

Industry: Food and Beverage  
Application: Flour Mill Roll Stands  
Products: Baldor•Reliance XE Motors with Roller Bearings on End Drive

## DOCUMENTED SAVINGS CASE STUDY NO. 21

### The Challenge

Flour Mills in the United States have been in operation for over 120 years. As a result, much of the equipment used today to mill flour has been in operation for many years and is in need of upgrading. One example of this equipment is U-frame motors, which have been in use since the 1950's. U-Frame motors were the standard design until the current T-frames were introduced in 1964. With improved insulation, T-Frames delivered more horsepower in smaller frames and also were designed with larger shafts and bearings per frame size to accommodate greater loads. As a result, U-frame motors are considered a legacy product with long lead times, higher costs and have no identifiable advantage over T-frame motors for this Flour Mill Roll Stand application.

### The Baldor Solution

The Baldor Industry Solutions team, local Sales Engineer, and Baldor Cleveland District office worked with the local distributor to evaluate the application and deliver back to the end-customer our XE Premium Efficient T-frame motor solution. With the assistance of Baldor Industry Solutions Engineering we calculated that we could improve the motor L10 bearing life from 40,000 hours to 100,000 by utilizing a roller bearing on the motor drive end. Calculation as follows:

#### Input Parameters:

Motor Hp .....	40.00	Driven RPM .....	714.67
Driver RPM.....	1785.00	Center Distance .....	72.00
Service Factor .....	1.30		

#### Drive Selection:

Belt Profile.....	BX	Sheave O.D. Driver .....	6.40
Belt Size.....	BX180	Sheave O.D. Driven .....	16.00
Number of belts.....	6		

#### Resultant Drive Data:

Belt Speed (FPM) .....	2995.47
Center Distance (in) .....	73.13

**Service Factor** ..... 1.94

#### Shaft Load (lbs):

Static Min. ....	884.16	Static Max. ....	1326.23
Dynamic Belt Pull.....	883.55		

#### Installation Data:

Belt Deflection at Center of Span (inches)	1.14	
Deflection Force per Belt (lbs):	Min: 6.04	Max: 6.96
Total Defl. Force for 6 Banded belts:	Min: 36.23	Max: 41.77



**T-Frame Option- 320T**

Calculated Ball Bearing L10 Life based on Dynamic Belt Pull of 883.55 is 17,500 Hours  
 Calculated Roller Bearing L10 Life based on Dynamic Belt Pull of 883.55 100,000+Hours

**U-Frame Option- 360U**

Calculated Ball Bearing L10 Life based on Dynamic Belt Pull of 883.55 is 40,000 Hours

Along with the up-front cost savings, by utilizing a Roller Bearing we have increased the theoretical life of the motor bearing by 60,000 hours compared to the U-frame 360 frame ball bearing. This savings can be calculated over the life of the improved motor design but is not quantified in this report.

Our Baldor XE Premium motor with a Roller Bearing on the drive end not only is a superior product to the 1952 U-Frame design, it also costs less. Example:

The Savings

<b>Existing U-Frame motor cost</b> .....	\$ 2,979
<b>New T-Frame motor cost with Roller Bearing</b> .....	\$ 1,771
<b>Savings per motor</b> .....	\$ 1,208
<b>Number of U-frame motors in operation</b> .....	74

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**Total Unit Price Savings** ..... **\$89,392**

The Conclusion

By focusing on providing our customers with the most Innovative Baldor Electric Product Solutions, we can identify solutions that range from cutting edge Rare Earth Magnet Servo Technology to upgrading 1952 design U-Frame motors that no longer deliver practical customer value.



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