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Compare Your Linear Guide System: IVT Vs. V-Guides

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Over the past couple years; PBC Linear has been touting Integral V™ Technology (IVT) and its ability to simplify linear guide systems without painstaking labor and alignment. This has sparked a wave of curiosity with potential customers wanting to know more; specifically “how does it work?”, and “how much will it cost me?”

Integral V™ linear guides were designed as the next generation in V-guide technology. Hardened steel inserts embedded directly into aluminum structural framing provide fast, accurate and long-lasting travel without additional fastening components, alignment or labor. Typical V-guide products require mounting fasteners, plates and bolts to adhere V-races onto structural framing; resulting in increased tolerance stack-up, or steadily accumulated variation in the products performance.

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Stacked against the competition, IVT shines out as the obvious choice for cost efficiency. This new linear guide product simplifies all facets of integrating a new linear guide system: design/installation labor, material costs and performance. For a definite picture of how IVT saves on cost, we must compare the product to its closest competing product: V-guides.

V-Guide

Integral V™

1. Designing the System

Linear motion engineers work tirelessly when designing a new system. This process can take hours, days and, in some cases, weeks to plan out appropriately—causing labor costs to skyrocket. Within a linear guide system integration process, design engineers have the highest labor cost; therefore a streamlined product that saves hours in design time could potentially save a company thousands of dollars!

Example application: Company X needs a linear guide system for a 1m application under general load, speed and environmental capacities.

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Using the given example, design time for this general application is broken down in Figure 1.1 below:

Design Labor		
Design Steps	**V-Guide Labor Time (min)**	**Integral V™ Labor Time (min)**
Select and source components	**30**	**10**
Download mode/drawings	**10**	**5**
Design carriage	**60**	**0**
Build and cost BOM	**25**	**10**
Manufacture/procure carriage	**20**	**20**
Manufacture/procure rail	**20**	**20**
Quality assurance	**20**	**5**
Total time (hours):	**3.08**	**1.17**
Design Cost Sub-total ($100.00/hour):	**$308.33**	**$116.67**

Note: Estimated Design Engineer Wage: $100.00/hour.

Conclusion: Due to eliminated tolerance stack-up, PBC Linear's availability of design models, and IVT's simplified design, the customer is able to save a potential **63%** on projected labor costs before the product is even ordered!

2. Comparing Material Costs

A V-guide system carries more additional components than two V-rails. It has an entire inventory of fastening and mounting materials. This not only presents tolerance and alignment issues, but also steadily increases the Bill of Materials (BOM).

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Figure 2.1 shows each product's potential BOM for the example application

Material Cost					
V-Guide BOM			Integral V™ BOM		
Product	**Quantity**	**Cost**	**Product**	**Quantity**	**Cost**
V-Rail guides	**2**	**$39.38**	**IVTAAFR**	**1**	**$71.60**
Mounting Plate	**1**	**$16.34**	**Fasteners**	**26**	**$0.13**
Fasteners	**56**	**$0.13**			
Material Cost Sub-total:		**$102.38**	***Material Cost Sub-total:***		**$74.98**

Conclusion: Over a length of 1m, Integral V™ linear guides are able to save the customer **27%** on material costs. This is due to the hardened steel embedded raceways; which are permanently adhered to the aluminum extrusion without the need for fasteners. IVT's innovative design and proprietary machining process allow for enhanced performance without enhanced component inventory. Using half of the fasteners required for V-guide technology, Integral V™ provides precision linear guidance, smooth travel and sophisticated operation.

3. Installation and Alignment Pains

The design is specified and the materials are ordered. The final step is to install the system. With V-guides, the installation process is complex, requiring constant checking and re-checking alignment of the V-guide rails to the machining plate and the machining plate to the aluminum extrusion. IVT's simplified design eliminates tolerance stack-up; which also reduces alignment issues.

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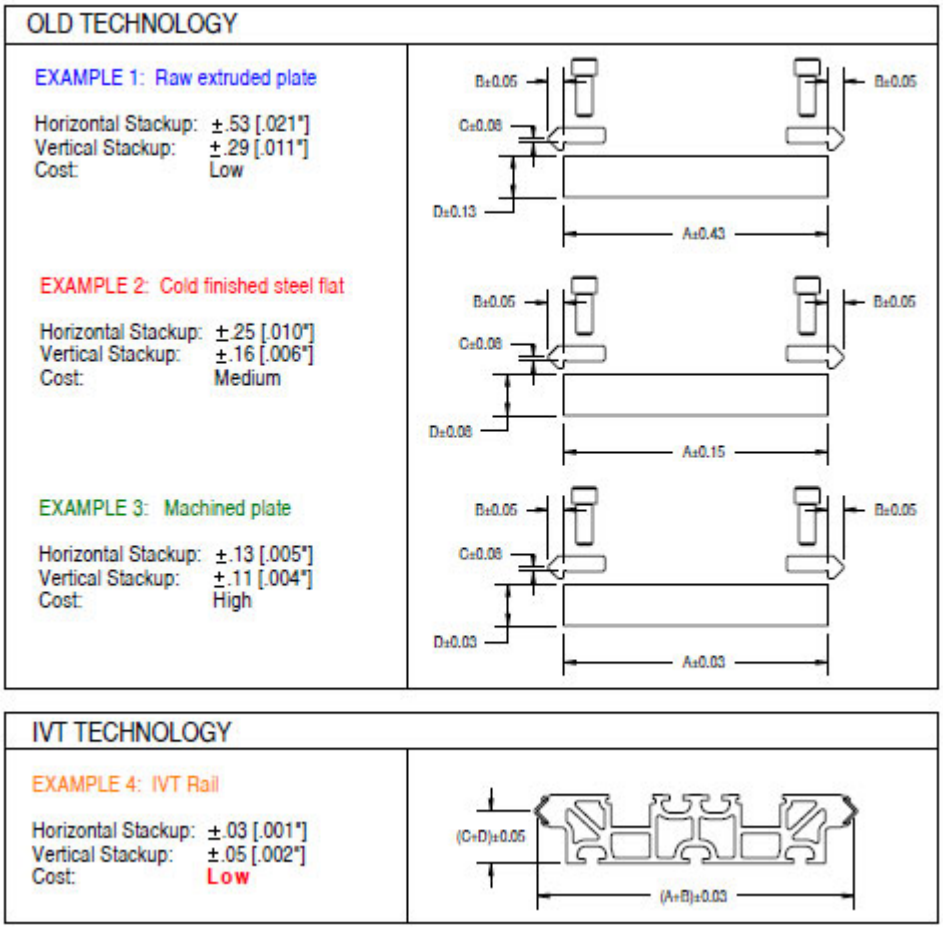
Figure 3.1: Tolerance stack-up comparison



As shown above, V-guides' additional components cause steadily increasing variance and inaccuracies for the linear guide application. However, installation requires more than alignment.

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Figure 3.2 depicts the installation steps for each product:

Installation Labor		
Installation Steps	**V-Guide Labor Time (min)**	**Integral V™ Labor Time (min)**
Drill/tap machine plate	**10**	**10**
Align guide with reference edge	**20**	**N/A**
Loosely fasten guide to machine plate	**10**	**N/A**
Secure rail, check for alignment	**10**	**N/A**
Repeat steps for secondary rail	**10**	**N/A**
Securely fasten system	**10**	**15**
Total Installation Time:	**60**	**25**
Installation Cost Sub-total ($35.00/hour)	**$35.00**	**$14.58**

Conclusion: As shown in Figure 3.2 above, Integral V™ saves the customer on time, cost and labor. This next-gen linear guide product is easy to specify, saves on materials, and installs in a fraction of the time versus the older technology. How is it able to accomplish this? IVT's competitive edge begins with PBC Linear's proprietary SIMO™ process (Simultaneous Integral Milling Operation). SIMO™ ensures accurate travel and precision by concurrently machining all qualified edges at once. This process rectifies the natural bow twist and camber variance in aluminum extrusions. V-guides—relying on outdated and expensive machining techniques—dramatically increase a customer's labor and production costs.

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Summary: In the example application, Integral V™ Technology (IVT) comes in to deliver a 47% overall cost savings over the traditional V-guide product. But does this make it more reliable? The proof is the performance. Integral V™ saves on cost NOT because it's a substandard product, but because it re-imagines the design of the traditional linear guide. IVT is designed to hold tight tolerances (±0.001''/0.025mm), precise parallelism (±0.001''), and machined straightness (±0.002''/ft). This allows IVT to deliver sophisticated, reliable and smooth linear guidance for several applications and industries. Available in multiple different profile structures along with custom options, Integral V™ is shown to be more versatile than competing technologies.

Potential applications include: CNC gantries, sliding doors, patient-assist adjustment tables and overhead architectural guidance.

For more information on **Integral V™ Technology** or any other PBC Linear products, please call 1.800.729.9085, email to marketing@pbclinear.com, or visit us at our Integral V™ dedicated website, IVT.pbclinear.com, for downloadable materials and other application examples.

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