e-SPECS for Revit: Integrating Building Information Models and Construction Specifications

Perhaps you have sat through an e-SPECS for Revit demonstration, or talked with an e-SPECS Product Specialist, or read an article about e-SPECS. If so, do any of these thoughts and comments come to mind: “How does e-SPECS really work? How can e-SPECS create a reliable and accurate specification manual from the information in the Revit models, considering all the details that must be included in the specifications and further considering all the things we do not actually model. How will I get this to work in my organization? Will this take years to integrate? This is far too overwhelming for me to take on. I do not get it.” If any of these sound familiar, read on. We will try to take the mystery out of the e-SPECS process and explain how you can be up and running with integrated models and specifications with relative ease. This is not a step-by-step tutorial on the use of e-SPECS but rather a higher level explanation of the integration technology and responses to common questions about program features. While this paper will focus on the particular integration to Autodesk Revit products, keep in mind that much of what you will see here is similar to the integration to Autodesk AutoCAD, Autodesk Navisworks, AutoCAD Architecture, Autodesk MEP, GRAPHISOFT ArchiCAD as well as to the integration to other CAD/BIM applications to come.

The e-SPECS Basics

e-SPECS is the first application to successfully integrate the construction drawings and specification documents, beginning with a fairly simple interface to AutoCAD nearly a decade ago and followed up with a version for Revit not long after its acquisition by Autodesk. Now in its seventh major release, e-SPECS has matured over the years based on continuous customer feedback and feature requests into a stable, easy to implement, integrated solution that delivers real value to customers.

First of all, let’s start with a very basic overview of how e-SPECS works in order to clarify some common misconceptions and to define some important terminology. e-SPECS does not magically create specification information using some super sophisticated algorithm based on items it might find in a building model. It is much simpler than that. e-SPECS creates project specific specification documents by filtering pre-configured master specification documents to the requirements of the building project based on information that it extracts from the Revit models. This is not unlike what most architects, engineers and specifiers do routinely to create the project specification “by hand” with word processing systems. They typically start with a set of master specification documents, review the project drawings to determine what specification sections are required, and then proceed to markup the master specifications documents for the specific requirements of the project. e-SPECS simply automates the process and in doing so, provides the added benefit of ensuring that the models (and resulting drawings) and the specifications remain in sync.
At the core of the e-SPECS integration technology is a patented process to simplify the filtering of the specification master documents based on selections in a master checklist. Figure 1 is a diagram that illustrates this fundamental concept. The checklist items, referred to as “tags” in the e-SPECS vernacular, are associated (or mapped) to the appropriate content in the master documents with relationships known as “mappings.” If the wood window tag is selected or “checked”, the relevant wood window section is selected from the master specification documents and the required paragraphs in the section is automatically included in the resulting specification documents. All the other paragraphs that are not related to the wood windows are removed.

![Figure 1: The patented e-SPECS Tag and Mappings is used to filter master specification documents.](image)

To see how this actually looks in practice, Figure 2 is an illustration of the e-SPECS specification checklist. If we select double hung wood windows from the checklist options...

![Figure 2: e-SPECS Insert Section Checklist filters the master sections.](image)
...the wood window section will be inserted into the specification manual with the relevant language included and the non-required language removed, as illustrated by Figure 3 below.

Figure 3: Wood Window Section as it appears in the e-SPECS Editor with required paragraphs included and all others struck out and removed.

One of the principal components of the e-SPECS system is the scope and integrity of the specification master database. e-SPECS is fully integrated with MasterSpec®, a product of the American Institute of Architects and the most widely used master guide specification system in the world today. The e-SPECS tags and mappings have been pre-configured for all versions of MasterSpec as a standard option with the e-SPECS for Revit software. e-SPECS also provides full integration to the U.S. Department of Veterans Affairs, DOD and NASA SpecIntact application using the Unified Facilities Guide Specifications (UFGS), and Canadian master guide specifications as well as a number of building product manufacturer’s proprietary specifications. However, e-SPECS is fully configurable so you can easily customize the checklist and master documents around your company’s particular requirements. In addition, you can add new sections and integrate your own custom office masters if you desire.
How does e-SPECS integrate with the building models?

Taking this a step further then, instead of having to make the selections “manually” by checking the checkboxes in the e-SPECS checklist, we can associate those checkboxes to Revit elements (or assemblies) in the Revit model so that when those elements are used in a particular project model, the specification section and the associated paragraphs are added to the specification manual for that project. The diagram below in Figure 3 is a graphical representation of this process.

The elements in the model can be associated to specific checklist tags to automatically “check the boxes” when the item is included in the model.

It is quite simple really, the elements in the model can be associated to specific checklist tags to automatically “check the boxes” when the item is included in the model. This association between an element in the model and the e-SPECS tags is called an e-SPECS “binding.”

e-SPECS provides a simple process to manage these associations with the e-SPECS “Binding Manager,” which is pictured below in Figure 5. In the Binding Manager you will notice that we have the same simple checklist as above in Figure 2, only now the checkbox items are associated (or “bound”) to information that is accessible in the Revit model.

Figure 4: Illustration of how the model elements can be linked to required specification information in e-SPECS.

Figure 5: e-SPECS Binding Manager is used to manage the associations from the Revit Assembly Codes to the specification tags.
The Assembly Code parameter in the Revit Family Type Properties, defined by the familiar UniFormat classification system, is used as the primary integration component to e-SPECS.

In Revit, the primary integration component is the Assembly Code parameter in the Revit Family Type Properties, as the example in Figure 6 shows. The Revit Assembly codes are defined by the familiar UniFormat classification system. For those less familiar with it, UniFormat is an industry standard classification system, developed in part by the Construction Specifications Institute (CSI), used primarily as a way of categorizing information about building elements which may contain multiple detailed parts. As defined by the CSI, “UniFormat is a method of arranging construction information based on functional elements, or parts of a facility characterized by their functions, and often referred to as systems or assemblies. It is a way to organize information about an entire assembly with multiple detail components.”

UniFormat provides a consistent way to classify building model components, regardless of the complexities of the assemblies or model elements that they represent. In the wood window example in Figure 6, the entire assembly could consist of a number of component parts, such as the wood frame, glazing, joint sealants, insulation, hardware and so on. In another assembly could consist of one simple component, an electrical junction box or a ceiling tile for instance.

Why is the link to Revit structured in UniFormat when the specs are in MasterFormat? Do I need to translate from one standard to the other?

UniFormat is routinely used at the earliest stages of design, during preliminary project planning stages for instance, and now more commonly used throughout the project design lifecycle in the building model applications. UniFormat is a very logical way to categorize building model elements as it is the way we tend to think about the components of the building. You typically do not think of the wood window in all its individual component parts while designing the model. It is the complete assembly of parts that we design around. Similarly, while the junction box could become part of a more elaborate assembly,
it is certainly appropriate to use it as a standalone assembly even though it does not contain any component parts.

However, when it comes to the construction specifications, those by convention in North America are structured according to the MasterFormat classification system, which, according to the CSI, is an “organizational standard for specifications and is a master list of titles and numbers classified by work results for organizing data about construction requirements, products, and activities.” Whether designers and specifiers actually use UniFormat in practice in their model or drawing tools or just conceptually in the way they think about building components, they are all required to prepare their specification manuals under the MasterFormat structure as that is a rather well adopted industry convention. So the challenge for designers and specifiers is to reconcile these two conventions.

e-SPECS has been designed to adhere to industry standards and conventions where applicable. In this case, it has been designed to adhere to the conventions of UniFormat when it comes to the model components and to MasterFormat with regards to the specifications. Through its Binding Manager system, e-SPECS provides a unique and rather simple solution to the reconciliation of these two industry standard classifications systems.

But doesn’t this require a lot of time and overhead to develop all these codes and to keep them in sync with the section documents?

On the contrary, because e-SPECS employs standard Revit Assembly Codes as the primary integration elements, it is easy for designers and specifiers to be up and running with meaningful integration without a lot of customization. e-SPECS ships with an extensive list of UniFormat Assembly codes with pre-configured “bindings” that integrate standard Revit families with the required MasterSpec sections. This extended list of Assembly Codes is accessible in Revit so that designers can simply assign the code to any Revit family that they may develop or modify. The bound specification sections will be included in the project manual when the Revit family is used in a project.

Also, you do not need to have a unique assembly code for each instance of a Revit family, only for each type of family. That is, while there might be several hundred instances of wood windows in a multi-story office building, all of those instances would typically be controlled by one single Revit family type. Some prospective user get confused by the amount of additional detail and family types that may be required to implement e-SPECS. The idea that you need an “explosion” of family types in order to manage the integration is just not true. Since the specifications are not concerned with the absolute number of items, this would require just one specific assembly code to specify all those windows in the project. This is true even if those window instances were to vary by some degree in the size and shape as the dimensions would typically be reflected on the drawings, not the specifications.

Do I need a new Assembly Code for every product variation?

One option for product variations is certainly to create a new Assembly Code, which is easy to do with e-SPECS. But that is not the only option. For standard product variations, you can extend the integration to the same Assembly Code with more specific Revit Family Type Parameters. Take the wood window for example. There are several different product variations from fixed to casement, double hung etc. Instead of adding new Assembly Codes
for each one, we use the wood window assembly code as the primary filter and then add product variations using the specific parameters as illustrated in Figure 7. This substantially reduces the number of codes required while reducing the effort to setup multiple product variations.

You can also use additional parameters for still more detailed integration, such as the more refined information in the MasterSpec bracket options. For instance, notice the wood window cladding options in paragraph 1.2.A that have been crossed out in the example in Figure 2. We could further integrate those options to a window type parameter so that when a vinyl clad window was inserted in a model, for instance, the vinyl cladding language would be inserted into the section text. While there are a number of common parameter values across all Revit family types, such as OmniClass, model numbers, and product description to name a few, the parameter values available in the Binding Manager are for the most part tailored around the requirements of specific family types. For instance, in the wood window example above, we have operable type as one of the more important parameters, as we discussed previously. For doors, we have fire rating and frame material as two specific door parameter options. To refine the door specifications for fire ratings, we simply add a common value to the fire rating parameter to indicate whether the doors are rated or not. You can even indicate the rating length by including additional sub-parameter values, for example ‘45 min rating’, ‘60 min rating’, ‘90 min rating’, ‘2 hr rating’, and so on. With these family parameter values, there is nearly unlimited control over the customization of the section text and the level of integration available.

In addition, e-SPECS has the capability to batch-filter specification documents by building type or location, LEED designated projects, or any other classification scheme one might use. A window for a school project, for instance, would not be specified with the same requirements as a window for a jail. To prevent the need to create multiple families of similar types, in this case a window family for steel windows in schools and another for steel windows in jails, e-SPECS provides a “filter” of sorts to allow for more generic Revit family types. These filters are referred to as Client Accounts Bindings in e-SPECS.
Figure 8 is a diagram showing how the Client Accounts can be used to facilitate the integration to Revit for specific project types. A Revit Steel Window

How can I take advantage of the e-SPECS Client Account technology for LEED Projects?

Leadership in Energy & Environmental Design (LEED) is, according to the U.S. Green Building Council that developed it, “an internationally recognized green building certification system that is providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.” With more and more building owners dictating that their projects comply with some level of LEED certification, architects and engineers are increasingly required to incorporate LEED standards into their designs. LEED certified designs require additional information to be incorporated into the construction specifications which can add to the time and cost to prepare the specifications as well as to increase the chances that the models and specifications will be misaligned and out of sync.

e-SPECS can help reduce the additional cost and complexities associated with LEED projects by automatically filtering the master specifications for LEED specific language. MasterSpec, for instance, includes hundreds of sections with LEED requirements text and commentaries, including six Division One LEED-related sections. By setting up an e-SPECS Client Account for LEED projects, this specific LEED language can be associated through additional e-SPECS Bindings to Revit Families that in one way or another require additional LEED information to be incorporated into the specifications. For instance, in the Wood Window section, there is additional specification language required for “manufacturer’s qualification” and for “certified wood” if the wood windows are to be LEED certified. The simple inclusion of these additional options in the LEED Client Account bindings will insure that the language is added to the specification manual as required. In another example, by using the LEED Client Account default binding, the six Division One LEED-related sections can be automatically included in the project manual as required to further ensure compliance with the LEED certification requirements. There are hundreds of these types of references throughout the specification masters that can e-SPECS can help ensure are included in the project.
How can I add to or extend the Assembly Codes used in e-SPECS and Revit?

If the designers and specifiers find that they need to extend the list of assembly codes beyond those provided with e-SPECS, there is a simple process for doing so with the e-SPECS Binding Manager. You can click on the desired parent item and add the new Assembly Code information as required. One easy way to make modifications is to use the Copy command, which copies and existing Assembly Code and its bindings to a new Assembly Code which you can easily edit as desired. For instance, if the designers find that they would prefer to have a unique Revit family type for correction facility windows, they could add a new assembly code to distinguish it from a standard steel window. In the example illustrated by Figure 9, we have added a new assembly code for steel windows for a correction facility to the list.

Figure 9: Assembly Codes can be added and modified in the e-SPECS Binding Manager.

How easy is it to assign Assembly Codes to my Revit Families?

These new assembly codes are instantly available in Revit to add to the desired Revit families. This process is simplified by the e-SPECS Console features in Revit. As Figure 10 below illustrates, with the e-SPECS Model Validation schedule in Revit, you can quickly scan those Revit families that are not currently “bound” to any specification sections and easily change the assembly code to the desired code right from the schedule. The management of all the families’ assembly codes can be maintained in one convenient location without having to open each individual family type, and certainly not the individual family instances.
How can I take advantage of this integration at the early stage of the project when we do not necessarily know the product details?

Many project details may not be known until the latter stages of the project. Yet it is frequently desirable to have coordinated specifications at some level of precision from the earliest stages of the project, with increasing detail added throughout the project design lifecycle. The e-SPECS integration methodology, with the top level assembly codes refined by the more detailed parameter values lends itself well to this reality. In the window example we have been citing, although we probably know from the project type what window construction we may use (steel vs wood for instance), we may not know initially the operable type, or the cladding, or the finish. So, using just the wood window assembly Code as the primary integration, we would get a more generic specification section, that would have a number of options not yet selected. As the project progressed, we can refine the Assembly Code or add the detail through the parameter values in the families to whatever level we choose.

However, we also might know from the project type just what type of windows would typically be used. In that case, we could enable the details and have a more complete specification at the outset. It is entirely up to the designers and specifiers. e-SPECS provides the tools to centralize and manage the effort and the reconciliation reporting to validate the results.

Do my modelers and drafts people need to have the expertise and knowledge of these Assembly Codes and formats?

It is not uncommon for people less experienced with specifications and classification standards to be assigned to develop Revit families and other modeling responsibilities. There is no requirement of the e-SPECS integration technology that they have this particular expertise. The modelers can simply go about designing the model as they typically would without regards to what codes and information to put into the custom families that they
may be creating. e-SPECS has a number of reconciliation reports and tools that allow the designer and specifiers to review the active Revit families for missing or incomplete assembly codes or parameter values. Those can be readily identified and assigned the proper updates, either directly by the designer or specifiers themselves or by providing the correct information to the modelers to make the updates. There is a consolidated schedule of Revit family assembly code and parameters available through the e-SPECS for Revit Console application that simplifies the maintenance and update process. Once the proper Assembly Code and parameter information has been included, it can be saved to the corporate library so the next time that family type is used in a project, it will be fully specified.

**Can the initial integration be customized for our BIM models and templates?**

Many customers take advantage of the popular e-SPECS Revit Pilot Integration Program as a way to “kick start” the integration process. e-SPECS BIM experts, working in collaboration with its customers, prepare a “Framework of Integration” by updating the customer’s BIM model with Assembly Codes and automation bindings for a new or existing project. The typical project takes the e-SPECS BIM specialists and specifiers just a few days to develop the integration bindings and assign assembly codes to existing families. That time includes reviewing the customer’s Revit models and corporate preferences, usually by reviewing a previous project specification manual. And then the e-SPECS BIM team is available to work with the customer’s team to see the project manual through to completion as needed. This ensures the success of the initial project as well as provides the transfer of knowledge to the customer’s staff on use for managing the integration on subsequent projects. The plan significantly reduces the impact on the customer’s available resources and schedules and allows them to complete their first BIM integrated project in less time and cost while establishing the process and data management framework for subsequent projects.

InterSpec’s Professional Services Group also routinely provides ongoing specification management services to its customers remotely for those companies that may not have an internal specifier or who may want additional resources at various stages of the project. This provides the added benefit of having an expert specification team assist in the development of the project specifications without the expense of having to maintain that expertise internally. By combining this remote service with the installed e-SPECS software, customers can have the comfort and satisfaction of a well prepared, high quality specification manual at a fraction of the cost they would pay for an outside specification writer. e-SPECS collaboration technology simplifies the integration of our outside experts into the project team, allowing us to offer attractive discounts on specwriting services when e-SPECS BIM integration and automation is implemented.

**What about items that we do not model, how do they get specified?**

Remember, since the elements or families in the model are developed as assemblies of products (or parts), we can simply bind additional specification sections to the relevant assemblies to cover the items you do not typically model.
included in the specification manual. However, you typically would not see either separately modeled, although you would typically find a callout to each in a detail or section drawing. To include the glazing and joint sealant information in the specifications, we can simply add a reference to the appropriate sections (and required paragraphs) in the bindings to the wood window assembly code, as Figure 11 illustrates.

![Figure 11: Non-modeled required specification sections and language can be bound to Revit models as the Glazing Section and Joint Sealants are here to Wood Windows.](image)

e-SPECS provides a “default binding” so that specification sections that may be project “type” specific but not necessarily something that would be modeled or associated with any Revit family. These might include Division 1 sections for instance, which may be tailored to particular project types or specific owner requirements. In order to include these sections in the project manual, e-SPECS provides a “default binding” for each Client Account so that these documents can be automatically included in a project manual without having a specific association to a model or drawing element.

![Figure 12: Example of binding settings for e-SPECS](image)

There are also a number of sections that may be project “type” specific but not necessarily something that would be modeled or associated with any Revit family. These might include Division 1 sections for instance, which may be tailored to particular project types or specific owner requirements. In order to include these sections in the project manual, e-SPECS provides a “default binding” for each Client Account so that these documents can be automatically included in a project manual without having a specific association to a model or drawing element.

Figure 12 below provides an example of this. You can see that under the “Binding Key” to the left there is a Default Binding called OFFICE BUILDING, which is the name of the Client Account we are using for the project. This has been bound to a number of Division 01 sections. These sections will be automatically inserted into the project manual, and filtered as defined by the binding selections, for every project created under the OFFICE BUILDING Client Account. If we used another Client Account, say EDUCATION FACILITIES, another distinct and separate list of default sections could be setup for that as well.
If you want to include sections that are not always used in every project of a certain type, or are for specialty items that may not be modeled, or ones that you do not want to create a permanent association to, you can always just insert sections using the e-SPECS insert section checklist, an example of which is illustrated by Figure 2. This will insert sections into the project manual and filter them according to the checklist choices. Specifiers like the fact that the specifications do not all need to be “driven” from the BIM models and can be easily inserted as needed.

Similarly, you may also want to import sections from an external source, such as from a building product manufacturer or from an outside consultant. e-SPECS provides a convenient way to import documents which will automatically format them for a consistent font, page numbering and headers and footers convention, and includes them in the table of contents together with all the other standard sections in the project. If you wish to link an imported or inserted section to an item in the model so that it can be accessed directly in Revit, there is a simple association manager which is very similar to the standard e-SPECS binding manager for enabling these project specific associations.

And finally, e-SPECS also allows you to import ancillary information and project files that may not be specifically included in the project manual but provides reference information to the specification project, through the e-SPECS Project Files facility. Project files can also be associated to model items so that they can be accessed from Revit for reference, review and markup. Project Files may also be attached to the Revit model for use by contractors during bidding and construction or by owners to facilitate as-built documentation and facilities management.
The real value of e-SPECS is to ensure that the models and specifications stay in sync, which e-SPECS facilitates with a number of reconciliation reports.

How do I ensure that the models and specifications are in sync?

One of the great benefits of using e-SPECS is of course to help automate the preparation of the project specification manual. But the real benefit here is to ensure that the models and specifications stay in sync. Even the slightest oversight or ambiguity in the construction documents can lead to time consuming and costly change orders if these things are not discovered before construction begins. e-SPECS facilitates the reconciliation of the construction documents with several reconciliation reports. In addition to the Model Validation Report that was introduced in Figure 10, e-SPECS Section History Report, as illustrated in Figure 14 below, gives a snap shot of all the sections and indicates why they are in the specification manual, either as a result of a model element, a manually inserted section, a section inserted as a result of a default binding, or an imported section.
Another example is the Assembly Report, illustrated in Figure 15, which provides a summary of all the model elements and resulting specification sections. Here we see the sections in the project manual required for the interior flush wood doors and the foundation wall. Notice that the curtain wall, however, is currently “unspecified.” This is an indication that this particular element has not been associated (with an e-SPECS binding) to any section or group of sections. This gives the designer and specifiers a quick way to review all the specification requirements of the model to ensure that the two are in sync. In this case, the specifier would simply double click on the curtain wall which would open the binding manager to let them select the specification section (or group of sections) and required details.

If a Revit modeler adds a component that is not recognized by e-SPECS (does not have a known association or binding), then the designers or specifiers can review the specification validation report to see at a glance where the two components of the construction documents will differ. Similarly, if some sections are added to the specification project that have yet to be included in the model, the designers and specifiers can again review a report.
that will so indicate the discrepancy. If the item included in the specifications has no counterpart in the model, that can be indicated to remove the exception.

**To complete the integration of the models and specifications, I need to get information from the specifications into my models or onto my drawings in the form of annotations and notes. How do I do that?**

To further insure that the drawings and specifications are in sync, designers typically annotate their drawings with information that identifies the locations where the information can be found in the specifications. Whether this takes the form of structured keynotes (typically a section prefix followed by a unique alphanumeric suffix with some additional annotation) or simple annotations, e-SPECS facilitates this effort by providing a very convenient way to generate these keynotes and annotations directly from the project specifications. After all, the keynotes and annotations should ideally be drawn from the specifications. Figure 16 below illustrates how those keynotes appear in e-SPECS for our wood window example.

![Figure 16: Project Keynotes can be extracted directly from the project specifications for inclusion on the Revit Models filtering the many master keynotes to just those used in the current project.](image)

We can add to that at the master level for future use or simply use it for the current project. In Revit, we have an integrated feature that lets you pick the generated keynotes and annotations to update the placement in the Revit model, as Figure 17 below illustrates. This “round trip” information, starting with information on the model which is used to generate the specification language which is then provided back to the model for keynoting and annotations, helps ensure that the entire construction documentation package is accurate and complete. e-SPECS also verifies that all the keynotes in the model (including those on re-used details or newly created annotations in Revit) have a corresponding reference to the specification documents if required.
We have many people involved in the construction documentation, collaboration and workflow process. Can e-SPECS accommodate the extended team members?

Anyone who has ever been involved in preparing coordinated construction documents, even for a small project, knows well the effort required to ensure quality and completeness. There are typically many disciplines involved in the preparation, review and approval of the construction documentation which, depending on the circumstances, could include: dedicated specifiers, project architects and engineers, program managers, external consultants, owner representatives, to name a few. In addition, we have the drafts people, modelers and other project team members who may not be directly involved in the specification review but certainly have a role in coordinating the information on the models and drawings. And after the design project is complete, or for design-build or Integrated Project Delivery types projects, viewing links specifications based on selected Families in the Revit model can be very useful for estimating, construction management and facilities management.

Knowing that not all disciplines need the same type of functionality while having access to common information and data, e-SPECS has been designed as a system of modular programs tailored to the needs of the various disciplines, all linked to a centrally managed database. It is typically installed locally on the customers LAN but it is also available online where the installation and databases are managed by InterSpec and the applications can be accessed through a web browser.
The diagram below is a representation of the e-SPECS Product Line.

Figure 18: e-SPECS is a system of modular component programs all linked to a central database.

e-SPECS for Revit is the principal application and the primary focus of this product brief. The e-SPECS Revit Plug-in Console is a component that is accessible in Revit for coordinating the model and specification data, with various features for managing integration information, keynoting and annotations, reconciliation reporting, and for reviewing and redlining the specification documents. For example, a project team member may review and redline the specification(s) required for a particular assembly by clicking on the family instance in Revit, as illustrated in Figure 19 below.

In Revit, project team members can review and redline the specifications required for a particular assembly by clicking on the family instance in Revit. Viewing linked specifications based on selected Families in the Revit model can be very useful for estimating, construction management and facilities management as well.

Figure 19: Project Specifications can be reviewed and redlined from the Revit BIM Model.
The markup can then be viewed side-by-side in e-SPECS so the “document of record” can be updated accordingly.

Figure 20: Specification markups and comments can be viewed side-by-side in the e-SPECS Editor to facilitate updates to the Project Manual with all markups archived for later retrieval as needed.

There are also project notes and various reports to further facilitate this collaboration effort. In addition, this redlining capability is available to non-Revit users through the freely distributed e-SPECS Desktop application. This can be provided to team members with access to the corporate network or those external resources that may need to review and comment on the specification content as well.

e-SPECS Designer is an optional add-on, typically required only by the specifiers or lead designers for customization of the document masters, for managing office master content databases around your specific intellectual property, and for managing master keynotes linked to the product tags. Your design preferences and corporate standards are centralized and linked to the project models to ensure high quality documentation using preferred products and manufacturers, submittal information, custom keynotes and annotations, and other proprietary corporate design standards.

Conclusions

Integrating the specifications with the building information models fulfills one of the great promises of BIM, to be able to use a single source of information to facilitate and coordinate complimentary processes. There is no better example of this than with e-SPECS integration with Revit. The benefits of well coordinated construction documents are un-mistakable and well known to building owners and their design and construction teams. Fewer change orders and modifications to the project and documentation saves everyone time and money.

As an eighth generation product, e-SPECS has evolved over a decade of continuous improvement based on customer feedback into a mature and stable application that is easy to implement, providing true integrated solutions that are years ahead of the competition in delivering real value to customers. e-SPECS ensures:

- Higher quality and coordinated construction documents.
- Reduced time and costs in developing the project manual.
- Simplified use of classification standards.
- Consistent reuse of lessons learned and preferred products and manufacturers.
- Well integrated project teams.
We have tried to remove the mystery from the e-SPECS integration process at the same time showing you how some of the built-in functionality facilitates the integration effort. e-SPECS in its most basic form is a document management system that facilitates filtering complex master specification documents to the specific requirements of the project and in doing so, ensures that the model, drawings and specification all remain in sync. The filtering is based on a rather simple tag and mapping process that has been developed for the master specification documents. This allows us to extend the filtering to the model components by interfacing the checklist tags to the model components through the e-SPECS bindings.

The bindings and the Revit interface are structured under the well-known industry standard UniFormat classification scheme to mimic the way we think about components in the building projects as assembly of products and parts. To conform to the conventions of the industry, e-SPECS automates the manual process that all architects, engineers and specifiers do, whether consciously or not, to convert the assembly information in the models to discrete products and materials designations in the specification manual under the MasterFormat classification scheme.

With this conversion process in place, we can then apply the items in the specification database categorized under the MasterFormat classification standard back to the model as keynotes for drawing detailing and annotation, completing the full integration loop from model to specifications and back to the model. With all the information fully integrated, project managers and specifiers can ensure reconciliations of both of the primary components of the construction document package.

At the final stages of the project it is all about final coordination. e-SPECS makes that process manageable, reducing the risk of discrepancies showing up after the contract award or project initiation, saving you valuable time and money.

For further information including Case Studies, e-SPECS Demos, News, and more:

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