

THIS BOOK

No. is the property of Name Title Business Street Add. City State Republic Steel Corp. MINING MANUAL Compiled by

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VENTILATION

Fundamental Formulae s=10 p=Klav^2/52i q=av K=pa/R u=pq HP=U/33000 V^2=pa/K

Application Total Ventilating press. Airway 12' wide 4' high water gauge 1.5 inches Find Total ventilating pressure. a=12x4=48 p=5.2x1.5=7.8 P=pa=78x48=3744 lbs.

Unit ventilating press. Airway 10' wide 4' high 6,000' long with a velocity of 500' per min. Find Unit ventilating pressure. p=Klav^2/a

Coefficient of friction Airway 10' wide 6' high 5,000' long with 30,000 cu. ft. of air per minute passing thru water gauge 1.5 inches. Find coefficient of friction. a=6x10=60 p=5.2x1.5=7.8 V=q/a=30,000/60=500 fpm

Quantity of air Airway 12' wide 5' high 4,000' long. Water gauge 2 inches. Find quantity of air per min. a=12x5=60 p=5.2x2=10.4 V^2=pa/K

Water gauge Airway 10' wide 5' high 4,000' long with a velocity of 300' per min. Find water gauge i=Klav^2/5.2a

Water gauge If 1 inch of water gauge required to ventilate an airway 10' wide 5' high. Find water gauge required to pass the same quantity of air through an entry 10' wide 4' high and the same length. i1=i2

Water gauge Water gauge of 2 inches produces velocity of 400' per min. Find water gauge required to produce velocity 800' per min. i1:i2::v1^2:v2^2

Units of work per minute 60,000 cu. ft. of air is passing through an airway with a water gauge of 2 inches. Find total lbs. of work expended per minute. p=5.2i=10.4 u=pq=10.4x60000=624,000 foot lbs.

Horsepower At 1.75 inches water gauge find horsepower required to circulate 50,000 cu. ft. of air per minute. p=5.2i=9.1 u=pq=9.1x50000=455,000 foot lbs. H.P.=u/33000=13.79 H.P.

Horsepower If 50 effective horse power is required to pass 120,000 cu. ft. of air per min. through a mine. Find how many horse power required to pass 150,000 cu. ft. of air per min. 50:120000^3::x:150000^3 x=150000^3x50/120000^3=97.65 H.P.

Equivalent Orifice A mine is passing 60,000 cu. ft. of air at a 4 inch water gauge. Find its equivalent orifice. a=.0004xq/sqrt(p)

Pressure Potential A mine is passing 60,000 cu. ft. of air through 2 splits: one is 6x8 ft. and the other is 5x8 ft. and 10,000' long. Find the volume of air passing in each split. x=a*sqrt(a/p)

Table of Gases: Hydrogen, Carbon, Nitrogen, Oxygen, Sulphur. Columns for name, formula, weight per cu. ft. lbs.

Table of Gases (cont'd): Methane, Carbon dioxide, Carbon monoxide, Sulphur dioxide. Columns for name, formula, specific gravity, etc.

Gases Firedamp is the mixture of methane and air. Methane is a chemical combination of carbon and hydrogen. To find weight of 1 cu. ft. of air.

Gases Gas problems A mine liberates 1,000 cu. ft. of CH4 per min. Find cu. ft. of air and gas required per min. to keep CH4 content to .5% on return.

Gases Gas problem The air being exhausted from a mine contains 1.5% of CH4. The volume of air entering the mine was 100,000 cu. ft. per min. Find the volume at the return fan.

Drainage The Syphon It is desired to convey the water from D to E. The level of the water in E being always lower than in D. The syphon consists of ordinary cast iron pipe.

Drainage The Syphon-cont'd. in the funnel F. The water drives the air out and takes its place in the pipe. When no more water can be poured in without overflowing at F, the valve C is closed.

Centrifugal pump By means of a revolving impeller, or impellers of a centrifugal pump of which creates a vacuum which draws in water which is forced ahead by centrifugal force.

Reciprocating pump The action of the piston or plunger on a reciprocating pump creates a vacuum which draws in water, the reverse action operates directly on the water forcing it through the discharge.

Drainage Static head is the unit pressure exerted by the height of a column of water. Friction head is the resistance offered by the friction of pipe against the flow of water expressed in the number of feet of static head equivalent to that resistance.

Sump A sump 10x30x4' is full of water. If 50 G.P.M. are flowing in find how long it will take to empty sump with a pump having a capacity of 150 G.P.M. 10'x30'x4'x7.5=9000 Gals. of water in sump

Drainage Total pressure exerted by 100' head of water on a dam 10' wide and 5' high. 62.5x10x5x100=312,500 lbs.=156,250 tons Pressure exerted on a dam 8' wide and 6' high. The dam is filled with water.

Horsepower Horsepower required to pump 400 G.P.M. to an elev. of 300' assuming the friction loss in the pipes amounted to 15% of the static head. 400x3.45x8.35=33,000 =39.92 horsepower

Drainage Equation of pipes of different diameters Showing relative capacity under same pressures. Table with diameters 3", 4", 6", 8" and capacities.

Table of rails and accessories: Columns for weight, length, diameter, and other specifications for various rail types.

Track Weight of rails in long tons of 2,240 lbs. required to lay 1,000' of single track. Weight of rail per yd. for 1,000' of track.

Table for ties: Columns for number of ties per 1,000' and per mile of track, and distance between ties.