Hydraulic parameters measure for SET 1 tests conducted with and without the application of the lid on the top of the manhole.

|  |
| --- |
| With Lid – No Surcharge (Qe = 0) |
| Test ID | Q2 (l/s) | Q1 (l/s) | Q3 (l/s) | H1 (m) | H3 (m) | Re (/) |
| 1 | 0 | 2.66 | 2.71 | 0.150 | 0.135 | 45112 |
| 2 | 0 | 3.31 | 3.54 | 0.206 | 0.181 | 56156 |
| 3 | 0 | 3.72 | 4.31 | 0.235 | 0.205 | 63094 |
| 4 | 0 | 5.10 | 5.21 | 0.399 | 0.348 | 86461 |
| 5 | 0 | 5.56 | 5.59 | 0.461 | 0.400 | 94167 |
| 6 | 0 | 6.33 | 6.23 | 0.573 | 0.496 | 107234 |
| With Lid – Surcharge (Qe > 0) |
| Test ID | Q2 (l/s) | Q1 (l/s) | Q3 (l/s) | H1 (m) | H3 (m) | Re (/) |
| 7 | 0 | 6.94 | 6.75 | 0.617 | 0.517 | 117595 |
| 8 | 0 | 7.52 | 7.13 | 0.685 | 0.567 | 127415 |
| 9 | 0 | 8.36 | 7.85 | 0.829 | 0.687 | 141656 |
| 10 | 0 | 8.70 | 8.20 | 0.894 | 0.744 | 147551 |
| 11 | 0 | 7.99 | 7.51 | 0.762 | 0.630 | 135364 |
| 12 | 0 | 8.98 | 8.39 | 0.941 | 0.780 | 152199 |
| 13 | 0 | 9.24 | 8.62 | 0.985 | 0.816 | 156559 |
| 14 | 0 | 9.41 | 8.73 | 1.015 | 0.839 | 159566 |
| Without Lid – No Surcharge (Qe = 0) |
| Test ID | Q2 (l/s) | Q1 (l/s) | Q3 (l/s) | H1 (m) | H3 (m) | Re (/) |
| 15 | 0 | 2.81 | 2.91 | 0.164 | 0.146 | 47607 |
| 16 | 0 | 3.58 | 3.95 | 0.223 | 0.194 | 60606 |
| 17 | 0 | 3.70 | 4.25 | 0.234 | 0.203 | 62786 |
| 18 | 0 | 5.07 | 5.16 | 0.394 | 0.344 | 85865 |
| 19 | 0 | 5.58 | 5.67 | 0.466 | 0.404 | 94646 |
| 20 | 0 | 6.09 | 6.01 | 0.538 | 0.466 | 103297 |
| 21 | 0 | 6.33 | 6.29 | 0.576 | 0.498 | 107366 |
| Without Lid – Surcharge (Qe > 0) |
| Test ID | Q2 (l/s) | Q1 (l/s) | Q3 (l/s) | H1 (m) | H3 (m) | Re (/) |
| 22 | 0 | 7.43 | 7.01 | 0.645 | 0.535 | 125907 |
| 23 | 0 | 8.08 | 7.04 | 0.679 | 0.551 | 136985 |
| 24 | 0 | 8.96 | 7.21 | 0.730 | 0.581 | 151897 |
| 25 | 0 | 9.09 | 7.27 | 0.737 | 0.585 | 154011 |
| 26 | 0 | 9.07 | 7.31 | 0.737 | 0.587 | 153820 |
| 27 | 0 | 9.60 | 7.37 | 0.768 | 0.603 | 162692 |
| 28 | 0 | 9.72 | 7.38 | 0.776 | 0.606 | 164772 |
| 29 | 0 | 10.05 | 7.46 | 0.797 | 0.618 | 170294 |

Hydraulic parameters measured for the SET 2 tests conducted including a flow depth on the surface (Q2 < 3 l/s) and varying the degree of downstream valve closure (Vd).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Vd (%) | Q2 (l/s) | Q1 (l/s) | Q3 (l/s) | H1 (m) | H3 (m) | h 2 (mm) | Re (/) |
| 48 | 2.75 | 8.07 | 7.35 | 0.677 | 0.551 | 5.50 | 136766 |
| 48 | 2.74 | 8.53 | 7.44 | 0.702 | 0.564 | 5.94 | 144651 |
| 48 | 2.75 | 8.96 | 7.54 | 0.725 | 0.577 | 6.36 | 151901 |
| 48 | 2.75 | 9.29 | 7.62 | 0.745 | 0.588 | 6.75 | 157425 |
| 48 | 2.74 | 9.59 | 7.69 | 0.764 | 0.598 | 7.01 | 162639 |
| 48 | 2.77 | 9.81 | 7.79 | 0.778 | 0.608 | 7.26 | 166341 |
| 48 | 2.76 | 10.04 | 7.82 | 0.793 | 0.615 | 7.29 | 170226 |
| 48 | 2.75 | 10.22 | 7.86 | 0.804 | 0.621 | 7.46 | 173299 |
| 62 | 2.80 | 6.92 | 6.52 | 0.626 | 0.533 | 3.37 | 117326 |
| 62 | 2.81 | 7.59 | 6.92 | 0.655 | 0.543 | 3.45 | 128651 |
| 62 | 2.81 | 8.11 | 7.09 | 0.681 | 0.555 | 3.76 | 137399 |
| 62 | 2.82 | 8.53 | 7.17 | 0.704 | 0.569 | 4.20 | 144520 |
| 62 | 2.83 | 8.98 | 7.26 | 0.729 | 0.581 | 4.57 | 152146 |
| 62 | 2.82 | 9.29 | 7.37 | 0.748 | 0.594 | 4.83 | 157451 |
| 62 | 2.82 | 9.57 | 7.40 | 0.765 | 0.604 | 5.17 | 162278 |
| 62 | 2.78 | 10.07 | 7.45 | 0.797 | 0.620 | 5.61 | 170622 |
| 71 | 2.72 | 6.90 | 5.16 | 0.631 | 0.561 | 5.32 | 117023 |
| 71 | 2.72 | 7.56 | 5.25 | 0.663 | 0.580 | 5.95 | 128204 |
| 71 | 2.73 | 8.05 | 5.30 | 0.688 | 0.594 | 6.31 | 136437 |
| 71 | 2.72 | 8.50 | 5.32 | 0.713 | 0.607 | 6.72 | 144072 |
| 71 | 2.73 | 8.95 | 5.38 | 0.738 | 0.619 | 7.01 | 151716 |
| 71 | 2.72 | 9.27 | 5.45 | 0.756 | 0.630 | 7.23 | 157143 |
| 71 | 2.73 | 9.58 | 5.48 | 0.776 | 0.642 | 7.37 | 162467 |
| 71 | 2.73 | 9.81 | 5.51 | 0.790 | 0.649 | 7.56 | 166283 |
| 81 | 2.54 | 6.91 | 4.06 | 0.635 | 0.580 | 6.76 | 117101 |
| 81 | 2.51 | 7.56 | 4.20 | 0.666 | 0.600 | 7.21 | 128191 |
| 81 | 2.52 | 8.50 | 4.29 | 0.716 | 0.627 | 7.69 | 144101 |
| 81 | 2.51 | 8.95 | 4.37 | 0.741 | 0.641 | 7.82 | 151645 |
| 81 | 2.53 | 9.28 | 4.48 | 0.760 | 0.653 | 7.95 | 157258 |
| 81 | 2.53 | 9.59 | 4.50 | 0.779 | 0.661 | 8.29 | 162490 |
| 81 | 2.51 | 9.81 | 4.48 | 0.793 | 0.668 | 8.74 | 166284 |
| 81 | 2.51 | 10.04 | 4.49 | 0.807 | 0.673 | 8.87 | 170158 |
| 86 | 2.75 | 6.88 | 2.34 | 0.640 | 0.576 | 7.47 | 116570 |
| 86 | 2.76 | 7.53 | 2.40 | 0.672 | 0.593 | 7.87 | 127712 |
| 86 | 2.79 | 8.04 | 2.46 | 0.697 | 0.604 | 8.10 | 136215 |
| 86 | 2.79 | 8.49 | 2.52 | 0.722 | 0.618 | 8.35 | 143858 |
| 86 | 2.76 | 8.93 | 2.48 | 0.746 | 0.629 | 8.48 | 151304 |
| 86 | 2.75 | 9.25 | 2.47 | 0.765 | 0.638 | 8.40 | 156807 |
| 86 | 2.75 | 9.54 | 2.48 | 0.782 | 0.645 | 8.36 | 161722 |
| 86 | 2.75 | 9.78 | 2.50 | 0.797 | 0.653 | 8.01 | 165846 |

Hydraulic parameters measured for the SET 2 tests conducted including a flow depth on the surface (Q2 > 8 l/s) and varying the degree of downstream valve closure (Vd)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Vd (%) | Q2 (l/s) | Q1 (l/s) | Q3 (l/s) | H1 (m) | H3 (m) | h 2 (mm) | Re (/) |
| 48 | 9.23 | 8.06 | 7.46 | 0.684 | 0.560 | 12.73 | 136661 |
| 48 | 9.22 | 8.51 | 7.52 | 0.707 | 0.571 | 12.91 | 144215 |
| 48 | 9.22 | 8.94 | 7.62 | 0.730 | 0.584 | 13.02 | 151615 |
| 48 | 9.19 | 9.28 | 7.63 | 0.749 | 0.591 | 13.16 | 157235 |
| 48 | 9.19 | 9.57 | 7.73 | 0.767 | 0.602 | 13.28 | 162251 |
| 48 | 9.19 | 9.80 | 7.80 | 0.781 | 0.611 | 13.36 | 166206 |
| 48 | 9.19 | 10.04 | 7.85 | 0.796 | 0.618 | 13.43 | 170128 |
| 48 | 9.23 | 10.21 | 7.93 | 0.806 | 0.625 | 13.45 | 173044 |
| 62 | 9.19 | 6.88 | 6.76 | 0.630 | 0.532 | 10.72 | 116618 |
| 62 | 9.21 | 7.57 | 7.00 | 0.661 | 0.546 | 10.89 | 128242 |
| 62 | 9.21 | 8.07 | 7.12 | 0.686 | 0.561 | 11.15 | 136796 |
| 62 | 9.20 | 8.51 | 7.17 | 0.708 | 0.573 | 11.42 | 144298 |
| 62 | 9.20 | 8.95 | 7.25 | 0.732 | 0.584 | 11.65 | 151676 |
| 62 | 9.20 | 9.29 | 7.33 | 0.752 | 0.595 | 11.81 | 157543 |
| 62 | 9.19 | 9.59 | 7.40 | 0.770 | 0.606 | 11.98 | 162572 |
| 62 | 9.20 | 9.81 | 7.44 | 0.783 | 0.614 | 12.03 | 166291 |
| 71 | 9.20 | 6.89 | 5.16 | 0.634 | 0.563 | 11.89 | 116713 |
| 71 | 9.20 | 7.51 | 5.24 | 0.663 | 0.581 | 12.29 | 127362 |
| 71 | 9.22 | 8.07 | 5.30 | 0.690 | 0.595 | 12.63 | 136832 |
| 71 | 9.22 | 8.50 | 5.37 | 0.714 | 0.609 | 12.78 | 144136 |
| 71 | 9.24 | 8.94 | 5.45 | 0.738 | 0.623 | 13.03 | 151495 |
| 71 | 9.21 | 9.27 | 5.43 | 0.757 | 0.631 | 13.25 | 157149 |
| 71 | 9.21 | 9.58 | 5.46 | 0.775 | 0.640 | 13.38 | 162350 |
| 71 | 9.22 | 9.80 | 5.54 | 0.789 | 0.648 | 13.44 | 166159 |
| 81 | 8.17 | 6.88 | 3.95 | 0.634 | 0.578 | 12.67 | 116684 |
| 81 | 8.16 | 7.50 | 4.14 | 0.664 | 0.598 | 13.09 | 127194 |
| 81 | 8.16 | 8.06 | 4.24 | 0.693 | 0.615 | 13.46 | 136646 |
| 81 | 8.17 | 8.51 | 4.36 | 0.717 | 0.629 | 13.70 | 144295 |
| 81 | 8.15 | 8.94 | 4.40 | 0.741 | 0.644 | 13.96 | 151592 |
| 81 | 8.15 | 9.27 | 4.46 | 0.759 | 0.650 | 14.16 | 157126 |
| 81 | 8.16 | 9.58 | 4.46 | 0.777 | 0.659 | 14.34 | 162323 |
| 81 | 8.16 | 9.80 | 4.46 | 0.792 | 0.668 | 14.55 | 166065 |
| 86 | 8.15 | 6.90 | 2.38 | 0.677 | 0.551 | 12.95 | 117012 |
| 86 | 8.13 | 7.52 | 2.38 | 0.702 | 0.564 | 13.16 | 127556 |
| 86 | 8.14 | 8.06 | 2.41 | 0.725 | 0.577 | 13.34 | 136594 |
| 86 | 8.15 | 8.48 | 2.46 | 0.745 | 0.588 | 13.58 | 143803 |
| 86 | 8.16 | 8.92 | 2.53 | 0.764 | 0.598 | 13.64 | 151278 |
| 86 | 8.14 | 9.26 | 2.50 | 0.778 | 0.608 | 13.72 | 156928 |
| 86 | 8.13 | 9.56 | 2.51 | 0.793 | 0.615 | 13.78 | 161994 |
| 86 | 8.13 | 9.78 | 2.54 | 0.804 | 0.621 | 13.79 | 165713 |