heating equipment and not have any cooling equipment or you can pick from both sides. If you pick heat pump the cooling equipment will be disabled and you'll pick from a list of heat pumps to determining what type of heat pump you've got.

[00:56:00]

An example at the bottom I've specified a single HVAC system that's got a duct furnace associated with it and a split system AC unit. I've entered the capacities and the fuel types and that in turn has driven what we see for the minimum efficiency requirement that you must meet.

If you don't see, a minimum efficiency that generally means that that type of equipment is regulated through the NAECA legislation and we do not choose to enforce requirements that are already enforced by other entities especially when it's being manufactured with the approved efficiency. So if you see a hyphen-hyphen that just means there is no requirement, either because the code doesn't regulate it or some other code legislation has been taken care of the requirement.

[00:57:00]

There are some additional worksheet type requirements we can help you determine compliance with. As mentioned a bit earlier, the fan systems is one of them. If you had picked the fan systems button as I showed you two slides back, you would come into a screen like this and you would define one or more fan systems given it a description in the area served to help your code official know what you're referring to.

You have two types of options for meeting fan system compliance. The motor nameplate horsepower is the simplest method. If you want more granularity considered in the fan system compliance then you'd pick brake horsepower, from there you can opt to add pressure credit, pressure drop credits –

[00:58:00]

and make some adjustments in your overall system knowing you have some of those features as a part of your system.

Your objective is to meet or beat the max allowed horsepower as shown in the lower right here. Your compliance outcome for this particular system will be reported on a pass/no pass basis in the lower left.

Once you have a fan system specified and its compliant, you would go back to your mechanical screen and for those systems that have that particular fan system, you would assign the description you provided in the fan library.

Lastly, you're going to visit the requirements tab and as I mentioned earlier a lot of the inputs we ask you for will help us filter out these requirements. There's a long list of them and we've tried to sort them by project envelope, interior lighting, exterior lighting, and mechanical –

[00:59:00]

so as you pick on any one of these different options at the top here the set will be refreshed and be explicit to your selection.

The intent of this whole thing is to get the information about mandatory requirements in front of the design individuals or people that are putting the plans together for this building. We feel like if you learn what the requirements are and what your code official will be inspecting or verifying you can incorporate this requirement further up in the whole process and thereby make it more efficient and quick to turn around for your code officials benefit and ultimately, for your benefit.

What you would do with this requirement is for any one you have selected here is to acknowledge –

[01:00:00]

that the requirement will be met. Where there are exceptions or the requirement simply doesn't apply you can put pick that option? And in most cases, we ask you for where in the plans the

requirement can be verified and documented as being incorporated into the project. This too will help your code official go right to the plans and verify compliance.

This is not presently a mandatory type completion process but we're expecting that to change in the near future such that you will have to fill these out. Right now, it's up to the code official community to enforce that, if they don't see it coming through the reports they can have the authority to push it back to the applicant for completion.

[01:01:00]

So next is the reports and you can access the reports by clicking on the file menu and then view and print report. And you choose which report you want to see, most users will pick all four but if you're only interested in the envelope compliance certificate, you can opt to be selective.

You will get a certificate for each selected report and then a compliance signature line. Pam will speak to these components of our reports coming up and the inspection checklist will be output in the report as well and to be used by your code official. And again, Pam will speak to those reports at this point in time.

So thank you for your attention, I'm sorry it was such a lot of information in a short period of time –

[01:02:00]

but hopefully, we've conveyed the basics and you can learn as you go.

*Pam Cole:*

Thanks, Bob, that's great. I'm going to go over the report function and then we are going to show a demo of the software.

So here's a screenshot of an actual report that's been generated off of a case study. And we do have a case study that's available on the website under our training resources on [energycodes.gov](http://energycodes.gov) as well.

But this example here is a generated compliance report. Now what is included, so you can have a little bit of understanding of what you will see and what the designer will see, what the code officials are expecting to see. And these reports are really good to go to if you're failing compliance and you're looking at your project –

[01:03:00]

and you're trying to figure out well, where am I failing? Go click it or go take a look at the compliance report because there are two critical columns on here that you will not see in the software that will help you.

On the screenshot here, if you look in the middle of the screen there's a proposed U factor and budget U factor. Those are the big player that will help you. If you're having issues with the project and you're not getting full compliance, take a look at those last two columns and it will show all of your assemblies, but if your proposed U factor is way higher than your budget U factor then that might be where your issue is.

You have other thing that come into play though, that might be your only reason there's solar gains that can come into play and some other things, but that would be the first starting point that I would go to. And if I was designing a building and I'm failing and I want to have a quick, easy way to try to determine where are my big failures or where am I not meeting compliance?

[01:04:00]

Is my insulation really, really low in my roof and is that causing me a problem? This is what I would go to is the actual report and take a look at it.

So on the compliance report itself, and I've enlarged it so you can see that each of these pages is a little bit bigger, and you want to first when you're looking at is if I'm a code official or even the designer, verify that you've chosen the proper code. This is big. There's a lot of code options in COMcheck. The DOE policy is that we will promote the most recent 90.1 and IECC and then two versions back. Those are the codes and standards that we support in COMcheck.

So you noticed Bob's talked about 2015 and 2012 and we support '09 those are the three codes of IECC and then the direct reference of 90.1 are the standards that we are supporting.

[01:05:00]

We do support a couple state specific versions and if you are a state energy office and you want more information you can go out to [energycode.gov](http://energycode.gov) and look at our state technical assistance information out there.

So on this report the other things you want to take a look at is make sure you've got the correct location. So from the project tab that Bob showed you a screenshot of make sure you've got the correct city and/or county and then your construction type. Those are the biggies and the thing that you will see on the front page of your compliance report for the envelope.

Lighting the same thing will almost apply, under lighting you're going to see the code, you're going to see your building types or your space types depending on how you're showing compliance. And then it will actually just show all your lighting layout that you've actually entered.

But for the envelope though, the first things you look at is the energy code, location, and your construction type specification.

You go a little bit further down on the report and then this is where you've entered all of your envelope assemblies, --

[01:06:00]

the building thermal envelope. So as you're running your takeoffs and you're looking at your building plans, you're defining the building thermal envelope of the conditioned space. Now it gets a little bit more complicated if you have a semi heated space or semi-exterior walls and that's code driven depending on what code.

But if you or right in the IECC and you had an office with an unconditioned warehouse then you would want to make sure that you'd defined the office space, the building thermal envelope its condition and that is what you have on your project. So take a quick look when you're done entering all your information and you've created your report, even though it's passing, go take a quick look at the actual report.

And make sure to double-check that you've entered all the square footages properly, you got the correct assemblies that are shown, the insulation placement is correct, cavity or continuous, your fenestration has been entered correctly.

[01:07:00]

And then verify and then sign at the bottom where it says verify this compliant statement.

For commercial and the commercial code, the person that signs the actual compliance report is supposed to be a registered design professional. That's what the actual code has stated but



COMcheck, as far as COMcheck concerned there is no certification to use COMcheck. Anyone can use our software tools you don't have to be certified. It's who signs those reports and who submits those reports and who enforces it at that jurisdiction is what's important. And on the commercial side, it should be a registered design professional.

So you might have three people signing an actual report in COMcheck. You might have a different person, an engineer signing the envelope; you might have a lighting designer signing the lighting portion, and a mechanical engineer doing the mechanical. So as you get in the commercial buildings, there's a lot more that might be involved in the actual project than just one person doing the entire compliance reporting.

[01:08:00]

So the inspection checklist. Bob showed you this requirements tab and I'll show you the software, but the inspection checklist and we get questions about this because you have an option when you go to create your report is do you want to have the inspection checklist. And I highly advise that you go through all the requirements in the requirements tab because it will list out all of the code requirements on the code that you've chosen and you're going to confirm whether you're meeting those provisions or not. Or maybe there's a provision that's not applicable to your project so you specify it and when you specify it, it will show up on these inspection checklists.

I would keep a copy of these the entire envelope or lighting, whatever the report is on your project site. I would keep one for the designer at hand and I would submit the entire thing to the building department along with the inspection checklist.

[01:09:00]

So what else is involved on this inspection checklist? So for the envelope portion the way these columns are set up is that you have the first column is it will actually give you the code section. So it will cite where the code section is from the code. The second one is the inspection type. So the way we set up the inspection checklist is actually like phases of construction. So this one it's the footing and foundation inspection and so that's what you would see is that we have the blow gray wall and the insulation R-value would show up for the footing and foundation inspection portion.

Then the next one is values from the plans. And then the question that comes up is well who, who's verifying this and what does this inspection checklist do?

[01:10:00]

Well a lot of people involved that can use this inspection checklist. The designer who's entered the information; this is information that they're going to want to have on hand to make sure that they're meeting all these specification. The plan reviewer, he can use this and start doing his plans verified and looking at the building plans and confirm that the compliance report is correct. And then sign off on permitting.

Then the next column, the value filled verified would be the inspector out on site. He might be putting or she might be putting the information in where they're out inspecting the provision and making sure that the installation specified and the assembly that's shown is what matches what's on the plans and what matches on the compliance report.

And then there's a column that says complies. This typically is done for the building department and the inspector to say that the measure's been met, no, it's not, it wasn't observable in the field, or this measure wasn't even applicable.

[01:11:00]

And then the last column is actually the comments and assumptions. And this is where when the user in COMcheck is going into the requirements tab and each of the provisions they have an option where they can say yes, this measure will be met on our project or it's not applicable. And they can also have the ability to put on what page on the building plans that this measure would show up. This only helps save time for the actual plan reviewer that they can go through when they have a huge set of plans in front of them and they're going through and they're doing their plan review. It's a really nice feature and I'll show that to you in COMcheck.

So again, this is a screenshot of the home page of [energycodes.gov](http://energycodes.gov). So if you went out to [energycodes.gov](http://energycodes.gov) we have more than just COMcheck as a software tool, we have a residential tool called REScheck and we've already done a webinar on that one.

[01:12:00]

And that's available; the recorded webinar is available on our training page so if you clicked on resource center and then training you would get to it.

But how you get to the software tools there's a couple different ways. You can get to COMcheck on the right hand side of the home page where it shows the popular link. You can click on the compliance navigation on the left hand side and it takes you to the compliance tool and there are two tools. As Bob mentioned, there is the desktop version and then there's the web tool. So you have two options as far as using these tools.

And here is a screenshot of the actual COMcheck page. So if you clicked on the compliance on the left hand side and then you clicked on software tools in COMcheck then you would have the options of the Windows desktop version. And you can go click on the download or you can go to the web tool and start COMcheck web.

[01:13:00]

If you're going to do the web tool though I highly advise that you give yourself and register with an e-mail and a password right off the bat. Because if you start entering a project and you're not registered, you're going to lose your data.

You want to be able to save that data, you never know if you might have to go back to it and typically, with commercial buildings you got more than one person involved. And the web tool is a really nice feature because with commercial buildings, you do have a lot of people involved in the project and you might want to set up a generic account. And that way you're lighting designer could login after the envelope portions done and you have one full compliance report when everything's finished that can be submitted.

And there is a feature in COMcheck where you can submit these reports electronically. So if you have a rapport with that building department and they have your stamp or whatever it might be on file and they allow you to submit your compliance reports electronically, great, that saves everyone a bunch of time.

[01:14:00]

You don't have to drive down and hand deliver the actual hard copy of these reports. And that is a feature that's within these tools is that you can send them electronically.

So let's go take a look at the actual software itself. And I'm going to open up the desktop version. So when you first go to the desktop version you'll see a screen display. I actually opened it so you didn't see me start it up but it will have a little starting with a little desktop icon on it that says COMcheck and it's downloading the actual upload, the actual software.

And so when you get into the software let's take a couple look at things that Bob went over on the actual screenshots that he showed and we're just going to go through some of the basic functions of how this software works.

[01:15:00]

So the first thing is at the very top of the software you'll see it says untitled.cck. I haven't opened up the data file and if I did open up the data file then instead of saying untitled it would have a name of a data file that I had saved. The dot cck is the actual extension of the file name that it will save it.

So let's say I had Pam's office that I designed and I saved it. And so when I went up to file and save if I hit save as and I save it as Pam's office, it will give it a dot cckextension. That's the actual data file. I also have the option I can save a report too. So if I come up here and I go file save report, it's going to save it as a pdf. Two different functions.

The next menu – and at the top of the toolbar, so you have the data file and I haven't opened one yet so you got the untitled.cck.

[01:16:00]

You got the version so this is a filled version of the software. This could be important if you're submitting a question through the help desk that you probably would want to say hey, and I'm on build version da-da-da-da-da and so we'll know exactly what version of the software you're working in and then submit your question.

And then the last things that up on that toolbar is the actual code. And right now, I'm on the 2015. You choose a code in the software and you close COMcheck down, the next time you open the program back up it's going to have that same code open again. So if you were working in multiple states and you're using multiple codes, you're going to want to pay attention to the code that it opened it up to 'cause you might to change that depending on your location of the project.

The next thing down is the actual menu toolbar. So we have file, edit, view, options, code, and then help.

[01:17:00]

So let's take a look at these. So if I click on file this is where I can start a new project. I can open existing projects. I can open recent projects. And then the save functionality that I talked to you about. The view print feature. Save the report as a pdf and then I can e-mail the report, let's click on that real quick.

So this is where if I've created a project and I want to go e-mail it electronically down to the building department, I can choose which reports I want to e-mail in and it gives you the options on the report side. The RTF option if you want to create an RTF. This functionality works well if you have CAD drawings and maybe you want to upload the actual report on to a CAD file then you might use that feature.

And then the complete your status. This complete your status is is you won't get the actual report unless you tell us that is this a complete project, yes or no?

[01:18:00]

And this is that you want to make sure that you're doing this before you submit it for approval. It's just another nice feature and it also is that there is a feature in these tools that where we can capture data. And we don't do anything with proprietary information but we like to analyze a lot of data here at the lab. And so there is a feature that you can turn off if you don't want us to capture your data, but this is one of the reasons why right here is we want to know if you have a complete project or not.

So let's cancel out of this. Now the edit, back up at the top again on the menu bar here we have the edit, the next one over is the edit. And you'll see that they're grayed out except for preferences and I'll get to these other ones, you actually have to be in one of the tabs for those other functions to work, the copy, paste, and duplicate rows.

But let's go to preferences.

[01:19:00]

What preferences does is if I want to customize and have the same information show up every time, maybe I want to customize my reports, the signature lines, and so forth, I can do it under

preferences. And so there are four tabs, under the first tab, the general tab, is maybe I want to have for file options a certain location where I want to save every time or where I want to go look to get my projects every time.

The other thing is number of recently files on the file menu; you can change the number of recent files that you want to show so you've got that option as well.

And then, if you want to show the full path of the data file name in the title bar up at the top that I showed you previously.

Then you can block other users from opening a currently opened data file. And if you want to share a data file then you want to make sure you don't have that clicked.

[01:20:00]

So if you have that clicked, you won't be able to share that data file and it's going to block it.

Version updates. You have the option here is if you wanted to go check if there's a new update available. I can say never, I can say every six months, every week, whatever it might be.

And then upload usage data this is where I talked about that we can capture data that we use for statistical analysis here at the laboratory and you can click off that feature if you wanted to.

On the project tab, this is where if you put under preferences and you choose a specific code and a location then it's going to open it up, every time you open up COMcheck it's going to save that preference every time. So be careful with this one, if you choose it under preferences then you have to go back under preferences to change it because it will not change it for you.

[01:21:00]

You would have to do it here under preferences or just leave it alone and don't use this feature.

The other one is you can actually enable certain things for the envelope. So let's say I know with all my projects that I'm going to do orientation every time. Now this is code specific as well, some codes require that you have to do orientation such as 90.1 2013. And then the visible transmittance these are things that you can

enable under the envelope tab and that they're available every time, but there, again, some codes require it.

The comments one though is that it is this is a feature that you can enable a show every time in the envelope tab, but you don't have to. It allows that user/designer to add; additional information for each assembly type they're entering. Maybe I have a special certain thing I want to talk about for a certain wall type –

[01:22:00]

and I want to give more information on that report about this specific wall type then that actual column is available to you to add that additional information. And I want to have that column enabled every time; you can do it under preferences.

Interior lighting. If you want the exemptions and allowances to show up every time, same thing, you can enable it here.

Under applicant, the applicant tab, if I want to have the owner agent and designer contractor where I customize my report I can do that here. I can add in the names and those names will show up every time I create a compliance report. But be careful, if you have other people working on these projects and you've got to have more than one designer contractor involved, you might not want to use the preferences here. But this gives a little bit more customability to the actual reports and that's why we call it preferences.

[01:23:00]

Under the reports tab this is where if I'm sending all my stuff electronically and I don't want to enter my e-mail every darn time, well then, go under preferences, and enter the information here. This will save you time as far – if you deal with one building department and that's all you work with, all your projects go into the same jurisdiction, then fix this under preferences and then you don't have to type it again. And then you could e-mail your report then and when you go to click on the e-mail function, all this is automatically populated if you put it under preferences under here. If not, then don't use this feature. This is a feature that wouldn't be applicable to you.

So I'm going to go ahead and click cancel and get out of the preferences. So the view button, we're back at the top now up on the tool menu bar and I'm going to have to go a little quick because I want to make sure I get to questions and answers because this is

only a two-hour webinar today. And I'm looking at time and we've almost got 11:30 so we almost have a half hour left.

[01:24:00]

This is where you can actually change what tools you want in status bar. Glazing requirements can come up and this is a nice feature and you'll want to use this feature if you're in the 2015 because there's some extra code driven requirements with glazing requirements that are involved.

Let me click out of this one real quick. The options menu, these are grayed out but they are dependent upon what tab I'm in and I already talked about orientation and digital transmittance. These other ones, the daylighting and the glazing allowances and so forth those wouldn't be grayed out if I can click on the envelope tab, see how they're not grayed out now? I can choose those options if I want to and again, they're very code driven. Some of those options may be grayed out depending upon what code you're on.

The code menu is where you have the drop down list of codes and your choices of codes. And I talked about view each policy of what codes we support very important to know which codes are supported in these tools the main IECC and 90.1.

[01:25:00]

And state specific versions these do change and they change after time as far as when states adopt new codes.

The help, the help topics, I highly advise if you are new COMcheck, you don't understand how to enter a certain assembly type or lighting go to the help topics. The entire software user's guide is embedded in the help topics. You can go click on such as roofs and roof types and it will define for you every roof type that you can choose within the software, a definition of that roof type, and then how to enter that roof. So a really nice feature if you are not familiar.

I just clicked on the software inputs, it will also explain to you how to enter the actual square footage of that roof, difference between cavity and continuous and so forth. Now these are all different depending on what code you're in and they can be code driven within the help topics.

[01:26:00]



But this is a really nice feature when you have questions. Before you submit those through the help desk you might want to go here and your question might get answered a lot quicker by going up to the help topics and kind of looking through to see what's available in the software user's guide that might help you get that question addressed a lot quicker.

But let's click off this one and now let's go down one more level here. Real quickly, this is just a Windows functionality, the next bar down this is cut, copy, print, some more functionality features. And then we have the tabs that are in COMcheck, project, envelope, interior lighting, exterior, mechanical, and then the requirements tab.

So in the project tab this is where you get your location, your project type, if it's new construction, addition, alteration. Compliance options, this will change depending on what code you have but you will need to make sure where it says red, --

[01:27:00]

Bob talked about colors, very important. Anything that shows up in red has to have some information entered or it will not finish creating a compliance report for you. So I would have to choose an efficiency option here and an air barrier option before I can continue on, it shows up in red.

Project details, if I clicked on the edit project details this is where I can enter my sites of the project, the title, I can enter the address and so forth, any notes. You might not have a permit number yet, then leave it alone. Owner agent and designer contractor, I showed you those under preferences but if you don't define them under preferences and you want to have them on your report, then you would put the in here. So you would put them from the project tab, you should then for this specific project that you're entering you would enter that owner information and then the designer contractor information.

[01:28:00]

So let's hit X out of here and get out of that. Over under the right hand side you have the building envelope area types, interior, and exterior lighting. Now questions that come up are well, what if I'm just doing my lighting, do I have to show my building envelope area thing. No. Each one of these are separated meaning compliance is individual. I can do my building envelope, save it, and be done. I can do just interior lighting, save it, and be done,

and exterior lighting or I could do a mechanical compliance report. You do not have to do all of these at the same time.

Now will the building department want to see the complete report submitted all at the same time, that's up to them. But as far as COMcheck is concerned, each one of these are created and calculated separately. This is not a whole building performance software tool.

[01:29:00]

So down at the very bottom you'll see envelope TBD, interior lighting, and exterior lighting. These are the calculations that COMcheck will do and they do them separately.

So after I've entered some building envelope area types and let's just quickly enter a couple. So I'm just going to enter a couple and I've got to enter my space conditioning type and it's code driven so I have non-res and res and I show it as nonresidential. I'll enter one more, so I'll enter a post office here and I'll just put some square footage in and I'll leave it as non-residential.

Now let's just say I'm done, I've got my building projects entered, we go over to the envelope tab, and now you see we've got some buttons up here, roof, skylights, exterior walls, windows. This is where I start defining my building thermal envelope. You might not have skylights, then don't touch the skylight button. If I don't have a basement, I'm not gonna even go to the basement button.

[01:30:00]

So you want to have your building plans in front of you and you want to know what your specifications are so I just start from the very beginning. You can either start at the slab foundation and go from the floor up or go from the roof down, it don't matter. But I highly advise before you start looking at the overall compliance results that happen down at the bottom, get the entire building envelope in there and then look at what you have for your compliance result.

So I start at roof, each one of these has a drop down list of assembly types that you can choose from. And if you do choose from one of these assembly types, we've already calculated the typical components that are involved with that assembly, meaning air films, framing members, if there's jib board involved, siding.

Whatever it might be, we've calculated it based on ASHRAE and the look up tables in ASHRAE appendix.

[01:31:00]

So this is my next thing that I give my highly advise to and these codes are bit more complicated. And as we get into the 2015 and 90.1 2013 and how COMcheck works, which is really using ASHRAE appendix C methodology, a lot of it. And we use the look up tables in the ASHRAE appendix. I advise that you grab an ASHRAE, the current ASHRAE book or the code that you're working in.

So if you're working in the 2012, you're working in the 2015, go get that codebook. You gotta know what's in these codes. You gotta know how you gotta enter these assembly types. The software user's guide will help you but it's really good and it's advisable that you have the codebook in front of you. I mean it's only just going to be very helpful for you.

And again, we don't have, you're not entering everything into the software, you're only entering the building thermal envelope there's a lot more involved and all those other code requirements will end up in the requirements tab that's at the top here.

[01:32:00]

So let's get back to roof. So if I choose one of these assembly types, take a look at this U factor over here at the column that's over a few ways where it says 027. I'm going to do insulation entirely above the roof deck and I'm going to give you an example. It already has a calculated U factor there. That's telling me before that typical assembly without any insulation, I've not even put insulation in what a raw insulation entirely above roof deck assembly component would be without insulation.

Then I would go in, I gotta enter my building area type. This where from the project tab that I've defined my building type. I've got to choose from the one that's applicable for this assembly. And let's say on the very top floor is the courthouse and then I enter the square footage.

So now, for roof it depends on the insulation placement.

[01:33:00]

So if I'm not insulating at the roof deck and I'm insulating down at the ceiling level, I'm calculating at the ceiling level for my square footage. Insulation placement for the roof. So if I'm insulating at the roof deck then I'm taking the roofs plane and I'm calculating out the roof plane for my square footage here. So I'm just going to enter some square footage and I'm going to tab over and since I did insulation entirely above the roof deck, it's already grayed out the cavity column. I don't have cavity insulation. Based upon this assembly type that I've entered, I can only enter continuous.

Watch the U factor after I enter a continuous insulation. So I'm going to enter just arbitrarily an R-38 the U factor changes. That is the overall U factor for that component and the total UA, U factor time's area for that roof assembly. Every one of the assessments in here is treated the same way.

[01:34:00]

Now let's say, let's go to exterior walls real quick, what if one of these assembly types doesn't match what I have on my building plan? Each one of these buttons at the top here you have an option to use other and you can choose other and when you do that, you need to enter your overall calculated U factor and back it up with your building plan and your compliance report to that code official so he knows how you calculated it. Really important.

So if I go to choose other, the other thing that's important is well, what type of exterior wall is this? The reason why this is important is because we've got to have a baseline to calculate against. When I showed you, the report there was a proposed U factor and a budget U factor, well I gotta have a baseline for your exterior wall to know what I'm working against for a code building when you choose other. So you've got to define what type of exterior wall it is.

[01:35:00]

So let's say it's a mass wall and it's got little pop up teasers that will help you along the way as well. And I'll read that I'm a new user, so I'm going to read that entire thing before I click okay. And then I make sure my building area type is correct. I have orientations that I have specified here so I want to do my orientation. Enter my gross area and now look, you see that the cavity and continuous is that you can't enter that?

When you choose other for your assembly type. You don't have the option to enter the insulation R value you only have the option to enter the total calculated U factor and you'll need to enter it and the heat capacity if it's a mass wall. If you don't understand what heat capacity is, go to the help topics. And actually, there's a table in there that actually defines that exterior wall and heat capacities for you that come from the code.

[01:36:00]

So let's go over to one more thing here. So let's take a look at windows. Under windows if I choose, let's just go with frame fixed, this is the fenestration performance details that was shown to you on a screenshot of how the windows that are fenestration works in the software. Now if I don't have a site built product, a FRC site built product then I'm not going to choose the first button here.

Let's say I have product performance and I want to enter my own for my own specifications my product performance evaluation and it's not a site built window, I click on that, I'm going to enter my U factor from my plan, my solar heat gain co-efficient from my plan, and then my product ID. If I don't have a product ID then enter N/A or I enter what my product is and then I click okay. It will automatically bring in those fenestration details, the product detail,

[01:37:00]

the assembly type that I chose and then I put my square footage in and then it will populate what the U factor and what I've entered in that screen previously.

For this one it also needs projection factor and what the projection factor is is the calculation of your permanent overhang on the side of that building. So if you need more information on how to calculate a projection factor you can go to the help topics and it will show you an actual screenshot of what the projection factor is and how you calculate that. Typically, it's less than one so I'll just enter a value there.

All right, so let me enter another exterior wall 'cause I want to show you some more things about functionality. So I've just entered just an arbitrary still frame wall. So some things about function is let's say I've entered all my project information and oops, I want to move my windows under that other exterior wall.

[01:38:00]

I can highlight window one here, row three, and I can drag it under row four. See how I did that? So I can move assemblies around as long as there's a parent-child relationship, meaning exterior walls you enter the gross opaque area, which includes all your windows and doors.

Then if you don't enter all your walls under one line item, 'cause you can do that, you can group like components if you want to and really make it a short report. But if you separate out all your walls then you've got to separate out all your fenestration and show them under the specific wall that they represent. Especially if you're doing orientation then you're going to separate out all your walls anyway. But you can move assemblies around so I can move my windows in between walls if I want to. I can actually duplicate with window, let's say I want to duplicate that same window. I can come up to the very top of that tool bar and go duplicate row.

[01:39:00]

And I can't duplicate that same assembly again, then I can highlight this row and move it under row two and drop it. So there's a nice feature there.

Some other things that you can do is as your start getting more columns at the top here, I can expand these its' almost like an Excel spreadsheet. I went over to gross area and look how I can expand that column. I don't really need to expand the gross area but I might want to expand my fenestration details if I have a lot of information there or construction details. Construction detail actually has to do a lot of that with alterations. But you can expand these columns, if need be, as you're working through your project.

Let's go back to the project tab and then let's go to the interior lighting tab. I've showed you envelope, I just went through it really briefly, and we're just talking about basic function. I didn't enter a complete project, I have blue down at the bottom, and I have read because I'm missing information.

[01:40:00]

I don't have a complete building here so it doesn't have a compliance result. There is an example data file that you can open in the COMcheck desktop if you want to and look at an example data file. Or you can go out and download one of the case studies from [energycode.gov](http://energycode.gov).

So let's go to project, let's go over to lighting real quick. I have the option to do building area method or space by space. I'll leave it on

space by space and let me just enter two types, so we can play around with the lighting real quick. And I'm entering my square footage and let's go click add again and let's go put another space type in. I'll do general seating area and I'll just put a number in and we'll be on our way.

So let's go over to the interior lighting tab now. It automatically takes what I put in the project tab and brings those space types over to your lighting tab, your interior lighting tab.

[01:41:00]

You've got to highlight the row or the building or the space size that you've entered before you start entering your lighting fixtures and that's where it's gonna place them.

So I had clicked on the first row and look, I can't see where it all fits, I'm going to scroll over, look at how I can expand my components so I can see the rest of that building type there. So I'm going to highlight that row. The other thing is it shows you the allowed wattage and your proposed wattage well I haven't entered any lighting so my proposed wattage is zero.

Now the other feature that it doesn't have up here, it has fixture ID, fixture description, lamps, ballast, number of lamps, number of fixtures. What if I have allowances and exemptions where's that? I showed you under preferences where it was but if you didn't choose it under preferences so it enables it every time, --

[01:42:00]

I've got to come up to options, and see how it's not grayed out, interior lighting and exemptions allowances. I click on it and now I've got that column. You're probably going to want to have that column if you've got detailed lighting that you're doing, especially retail where you might have some retail display.

So get that column out there. Now I can come over here and I can add a fixture and I can typically, I can go down and add fixture from my fixture library. This is my fixture library. So I've added a lot of stuff to my library where I can go in and automatically enter my number of fixtures, my fixture wattage, and if I have any exemptions or allowances. The exemptions and allowances are code driven. So they come from the code that you've chosen. I'm not going to go into detail about these 'cause, again, that depends on the code but that's where that will display, that column will display to help you define out any decorative appearances or any exemptions that you might have for your lighting.

[01:43:00]

Now let's go to fixture library real quick. If you're new to the software, create your own and you're a lighting designer, start creating your own library. If you create your library, you can share that library with other users that are lighting designers. Send in a question through the help desk and I'll explain how to do that, it's actually a file that's within the program that you can send up. Even if you download a new build version, you can capture and save your lighting library so you don't lose it so send me in a help desk question if you're a lighting designer and you want more information.

But here's my lighting library. So I can delete fixtures, I can add fixtures, I can save them. So this has what I have populated so far. If I didn't have a library and you click on the add fixture, you're just going to get the drop down list of the typical lighting fixtures that we have in the software and you can start defining your lighting schedule if you want.

[01:44:00]

You don't have to do anything with the fixture library. You don't have to save anything in the library if you don't want to.

So that's a quick introduction to the interior lighting now let's go back to the project tab, let's click on the exterior lighting areas and this one, which was is code driven is exterior lighting zones. And it will stay in red and it will not calculate until I define what my lighting one is. So let's just put one in and now this is where under lighting you've got tradeable and non-tradeable areas. All the codes are the same way with this one. So be very careful and pay attention to the number of units. The units are what change depending on what you have. So again, I can scroll over, you know I can increase what these things say tradeable versus non-tradeable.

But this says number of units, it says machine quantity. This wants to know machine, how many machines I have. I'm going to add one more row quickly so you can see the difference here.

[01:45:00]

Driveways, I'm going to enter a driveway and now it's square footage of the driveway. So pay attention if you're doing exterior lighting to what those units are and whether you have a tradeable or non-tradeable area.



And on this one, one's tradeable and one is not so I can put in I have two ATMs and then I can put that I have 1,500 square feet of a driveway. I come over to my exterior lighting tab, and yet again, it's populated those exterior lighting areas right over to the exterior lighting tab. So I have to highlight on which one I want to start entering my lighting, pretty straightforward, it's the same as interior lighting except just different lighting, of course. And then I start entering it from my fixture library or I add the fixture from the add fixture button. Simple, simple.

All right, that's the quick and easy about the envelope, interior lighting, exterior lighting, and mechanical.

[01:46:00]

And then we're going to finish this webinar with questions and answers right after I get your mechanical and requirements tab.

Mechanical does not give you a pass or fail. There is no compliance result at the bottom. But what it does do, it gives you a nice customized report because depending on how much detail you have in your systems the more information you're going to see that's going to appear that's going to be required to be entered.

And what I mean by that, as you get into your fans, your supply, your exhaust fans and you can enter those fans and there is a little bit of calculation involved when you get to fans. But I have options here at the top, I can enter an HVAC system and it will come up with a pop up screen that says what is my equipment type, heating versus cooling and I can define it. I can put my zoning categories in if I want to. So if I say heat pump I can choose from the drop down list of heat pumps available. So I can do VRF, water source, whatever it might, be click okay.

[01:47:00]

These columns start getting longer and longer as you get more detail into your mechanical system. So I got capacity and I need to enter my capacity it's in red. I got my system details and it says click here for cooling. This is code driven and climate zone driven. Is an economizer required? It could be that an economizer is required. What economizer type do you have is it a water, no economizer, and if so, are you taking a provision meaning do I have high efficiency equipment where this economizer is not applicable or the capacity is lower than what pushes you to have an economizer that could be taking place too. I haven't entered my

capacity yet so I'd have to enter that first before I could even go to this step but I'm just giving you some examples here.

So anyway, I'll click out and cancel. Here's the fan system details, let's click on this real quick and see where we go.

[01:48:00]

So let's configure some fans. It's blank. I don't have any fans in here yet. Look down at the very bottom there's a fan systems and there's a little plus sign. So I click on the plus button and now I can start putting all my fans in.

Now I can enter all my fans from my mechanical plans if I want to. I might have 20 different fan systems going on. I can do them all at once and then I can actually map them to my mechanical systems over here up at the top later on if I want. Or I can do them one by one. As I start, entering my mechanical systems in, I can enter each fan each time and then map it. And you'll see when I say map it, this one says fan system one over here, I can change the name of this fan system, if I want to; to my own fan or whatever I want to call it. And then the area that it serves, very important especially on this compliance report so I know I can quickly go to the mechanical plan and see where this fan is located.

[01:49:00]

So down below you have the options of motor nameplate horsepower or break horsepower those are your two options. Those come from the code, no other options on how these get calculated. So if I leave it on motor nameplate horsepower, I come down here to fans and I click on the plus button. And then it wants to know your fan type, supply or return, relief exhaust. I choose which one it was, fan control, and then I got my volumes and my nameplate and my fan efficiency.

I'm not going to go through these, you can do these on your own if you're a mechanical engineer and you're actually entering your mechanical systems. I just wanted to give you a touch of this so when you're in the mechanical tab, you understand how to just get to the fan portion and start entering your fan information.

Now if I hit – I don't have all my information in here but if I hit close I should be able to go, --

[01:50:00]

if I saved that fan I can go select this fan for this actual HVAC system that I'm entering her right now. But that just gives you a little touch of the actual fan system detail.

So I can come up to plant and I can enter a plant and it gives you another pop up different than the HVAC system then you can choose from your plant details. Then I hit cancel. I can come over to water heating and I can enter the different types of water heating whether I have storage water heater or instantaneous water heater and it will actually display it into my grid. So it will keep moving me along where I can have my water heater, enter my capacity, how many of those do I have and system details of that water heater, and so forth.

So the fan system details there's a button for fan if you want to come up and reach your fan system inputs that ways as well. So there's just a little bit about mechanical. Not really going into a lot of detail 'cause like I said, it can get really complex the further you go along with your actual system.

[01:51:00]

Let's go to the requirements tab and then we are done taking like the quickest demo ever possible that I've ever done and showing the basics of COMcheck. The requirements tab all is driven also, by what you've put into the actual software. So don't go to the requirements tab just yet. If you're just doing envelope, get all your envelope assemblies entered then go over to the requirements tab. Right now this is optional for you to go through and confirm that you're meeting all these requirements but we're looking at changing that and enforcing designers to confirm these requirements because they need to know what they are regardless.

And I'll tell you what I mean by that, is that there's a project envelope interior lighting and let's just say I'm doing project first, plans and specifications. I've got to confirm that I'm going to provide this, right. So all I do is say requirement will be met. I can put where on the plans if I wanted to.

[01:52:00]

Let's click on the envelope tab. All these are the applicable code requirements that come from the code that I've chosen. Air leakage requirements, air barrier requirements, and there's outdoor air exhaust, intake dampers, you name it, all these come from the code. It makes it nice, it simplifies things, it makes it a lot faster.

But you should go through each one of these and confirm whether this measure will be met. This one's important because it actually, if you're not familiar with what's in the code and you don't have the codebook in hand; well we've kind of done that for you here. We've added those requirements in a tool. So you'll want to go through each one of these, click whether it will be met or not and then this will actually be populated on that inspection checklist that I showed you earlier.

So again, depending on what you're doing you can click on interior lighting and here comes some more information about interior lighting, exterior lighting, and then mechanical.

[01:53:00]

And go through each one of these. So if you're doing all of them, then you're going to want to make sure you click on all these and confirm all these code provisions before you create your report.

So up again, last thing, how do you create a report? You can save your report, you can view, print report from here. You can e-mail it and then you can save your data file from save or save as.

So this ends the kind of quick and dirty of the basic functionalities of COMcheck. Again, this is not our advanced version but this just gives you how to begin entering whether you're doing your envelope lighting or mechanical systems into the tool and the basic functions of how COMcheck works.

So from there and I'd like to thank everyone for joining us today. I know that this is a lot of information to take in in a short period of time –

[01:54:00]

so there is a lot of resources available out on our website. There are training materials available so let's go take a look at that. We have the compliance software, we have technical support, we have code notes available, and those are all under the resource center. There are publications that you might want to go take a look at, resource guides, and then the training materials.

We do post PowerPoints for every main code version and it is every code provision that's in that code under the training materials. And that might be a good resource for you especially if you don't have that codebook in front of you.

Again, you might want to have the ASHRAE 90.1. We use that, those are the look up tables that we use, appendix C methodology for COMcheck. So you might want to have that book in hand.

Again, thanks for your time. So now, we're going to get into the question and answer period.

[01:55:00]

We don't have a lot of time left so we're going to extend this a little bit. I was really pushing it, I know it's already noon so for those of you that want to stay on, I'm going to spend an extra 15 minutes and go through some questions that have come in. And if you do have a question later on, submit it through our help desk that's out here.

So, Bob, thank you for doing the beginning portion of this webinar and I'm going to start looking at some of these questions that we have. So again, we're going to take 15 minutes, gonna go a little over. And the first question is if COMcheck requires the low-rise multifamily buildings and this one says in Oregon. Well, low rise multifamily regardless, multifamily is code driven meaning the definitions that come from the code. So multifamily, if you have three stories or less above grade, it is considered a residential building and you would follow the residential code and you could use a REScheck.

[01:56:00]

If you have more than three stories and three attached dwelling units above grade, greater than three stories, then you're going to use COMcheck because that's considered a high-rise multifamily. I don't believe Oregon has amended out that definition. There are a couple states that have amended that definition to four-story, so you want to pay attention to what state you're in to determine that they haven't amended that definition and not too many have. But that's the basic definition is the three stories above grade and whether it's low rise or high rise and whether you've got to use the residential code or a commercial code.

The next question is can you comment further regarding, this is Oregon specific again, we must have a lot of Oregon people on the call. Can you comment further regarding Oregon only construction methods is it tradeoff method or not?

It does allow some tradeoffs but it's very prescriptive in nature and not like the other code that we have in there that takes into account some internal gain, --

[01:57:00]

some internal loads and for one good example like 90.1 2013 what we're doing is simulation run. And they're separated simulation one for envelope is separate then for lighting and so forth. But it's very prescriptive in nature and if you're from Oregon, you should already know what that means because they've been on a prescriptive code for many, many years now.

If you have state specific questions, submit them through our help desk and we'll answer them that way.

Next question, can you provide an example or explain how to use COMcheck for a building with one exterior wall and three interior walls? And then I'm going to let Bob have the next question.

When you have complex or mixed use buildings this is where it can get a little complicated as far as how you enter them into COMcheck. So let's say I have one exterior wall and three interior walls. Well, to answer this would depend on what those three interior walls are.

[01:58:00]

Are those three interior walls a semi exterior wall? What are those walls up against? Are they up against a fully conditioned space and is that fully conditioned space part of this project?

My example is a strip mall. Let's say I'm only doing compliance for the corner portion of a strip mall and all I have is two, a front, and a back wall that I'm dealing with. And I really don't have that wall that's separating that other retail space, right, they've already moved in, they're already leased. Then in COMcheck, you're only entering for your project, your space. What defines that building thermal envelope?

Now for semi exterior when I mentioned that that's code driven. If you're 90.1 2013 and you have a semi heated space you can use that feature. And in the project tab that that's another construction space conditioning type that you can choose from.

[01:59:00]

I hope that addressed the question that one's a little bit harder to answer because I don't know what's all involved in that building to

why you have one exterior and three interior, I'd need to know more.

Let's answer another question here. What do you do if we have a complete tenant improvement project; it's a big box store where the envelope is part of different building permit? Again, this is probably building department driven where that's going to be enforced by the code official for this one. If you have a different building permit, it will all depend on what's required on that permit. I can't specifically answer this one, yeah, that one's going to have to be answered by a code official.

Let me look at this next one here.

[02:00:00]

Can lighting and HVAC be submitted as a default? In other words, only input the envelope data. As I mentioned before, you do not have to do each one of the provisions in COMcheck. I can do just envelope and be done with my project. I can enter just lighting and be done with lighting. So you don't have to do all of them at once. It will be up to that jurisdiction as far as what they're going to require, if they want one complete report, if they're okay with you submitting separately individual reports that you can create from COMcheck. Again, that's coordination between you and your jurisdiction.

How do I enter a tested assembly U factor for roof or a wall surface? Really good question. So again, I'm going to address this question and I'm going to let Bob answer this one, he hasn't answered one yet. How do you enter a tested assembly U factor for a roof or wall surface? Bob, you want to go ahead and answer that one.

[02:01:00]

*Bob Schultz:*

Pam illustrated if you don't see one of the standard types listed in our software you would pick other and expose the U factor cell in the column or and row for that roof. And then you would take that U factor that you're purporting to have calculated and enter that. You are obligated to submit documentation that it was produced by a certified, recognizable, acceptable manner and your code official is to verify that when submitted with the document plans.

*Pam Cole:*

Great. Thanks Bob. I'll let you answer one more this is another good one, this a question that gets sent in quite a bit through the help desk.

[02:02:00]

Is there a method to increase the fenestration over 30 percent of the wall area? Now before we answer this, 30 and 40 these are maximum fenestration hard limits in the specific code. So 30 competition is code driven to a specific code but Bob, go ahead and why don't you address that one as well.

*Bob Schultz:*

Yeah, this is a good question it comes up somewhat frequently. But depending on the code and to be more specific the IECC codes will strictly enforce that you can't go above the fenestration requirement of 40 percent or 30 percent depending on which code you're on. If you want to get a bump in it by 10 percent you have to agree to do advanced daylighting control features in your building. And if you agree to do that and put that in your plans then you're allowed to go to 40 percent.

[02:03:00]

If you still, if you don't want to do that, or you want to go above the 40 percent you then have to revert to using the 90.1 code. And that code from 90.1 had to be the companion one for the year of the IECC that you're associated with. IECC 2012 is companioned with 90.1 2010. 2105 IECC refers you to 90.1 2013.

If you're using the 90.1 codes, yes, they have limit for window wall ratios and indeed, skylight to roof ratios but the methodology allows you to model the baseline or code building at the 30 or 40 percent level while your proposed building will be modeled as you've designed it.

[02:04:00]

So you would in effect have to do fairly good on your other assemblies to overcome the fact you're comparing your results to a building that's held to the 40 competition threshold. Again, that's in the 90.1 scenario.

*Pam Cole:*

All right, Bob, well while you're still talking about fenestration I was kind of reading through some of these questions and this kind of plays into it. It says on slide 35 the data took into account prescriptive only for fenestration why not performance can you explain that a little bit more?

*Bob Schultz:*

You're going to have to repeat the question.



*Pam Cole:* So the slide 35, which talked about data that took into account prescriptive only for fenestration and why not performance can you explain a little bit more?

*Bob Schultz:* If you are going down the performance path then you don't have to meet the prescriptive conditions.

[02:05:00}

I'm assuming we're talking about the IECC codes. So if you're going down the performance, the full performance that is and COMcheck doesn't support that, then you by default will be taken into account fenestration performance. Otherwise, it's the IECC's way of making sure that fenestration doesn't get a pass, if you will, or get considered too leniently through the total UA. And again, it would depend on what code we're talking about and I'm assuming it's the IECC 2015 because that's the only one that prescriptively mandates fenestration requirements.

*Pam Cole:* Okay. So here's one question and I didn't touch on this as far as alterations and it showed the alterations feature in COMcheck.

[02:06:00]

If you're doing an alterations in an exterior space, a one-story building and no roof changes how do you show this? Well, for alterations you only show the assemblies that you're touching and in COMcheck, they're prescriptive in nature meaning each assembly you show that you're, altering has to pass on its own.

It's a pass or fail there are no tradeoffs. So it's basically looking at the lookup tables or the prescriptive values and that climate zone and that code. There are a drop down list of exceptions that might apply to that assembly type or lighting depending if you're doing lighting less than 50 percent fixture replacement then you would define it as such.

So, again, if you're not touching your roof, you don't show your roof but if you are then you need to show it and either you meet an exception or you've got to put in your proposed installation value and it has to meet that climate zone and that minimum insulation value that comes from the code.

[02:07:00]

And let's take, I'm looking at the time and we won't reach all these questions for sure, that's for sure, you'll have to submit them to our help desk if we didn't get to yours. I'm kind of reading through. For mechanical mandatory requirements, what should you do if a requirement does not apply but there is not check box label requirement does not apply?

This is a good one. Want to touch on that, Bob?

*Bob Schultz:* Well, I would say submit that particular requirement and the argument for why it might not apply to us and we'll reconsider changing or making that option available in the software.

[02:08:00]

We've made our best guess and evaluation that knowing which ones should have that or implementing those that actually have that option but we clearly could've overlooked something that needs to be addressed.

So one, bring that to our attention but then always consider speaking your code official and reach an agreement that should have been enabled and documented in whatever you agreed to, what your code official in your application.

*Pam Cole:* One question was what is the latest release? It is the desktop is 4.0.2.9 that's the latest release that's out there right now.

*Bob Schultz:* Actually, its 4.0.3—

*Pam Cole:* Am I wrong?

*Bob Schultz:* Yeah, you're wrong. We released the build version yesterday, 4.0.3.1 the website administrator has to past that but it will be out there hopefully, the end of midday today, well, we're in midday I guess, so I'd have to check to see if it's there.

[02:09:00]

But 4.0.3.1 will be the latest, 4.0.3.0 is presently available now.

*Pam Cole:* We've got a couple questions about the signing of these reports and does it have to be a professional engineer, does it have to be a licensed designer, clarify this a little bit more. Okay, anyone can use COMcheck there is no certification to use the software is what I was trying to get across. The code requires that construction

documents and I'll be really clear on this because that's what is said in the IECC. The construction documents submitted must be a registered design professional.

Now, construction documents can be your building plans that doesn't mean that, and I'm just saying this, maybe you're not that registered design professional and you're signing a COMcheck compliance report.

[02:10:00]

As long as the authority having jurisdiction accepts that signature, you're okay. However, depending on their enforcement and what their provisions are down at that building department, they might require that you have that stamp on hand, that stamp on file, registered design professional and there's a definition for that. And I actually have that as an FAQ that definition of what is a registered design professional? It's one that is registered through the state in which you're designing your project, basically. I mean that's just the rough end of it.

That doesn't mean, you know, a lot of engineers run these projects, there are a lot of architects that use COMcheck. There are a lot of contractors that use COMcheck and they're signing these reports. If you're really not sure and this is the first time you're submitting a compliance report double check with the jurisdiction and ask them. And it's a really layman term, I think, that registered design professional but it's there for a reason.

[02:11:00]

As you get into commercial buildings, there's an expectation that's higher than residential. There's a lot more involved in the commercial code than there is a residential code. And so they're expecting that you have a professional engineer on site or professional architectural stamp that's registered and keeping up with his continuing units and education.

I mean there are some exceptions but again, I can't answer that completely as far as what they enforce by the authority having jurisdiction and when they got the project. I hope I cleared that one up.

How do I know what code to choose if the look up gives both 90.1 2013 and IECC version? So in COMcheck if you click on the code menu there's a drop down list of code options. If you don't know

what code, energycode.gov we actually have state pages that show what code, energy code is adopted in each state.

[02:12:00]

That's at the state level so if you're in home rule state you might have adoption at the jurisdiction level; you'll need to check that, so that's one thing.

But depending on where your project is, so you can go out and look at what the state adoption code is out on the website. And again, so let's say a state's adopted the 2012 or the 2015 IECC. Within the IECC, there are compliance options. There's prescriptive, there's tradeoff, there's performance. There's also direct reference to 90.1 in the IECC as a compliance option. That 90.1 standard version depends on what version of the IECC.

So for example, 2012 IECC that references AHSRAE 90.1 2010 and 2015 IECC that one references ASHRAE 90.1 standard 2013. So again, those are direct references –

[02:13:00]

and unless the state or jurisdiction has amended out that you can't use 90.1, you can use it. It's your choice. However, you can't mix and match. You cannot do your envelope using 90.1 and do your lighting using IECC. It's one or the other and it's all for the entire building. You cannot mix and match between these two codes and that's written in the code. So once you go down the route of 90.1 then you better communicate with all the rest of the people on that project that they've got to use 90.1 too if they're doing separate compliance reports for the lighting or the mechanical. It's one of the other.

I think that's going to be the last question that we're going to take is we're going do one more here and then we're going to – we'll do two. How do I input partition walls? Partition walls. Now partition wall if that is not a full length wall—

[02:14:00]

well, first of all, partition walls if this is pertaining to the building envelope and this is for getting compliance for your building envelope that partition wall has to be a full from floor to ceiling height wall that encloses the building thermal envelope space with a continuous air barrier to be a complete assembly to meet code and that's what you would enter in the COMcheck.

If it's a half wall, then that's not a building thermal envelope assembly that's got to be some – it wouldn't be considered by definition a wall that would meet that specification. Now lighting could be different. So I might have partitions for my lighting and I have cubbies wherever within a big office building, so to speak and I'm trying to define out my lighting areas,--

[02:15:00]

I can put those if I want and start defining out those different areas. And that's up to you that's optional. Or you can just do the entire space by floor space is what I'm referring to. Hopefully, I answered that one.

One more. How does the software, your fixture library – oh, how do you save your fixture library through the software version updates. Bob, you want to explain that real quick?

*Bob Schultz:*

Yeah, well any time you get an update to the software it will leave the fixture library you had in place previously. It will not override it or eliminate it. If you want to share that you need to go a particular location where we save this usually it's under your user account app data COMcheck or roaming, app data roaming COMcheck that's' where you'll find fixture library.XML.

[02:16:00]

If you want to make a copy of that and send it to a coworker to share you can do it that way or if you want to preserve it because you're having to move to a new machine or something and you want to have access to it on the new machine, copy that to disk or a share drive somewhere.

*Pam Cole;*

All right, thanks, Bob. We are over 20 minutes and this was a two-hour webinar and I really appreciate those of you that are still on. I am going to stop at this time. I still have a lot of questions that came in and so here's two options, I'm going to try to capture these questions and see if I can map them to your login e-mail. I've not done this yet before but I'm going to try to do that and maybe we can address, because there are a lot of questions that didn't get answered her.

[02:17:00]

But if not, send us in your question through that help desk form that's up. I have the website up so I got the building energy codes website, I have the help desk URL form right there. Send in your

question that way and then it will get addressed through our help desk. And then again, here's the URL so if you want AIA learning units or a certificate of attendance for today's webinar.

But I am going to cut it off at this time, I do appreciate you taking the extra time and spending this was over a two-hour webinar and probably should have been a lot longer, we typically train on, you know, when we do standup training we spend more than two hours on it, so I do appreciate you taking the time to stay longer than what we intended to today.

And again, at this time, again, thank you, and have a good day and everyone can hang up.

*[End of Audio]*