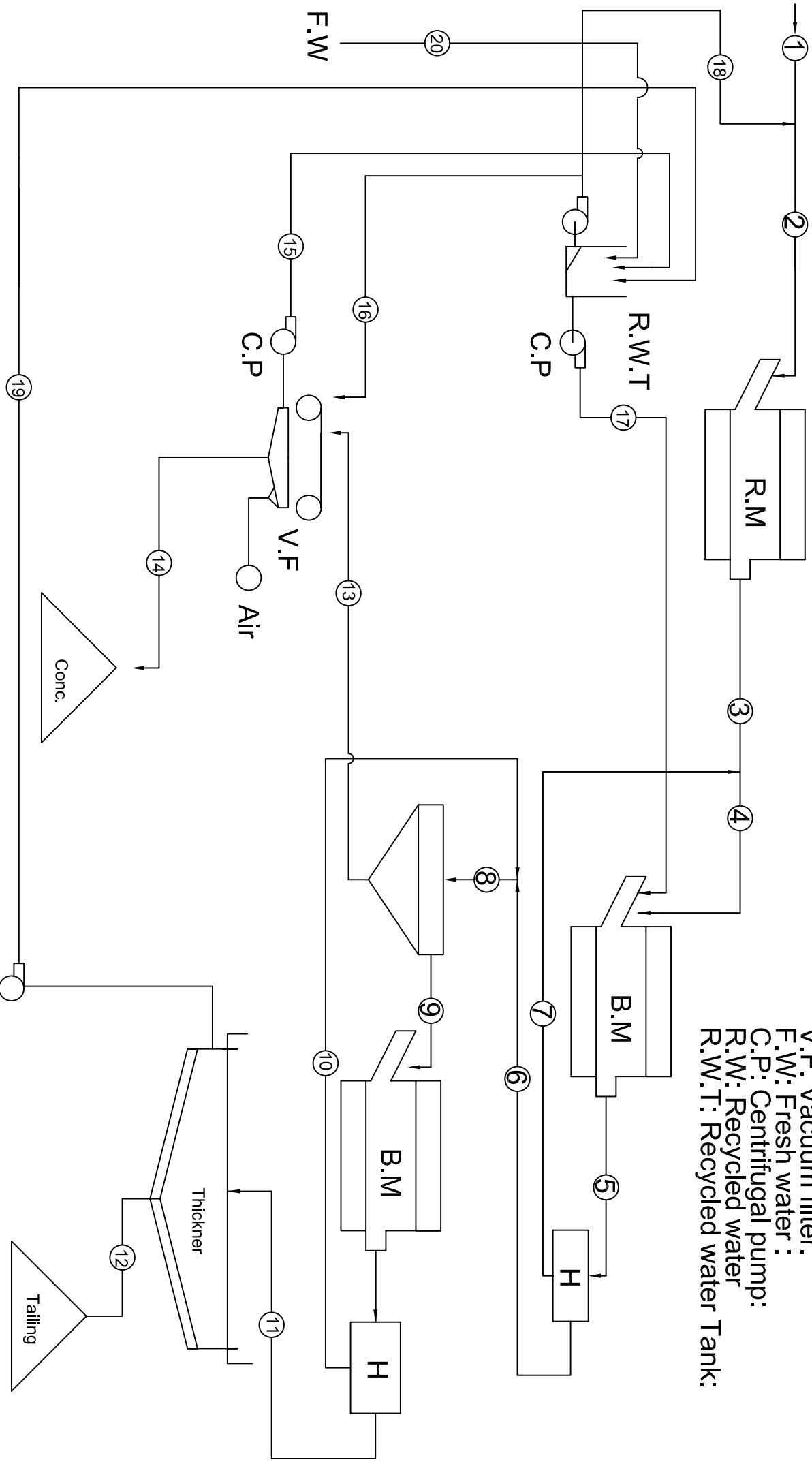


Group A: Grinding circuit



- B.M.: ball mill
- H.: Hydrosizer:
- R.M.: rod mill
- V.F.: Vacuum filter:
- F.W.: Fresh water :
- C.P.: Centrifugal pump:
- R.W.: Recycled water
- R.W.T: Recycled water Tank:

A-Ball mill Feed size and chemical analysis

| Size (μm) | %wt | % Cu |
|------------------------|-----|------|
| -100+700 | 3 | 5 |
| -700+500 | 6 | 8 |
| -500+350 | 9 | 10 |
| -350+250 | 11 | 10 |
| -250+175 | 15 | 7 |
| -175+125 | 21 | 4 |
| -125+90 | 17 | 3 |
| -90+63 | 12 | 1 |
| -63+45 | 4 | 0.5 |
| -45 | 2 | 0.1 |
| Total | 100 | |

B-hydroziser and flotation cell overflow size analysis

| Size (μm) | %wt | | |
|------------------------|--------|-------|------|
| | coarse | Float | Fine |
| -500+350 | 11 | -- | |
| -350+250 | 12 | -- | |
| -250+175 | 16 | 9 | |
| -175+125 | 23 | 33 | |
| -125+90 | 19 | 28 | |
| -90+63 | 13 | 19 | 30 |
| -63+45 | 4 | 7 | 20 |
| -45 | 2 | 4 | 50 |
| Total | 100 | 100 | 100 |

B-Ball mill experiments results

| Size D ₅₀ (μm) | Solid (%wt) | Rotational speed (rpm) | Retention time (min) | Circulation load (%) | Product size D ₅₀ (μm) |
|--|-------------|------------------------|----------------------|----------------------|--|
| 700 | 65 | 200 | 5 | 10 | 450 |
| 700 | 65 | 200 | 5 | 30 | 500 |
| 700 | 65 | 200 | 5 | 50 | 550 |
| 700 | 65 | 200 | 5 | 100 | 580 |
| 700 | 65 | 200 | 5 | 200 | 620 |
| 700 | 65 | 200 | 10 | 10 | 370 |
| 700 | 65 | 200 | 10 | 30 | 420 |
| 700 | 65 | 200 | 10 | 50 | 510 |
| 700 | 65 | 200 | 10 | 100 | 580 |
| 700 | 65 | 200 | 10 | 200 | 600 |
| 700 | 65 | 500 | 5 | 10 | 250 |
| 700 | 65 | 500 | 5 | 30 | 280 |
| 700 | 65 | 500 | 5 | 50 | 340 |
| 700 | 65 | 500 | 5 | 100 | 400 |
| 700 | 65 | 500 | 5 | 200 | 500 |
| 700 | 65 | 500 | 10 | 10 | 130 |

| Size D ₅₀ (μm) | Solid (%wt) | Rotational speed (rpm) | Retention time (min) | Circulation load (%) | Product size D ₅₀ (μm) |
|---------------------------|-------------|------------------------|----------------------|----------------------|-----------------------------------|
| 700 | 65 | 500 | 10 | 30 | 200 |
| 700 | 65 | 500 | 10 | 50 | 260 |
| 700 | 65 | 500 | 10 | 100 | 310 |
| 700 | 65 | 500 | 10 | 200 | 350 |
| 700 | 65 | 1000 | 5 | 10 | 170 |
| 700 | 65 | 1000 | 5 | 30 | 200 |
| 700 | 65 | 1000 | 5 | 50 | 280 |
| 700 | 65 | 1000 | 5 | 100 | 320 |
| 700 | 65 | 1000 | 5 | 200 | 350 |
| 700 | 65 | 1000 | 10 | 10 | 160 |
| 700 | 65 | 1000 | 10 | 30 | 190 |
| 700 | 65 | 1000 | 10 | 50 | 200 |
| 700 | 65 | 1000 | 10 | 100 | 230 |
| 700 | 65 | 1000 | 10 | 200 | 380 |
| 700 | 50 | 200 | 5 | 10 | 400 |
| 700 | 50 | 200 | 5 | 30 | 450 |
| 700 | 50 | 200 | 5 | 50 | 500 |
| 700 | 50 | 200 | 5 | 100 | 550 |
| 700 | 50 | 200 | 5 | 200 | 580 |
| 700 | 50 | 200 | 10 | 10 | 350 |
| 700 | 50 | 200 | 10 | 30 | 400 |
| 700 | 50 | 200 | 10 | 50 | 480 |
| 700 | 50 | 200 | 10 | 100 | 540 |
| 700 | 50 | 200 | 10 | 200 | 580 |
| 700 | 50 | 1000 | 5 | 10 | 150 |
| 700 | 50 | 1000 | 5 | 30 | 180 |
| 700 | 50 | 1000 | 5 | 50 | 230 |
| 700 | 50 | 1000 | 5 | 100 | 290 |
| 700 | 50 | 1000 | 5 | 200 | 320 |
| 700 | 50 | 1000 | 10 | 10 | 150 |
| 700 | 50 | 1000 | 10 | 30 | 170 |
| 700 | 50 | 1000 | 10 | 50 | 185 |
| 700 | 50 | 1000 | 10 | 100 | 200 |
| 700 | 50 | 1000 | 10 | 200 | 330 |
| 700 | 40 | 500 | 5 | 10 | 240 |
| 700 | 40 | 500 | 5 | 30 | 265 |
| 700 | 40 | 500 | 5 | 50 | 320 |
| 700 | 40 | 500 | 5 | 100 | 380 |
| 700 | 40 | 500 | 5 | 200 | 470 |
| 700 | 40 | 500 | 10 | 10 | 120 |
| 700 | 40 | 500 | 10 | 30 | 170 |
| 700 | 40 | 500 | 10 | 50 | 250 |
| 700 | 40 | 500 | 10 | 100 | 300 |
| 700 | 40 | 500 | 10 | 200 | 340 |
| 350 | 40 | 200 | 5 | 10 | 200 |
| 350 | 40 | 200 | 5 | 30 | 230 |
| | | | | | |

| Size D ₅₀ (μm) | Solid (%wt) | Rotational speed (rpm) | Retention time (min) | Circulation load (%) | Product size D ₅₀ (μm) |
|---|----------------|---------------------------|-------------------------|-------------------------|---|
| 350 | 40 | 200 | 5 | 50 | 250 |
| 350 | 40 | 200 | 5 | 100 | 270 |
| 350 | 40 | 200 | 5 | 200 | 300 |
| 350 | 40 | 200 | 10 | 10 | 180 |
| 350 | 40 | 200 | 10 | 30 | 210 |
| 350 | 40 | 200 | 10 | 50 | 240 |
| 350 | 40 | 200 | 10 | 100 | 250 |
| 350 | 40 | 200 | 10 | 200 | 280 |
| 350 | 65 | 200 | 5 | 10 | 210 |
| 350 | 65 | 200 | 5 | 30 | 240 |
| 350 | 65 | 200 | 5 | 50 | 270 |
| 350 | 65 | 200 | 5 | 100 | 275 |
| 350 | 65 | 200 | 5 | 200 | 310 |
| 350 | 65 | 200 | 10 | 10 | 185 |
| 350 | 65 | 200 | 10 | 30 | 215 |
| 350 | 65 | 200 | 10 | 50 | 250 |
| 350 | 65 | 200 | 10 | 100 | 280 |
| 350 | 65 | 200 | 10 | 200 | 315 |
| 180 | 50 | 500 | 5 | 10 | 110 |
| 180 | 50 | 500 | 5 | 30 | 125 |
| 180 | 50 | 500 | 5 | 50 | 130 |
| 180 | 50 | 500 | 5 | 100 | 140 |
| 180 | 50 | 500 | 5 | 200 | 155 |
| 180 | 50 | 500 | 10 | 10 | 90 |
| 180 | 50 | 500 | 10 | 30 | 105 |
| 180 | 50 | 500 | 10 | 50 | 115 |
| 180 | 50 | 500 | 10 | 100 | 125 |
| 180 | 50 | 500 | 10 | 200 | 130 |
| 180 | 65 | 200 | 5 | 10 | 115 |
| 180 | 65 | 200 | 5 | 30 | 120 |
| 180 | 65 | 200 | 5 | 50 | 130 |
| 180 | 65 | 200 | 5 | 100 | 135 |
| 180 | 65 | 200 | 5 | 200 | 150 |
| 180 | 65 | 200 | 10 | 10 | 110 |
| 180 | 65 | 200 | 10 | 30 | 120 |
| 180 | 65 | 200 | 10 | 50 | 125 |
| 180 | 65 | 200 | 10 | 100 | 130 |
| 180 | 65 | 200 | 10 | 200 | 140 |
| 180 | 40 | 1000 | 5 | 10 | 80 |
| 180 | 40 | 1000 | 5 | 30 | 90 |
| 180 | 40 | 1000 | 5 | 50 | 95 |
| 180 | 40 | 1000 | 5 | 100 | 110 |
| 180 | 40 | 1000 | 5 | 200 | 115 |
| 180 | 40 | 1000 | 10 | 10 | 60 |
| 180 | 40 | 1000 | 10 | 30 | 65 |
| 180 | 40 | 1000 | 10 | 50 | 70 |
| 180 | 40 | 1000 | 10 | 100 | 80 |
| 180 | 40 | 1000 | 10 | 200 | 85 |