

PAPER MANUFACTURING

PowerSeal™ Rewind Provides Up-rate and Efficiency Gain



- **Application** = Refiner
- **Motor Type** = AC Induction
- **Manufacturer** = GE
- **HP** = 5000
- **Voltage** = 6900
- **RPM** = 1200

The Challenge

A newsprint paper mill in the Northwest US has thirty six refiner motors in operation. These motors are commonly pushed beyond their 5000 HP rating, which has resulted in multiple failures and costly unplanned downtime. The motor OEM has recommended that the mill rewind their refiner motors to uprate them to 5620 HP. Unfortunately, several of the OEM rewinds have failed prematurely.

The Solution

IPS rewound all 36 refiner motors with its proprietary PowerSeal® medium-voltage, global VPI engineered insulation system. IPS engineers custom designed the stator coils to deliver the following benefits:

- Motor uprate from 5,000 HP to 5,620 HP
- 3% increase in motor efficiency from 90% to 93%

The PowerSeal rewind includes a standard 5-year warranty and the following reliability upgrades:

- Designed circuit rings to eliminate the leads from being connect on the end of the stator to allow for easier replacement of leads and to run cooler
- Eliminated the rigid mounting of the support rings back to the stator frame to allow thermal expansion of the coils to be independent from the frame
- Used surge rope and steel surge rings with felt blocking to allow for a rigid setup and ample cooling
- Tig welding of lamination finger supports to keep them in place during operation



IPS PowerSeal global VPI rewinds come standard with a 5-year warranty.



PowerSeal is IPS's qualified and patented medium voltage VPI engineered insulation system.



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The Savings

The newspaper paper mill has experienced almost \$500,000 in annual savings or over \$3,400,000 in total savings over the past 7 years.

- Initial rewind cost – IPS PowerSeal rewind is approximately \$35K cheaper than the OEM offered rewind
- Unplanned downtime – Unlike the OEM rewinds, the IPS PowerSeal rewinds have experienced no failures, thus eliminating unplanned downtime conservatively estimated at \$10,000 per hour
- Motor efficiency gain – IPS PowerSeal stator coils were custom designed with more copper which resulted in a cooler running motor with a 3% efficiency gain, thus decreasing the annual power bill for running refiner motors by an estimated \$43,468 each.

COST ITEM	COST DESCRIPTION	ANNUAL TCO	IPS SOLUTION
Plant Production	Unplanned Downtime		
	Total events (Qty. / Year)	2	0
	Reduction in Capacity (\$ / Hour)	\$10,000	\$0
	Avg. time per event (Hours)	12	0
	Sub-Total (\$ / Year)	\$240,000	\$0
Plant Labor	Unplanned Downtime		
	Total events (Qty. / Year)	2	0
	Mtn. labor rate (\$ / Hour)	\$80	\$0
	Avg. time per event (Hours)	12	0
	Mtn. personnel per event (Qty.)	4	0
Sub-Total (\$ / Year)	\$7,680	\$0	
Service Solution	Repair		
	Total events (Qty. / Year)	3	3
	Avg. repair cost (\$)	\$187,500	\$150,000
Sub-Total (\$ / Year)	\$562,500	\$450,000	
Efficiency Cost	Energy Losses		
	Motor Efficiency (%)	90%	93%
	Total HP	16860	16860
	Energy Cost (\$ / kW Hr)	\$0.05	\$0.05
	Operating House (Hours / Day)	24	24
	Operating Days (Days / Year)	320	320
	Annual Operating Calculation (Hours / Year)	7680	7680
	Sub-Total (\$ / Year)	\$434,680	\$304,276
1st Year TCO =		\$1,244,860	\$754,276
IPS SOLUTION SAVINGS =			\$490,584
7-YEAR TOTAL SAVINGS =			\$3,434,089

The Conclusion

IPS offers proven rewind technologies (e.g. PowerSeal), industry knowledge and in-house engineering capable of increasing the reliability and performance of your critical rotating assets. By doing so, IPS is also able to help you minimize unplanned downtime, increase production and potentially return millions in savings to an operation.

