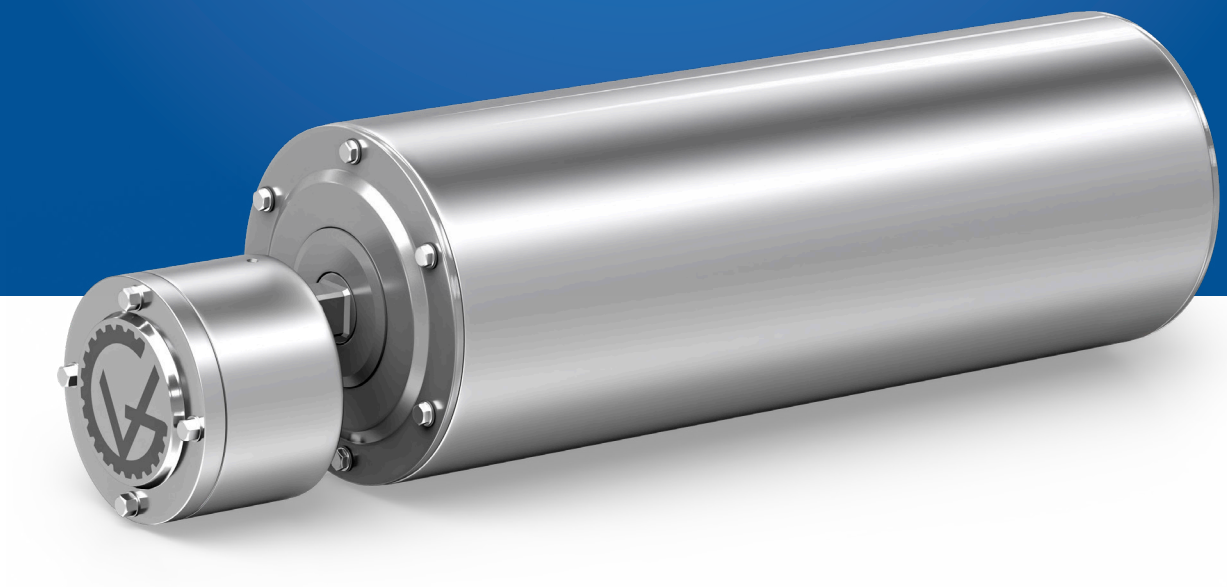
ENERGY EFFICIENCY COMPARISON STUDY

# Traditional Conveyor Drive

VS.

# VDG IntelliDrive® Drum Motor

PERMANENT MAGNET DRUM MOTOR TECHNOLOGY



VDG Van der Graaf

# OVERVIEW

## An efficiency comparison study was conducted to measure energy consumption, performance, and overall energy costs between a traditional external motor/gearbox drive and the **VDG IntelliDrive® Permanent Magnet Drum Motor**.

The study examined two identical conveyors, each using a 1 hp electric motor geared for conveyor belt velocity of 51 ft/min and mechanically connected to a load cell.

Both drives were subjected to three test criteria and measured for energy consumption, load capacity and annual energy cost based on $0.15 kWh, 24 hrs/day, 365 days/yr.

Test studies revealed that the conveyor belt driven by the **VDG IntelliDrive®** had **significant energy and cost savings** compared to the traditional motor/gearbox conveyor drive. The study indicated 284.0% difference in electrical cost under no load condition (Test 3), and 63.6% difference when equal amount of ft-lbs. of torque was applied to each drive (Test 1). When both drives were subjected to full load condition (Test 2), although both drives consumed the same amount of energy, the IntelliDrive® Drum Motor delivered 60% more torque. In addition, the electrical savings with the IntelliDrive® was achieved without loss of torque or belt-pull.

Results clearly indicates that a conveyor driven by the IntelliDrive® drum motor is overall the most efficient, saves energy and cost, prolongs the lifespan of the drive compared to a traditional conveyor drive system.

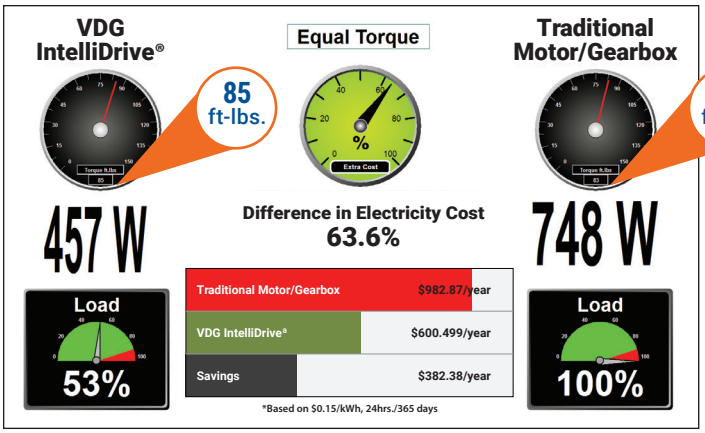
The **VDG IntelliDrive®** Drum Motor has all drive components, including the permanent magnet (PM) motor coupled in-line with the gear reducer, enclosed within the drive drum, and is designed for **80,000 hours of continuous operation before maintenance**.

The IntelliDrive® eliminates safety hazards and maintenance costs associated with external motor/gearbox systems.



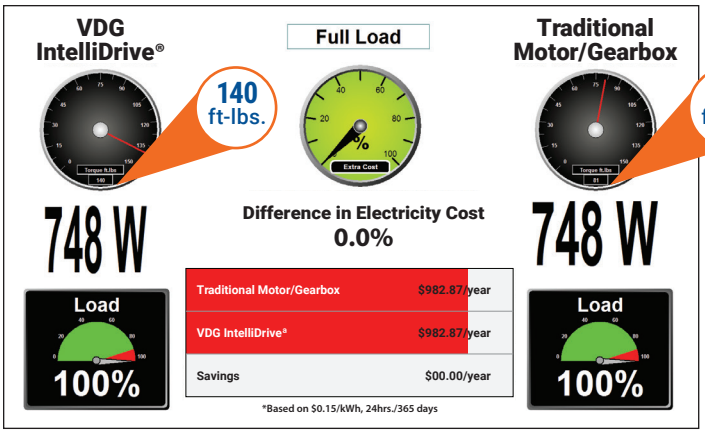
# RESULTS

## TEST 1 CRITERIA: Both drives loaded to produce same amount of torque.



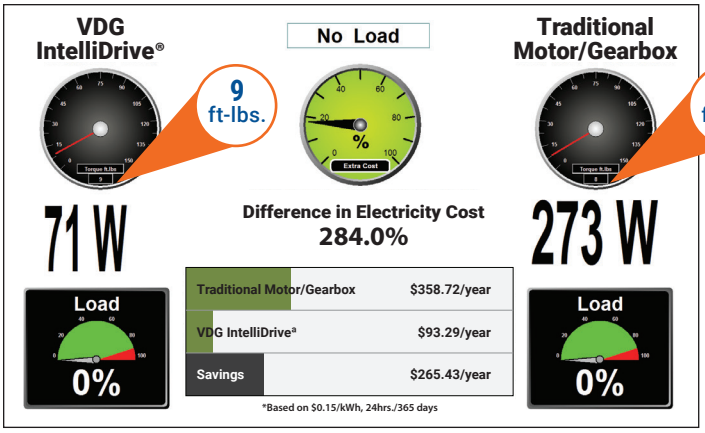

| | VDG IntelliDrive® | Conventional Motor/Gearbox |
|---|---|---|
| Torque | 85 ft.-lbs. | 83 ft.-lbs. |
| Motor load | **53%** | 100% |
| Energy consumption | **457 watts** | 748 watts |
| Energy cost* | **$600.49/year** | $982.87/year |

## TEST 2 CRITERIA: Both drives at 100% motor load.




| | VDG IntelliDrive® | Conventional Motor/Gearbox |
|---|---|---|
| Torque | **140 ft.-lbs.** | 81 ft.-lbs. |
| Motor load | 100% | 100% |
| Energy consumption | 748 watts | 748 watts |
| Energy cost* | $982.87/year | $982.87/year |

## TEST 3 CRITERIA: Both drives at 0% motor load.




| | VDG IntelliDrive® | Conventional Motor/Gearbox |
|---|---|---|
| Torque | 9 ft.-lbs. | 8 ft.-lbs. |
| Motor load | 0% | 0% |
| Energy consumption | **71 watts** | 273 watts |
| Energy cost* | **$93.29/year** | $358.72/year |

*Based on $0.15 kWh, 24 hrs./day, 365 days/yr

Founded in 1948 and established in North America in 1985, VDG (Van der Graaf) is the world's leader in the design and manufacturing of drum motors for material handling and processing belt conveyor applications such as warehousing, postal and parcel, food processing, airline baggage, mining and aggregate, among others.

VDG offers quality products, expedited production, and after-sales service through its in-house R&D, engineering, and manufacturing facilities and service centers located in the USA, Canada, and Europe.

VDG adheres to a simple principle: design a superior product to meet customer needs in a changing marketplace.



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