Calculating Bucket Elevator Capacity

CAPACITY of the bucket at water level (Cubic Inches)	NUMBER OF BUCKETS per foot (12 ÷ spacing in Inches)	NUMBER OF ROWS of buckets on the belt	SPEED of the belt or chain FPM (Feet Per Minute)	CUBIC IN. PER HOUR SEE BELOW FOR CONVERSION
_____	X _____	X _____	X _____	X 60 MINUTES

For engineering purposes, it is recommended to use water level capacity as the basis for calculation. Actual bucket fill will vary depending on the product and operational conditions.

STEP 1: Multiply the CAPACITY of the bucket times the NUMBER OF BUCKETS per foot (12 divided by spacing) times the NUMBER OF ROWS of buckets. This will give the capacity in cubic inches of each running foot of the belt or chain.

STEP 2: Multiply the answer times the SPEED of the belt or chain in FPM for the capacity discharged per minute.

For FEET Per Minute

π		head pulley diameter (in.)		RPM		in. / feet		feet / min.
3.1416	x	_____	x	_____	÷	12	=	_____

STEP 3: Then multiply by 60 minutes to get cubic inches per hour.

CONVERT CUBIC INCHES PER HOUR AS FOLLOWS:

BUSHELS:	Divide by 2,150 to convert to bushels.
CUBIC FEET:	Divide by 1,728 to convert to cubic feet.
SHORT TONS:	Multiply cubic feet capacity times weight of product per cubic foot and divide by 2,000.
METRIC TONS:	Multiply cubic feet capacity times weight of product per cubic foot and divide by 2,204.62.

For BUSHELS Per Hour

cu.in. / hour		cu. in. / bushel		BPH
_____	÷	2,150	=	_____

For CUBIC FEET Per Hour

cu.in. / hour		cu. in. / cu. ft.		cu. ft. / hour
_____	÷	1728	=	_____

For SHORT TONS Per Hour

*** First determine cubic ft/hr. at water level using above formula then proceed as follows*

cu.ft./ hr.		weight of product / cu. ft.		lbs. / hour		lbs. / ton		tons / hr.
_____	x	_____	=	_____	÷	2,000	=	_____

For METRIC TONS Per Hour

*** First determine cubic ft/hr. at water level using above formula then proceed as follows*

cu.ft./ hr.		weight of product / cu. ft.		lbs. / hour		lbs./ metric ton		metric tons / hr.
_____	x	_____	=	_____	÷	2,204.62	=	_____

CALCULATING HORSEPOWER

$$\text{HP (at head Shaft)} = \frac{W \times H}{33{,}000} \qquad W = \frac{\text{lbs. / hour}}{60 \text{ minutes}} \qquad H = \text{Vertical Lift In Feet}$$

The above formula will result in the theoretical horsepower necessary. It is recommended that an additional 25% minimum be added for drive losses and up to 15% for elevator friction and cup digging through the boot.