**Best practices for kitting and sub-assembly**

Kitting can be very beneficial when the assemblies have a high degree of variation. Think of the concept of mass customization. In contrast, kitting is less useful if the assemblies are highly standardized. In these scenarios, you might just end up with extra and unnecessary part handling. Adieu to your objective of lean production. More on this below.   
  
**Kitting Benefits**   
As you can see, kitting comes in many flavors. But what is the overall purpose? While it helps companies keep inventory levels as low as possible, ensure that materials and products are available for production and customer delivery, as well as plan manufacturing activities, delivery schedules and purchasing activities, kitting can deliver even more benefits:  
  
Facilities

By reducing stock and using, kitting can save space that is normally allocated to manufacturing or inventory.

Operations

Kitting can positively impact the efficiency of your operations. By eliminating the need to   
supply individual component containers, you can reduce material delivery to workstations. Similar efficiency is available if you are a manufacturer or distributor that uses machinery to assemble. You don't have to stop the lines due to part shortages or need to search for parts. Another benefit is that your shop floor can be cleaner because you're using fewer containers with more individual items in each, rather than a container for every component.

Competitiveness

Two areas where kitting clearly adds economic value is by 1. increasing throughput in pick and pack and manufacturing operations, and 2. reducing Work in Progress (WIP) inventory. (WIP bottlenecks at or near the production lines can be reduced, or at least better controlled). By storing   
primary components and subassemblies in a centralized storage area, kitting can reduce WIP inventory at the point of assembly.

Flexibility

Since components are not stored or staged at the points of assembly, facilities have greater flexibility in changing assembly lines as well as the products they assemble.

Employees

When kitting is part of the process, assembly workers usually spend more time assembling and less time walking around searching for components. The value-add time contributed by assemblers is therefore maximized. Another benefit that researchers who have academically studied kitting operations have noticed is that new staff training costs and acclimation periods are reduced.

Quality

Kitting can have a very positive upside when tracking product and part quality. Part damage, due to less handling will usually drop. This is especially important if the parts are either expensive or perishable. Another area where quality improves is tracing and correcting defects. Kitting provides the opportunity to have quality control verification earlier, reducing the possibility of wrong parts or incorrectly assembled components being used in the final product.

**A Caveat: the Dark Side of Kitting**  
Before we move on, let's look at the dark side of kitting. Like the other best practices for warehouse and inventory management that we've already discussed, you'll love the benefits if it is done well. Product quality will plummet if it is poorly implemented and issues such as making kits with missing or incorrect parts results.   
  
**When Kitting Goes Sideways**  
We've looked at the benefits. Now, lets look at some of the negative issues that can arise if your kitting isn't working quite as well as planned.   
  
An insufficient quantity of components, having too many of the rights ones (or wrong ones), or even either damaged or poor quality components can create some obvious problems as well as some that aren't as evident.   
  
Defective parts that are inadvertently used in certain kits will lead to parts shortages at the workstations. Kits found to contain defective parts during quality control will have to reassembled. A temporary shortage of parts may be addressed by building the kit anyway. This will reduce overall efficiency because you'll have to handle the kits a second time after receiving the missing pieces. (You'll also need to create storage space for these partially assembled kits). Part shortages can also result from cannibalization where parts are removed from raw inventory or completed kits. All of these actions, usually taken by well-meaning workers will exacerbate part shortages, screwing up inventory accuracy.   
  
Another issue to consider is having a sufficient quantity of replacement parts for the kitting process. Your kitting work may require parts that fail or break during assembly. They may be fragile or your workers may be sloppy or the assembly process itself may be difficult. Factor in the possibility of having either a spare piece with each kit or to having extras stored in containers at some workstations close to the kitting activity.  
  
Finally, you'll have to account for additional storage space to handle kits that are prepared in advance. Balance the cost of this physical space against all of the benefits just described.

http://www.smartturn.com/images/blog-tips-006.png**TIP:** inefficient kitting can waste employee time, idle machinery, necessitate additional and otherwise unnecessary inventory capacity requirements and create quality control problems.

**Considerations Before Implementing Your Own Kitting Process**  
  
OK, you're considering kitting and want to know a little more about planning. Take the time to think before you jump. Here are some things to consider:   
  
How

Kit assembly is basically a version of order picking. Your challenges are:

1. Designing the kits for ease of creation
2. Designing the kits for ease of assembly (how are people going to remove the components from them)
3. Figuring out how to put the correct parts into the correct kit
4. Determining how you are going to deliver the correct kit to the correct workstation

Since a kit usually comprises several components or sub assemblies, you usually assemble more than one at a time. After component and subassemblies are brought to the kitting area, it is more efficient to assemble several kits of the same type. Some people call this batch kitting.

http://www.smartturn.com/images/blog-tips-006.png**TIP:** Consider having additional small parts on hand. Some companies specify a percentage overage, which is known as over-kitting, while others simply keep spares in stock. You might have to make a friend in purchasing, document control, or manufacturing to buy the extras.

A Few Words on Optimizing Your Picking Process  
While picking is such an important subject that it merits its own best practice chapter, we'll briefly mention the relationship between kitting and picking. The types of kits you make will influence the picking process that is best for your operation. Picking and kitting are closely tied together. If you want to introduce kitting into your operation, you'll have to select and implement an appropriate picking method.

http://www.smartturn.com/images/blog-tips-006.png**TIP:** Optimize your picking process for the type of kits that you are going to build

Batch and zone picking (and their variations) can each work but their effectiveness depends on the unique characteristics of the kits you need to make. Some kitting experts believe that batch picking (and kitting) only works if the parts comprising kits are similar. However, batch kitting can work if you are building multiple kits which contain the same parts variations. While it is true that batch picking can produce higher picking efficiency, these gains can be offset by the time spent sorting and administering parts.   
  
Another option is zone picking. There are two common methods. The first is to process each order or kit one zone at a time, in effect you are kitting as you pick [(pick methods are explained here)](http://www.smartturn.com/forums/blogs/kevin-collins/9-picking-selecting-systems-methods-technology-right-you.html). With this method you pick the parts and kit at the same time until it reaches its final zone where the kit is completed. The other common method is to have all of the kit orders picked simultaneously. Parts from each order are picked from each zone and are dropped off at a staging area where the parts are prepared for final assembly or kitted.  
  
NOTE: Depending on the picking process you select, you may or may not have to make a sizable capital investment in new technology (pick-to-light for example) and information technology products and services.

http://www.smartturn.com/images/blog-tips-006.png**TIP:** When designing a kitting process, pay attention to the design of the physical container in which you are going to aggregate the parts. Kitting efficiency is impacted by both parts picking as well as assembly. Configure parts in the container in the order they will be used later in the assembly process. Doing so can greatly reduce assembly time. Another reason to optimize the container is that pickers will be able to quickly confirm visually whether any parts are missing.

http://www.smartturn.com/images/blog-tips-006.png**TIP:** By arranging parts in a logical sequence in the kit container, you contribute to a more efficient assembly process. Assemblers won't have to waste time search for the correct part. Assemblers will also be able to quickly confirm whether the assembly process was correct by looking at any leftover parts.

What

There are lot of different assemblies you can kit. Some assemblies, however, don't lend themselves to kitting, either in whole or in part. One the primary “obstructions” can be part size. If you have an assembly that can be partially kitted you can pull the non-kittable parts separately as needed. Additionally, it is not uncommon for a kit to lack all of the parts required to assemble a single unit of the end product. Fasteners such as bolts and washers, etc. are usually not included in kits. We've already discussed how part size or assembly complexity might require a lengthier process in which one or more kits might have to be first assembled and then combined into the finished product.

Who

Who is going to actually kit components? Can you use employees? Can you use machines? In some situations, robotic picking and kitting are feasible. In other situation where components are too large or there is large variation in components lists, for example, machine kitting may just not work. There is much variety in selecting who will kit. Some situations call for assemblers to kit for other assemblers. Whoever you choose to kit, concentrate on delivering efficiency and accuracy when selecting the assembly team.

Where

This issue relates to both the geographic location of your kitting operation based on your choice of facility as well as the decision of where to establish the kit assembly stations within the facility. The answer to the first part is obvious if you only have one facility. It becomes more difficult should you have multiple locations spread across two or more states. The location within your facility depends on your picking process, the availability of physical space in which to assemble kits and store the finished work, and the proximity to the shipping dock.

**Conclusion: getting friendly with kitting**  
Kitting and assembly are essential elements of the modern distribution business. Just about every contemporary product is shipped to the customer with an instruction manual and some sort of accompanying CD or DVD. Kitting is here to stay and a great opportunity for you to win business if you aren't already providing this value-added service.   
  
Recognize, though, that one of the biggest limitations with kitting is the risk of moving forward with a poorly designed system. The benefits will rapidly morph into profit-sucking problems and disappointed customers. Unsuccessful implementations are costly. You'll likely end up with a high percentage of incorrect kits, persistent quality issues, and unnecessarily high labor costs. In contrast, a well-planned and implemented kitting operation closely aligns with the theory and practice of lean distribution and production.   
  
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