

## HVAC – Las Vegas Hotel Casino

**Market:** HVACR  
**Where:** Large Hotel, Casino and Conference Center  
**Problem:** Energy efficiency  
**Application:** York air handling unit  
**Drive:** Motor 60 hp, Driver RPM 1775  
**Current Belts:** Five wrapped molded B158 belts, Service Factor 1.3  
**Belts Tested:** Three Carlisle® 5VX1700 Power-Wedge® Cog-Belt®, Service Factor 1.8  
**Description:** Conducted an energy efficiency study on a York air handling unit comparing Carlisle 5VX Power-Wedge Cog-Belt to standard wrapped molded B-section belt



### Existing Conditions:

- Five matched B158 wrapped belts
- Drive was under tensioned
- Poor drive efficiency

### Testing parameters:

- All tests were run in two hour intervals and constantly monitored to ensure a controlled environment
- New belts were properly tensioned and aligned

### Solutions:

- Replace five B158 wrapped belts with three Carlisle 5VX Power-Wedge Cog-Belts
  - The U.S. Department of Energy confirms that cogged belts “run cooler, last longer, and have an efficiency that is ~2% higher than that of standard V-belts”
- Replace worn sheaves with new, larger diameter sheaves
  - Larger diameter sheaves increase energy efficiency
- Implement belt tensioning program
  - Tension loss in a v-belt drive has a major impact on the efficiency and operating cost of the HVAC system
  - Proper tensioning is critical to satisfactory belt life and performance

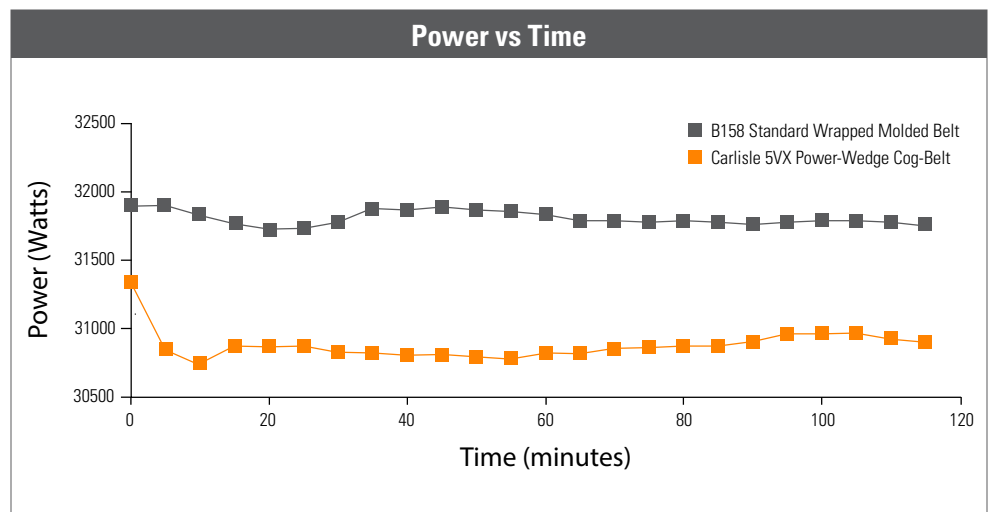
### Conclusions:

- Carlisle 5VX belts showed a significant decrease in energy usage compared to the B158 wrapped belts currently used on the drive
- Carlisle 5VX belts produced higher air flow with lower power used than wrapped belts, indicating increased efficiency of the belt
- In real life conditions where belts are typically under tensioned, the 5VX raw edge cog-belts maintain efficiency better than a standard wrapped belt
- The higher horsepower rating of the 5VX over the wrapped molded belts increases the life expectancy of the drive

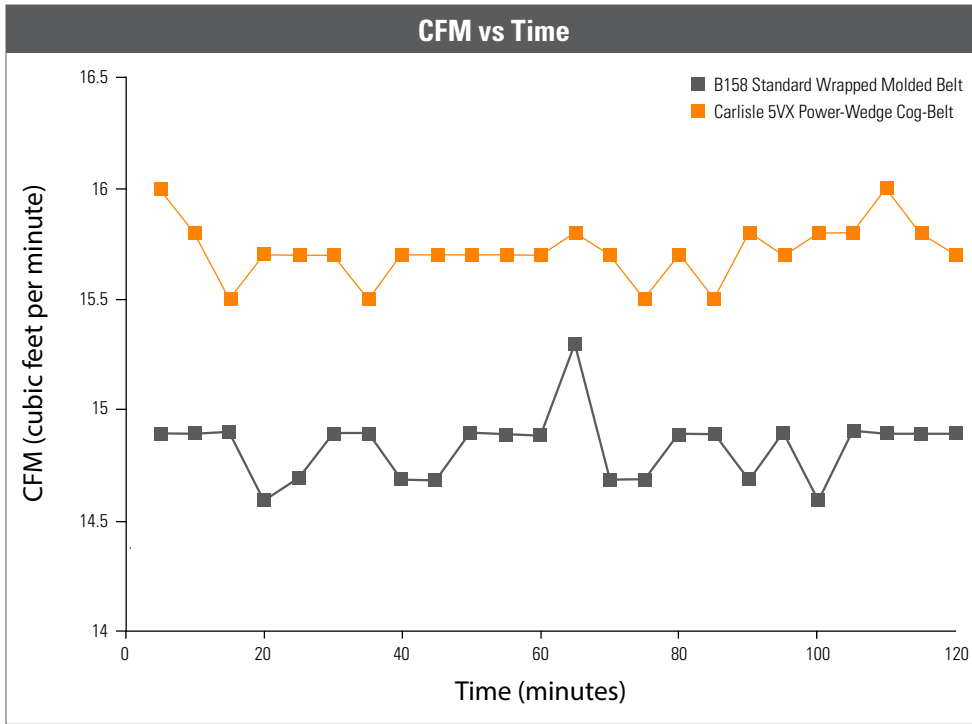
### Savings:

- An annual cost savings of more than \$700 is expected after upgrading to Carlisle Power-Wedge Cog-Belts
- The belt life of a raw edge cog-belt on this application is expected to be as much as 50% longer than the wrapped belt
- Longer belt life results in fewer belts purchased over the life of the unit
  - Fewer preventative maintenance cycles required over life of unit
- Reduced belt replacement costs when maintaining a 3-belt drive vs a 5-belt drive

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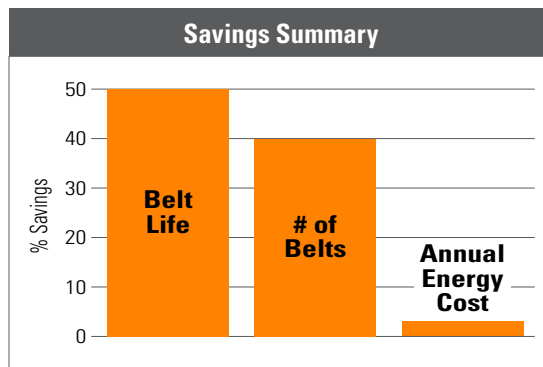
# Case Study Support Data



Dollars per CFM Consumption				
Belt Type	Consumption	Cost per KWH	Cost per Hour	Annual Energy Cost
B158 Standard Wrapped Belt	31,811 kw @ 60 min = 31.0 kwh	\$0.09	\$2.86	\$25,071
<b>Carlisle 5VX Power-Wedge Cog-Belt</b>	<b>30,878 kw @ 60 min = 30.88 kwh</b>	<b>\$0.09</b>	<b>\$2.78</b>	<b>\$24,346</b>
<b>Annual Energy Savings</b>				<b>\$725.12</b>

## Savings Summary:

- 50% savings on belt life
- 40% savings on belt purchases and maintenance
- 3% annual energy cost savings



# TIMKEN

The Timken team applies their know-how to improve the reliability and performance of machinery in diverse markets worldwide. The company designs, makes and markets high-performance mechanical components, including bearings, belts, gears, chain, couplings and related mechanical power transmission products and services.

[www.carlislebelts.com](http://www.carlislebelts.com)

## Resources:



## PowerMiser Mobile Web App

Simply enter your drive parameters, local utility rate and select an energy efficient Carlisle belt. PowerMiser instantly provides estimated annual energy costs, savings and payback.

To download, scan the QR code above or visit <http://www.powermiser.driveengineer.com> and save to your home page or desktop.

## Carlisle Industrial V-Belt Drives Service Manual

A complete manual containing helpful tips on proper installation and maintenance of belt drives including tools to aid in belt tensioning and alignment:

- Tension-Finder (Part #108039-A)
- Frequency-Finder (Part #109061)
- Laser-Align (Part #109083)

Download manual at [http://www.carlislebelts.com/cms\\_files/original/Carlisle\\_V\\_Belt\\_Service\\_Manual\\_2015.pdf](http://www.carlislebelts.com/cms_files/original/Carlisle_V_Belt_Service_Manual_2015.pdf).