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USEFUL FORMULAS AND TABLES

LENGTH:

1 centimetre (cm) = 10 millimetre (mm)
 1 metre (m) = 100 cm / 1 000 mm
 1 kilometre (km) = 1 000 m

SURFACE / AREA:

1 sq cm (cm²) = 100 mm²
 1 sq metre (m²) = 10 000 cm²
 1 sq km (km²) = 100 hectares

TEMPERATURE:

Celsius = (F - 32) x 0.556
 Fahrenheit = 1.8 x C + 32

VOLUME & CAPACITY:

1 cu metre (m³) = 1 000 dm³
 1 litre (ℓ) = 1 cu decimetre (dm³)
 1 hectolitre (hl) = 100 ℓ
 1 kilolitre (kl) = 1 000 ℓ

WEIGHT:

1 gram (g) = 1 000 milligram (mg)
 1 kilogram (kg) = 1 000 g
 1 tonne (t) = 1 000 kg

MATERIAL DENSITY (KG / M³):

These figures are typical but may vary subject to conditions and granulation.

Wheat	= 750
Cake flour	= 550
Bread flour	= 530
Brown bread meal	= 520
Pollard	= 360
Bran	= 300
Digestive bran	= 160
Maize	= 750
Samp	= 700
Maize rice	= 650
Grits	= 600
Super maize meal	= 580
Special maize meal	= 570
Maize flour	= 560
Maize offal	= 350-400
Rye	= 680
Rye flour	= 510
Oats	= 570
Rice	= 700

WIRE MESH SELECTION CHART:

The aperture size will vary, dependant on wire diameter used by various suppliers.

Mesh Count	Aperture (Microns)	Wire Dia.	Mesh Count	Aperture (Microns)	Wire Dia.
3	7 550	0.700	32	634	0.160
3.5	6 600	0.700	34	587	0.160
4	5 650	0.700	36	558	0.150
5	4 380	0.700	38	518	0.140
6	3 690	0.550	40	485	0.140
7	3 080	0.550	42	465	0.140
8	2 680	0.550	44	437	0.140
10	2 200	0.340	46	422	0.130
12	1 807	0.310	48	399	0.130
14	1 534	0.280	50	378	0.130
16	1 308	0.280	52	368	0.120
18	1 171	0.260	54	350	0.120
20	1 030	0.240	56	338	0.115
22	953	0.220	60	308	0.115
24	858	0.200	62	298	0.115
26	820	0.200	64	287	0.115
28	727	0.180	70	263	0.110
30	667	0.180	80	228	0.100

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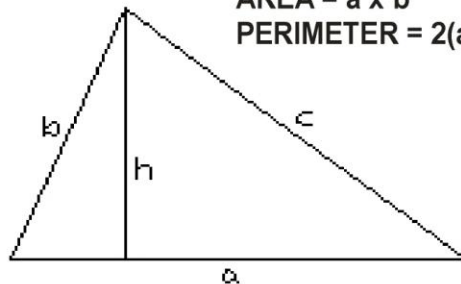
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MEASUREMENT:



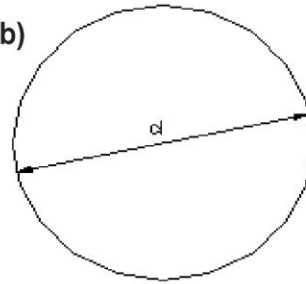
$$\text{AREA} = a \times b$$

$$\text{PERIMETER} = 2(a + b)$$



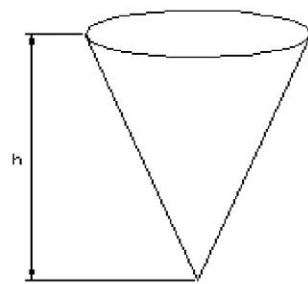
$$\text{AREA} = \frac{a \times h}{2}$$

$$\text{PERIMETER} = a + b + c$$

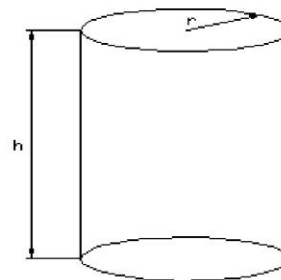


$$\text{AREA} = \frac{d^2 \times \pi}{4}$$

$$\text{CIRCUMFERENCE} = \pi \times d$$



$$\text{VOLUME} = \frac{(\text{AREA OF BASE} \times h)}{3}$$



$$\text{VOLUME} = r^2 \times \pi \times h$$

$\pi = 3.14$

SPOUTING PIPE FLOW RATE (TONS / HOUR):

Pipe Dia.	Grain		1BK	Flour
mm	Vertical	45 Deg.	Vertical	60 Deg.
100	15	11	4	2.5
120	22	17	6	3.5
150	37	26.5	9	7
200	63	45	15	12
250	99	70.5	25	21
300	142	100	37	31
350	190	136	50	42

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WATER ADDITION:

The following formula is used to calculate the amount of water added to increase the dry moisture of grain to a target moisture suitable for processing:

$$\frac{\text{MATERIAL FLOW RATE IN KG} \times (\text{TARGET MOISTURE} - \text{DRY MOISTURE})}{100 - \text{TARGET MOISTURE}}$$

eg. 12 t/hour mill with a 15% target moisture. Dry moisture is 12%:

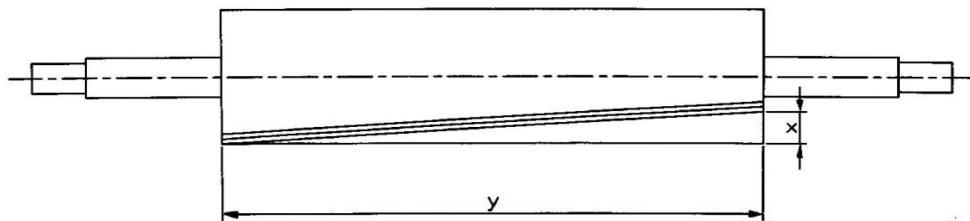
$$\frac{12\,000 \times (15 - 12)}{100 - 15} = \frac{12\,000 \times 3}{85} = 423.5 \text{ litres per hour water addition.}$$

The following formula is used to calculate the percentage increase in mass due to the addition of water:

$$\frac{100 \times (\text{TARGET MOISTURE} - \text{DRY MOISTURE})}{100 - \text{TARGET MOISTURE}}$$

FLUTE SPIRAL:

The following formula is used to calculate the percentage spiral used on fluted rolls:



- The distance the spiral moves around the circumference of the roll (x)
- The length of the roll (y)
- % spiral = $x \div y \times 100$

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DIFFERENTIAL DRIVES:

The following formula is used to calculate the speed of the **driven pulley**:

$$\frac{\text{DIAMETER OF THE DRIVER PULLEY} \times \text{SPEED OF THE DRIVER PULLEY}}{\text{DIAMETER OF THE DRIVEN PULLEY}}$$

or with **gears**:

$$\frac{\text{NUMBER OF TEETH ON THE DRIVER GEAR} \times \text{SPEED OF THE DRIVER GEAR}}{\text{NUMBER OF TEETH ON THE DRIVEN GEAR}}$$

ROLL DISPOSITION:

