Van der Graaf DRUM MOTORS

Engineered to Keep Your Business Running

TM500 - TM800 DRUM MOTORS

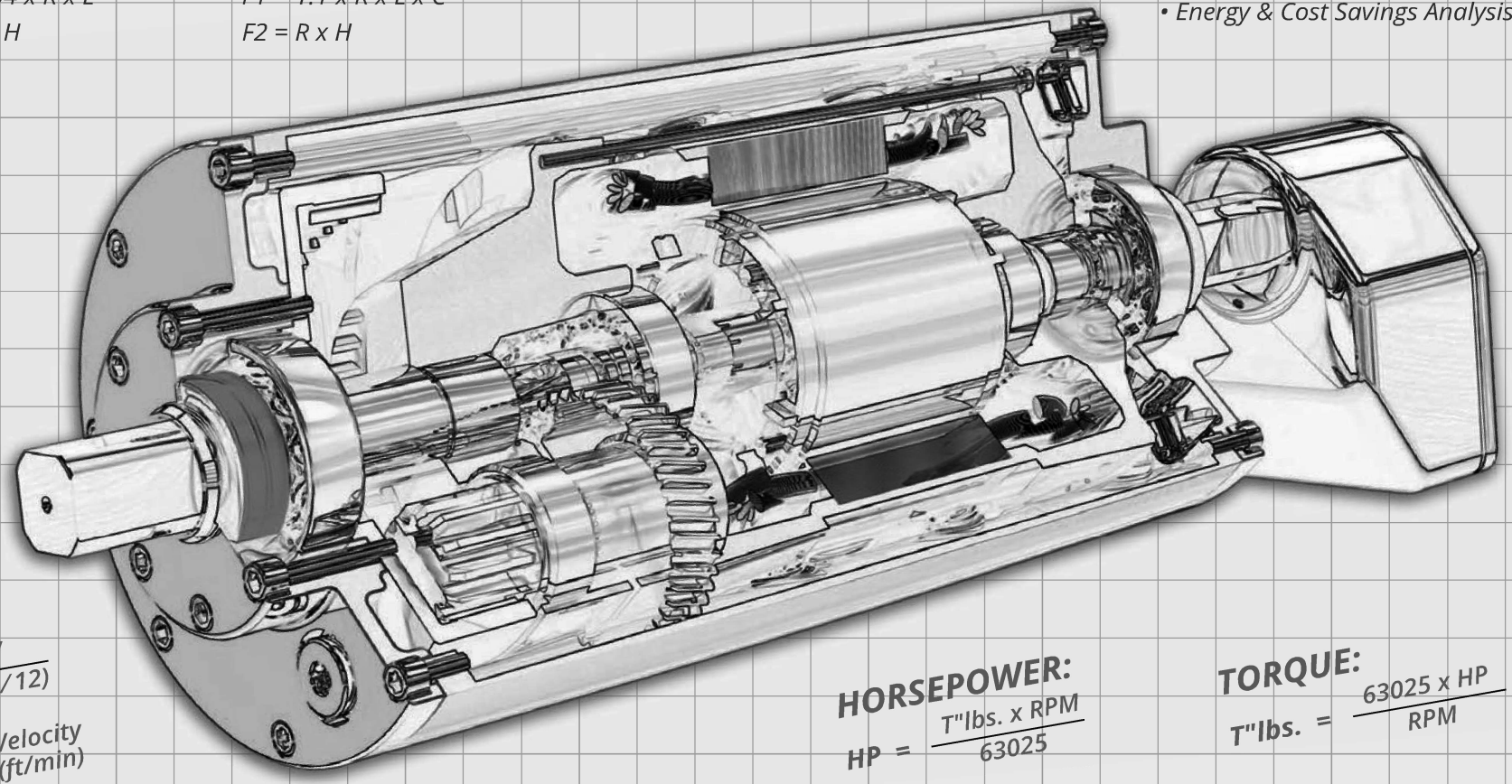
20" to 31.5" diameter • 20 to 200 hp

EXTREME-DUTY

BELT PULL (BP) = (F0 + F1 + F2)

Roller Bed Conveyor	*Slider Bed Conveyor*
F0 = 0.04 (2P + Q) L	*F0 = 1.1 x P x L x C*
F1 = 0.04 x R x L	*F1 = 1.1 x R x L x C*
F2 = R X H	*F2 = R x H*

- *Dimensions & Specifications*
- *Electric Motor Full Load AMP Chart*
- *Drum Motor Design Features*
- *Energy & Cost Savings Analysis*



RPM:

$$= \frac{V}{\Pi\,(d/12)}$$

V = Velocity (ft/min)

HORSEPOWER:

$$HP = \frac{T"lbs. \times RPM}{63025}$$

TORQUE:

$$T"lbs. = \frac{63025 \times HP}{RPM}$$

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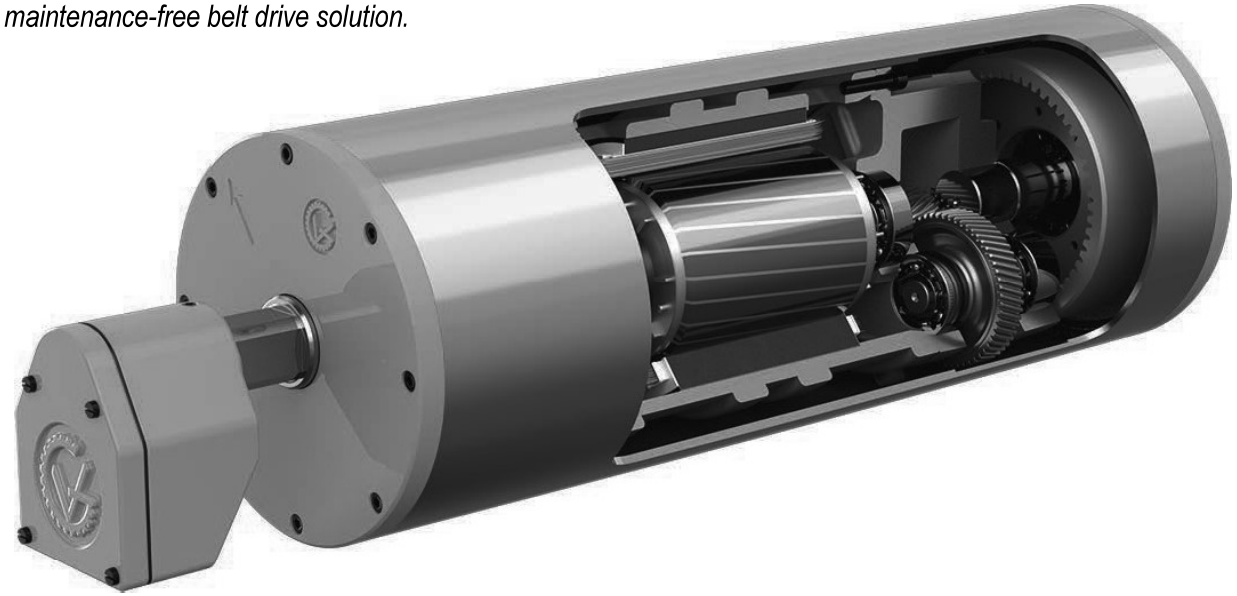
DESIGN BENEFITS

Van der Graaf is a leading designer and manufacturer of specially engineered drum motors. Built to endure the demands of the bulk handling industry – from ship loading, to power generation, to surface and underground mining. Van der Graaf products are manufactured and marketed worldwide through a respected international network of distributors. As the leading global supplier of conveyor belt drives, Van der Graaf has proven to be highly intuitive in projecting and reacting to changing market demands.

The Extreme Duty Series offers a conveyor drive in which all components are housed internally. This advanced design eliminates the need for external features including the motor, gearbox, sprockets, chain, chain guard, and pillow block bearings, making it ideal for the harshest of environments.

The Van der Graaf Extreme Duty Mining Series incorporates the benefits of a tried and tested drum motor with an increase in power and capacity. This durable design is entirely sealed from the most challenging work environments, providing a completely reliable, less complex, and virtually maintenance-free belt drive solution.



OPERATOR SAFETY

The advanced design eliminates safety hazards found with a conventional drive while offering a significantly less complex solution to powering your conveyor and improving safety conditions. As the motor is sealed and isolated from its surroundings, and all moving parts are kept within the conveyor frame, operator safety is increased while optimizing floor space utilization.

LOWER ENERGY COSTS

Van der Graaf drum motors operate at 96% mechanical efficiency resulting in lower operating cost and energy savings of up to 30% compared to conventional exposed-drive conveyors.

NO MAINTENANCE SYSTEM

This entirely sealed approach, with no external moving components, eliminates the need for continual adjustment and nearly all maintenance. Van der Graaf motors only require an oil change after 50,000 hours of operation. This can be easily performed without removing the drum motor from the conveyor, reducing downtime and increasing productivity.

SPACE UTILIZATION

The low-profile drive results in a streamline appearance and enables more belt conveyor to fit into less floor or overhead space, this promotes higher density and numerous applications. This efficient design allows for a more productive use of space and safe passage among the conveyor frame.

*Energy and Cost Savings Analysis - page 14-15

EXTREME-DUTY CONSTRUCTION

The drum motor utilizes heavy duty bolt-on cast iron end caps and cast iron gear housing. This provides a strong, durable construction and the ability to withstand greater levels of belt tension over typical motorized drives. Gears are precision designed and manufactured by the most stringent industry standard to provide years of continuous service.

ELECTRIC MOTOR

All Van der Graaf electric motors are manufactured to inverter duty standards.

Insulation: All material used for the electric motor windings meet Class F standards (155˚C). The optional Class H standards (180˚C) is required for applications with ambient temperature of 125˚F and higher.

Vacuum Pressure Impregnation (VPI): One of the key contributors to long life for an electric motor is the method of encapsulation. This state of the art technique is achieved through a process called Vacuum Pressure Impregnation (VPI) and has been proven to reduce electric motor failures substantially. This method is only used in less than 10% of world's standard electric motor production and is mainly applied to extreme heavy duty applications.

Supply Voltage: The drum motor can be supplied in all standard voltage and all other nonstandard voltage and frequency for three phase applications.

GV THERMAL (GVTHERM) OVERLOAD PROTECTION

Thermal overload protectors are devices, embedded into the motor windings (one per phase) and are available for both Class F and H insulation. These are bi-metal type devices, maintaining continuity under normal temperature conditions. When temperature within the motor rises above 135˚C for Class F and 165˚C for Class H, the GVTHERM will trip, causing an open circuit between the respective GVTHERM leads.

EXTREME-DUTY MECHANICAL SEALS

All Extreme Duty series drum motors are equipped with an advanced mechanical sealing system for continuous operation in the most severe conditions without corrosion or contamination. The unique sealing systems avoids the need for re-greasing while extending seal life.

COOLING

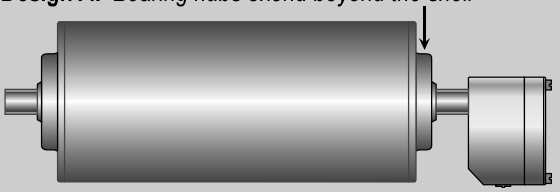
All TM800 Extreme Duty series drum motors are 'cooler ready' enabling for a broader range of applications, to include hot areas and hot product uses.

BREATHER VENT

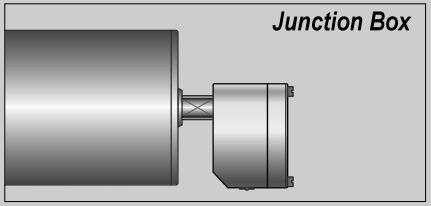
All Extreme Duty series drum motors include a breather vent to extend the overall life of the drum motor.

HUB DESIGN:

Design A: *Bearing hubs exend beyond the shell*



POWER HOOK-UP:



NON-STANDARD LENGTH / EXTRA LONG FACE WIDTH
Please contact your Van der Graaf technical representative for details.

SHELL (DRUM):
The shell of the Van der Graaf drum motor is machined to convex crown approximately 1% of the diameter in order to help track the belt more accurately. Other crown profiles such as trapezoidal or flat face are available.

LAGGING: Van der Graaf offers a complete line of optional lagging materials.

Hot Bond: a vulcanization process to hot bond rubber wrapped to the outside of the drive shell. Available in plain, herringbone and diamond pattern finishes.

Slide lagging: a system of patterned rubber pads, that are slid into welded binding strips along the length of the drive shell. The systems allows for rapid replacement of rubber lagging material and is designed for standard applications.

Ceramic lagging: embedded ceramic tiles with the rubber substrate to provide traction and durability.
This lagging is designed for harsh, abrasive applications where rubber lagging is insufficient.

Metal Tread lagging: an upgrade to ceramic lagging, metal tread lagging uses ceramic lagging technology and adds steel inserts along the face of the shell, in either straight or chevron patterns. Designed for the harshest applications, to compliment ceramic lagging performance, it extends overall wear and life expectancy.

BACKSTOP DEVICE
The backstop device permit operational rotation in only one direction. Specified by the user as clockwise or counter clockwise, it prevents the unit from rotating in the opposite direction, ideal for inclined conveyors.

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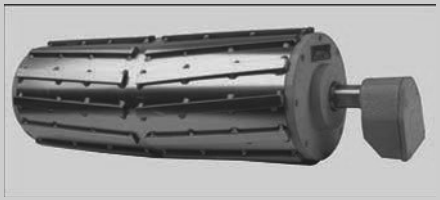
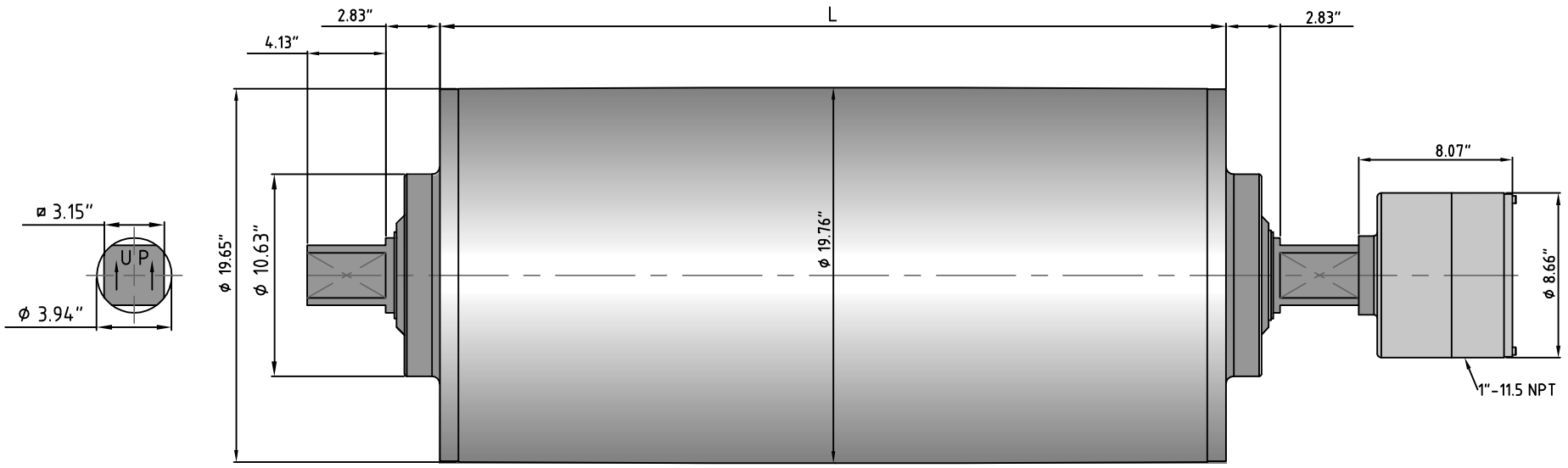
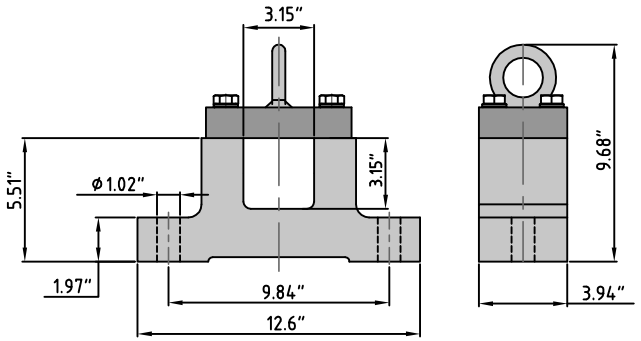




Standard face widths* (L) in inches:

38.0	44.0	50.0	56.0	62.0	68.0	74.0

Bracket AB 100



**Some face widths are not available in all horsepowers. For minimum available face widths refer to page 12.*
***Idler dimensions are identical to the drum motor with no junction box.*

75 HP

V *(ft/min)* M/G	600 2/PL2	500 2/PL2	400 2/PL2
Belt Pull *(lbs)*	3919	4703	5878
Drum RPM	115	95	76

60 HP

V *(ft/min)* M/G	600 2/PL2	500 2/PL2	400 2/PL2	300 4/PL2	250 4/PL2
Belt Pull *(lbs)*	3135	3762	4703	6200	7500
Drum RPM	115	95	76	57	48

50 HP

V *(ft/min)* M/G	600 2/PL2	500 2/PL2	400 2/PL2	300 4/PL2	250 4/PL2	200 4/PL2
Belt Pull *(lbs)*	2613	3135	3919	5224	6270	7840
Drum RPM	115	95	76	57	48	38

40 HP

V *(ft/min)* M/G	300 4/PL2	250 4/PL2	200 4/PL2
Belt Pull *(lbs)*	4180	5000	6270
Drum RPM	57	48	38

30 HP

V *(ft/min)* M/G	300 4/PL2	250 4/PL2	200 4/PL2
Belt Pull *(lbs)*	3100	3760	4700
Drum RPM	57	48	38

25 HP

V *(ft/min)* M/G	300 4/PL2	250 4/PL2	200 4/PL2
Belt Pull *(lbs)*	2612	3135	3920
Drum RPM	57	48	38

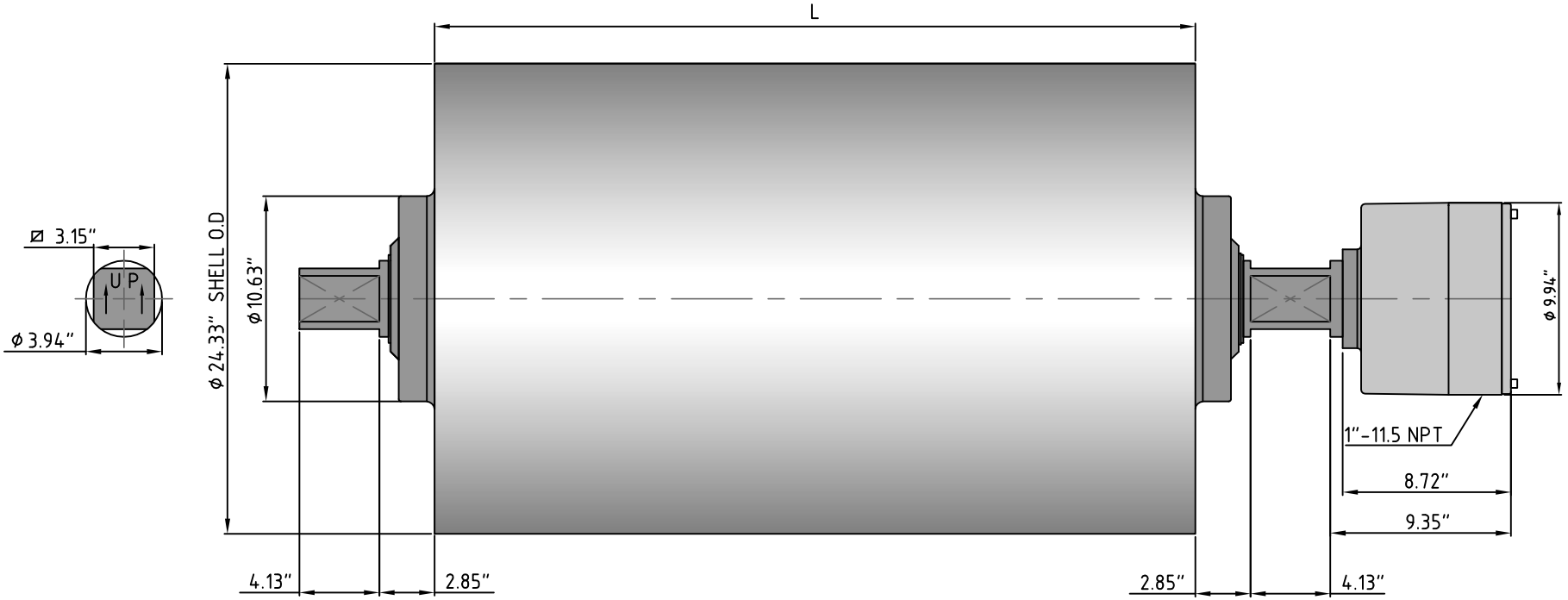
20 HP

V *(ft/min)* M/G	200 6/PL2	150 6/PL2	120 6/PL2
Belt Pull *(lbs)*	3330	4100	4850
Drum RPM	38	29	23

V = ***Belt Speed*** *(ft/min)*

M/G = ***Motor/Gear Reducer Configuration (at rated horsepower)***

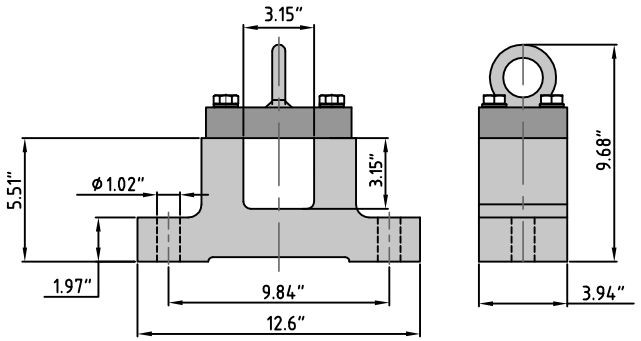
High Speed Low Torque ◀ 2/S2 4/S2 6/S2 2/S3 4/S3 6/S3 2/PL2 4/PL2 6/PL2 2/PL3 4/PL3 6/PL3 ▶ *Low Speed High Torque*



Standard face widths* (L) in inches:

38.0	44.0	50.0	56.0	62.0	68.0	74.0

Bracket AB 100



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***Idler dimensions are identical to the drum motor with no junction box.*

75 HP

V *(ft/min)* M/G	**744** 2/PL2	**620** 2/PL2	**496** 2/PL2	**372** 4/PL2	
Belt Pull *(lbs)*	**3171**	**3805**	**4756**	**6341**	
Drum RPM	**115**	**95**	**76**	**57**	

60 HP

V *(ft/min)* M/G	**744** 2/PL2	**620** 2/PL2	**496** 2/PL2	**372** 4/PL2	**310** 4/PL2	
Belt Pull *(lbs)*	**2536**	**3044**	**3805**	**5016**	**6068**	
Drum RPM	**115**	**95**	**76**	**57**	**48**	

50 HP

V *(ft/min)* M/G	**744** 2/PL2	**620** 2/PL2	**496** 2/PL2	**372** 4/PL2	**310** 4/PL2	**248** 4/PL2	
Belt Pull *(lbs)*	**2114**	**2536**	**3171**	**4227**	**5073**	**6343**	
Drum RPM	**115**	**95**	**76**	**57**	**48**	**38**	

40 HP

V *(ft/min)* M/G	**372** 4/PL2	**310** 4/PL2	**248** 4/PL2		
Belt Pull *(lbs)*	**3382**	**4045**	**5073**		
Drum RPM	**57**	**48**	**38**		

30 HP

V *(ft/min)* M/G	**372** 4/PL2	**310** 4/PL2	**248** 4/PL2		
Belt Pull *(lbs)*	**2508**	**3042**	**3803**		
Drum RPM	**57**	**48**	**38**		

25 HP

V *(ft/min)* M/G	**372** 4/PL2	**310** 4/PL2	**248** 4/PL2		
Belt Pull *(lbs)*	**2113**	**2536**	**3172**		
Drum RPM	**57**	**48**	**38**		

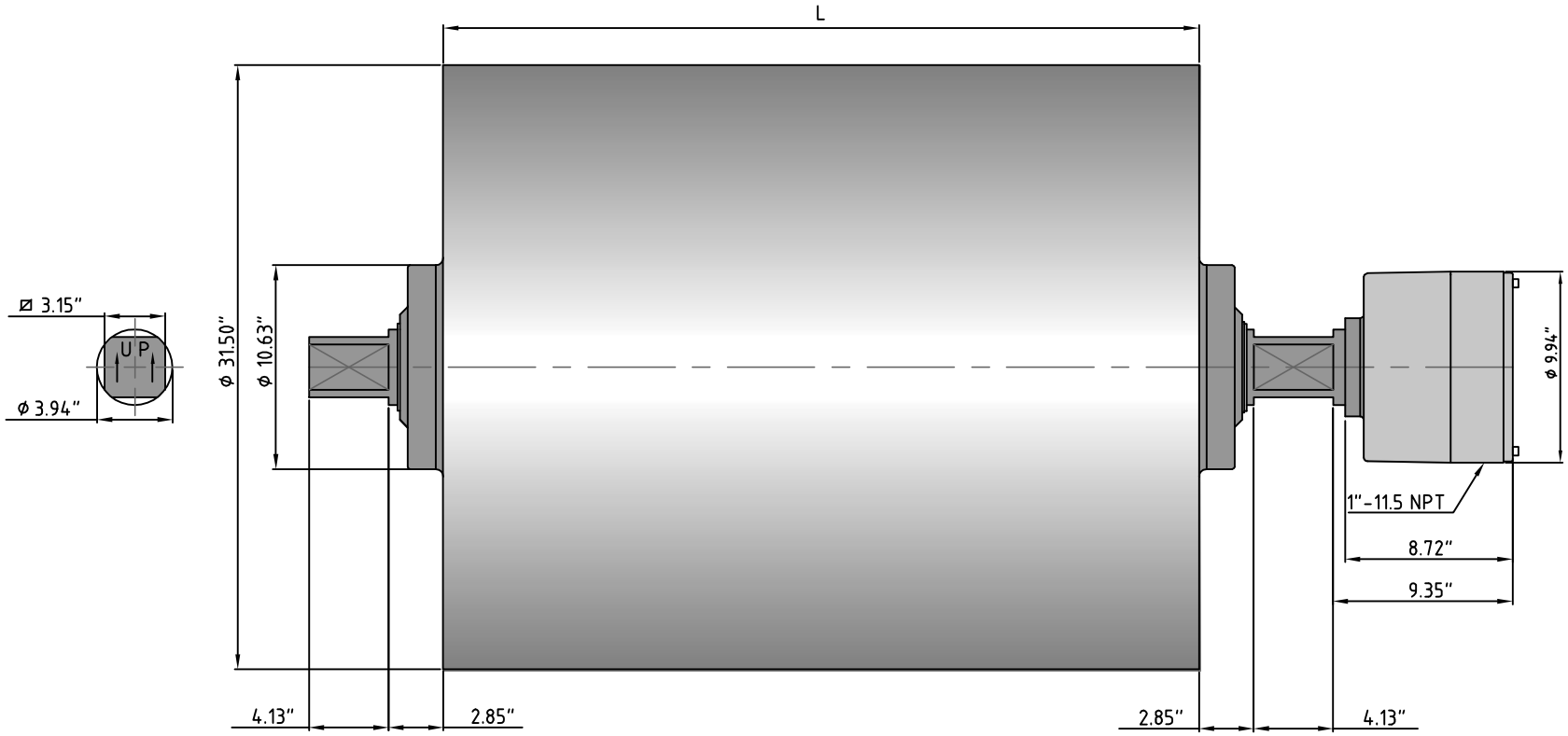
20 HP

V *(ft/min)* M/G	**248** 6/PL2	**186** 6/PL2	**149** 6/PL2		
Belt Pull *(lbs)*	**1691**	**2023**	**2536**		
Drum RPM	**38**	**29**	**23**		

V = ***Belt Speed*** *(ft/min)*

M/G = ***Motor/Gear Reducer Configuration (at rated horsepower)***

High Speed Low Torque ◀ 2/S2 | 4/S2 | 6/S2 | 2/S3 | 4/S3 | 6/S3 | 2/PL2 | 4/PL2 | 6/PL2 | 2/PL3 | 4/PL3 | 6/PL3 ▶ *Low Speed High Torque*



Standard face widths* (L) in inches:

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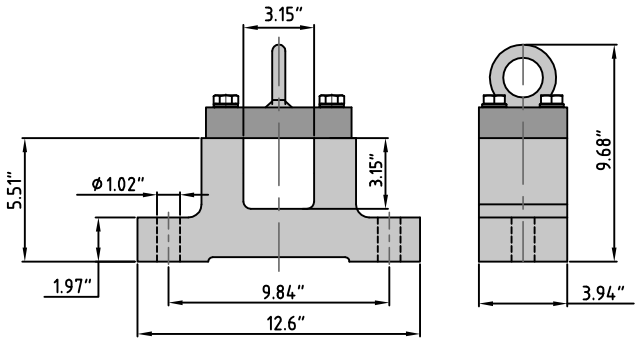
Bracket AB 100



**Some face widths are not available in all horsepowers. For minimum available face widths refer to page 12.*
***Idler dimensions are identical to the drum motor with no junction box.*

75 HP

V *(ft/min)* M/G	960 2/PL2	800 2/PL2	640 2/PL2	480 4/PL2	
Belt Pull *(lbs)*	2449	2939	3674	4898	
Drum RPM	116	97	78	58	

60 HP

V *(ft/min)* M/G	960 2/PL2	800 2/PL2	640 2/PL2	480 4/PL2	400 4/PL2	
Belt Pull *(lbs)*	1959	2351	2939	3875	4688	
Drum RPM	116	97	78	58	49	

50 HP

V *(ft/min)* M/G	960 2/PL2	800 2/PL2	640 2/PL2	480 4/PL2	400 4/PL2	320 4/PL2
Belt Pull *(lbs)*	1633	1959	2449	3265	3919	4900
Drum RPM	116	97	78	58	49	39

40 HP

V *(ft/min)* M/G	480 4/PL2	400 4/PL2	320 4/PL2
Belt Pull *(lbs)*	2613	3125	3919
Drum RPM	58	49	39

30 HP

V *(ft/min)* M/G	480 4/PL2	400 4/PL2	320 4/PL2
Belt Pull *(lbs)*	1938	2350	2938
Drum RPM	58	49	39

25 HP

V *(ft/min)* M/G	480 4/PL2	400 4/PL2	320 4/PL2
Belt Pull *(lbs)*	1633	1959	2450
Drum RPM	58	49	39

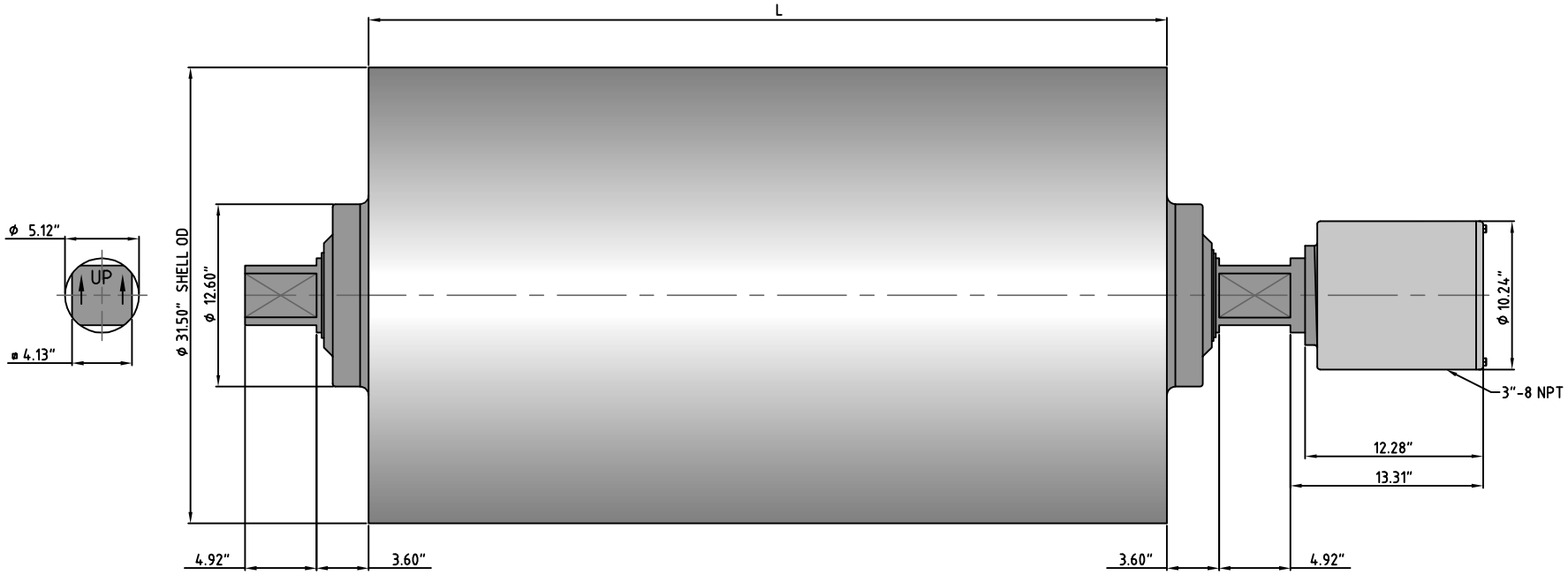
20 HP

V *(ft/min)* M/G	320 6/PL2	240 6/PL2	192 6/PL2
Belt Pull *(lbs)*	1306	1563	1959
Drum RPM	39	29	23

V = ***Belt Speed*** *(ft/min)*

M/G = ***Motor/Gear Reducer Configuration (at rated horsepower)***

High Speed Low Torque ◀ 2/S2 4/S2 6/S2 2/S3 4/S3 6/S3 2/PL2 4/PL2 6/PL2 2/PL3 4/PL3 6/PL3 ▶ *Low Speed High Torque*



Standard face widths* (L) in inches:

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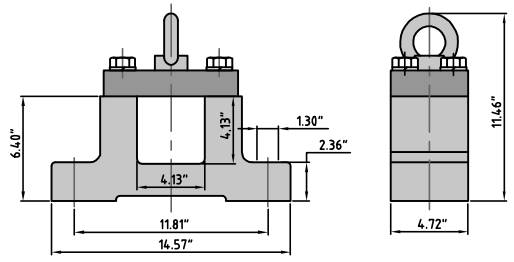
Bracket AB 130



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***Idler dimensions are identical to the drum motor with no junction box.*

200 HP

V *(ft/min)* M/G	1077 4/S2	914 4/S2	745 4/S2
Belt Pull *(lbs)*	5715	6736	8786
Drum RPM	131	111	90

180 HP

V *(ft/min)* M/G	1077 4/S2	914 4/S2	745 4/S2
Belt Pull *(lbs)*	5144	6063	7908
Drum RPM	131	111	90

150 HP

V *(ft/min)* M/G	1077 4/S2	914 4/S2	745 4/S2
Belt Pull *(lbs)*	4287	5053	6590
Drum RPM	131	111	90

120 HP

V *(ft/min)* M/G	1091 4/S2	917 4/S2	703 4/S2	597 4/S2	458 4/S2
Belt Pull *(lbs)*	3462	4117	5369	6328	8253
Drum RPM	132	111	85	72	56

100 HP

V *(ft/min)* M/G	1091 4/S2	917 4/S2	703 4/S2	597 4/S2	458 4/S2
Belt Pull *(lbs)*	2885	3430	4474	5273	6878
Drum RPM	132	111	85	72	56

75 HP

V *(ft/min)* M/G	1091 4/S2	917 4/S2	703 4/S2	597 4/S2	458 4/S2
Belt Pull *(lbs)*	2116	2516	3281	3867	5044
Drum RPM	132	111	85	72	56

V = ***Belt Speed*** *(ft/min)*

M/G = ***Motor/Gear Reducer Configuration (at rated horsepower)***

High Speed Low Torque ◀ 2/S2 4/S2 6/S2 2/S3 4/S3 6/S3 2/PL2 4/PL2 6/PL2 2/PL3 4/PL3 6/PL3 ▶ *Low Speed High Torque*

MINIMUM FACE WIDTH (L in inches)

TM500A100 / TM630A100 / TM800A100										
HP	75	60	60	50	50	40	30	25	20	
MOTOR/GEAR REDUCER	2/PL2	2/PL2	4/PL2	2/PL2	4/PL2	4/PL2	4/PL2	4/PL2	6/PL2	
HUB A min. FACE WIDTH (L)	43.31	43.31	41.34	43.31	41.34	39.37	35.43	35.43	35.43	
TM800A130										
HP	200	180	150	120	100	75				
MOTOR/GEAR REDUCER	4/S2	4/S2	4/S2	4/S2	4/S2	4/S2				
HUB A min. FACE WIDTH (L)	55.12	55.12	55.12	55.12	55.12	55.12				

ELECTRIC MOTOR FULL LOAD AMP

TM500A100 / TM630A100 / TN800A100

RPM	3600			1750					1150									
HP	**75.0**	**60.0**	**50.0**	**60.0**	**50.0**	**40.0**	**30.0**	**25.0**	**20.0**									
Full Load Amps at: 240v	N/A	N/A	N/A	N/A	N/A	N/A	67.4	55.6	49.78									
480v	96.0	77.0	64.0	68.0	55.40	43.62	33.7	29.4	24.89									
600v	77.0	62.0	51.0	55.0	44.32	34.80	26.5	21.0	18.70									

TM800A130

RPM	1740			1150														
HP	**200.0**	**180.0**	**150.0**	**120.0**	**100.0**	**75.0**												
Full Load Amps at: 240v	NA	NA	NA	NA	NA	NA												
480v	242.00	201.00	176.00	150.00	128.00	95.00												
600v	192.00	168.00	144.00	125.00	99.00	79.00												

ENERGY & COST SAVINGS ANALYSIS

Van der Graaf DRUM MOTORS

SCOPE

This is a comparative analysis concerning the energy consumption of a conventional conveyor with an electric motor, a gear reducer and a chain drive, and a conveyor driven by a Van der Graaf drum motor.

HYPOTHESIS

There will be considered that both conveyors, the conventional conveyor and the conveyor driven by Van der Graaf Drum Motor:

a) have the same rated output power,
b) operate in the same environmental conditions (temperature, pressure, humidity, altitude),
c) supplied power have the same parameters (phase number, line voltage, frequency),
d) loaded at the same constant output power, equal by the rated output power, for the whole period of the considered operation time.

CALCULATION

a) The conventional conveyor (index C from conventional) operates with a motor, with rated output power 50 hp, (or 37300 W, rated speed 1750 rpm, rated voltage 3 x 460 V, rated frequency 60 Hz), a coupling, a right angle gear reducer with a gear ratio 20, and a chain drive with ratio 1.5. The electric motor has the rated efficiency 85.5%, the coupling has the efficiency 99%, the gear reducer is a worm gear reducer with efficiency of 87% [6.5] and the chain drive has the efficiency 75%. (See page 15, Diagram B)

The total efficiency of the Conventional Conveyor is:

$$\eta_C = 0.855 \times 0.99 \times 0.87 \times 0.75 = 0.552, \text{ or } 55.2\%$$

The input power (index 1 for input and 2 for output) of the conventional conveyor is:
$P_{1C} = P_{2C} / \eta_C = 37300/0.552 = 67572.50 \text{ W} \approx 67.57 \text{ kW}$

b) The conveyor (index M from drum motor) driven by a Van der Graaf Drum Motor is considered. It has the same rated output power as the conventional conveyor, 50 hp or 37300 W and contains an electric motor with rated efficiency 87% and a parallel-shaft gear reducer with efficiency 0.96%. (See page 15, Diagram A)

The total efficiency of the conveyor driven by Van der Graaf Drum Motor is:

$$\eta_M = 0.87 \times 0.96 = 0.835, \text{ or } 83.5\%$$

The input power (1 for input and 2 for output) of the conveyor driven by Van der Graaf drum motor is:
$P_{1M} = P_{2M} / \eta_M = 37300/0.835 = 44670 \text{ W} = 44.67 \text{ kW}$

c) An operation time of both conveyors is determined taking into consideration that both conveyors work 8 hours shift, 2 shifts per day, 5 days per week, and 52 weeks per year,
t = 8 hours/shift x 2 shift/day x 5 days/week x 52 weeks/year = 4160 hours/year.

d) **The electric energy consumed by the conventional conveyor**, in the considered operation time, is determined by the product of the input active power and the operation time:
$E_C = P1C \times t = 67.57 \text{ kW} \times 4160 \text{ hours/year} = 281091.20 \text{ kWh/yr}$ **≈ 281,090 kWh/yr**

e) **The electric energy consumed by the conveyor driven by Van der Graaf Drum Motor,** in the considered operation time, is similarly determined:
$E_M = P_{1M} \times t = 44.67 \text{ kW} \times 4160 \text{ hours/year}$ **= 185,830 kWh/yr**

f) An average price of the electric energy in USA is considered: p = 0.08 USD/kWh.

g) **The cost of the electric energy per year of the conventional conveyor** will be calculated as the product between the consumed electric energy in the considered operation time and the specific price of the electric energy:
$C_C = E_C \times p = 281090 \text{ kWh/yr} \times 0.08 \text{ USD/kWh} = 22487.20 \text{ USD/yr}$ **≈ 22,490 USD/yr**

h) **The cost of the electric energy per year of the conveyor driven by Van der Graaf drum motor** will be similrly calculated:
$C_M = E_M \times p = 185830 \text{ kWh/yr} \times 0.08 \text{ USD/kWh} = 14866.40 \text{ USD/yr}$ **≈ 14,870 USD/yr**

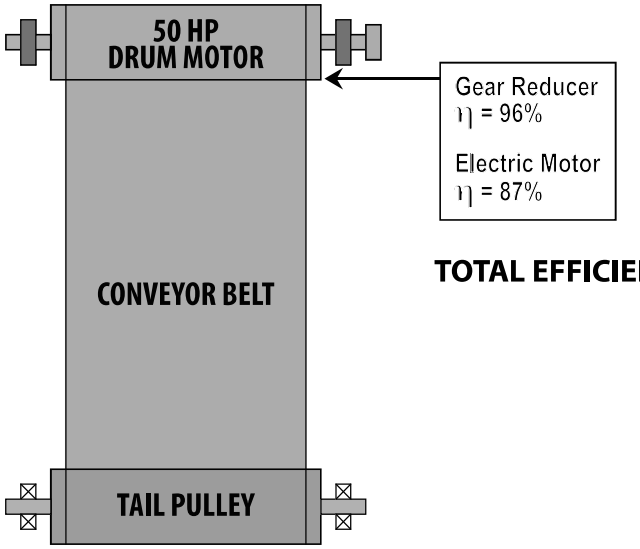
i) **The energy saving per year** of the higher efficient conveyor, respectively of the conveyor driven by Van der Graaf drum motor, is determined as a difference between the consumed energy of the conventional conveyor and the consumed energy of the conveyor driven by Van der Graaf drum motor, in the considered operation time of one year period (See page (See page 15, Graph 1)
$ES = E_C - E_M = 281090 \text{ kWh/yr} - 18583 \text{ kWh/yr} =$ **95,620 kWh/yr**

j) **The cost saving per year** of the higher efficient conveyor, respectively of the conveyor with Van der Graaf drum motor, is determined as a difference between the cost of the consumed energy of the convetional conveyor and the cost of the consumed energy of the conveyor drive by Van der Graaf drum motor, in the considered operation time of one year period. (See page 15, Graph 2)
$CS = C_C - C_M = 22490 \text{ USD/yr} - 1487 \text{ USD/yr} =$ **7,620 USD/yr**

ENERGY COST SAVINGS WITH CONVEYOR DRIVEN BY VAN DER GRAAF DRUM MOTOR IS 762 USD/YEAR

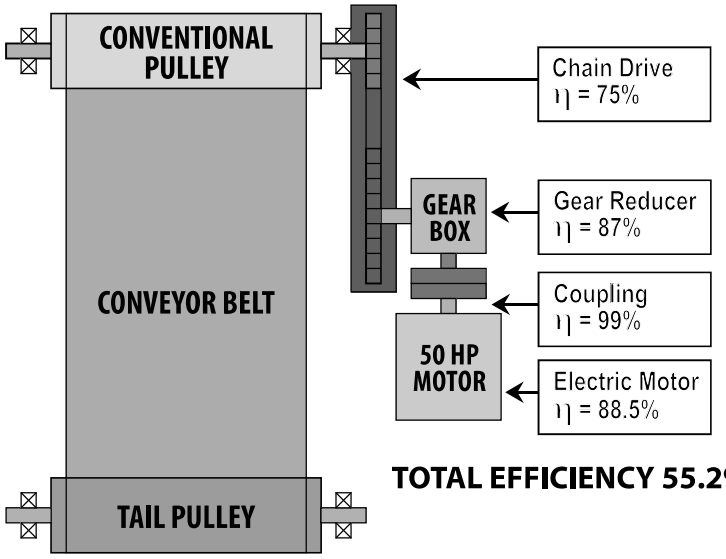
NOTE: If the cost of energy of the conventional conveyor is considered 100%, than the cost of energy of the conveyor driven by Van der Graaf Drum Motor is 66% and the cost savings with the Van der Graaf Drum Motor is 34%.

Diagram A: Conveyor Driven by a Van der Graaf Drum Motor



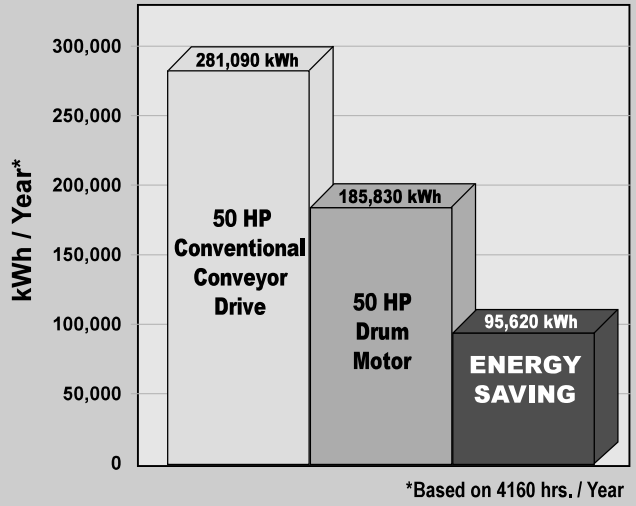
TOTAL EFFICIENCY 83.5%

Diagram B: Conveyor Driven by a Conventional Conveyor Drive

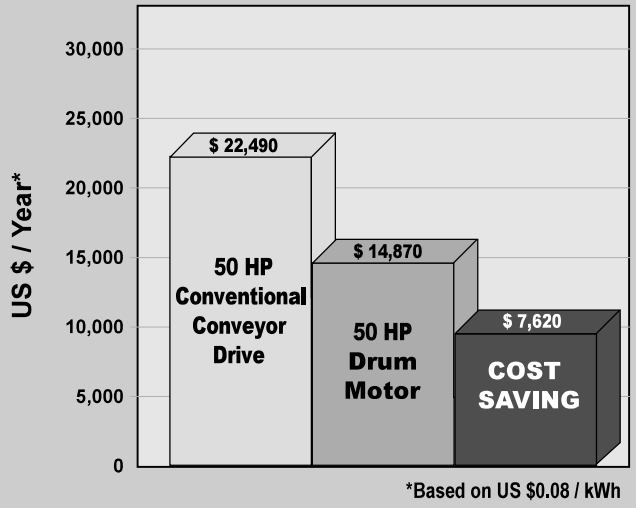


TOTAL EFFICIENCY 55.2%

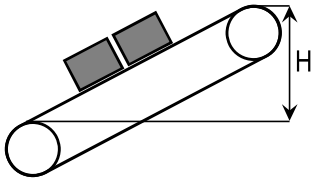
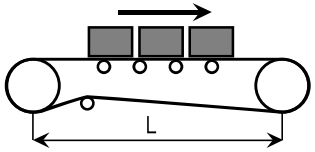
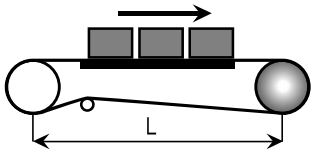
Graph 1: Energy Consumption Comparison



Graph 2: Energy Cost Comparison



BELT PULL CALCULATION

Conveying System	F_0  Force without load	F_1  Force to convey materials horizontally	F_2  Force to convey materials on incline
R  Roller bed conveyor	$F_0 = 0.04\ (2P + Q)\ L$	$F_1 = 0.04 \times R \times L$	$F_2 = R \times H$
R  Slider bed conveyor	$F_0 = 1.1 \times P \times L \times C$	$F_1 = 1.1 \times R \times L \times C$	$F_2 = R \times H$

BELT PULL(BP):

$BP = (F_0 + F_1 + F_2)$ in pounds

F = Force (lbs.)

P = Belt weight (lbs./linear ft.)

Q = Weight of rotating parts in pounds per foot of length of belt conveyor

R = Weight in pounds of conveyed product per foot of belt conveyor length

C = Co-efficient of friction between conveyor belt and top slider bed

L = Center to center length (feet)

H = Height (feet)

CALCULATIONS:

HORSEPOWER TABLES FOR BULK CONVEYORS

Table 1: Horsepower to move empty belt (for each 100 ft./min.)

Belt Width	30"	36"	42"	48"
CONVEYING LENGTH (ft.)	**HORSEPOWER (hp)** (per 100 ft./min.)			
50	0.64	0.8	0.96	1.16
100	0.8	1.0	1.2	1.5
200	1.1	1.4	1.7	2.2
300	1.4	1.8	2.2	2.8
400	1.8	2.2	2.6	3.4
500	2.1	2.6	3.1	4.0
600	2.4	3.0	3.6	4.6
800	3.1	3.8	4.5	5.8
1000	3.6	4.6	5.5	7.0
1400	5.2	6.5	7.9	10.4
2000	6.8	8.4	10.3	13.8
2500	8.4	10.3	12.7	17.2
3000	10.0	12.2	15.1	20.6
3500	11.6	14.1	17.5	24.0
4000	13.2	16.0	19.9	27.4
4500	14.8	17.9	22.3	30.8
5000	16.4	19.8	24.7	34.2
5500	18.0	21.7	27.1	37.6
6000	19.6	23.6	29.5	41.0
6500	21.2	25.5	31.9	44.4
7000	23.8	27.4	34.3	47.8
7500	25.4	29.3	36.7	51.2
8000	27.0	31.2	39.1	54.6
8500	28.6	33.1	41.5	58.0
9000	30.2	35.0	43.9	61.4
9500	31.8	36.9	46.3	64.8
10000	33.4	38.8	48.7	68.2

Table 2: Horsepower to move load horizontally (any speed, any material, any belt width)

TONS/HOUR CONVEYED	100	200	300	400	500	600	800	1000	1200	1400	1600	1800	2000
CONVEYING LENGTH (ft.)	HORSEPOWER (hp)												
50	0.25	0.5	0.75	1.0	1.25	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
100	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
200	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
300	1.5	3.0	4.5	6.0	7.5	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0
400	2.0	4.0	6.0	8.0	10.0	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0
500	2.5	5.0	7.5	10.0	12.5	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0
600	3.0	6.0	9.0	12.0	15.0	18.0	24.0	30.0	36.0	42.0	48.0	54.0	60.0
800	4.0	8.0	12.0	16.0	20.0	24.0	32.0	40.0	48.0	56.0	64.0	72.0	80.0
1000	5.0	10.0	15.0	20.0	25.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0
1400	7.5	15.0	22.5	30.0	37.5	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0
2000	10.0	20.0	30.0	40.0	50.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0
2500	12.5	25.0	37.5	50.0	62.5	75.0	100.0	125.0	150.0	175.0	200.0	225.0	250.0
3000	15.0	30.0	45.0	60.0	75.0	90.0	120.0	150.0	180.0	210.0	240.0	270.0	300.0
3500	17.5	35.0	52.5	70.0	87.5	105.0	140.0	175.0	210.0	245.0	280.0	315.0	350.0
4000	20.0	40.0	60.0	80.0	100.0	120.0	160.0	200.0	240.0	280.0	320.0	360.0	400.0
4500	22.5	45.0	67.5	90.0	112.0	135.0	180.0	225.0	270.0	315.0	360.0	405.0	450.0
5000	25.0	50.0	75.0	100.0	125.0	150.0	200.0	250.0	300.0	350.0	400.0	450.0	500.0
5500	27.5	55.5	82.5	110.0	137.5	165.0	220.0	275.0	330.0	385.0	440.0	495.0	550.0
6000	30.0	60.0	90.0	120.0	150.0	180.0	240.0	300.0	360.0	420.0	480.0	540.0	600.0
6500	32.5	65.0	97.5	130.0	162.5	195.0	260.0	325.0	390.0	455.0	520.0	585.0	650.0
7000	35.0	70.0	105.0	140.0	175.0	210.0	280.0	350.0	420.0	495.0	560.0	630.0	700.0
7500	37.5	75.0	112.5	150.0	187.5	225.0	300.0	375.0	450.0	525.0	600.0	675.0	750.0
8000	40.0	80.0	120.0	160.0	200.0	240.0	320.0	400.0	480.0	560.0	640.0	720.0	800.0
8500	42.5	85.0	127.5	170.0	212.5	255.0	340.0	425.0	510.0	595.0	680.0	765.0	850.0
9000	45.0	90.0	135.0	180.0	225.0	270.0	360.0	450.0	540.0	630.0	720.0	810.0	900.0
9500	47.5	95.0	142.5	190.0	237.5	285.0	380.0	475.0	570.0	665.0	760.0	855.0	950.0
10000	50.0	100.0	160.0	200.0	250.0	300.0	400.0	500.0	600.0	700.0	800.0	900.0	1000.0

Table 3: Horsepower to lift load vertically - negative for downhill conveyors (any speed, any material, any belt width)

TONS/HOUR CONVEYED	100	200	300	400	500	600	800	1000	1200	1400	1600	1800	2000
LIFT (ft.)	HORSEPOWER (hp)												
10	1.14	2.28	3.42	4.56	5.7	6.84	9.12	11.4	13.68	15.96	18.24	20.52	22.8
20	2.28	4.56	6.84	9.12	11.4	13.68	18.24	22.8	27.36	31.92	36.48	41.04	45.6
30	3.42	6.84	10.26	13.68	17.1	20.52	27.36	34.2	41.04	47.88	54.72	61.56	68.4
40	4.56	9.12	13.68	18.24	22.8	27.36	36.38	45.6	54.72	63.84	72.96	82.08	91.2
50	5.7	11.4	17.1	22.8	28.5	34.2	45.6	57.0	68.4	79.8	91.2	102.6	114.0
60	6.84	13.68	20.52	27.36	34.2	41.04	54.72	68.4	82.08	95.76	109.4	123.1	136.8
70	7.98	15.96	23.94	31.92	39.9	47.88	63.84	79.8	95.76	111.7	127.7	143.6	159.6
80	9.12	18.24	27.36	36.48	45.6	54.72	72.96	91.2	109.4	127.7	145.9	164.2	182.4
90	10.26	20.52	30.78	41.04	51.3	61.56	82.08	102.6	123.1	143.6	164.2	184.7	205.2
100	11.4	22.8	34.2	45.6	57.0	68.4	91.2	114.0	136.8	159.6	182.4	205.2	228.0
150	17.1	34.2	51.3	68.4	85.5	102.6	136.8	171.0	205.2	239.4	273.6	307.8	342.0
200	22.8	45.6	68.4	91.2	114.0	136.8	182.4	228.0	273.6	319.2	364.8	410.4	456.0
250	28.5	57.0	85.5	114.0	142.5	171.0	228.0	285.0	342.0	399.0	456.0	513.0	570.0
300	34.2	68.4	102.6	136.8	171.0	205.2	273.6	342.0	410.4	478.8	547.2	615.6	684.0
350	39.9	79.8	119.6	159.6	200.0	239.4	319.2	399.0	478.8	558.5	638.4	718.0	798.0
400	45.6	91.2	136.8	182.4	228.0	273.6	364.8	456.0	547.2	638.4	729.6	820.8	912.0
450	51.3	102.6	153.9	205.4	256.5	307.8	410.4	513.0	615.6	718.0	820.0	923.5	1026.0
500	57.0	114.0	171.0	228.0	285.0	342.0	456.0	570.0	684.0	798.0	912.0	1026.0	1140.0
600	68.4	136.8	205.2	273.6	342.0	410.4	547.2	684.0	820.8	957.6	1094.0	1231.0	1368.0
700	79.8	159.6	239.4	319.2	399.0	478.8	638.4	798.0	957.6	1117.0	1277.0	1436.0	1596.0
800	91.2	182.4	273.6	364.8	456.0	547.2	729.6	912.0	1094.0	1277.0	1459.0	1642.0	1824.0
900	102.6	205.2	307.8	410.4	513.0	615.6	820.8	1026.0	1231.0	1436.0	1642.0	1847.0	2052.0
1000	114.0	228.0	342.0	456.0	570.0	684.0	912.0	1140.0	1368.0	1596..0	1824.0	2052.0	2280.0

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Van der Graaf has provided solutions to the material handling industry for over half a century. By making consistent investments in factory automation over the years, Van der Graaf continues as the leading global supplier of conveyor belt drives for a broad range of industries. Whether it's an explosion-proof motor for driving coal mine conveyor belts or sanitary drives in a food processing plant, Van der Graaf has innovative designs to solve application challenges.

Van der Graaf has adhered to a simple principle: design a superior product to meet customer needs in a changing marketplace.

Van der Graaf offers outstanding application engineering and customer service for high quality products and years of low maintenance performance. Our products and people are trusted around the world for reliable performance and personal service.

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