

Project No.:

Date:

Project data

Name:

Street:

PC/City:

Telephone:

Fax:

Investor/Building Owner

Name:

Street:

PC/City:

Telephone:

Fax:

Email:

Responsible:

Planner

Name:

Street:

PC/City:

Telephone:

Fax:

Email:

Responsible:

Comments

Drawing data

Drawing No.:

File: Plumbing Network.dwg

Content:

Auth.Pers:

Date:

Comments:

Building data

Building type: Residential building

Minimum supply pressure: 3000 hPa

Calculation method: DIN 1988-300/ EN 806

The minimum flow pressure may not be under-run.

Medium: Potable water

Temperature: 10 °C

Dimensioning pipe system

Overview of calculation results:

Cold and hot water pipe runs

Flow paths: 42
 Section parts: 107
 Components: 416
 System peak flow rate:

Circulation

Flow paths: 9
 Section parts: 17
 Components: 81
 Valve drilling and tapping clamp No. 1, Q = 1.02 l/s

| | | |
|------------------------|-------------|----------------------|
| Total length of pipes: | 465.5 m | Circulation: 116.4 m |
| | | Cold water: 186.8 m |
| | | Hot water: 162.3 m |
| Total volume of pipes: | 113.6 l | Circulation: 19.7 l |
| | | Cold water: 49.1 l |
| | | Hot water: 44.7 l |
| Nom. pipe diameters: | DN12 - DN25 | |

Hydraulically most unfavorable flow paths

PW: Hand washbasin, Flow path 16
 SP-No.1,13,14,15,40,50,51,49

PWH: Shower, Flow path 3
 SP-No.1,2,3,4,5,6,7,8,9,10,20,21

Pressure balance sheet

| | | Dimension | PW | PWH |
|----------------------------------------------------------------------------------------|-----------------------------------------|-----------|------|------|
| 1. Minimum supply pressure | $P_{\min V}$ | hPa | 3000 | 3000 |
| 2. Pressure loss by change of geodetic altitude | Δp_{geo} | hPa | 60 | 437 |
| 3. Pressure drops through appliances | | | | |
| a.) Water meter | Δp_{WM} | hPa | 0 | 0 |
| b.) Filter | Δp_{FIL} | hPa | 0 | 0 |
| c.) softening installations | Δp_{SI} | hPa | 0 | 0 |
| d.) Dosing systems | Δp_{DOS} | hPa | 0 | 0 |
| e.) Potable water heater | Δp_{TE} | hPa | 0 | 200 |
| f.) Further devices: | Δp_{app} | hPa | 0 | 0 |
| 4. Minimum flow pressure | $P_{\min FL}$ | hPa | 1000 | 1000 |
| 5. Gain of pressure by pumps and booster station | Δp_p | hPa | 0 | 0 |
| 6. Total of pressure losses of No. 2 to No. 4 | $\Sigma \Delta p_{\text{No.2 - No.4}}$ | hPa | 1060 | 1637 |
| 7. Available for pipe friction pressure loss and single resistance (No.1+No.5-No.6) | Δp_{avail} | hPa | 1940 | 1363 |
| 8. Portion for individual resistances | Z | hPa | 177 | 191 |
| 9. Available for pipe friction pressure loss | $L_{\text{tot}} \cdot R_{\text{avail}}$ | hPa | 1763 | 1172 |
| 10. Pipe length | l_{tot} | m | 47.0 | 46.1 |
| 11. Available pipe friction pressure gradient | R_{avail} | hPa/m | 38 | 25 |

Drag coefficients

Copper, DIN EN 1057, Drag coefficients: Metal pipe material systems (CU, RB, Fe)
 PE-X pipe, Drag coefficients: Plastic pipe material systems (PE-X, composite material)

Dimensioning of the most unfavorable flow paths

| Flow paths | | | | | | | | | | | | |
|---------------------------------------------------|------|----------|----|------------------|-----------|-------|----------------|-------|-------|---------|---------|-------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_p l/s | w m/s | $\Sigma \zeta$ | Z hPa | l m | R hPa/m | R l hPa | R l + Z hPa |
| Flow path PW: | | | | | | | | | | | | |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 37 | 1.40 | 19.2 | 27.0 | 63.9 |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10 | 0.49 | 13.8 | 6.8 | 17.2 |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 27 | 3.08 | 12.5 | 38.5 | 65.2 |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49 | 19.01 | 24.9 | 474.0 | 523.0 |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1 | 5.97 | 12.3 | 73.7 | 74.6 |
| 50 | PWC | CU | 12 | 0.33 | 0.26 | 1.95 | 2.40 | 46 | 15.55 | 38.5 | 599.0 | 644.7 |
| 51 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7 | 1.48 | 4.0 | 5.9 | 13.1 |
| 49 | PWH | - | - | 0.14 | 0.14 | 0.00 | 0.00 | 0 | 0.00 | 0.0 | 0.0 | 0.0 |
| Total pipe friction pressure loss: | | | | | | | | | | | 1224.7 | |
| Available for pipe friction pressure loss: | | | | | | | | | | | 1763.1 | |
| Residual pressure loss (not used): | | | | | | | | | | | 538.3 | |
| Flow path PWH: | | | | | | | | | | | | |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 37 | 1.40 | 19.2 | 27.0 | 63.9 |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49 | 0.44 | 28.4 | 12.5 | 61.8 |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24 | 1.51 | 22.2 | 33.6 | 57.8 |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 26 | 3.08 | 19.8 | 61.0 | 86.6 |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24 | 19.01 | 11.3 | 214.5 | 238.5 |
| 6 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 1.10 | 7 | 4.90 | 6.8 | 33.6 | 40.8 |
| 7 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 0.70 | 5 | 0.14 | 6.8 | 1.0 | 5.6 |
| 8 | PWH | CU | 20 | 0.36 | 0.28 | 0.89 | 0.10 | 0 | 0.90 | 4.3 | 3.9 | 4.3 |
| 9 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 4.70 | 7 | 10.11 | 1.8 | 18.0 | 24.8 |
| 10 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 4 | 1.23 | 1.8 | 2.2 | 6.1 |
| 20 | PWH | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 9 | 3.40 | 1.5 | 5.0 | 13.7 |
| 21 | PWH | - | - | 0.30 | 0.24 | 0.00 | 0.00 | 0 | 0.00 | 0.0 | 0.0 | 0.0 |
| Total pipe friction pressure loss: | | | | | | | | | | | 412.3 | |
| Available for pipe friction pressure loss: | | | | | | | | | | | 1171.6 | |
| Residual pressure loss (not used): | | | | | | | | | | | 759.3 | |

Dimensioning of the most unfavorable flow paths

| Flow paths | | | | | | | | | | | | |
|------------|------|---------------|----|---------------------|--------------|------------|----------------|------------|----------|--------------|--------------|------------------|
| Sp. No. | Type | Mate- rial | DN | ΣQ_r l/s | Q_p l/s | w m/s | $\Sigma \zeta$ | Z hPa | l m | R hPa/m | $R l$ hPa | $R l + Z$ hPa |
| | | | | | | | | | | | | |

List of all outlet armatures

| Flow rates and min. flow pressure | | | | | | | | |
|-----------------------------------|---------------------------|-------------------|---------|----------------------|---------|-------------------------------------|---------|------------------------|
| Fl.p. No. | Outlet armature | Sum of flow rates | | Continuous flow rate | | Peak fl.r. consid. | Min. DN | Min. flow pressure hPa |
| | | cold l/s | hot l/s | cold l/s | hot l/s | | | |
| 1 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 3 | Shower | 0.15 | 0.15 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 1000.0 |
| 5 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 7 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 9 | Bathtub | 0.15 | 0.15 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 1000.0 |
| 11 | Shower | 0.15 | 0.15 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 1000.0 |
| 13 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 15 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 17 | Shower | 0.15 | 0.15 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 1000.0 |
| 19 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 21 | Sink | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 1000.0 |
| 23 | Dish washer | 0.07 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 500.0 |
| 25 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 27 | Sink | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 1000.0 |
| 29 | Washing machine | 0.15 | 0.25 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 500.0 |
| 31 | Shower | 0.15 | 0.15 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 15 | 1000.0 |
| 33 | Hand washbasin | 0.07 | 0.07 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 1000.0 |
| 35 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |
| 36 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |
| 37 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |
| 38 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |
| 39 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |
| 40 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |
| 41 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |
| 42 | Toilet with flushing tank | 0.13 | 0.00 | 0.00 | 0.00 | <input checked="" type="checkbox"/> | 12 | 500.0 |

Pressure loss calculation Outlet armatures

| Pressure losses | | | | | | | | | |
|-----------------|---------------------------|---------------------------|----------------------------|--------------------------|----------|------------|--------------------------|--------------------------|-----------------------------|
| Ar. No. | Outlet armature | P _{min,V} hPa | P _{min,FI} hPa | Δp _{geo} hPa | Z hPa | R l hPa | Δp _{app} hPa | Δp _{pmp} hPa | Δp _{resid.} hPa |
| 1 | Hand washbasin | 3000 | 1000 | 360 | 202 | 426 | 200 | 0 | 813 |
| 2 | Hand washbasin | 3000 | 1000 | 360 | 181 | 707 | 0 | 0 | 752 |
| 3 | Shower | 3000 | 1000 | 437 | 191 | 412 | 200 | 0 | 759 |
| 4 | Shower | 3000 | 1000 | 437 | 170 | 691 | 0 | 0 | 702 |
| 5 | Hand washbasin | 3000 | 1000 | 60 | 186 | 396 | 200 | 0 | 1158 |
| 6 | Hand washbasin | 3000 | 1000 | 60 | 165 | 655 | 0 | 0 | 1120 |
| 7 | Hand washbasin | 3000 | 1000 | 60 | 186 | 394 | 200 | 0 | 1160 |
| 8 | Hand washbasin | 3000 | 1000 | 60 | 159 | 646 | 0 | 0 | 1135 |
| 9 | Bathtub | 3000 | 1000 | 41 | 182 | 387 | 200 | 0 | 1190 |
| 10 | Bathtub | 3000 | 1000 | 41 | 146 | 620 | 0 | 0 | 1193 |
| 11 | Shower | 3000 | 1000 | 137 | 174 | 377 | 200 | 0 | 1112 |
| 12 | Shower | 3000 | 1000 | 137 | 144 | 650 | 0 | 0 | 1069 |
| 13 | Hand washbasin | 3000 | 1000 | 60 | 170 | 377 | 200 | 0 | 1193 |
| 14 | Hand washbasin | 3000 | 1000 | 60 | 138 | 648 | 0 | 0 | 1153 |
| 15 | Hand washbasin | 3000 | 1000 | 60 | 171 | 415 | 200 | 0 | 1153 |
| 16 | Hand washbasin | 3000 | 1000 | 60 | 177 | 1225 | 0 | 0 | 538 |
| 17 | Shower | 3000 | 1000 | 437 | 164 | 237 | 200 | 0 | 962 |
| 18 | Shower | 3000 | 1000 | 437 | 131 | 323 | 0 | 0 | 1109 |
| 19 | Hand washbasin | 3000 | 1000 | 360 | 174 | 247 | 200 | 0 | 1018 |
| 20 | Hand washbasin | 3000 | 1000 | 360 | 142 | 334 | 0 | 0 | 1164 |
| 21 | Sink | 3000 | 1000 | 60 | 145 | 220 | 200 | 0 | 1374 |
| 22 | Sink | 3000 | 1000 | 60 | 96 | 288 | 0 | 0 | 1556 |
| 23 | Dish washer | 3000 | 500 | 60 | 143 | 220 | 200 | 0 | 1877 |
| 24 | Dish washer | 3000 | 500 | 60 | 96 | 288 | 0 | 0 | 2056 |
| 25 | Hand washbasin | 3000 | 1000 | 60 | 157 | 187 | 200 | 0 | 1396 |
| 26 | Hand washbasin | 3000 | 1000 | 60 | 101 | 166 | 0 | 0 | 1673 |
| 27 | Sink | 3000 | 1000 | 60 | 152 | 186 | 200 | 0 | 1402 |
| 28 | Sink | 3000 | 1000 | 60 | 88 | 152 | 0 | 0 | 1700 |
| 29 | Washing machine | 3000 | 500 | 60 | 175 | 189 | 200 | 0 | 1877 |
| 30 | Washing machine | 3000 | 500 | 60 | 95 | 153 | 0 | 0 | 2192 |
| 31 | Shower | 3000 | 1000 | 437 | 127 | 89 | 200 | 0 | 1147 |
| 32 | Shower | 3000 | 1000 | 437 | 74 | 76 | 0 | 0 | 1413 |
| 33 | Hand washbasin | 3000 | 1000 | 360 | 137 | 101 | 200 | 0 | 1202 |
| 34 | Hand washbasin | 3000 | 1000 | 360 | 84 | 91 | 0 | 0 | 1465 |
| 35 | Toilet with flushing tank | 3000 | 500 | 400 | 228 | 755 | 0 | 0 | 1117 |
| 36 | Toilet with flushing tank | 3000 | 500 | 100 | 185 | 677 | 0 | 0 | 1538 |
| 37 | Toilet with flushing tank | 3000 | 500 | 100 | 208 | 1258 | 0 | 0 | 934 |
| 38 | Toilet with flushing tank | 3000 | 500 | 100 | 205 | 1252 | 0 | 0 | 943 |
| 39 | Toilet with flushing tank | 3000 | 500 | 100 | 155 | 666 | 0 | 0 | 1580 |

Pressure loss calculation Outlet armatures

| Pressure losses | | | | | | | | | |
|-----------------|---------------------------|---------------------|----------------------|--------------------------------|----------|------------|--------------------------------|--------------------------------|-----------------------------------|
| Ar. No. | Outlet armature | $p_{\min,V}$ hPa | $p_{\min,FI}$ hPa | Δp_{geo} hPa | Z hPa | R l hPa | Δp_{app} hPa | Δp_{pmp} hPa | $\Delta p_{\text{resid.}}$ hPa |
| 40 | Toilet with flushing tank | 3000 | 500 | 400 | 189 | 363 | 0 | 0 | 1549 |
| 41 | Toilet with flushing tank | 3000 | 500 | 100 | 119 | 183 | 0 | 0 | 2099 |
| 42 | Toilet with flushing tank | 3000 | 500 | 400 | 132 | 126 | 0 | 0 | 1842 |

Pressure loss calculation Section parts

| Section parts | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27 | 0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 13 | 200 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 34 | 0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61 | 0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 215 | 0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 6 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 1.10 | 7.2 | 4.90 | 6.8 | 34 | 0 | 40.8 |
| - Connection on SP-No.: 7 | | | | | | | | | | | | | |
| 7 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 0.70 | 4.6 | 0.14 | 6.8 | 1 | 0 | 5.6 |
| - Branch acc. SP-No.: 8, 32 | | | | | | | | | | | | | |
| 8 | PWH | CU | 20 | 0.36 | 0.28 | 0.89 | 0.10 | 0.4 | 0.90 | 4.3 | 4 | 0 | 4.3 |
| - Branch acc. SP-No.: 23, 9 | | | | | | | | | | | | | |
| 9 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 4.70 | 6.8 | 10.11 | 1.8 | 18 | 0 | 24.8 |
| 10 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 1.23 | 1.8 | 2 | 0 | 6.1 |
| - Branch acc. SP-No.: 11, 20 | | | | | | | | | | | | | |
| 11 | PWH | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.0 | 4.12 | 4.4 | 18 | 0 | 37.2 |
| 12 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 7 | 0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 39 | 0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474 | 0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68 | 0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 17 | PWC | CU | 20 | 0.62 | 0.41 | 1.31 | 0.10 | 0.9 | 0.71 | 11.2 | 8 | 0 | 8.7 |
| - Branch acc. SP-No.: 26, 18 | | | | | | | | | | | | | |
| 18 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 6.70 | 25.2 | 11.49 | 5.4 | 62 | 0 | 87.4 |
| - Branch acc. SP-No.: 19, 22, 99 | | | | | | | | | | | | | |
| 19 | PWC | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.4 | 3.79 | 5.9 | 22 | 0 | 41.6 |
| 20 | PWH | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.7 | 3.40 | 1.5 | 5 | 0 | 13.7 |
| 21 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

Pressure loss calculation Section parts

| Section parts | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 22 | PWC | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.9 | 3.18 | 1.9 | 6 | 0 | 15.1 |
| 23 | PWH | CU | 12 | 0.14 | 0.14 | 1.05 | 1.20 | 6.6 | 0.47 | 9.9 | 5 | 0 | 11.2 |
| - Branch acc. SP-No.: 29, 24 | | | | | | | | | | | | | |
| 24 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.70 | 7.8 | 1.41 | 2.9 | 4 | 0 | 11.9 |
| 25 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |
| 26 | PWC | CU | 12 | 0.27 | 0.21 | 1.61 | 1.20 | 15.6 | 0.71 | 27.6 | 20 | 0 | 35.3 |
| - Branch acc. SP-No.: 31, 27 | | | | | | | | | | | | | |
| 27 | PWC | CU | 12 | 0.20 | 0.15 | 1.13 | 0.90 | 5.8 | 0.66 | 14.8 | 10 | 0 | 15.6 |
| - Branch acc. SP-No.: 28, 100 | | | | | | | | | | | | | |
| 28 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.2 | 0.85 | 4.0 | 3 | 0 | 10.6 |
| 29 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.1 | 0.75 | 2.9 | 2 | 0 | 9.3 |
| 30 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |
| 31 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.2 | 0.85 | 4.0 | 3 | 0 | 10.6 |
| 32 | PWH | CU | 20 | 0.15 | 0.15 | 0.48 | 9.40 | 10.5 | 2.41 | 1.4 | 3 | 0 | 14.0 |
| 33 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Bathtub | | | | | | | | | | | | | |
| 34 | PWC | CU | 20 | 0.15 | 0.15 | 0.48 | 9.40 | 10.7 | 2.59 | 1.9 | 5 | 0 | 15.7 |
| 35 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 0.10 | 0.3 | 5.97 | 3.0 | 18 | 0 | 18.4 |
| - Branch acc. SP-No.: 36, 47 | | | | | | | | | | | | | |
| 36 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.20 | 3.2 | 2.84 | 1.8 | 5 | 0 | 8.2 |
| 37 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 0.70 | 1.0 | 0.92 | 1.8 | 2 | 0 | 2.7 |
| - Branch acc. SP-No.: 38, 44 | | | | | | | | | | | | | |
| 38 | PWH | CU | 20 | 0.15 | 0.15 | 0.48 | 8.40 | 9.4 | 2.62 | 1.4 | 4 | 0 | 13.2 |
| 39 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1.0 | 5.97 | 12.3 | 74 | 0 | 74.6 |
| - Branch acc. SP-No.: 41, 50 | | | | | | | | | | | | | |
| 41 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 2.20 | 8.3 | 4.25 | 5.4 | 23 | 0 | 31.3 |
| - Branch acc. SP-No.: 42, 46 | | | | | | | | | | | | | |
| 42 | PWC | CU | 20 | 0.28 | 0.22 | 0.71 | 0.70 | 1.8 | 0.27 | 3.8 | 1 | 0 | 2.8 |
| - Branch acc. SP-No.: 43, 104 | | | | | | | | | | | | | |

Pressure loss calculation Section parts

| Section parts | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R · L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 43 | PWC | CU | 20 | 0.15 | 0.15 | 0.48 | 8.40 | 9.6 | 3.11 | 1.9 | 6 | 0 | 15.6 |
| 44 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 4.30 | 5.9 | 1.27 | 2.9 | 4 | 0 | 9.6 |
| 45 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |
| 46 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 4.30 | 6.0 | 1.37 | 4.0 | 5 | 0 | 11.4 |
| 47 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 2.40 | 3.3 | 14.12 | 2.9 | 41 | 0 | 44.5 |
| 48 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.70 | 7.8 | 2.51 | 2.9 | 7 | 0 | 15.1 |
| 49 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |
| 50 | PWC | CU | 12 | 0.33 | 0.26 | 1.95 | 2.40 | 45.7 | 15.55 | 38.5 | 599 | 0 | 644.7 |
| - Branch acc. SP-No.: 51, 101 | | | | | | | | | | | | | |
| 51 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.2 | 1.48 | 4.0 | 6 | 0 | 13.1 |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30 | 0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 53 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 2.10 | 5.5 | 15.96 | 3.0 | 49 | 0 | 54.1 |
| - Branch acc. SP-No.: 65, 54 | | | | | | | | | | | | | |
| 54 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 5.20 | 7.5 | 10.39 | 1.8 | 19 | 0 | 26.0 |
| 55 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 3.70 | 5.3 | 1.10 | 1.8 | 2 | 0 | 7.3 |
| - Branch acc. SP-No.: 56, 62 | | | | | | | | | | | | | |
| 56 | PWH | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.7 | 2.65 | 1.5 | 4 | 0 | 12.6 |
| 57 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49 | 0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 59 | PWC | CU | 20 | 0.49 | 0.35 | 1.12 | 2.10 | 13.2 | 15.96 | 8.5 | 136 | 0 | 149.0 |
| - Branch acc. SP-No.: 60, 69 | | | | | | | | | | | | | |
| 60 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 8.20 | 30.8 | 10.84 | 5.4 | 59 | 0 | 89.6 |
| - Branch acc. SP-No.: 61, 64, 105 | | | | | | | | | | | | | |
| 61 | PWC | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.9 | 3.36 | 1.9 | 7 | 0 | 15.4 |
| 62 | PWH | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.0 | 3.13 | 4.4 | 14 | 0 | 32.8 |
| 63 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

Pressure loss calculation Section parts

| Section parts | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 64 | PWC | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.4 | 3.09 | 5.9 | 18 | 0 | 37.5 |
| 65 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 2.80 | 0.7 | 15.52 | 0.4 | 6 | 0 | 6.5 |
| 66 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 0.70 | 0.2 | 1.98 | 0.4 | 1 | 0 | 0.9 |
| - Branch acc. SP-No.: 67, 71 | | | | | | | | | | | | | |
| 67 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.0 | 1.79 | 0.4 | 1 | 0 | 2.7 |
| 68 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Sink | | | | | | | | | | | | | |
| 69 | PWC | CU | 20 | 0.14 | 0.14 | 0.45 | 2.80 | 2.8 | 17.51 | 1.7 | 30 | 0 | 32.7 |
| - Branch acc. SP-No.: 70, 73 | | | | | | | | | | | | | |
| 70 | PWC | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.1 | 1.46 | 0.5 | 1 | 0 | 2.8 |
| 71 | PWH | CU | 20 | 0.00 | 0.00 | 0.00 | 7.90 | 0.0 | 1.00 | 0.0 | 0 | 0 | 0.0 |
| 72 | PWH | - | - | 0.07 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Dish washer | | | | | | | | | | | | | |
| 73 | PWC | CU | 20 | 0.07 | 0.07 | 0.22 | 7.90 | 2.0 | 0.90 | 0.5 | 0 | 0 | 2.4 |
| 74 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 1.10 | 4.8 | 3.40 | 4.8 | 16 | 0 | 21.3 |
| - Connection on SP-No.: 75 | | | | | | | | | | | | | |
| 75 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 0.70 | 3.1 | 0.22 | 4.8 | 1 | 0 | 4.2 |
| - Branch acc. SP-No.: 76, 82 | | | | | | | | | | | | | |
| 76 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 2.90 | 4.0 | 0.73 | 2.9 | 2 | 0 | 6.1 |
| 77 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.70 | 7.8 | 1.07 | 2.9 | 3 | 0 | 10.9 |
| 78 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |
| 79 | PWC | CU | 20 | 0.42 | 0.32 | 1.00 | 1.10 | 5.5 | 3.87 | 7.0 | 27 | 0 | 32.6 |
| - Branch acc. SP-No.: 80, 85 | | | | | | | | | | | | | |
| 80 | PWC | CU | 12 | 0.20 | 0.15 | 1.13 | 1.20 | 7.7 | 0.87 | 14.8 | 13 | 0 | 20.5 |
| - Branch acc. SP-No.: 106, 81 | | | | | | | | | | | | | |
| 81 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 6.90 | 9.6 | 1.22 | 4.0 | 5 | 0 | 14.4 |
| 82 | PWH | CU | 20 | 0.32 | 0.25 | 0.80 | 1.70 | 5.4 | 1.03 | 3.6 | 4 | 0 | 9.1 |
| - Branch acc. SP-No.: 87, 83 | | | | | | | | | | | | | |
| 83 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.0 | 1.52 | 0.4 | 1 | 0 | 2.6 |
| 84 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Sink | | | | | | | | | | | | | |

Pressure loss calculation Section parts

| Section parts | | | | | | | | | | | | | |
|-------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 85 | PWC | CU | 20 | 0.22 | 0.17 | 0.54 | 1.70 | 2.5 | 1.03 | 2.4 | 2 | 0 | 5.0 |
| - Branch acc. SP-No.: 89, 86 | | | | | | | | | | | | | |
| 86 | PWC | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.1 | 1.66 | 0.5 | 1 | 0 | 3.0 |
| 87 | PWH | CU | 20 | 0.25 | 0.25 | 0.80 | 7.90 | 24.6 | 0.86 | 3.5 | 3 | 0 | 27.6 |
| 88 | PWH | - | - | 0.40 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Washing machine | | | | | | | | | | | | | |
| 89 | PWC | CU | 20 | 0.15 | 0.15 | 0.48 | 7.90 | 9.0 | 0.96 | 1.9 | 2 | 0 | 10.9 |
| 90 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 3.78 | 1.8 | 7 | 0 | 10.6 |
| 91 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 2.48 | 1.8 | 4 | 0 | 8.3 |
| - Branch acc. SP-No.: 92, 96 | | | | | | | | | | | | | |
| 92 | PWH | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.7 | 3.18 | 1.5 | 5 | 0 | 13.4 |
| 93 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |
| 94 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 4.70 | 17.7 | 6.41 | 5.4 | 35 | 0 | 52.4 |
| - Branch acc. SP-No.: 95, 98, 107 | | | | | | | | | | | | | |
| 95 | PWC | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.9 | 3.77 | 1.9 | 7 | 0 | 16.2 |
| 96 | PWH | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.0 | 3.68 | 4.4 | 16 | 0 | 35.3 |
| 97 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0 | 0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |
| 98 | PWC | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.4 | 3.75 | 5.9 | 22 | 0 | 41.4 |
| 99 | PWC | PE-X | 12 | 0.13 | 0.13 | 1.15 | 10.10 | 66.8 | 4.07 | 17.3 | 70 | 0 | 137.0 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |
| 100 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.70 | 27.4 | 2.18 | 11.5 | 25 | 0 | 52.5 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |
| 101 | PWC | CU | 12 | 0.26 | 0.21 | 1.55 | 0.90 | 10.8 | 0.35 | 25.7 | 9 | 0 | 19.9 |
| - Branch acc. SP-No.: 103, 102 | | | | | | | | | | | | | |
| 102 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.70 | 27.4 | 2.57 | 11.5 | 30 | 0 | 57.1 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |
| 103 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.20 | 25.0 | 2.05 | 11.5 | 24 | 0 | 48.6 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |
| 104 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 4.30 | 20.6 | 1.89 | 11.5 | 22 | 0 | 42.4 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |
| 105 | PWC | PE-X | 12 | 0.13 | 0.13 | 1.15 | 10.10 | 66.8 | 2.70 | 17.3 | 47 | 0 | 113.3 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

Pressure loss calculation Section parts

| Section parts | | | | | | | | | | | | | |
|-------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 106 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.70 | 27.4 | 1.86 | 11.5 | 21 | 0 | 48.8 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |
| 107 | PWC | PE-X | 12 | 0.13 | 0.13 | 1.15 | 10.10 | 66.8 | 3.35 | 17.3 | 58 | 0 | 124.6 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

Determination of the peak flow rate

| Calculation parameters | | | | | |
|------------------------------------------------------------------------------------------------------|------|---------------------|--------------------|-----------------------|-----------------------------|
| Volume flow rate overview: Section part No. 1, Cold water, Valve drilling and tapping clamp No. 1 | | | | | |
| Type of building / simultaneity | Type | ΣQ_r l/s | $Q_{r,max}$ l/s | Consider flow rate | Amount of tapping points |
| Residential building | Hot | 1.70 | 0.25 | Yes | 16 |
| Residential building | Cold | 2.71 | 0.15 | Yes | 25 |

Sum of flow rates : 4.41 l/s (n.c. 0.00 l/s)
 Continuous flow rate : 0.00 l/s
 Fire water flow rate : 0.00 l/s
 Peak flow rate : 1.02 l/s

Section parts per flow path

| Flow path No. 1, Hand washbasin | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 6 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 1.10 | 7.2 | 4.90 | 6.8 | 33.6 | 0.0 | 40.8 |
| - Connection on SP-No.: 7 | | | | | | | | | | | | | |
| 7 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 0.70 | 4.6 | 0.14 | 6.8 | 1.0 | 0.0 | 5.6 |
| - Branch acc. SP-No.: 8, 32 | | | | | | | | | | | | | |
| 8 | PWH | CU | 20 | 0.36 | 0.28 | 0.89 | 0.10 | 0.4 | 0.90 | 4.3 | 3.9 | 0.0 | 4.3 |
| - Branch acc. SP-No.: 23, 9 | | | | | | | | | | | | | |
| 9 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 4.70 | 6.8 | 10.11 | 1.8 | 18.0 | 0.0 | 24.8 |
| 10 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 1.23 | 1.8 | 2.2 | 0.0 | 6.1 |
| - Branch acc. SP-No.: 11, 20 | | | | | | | | | | | | | |
| 11 | PWH | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.0 | 4.12 | 4.4 | 18.2 | 0.0 | 37.2 |
| 12 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 2, Hand washbasin | | | | | | | | | | | | | |
|----------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68.5 | 0.0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 17 | PWC | CU | 20 | 0.62 | 0.41 | 1.31 | 0.10 | 0.9 | 0.71 | 11.2 | 7.9 | 0.0 | 8.7 |
| - Branch acc. SP-No.: 26, 18 | | | | | | | | | | | | | |
| 18 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 6.70 | 25.2 | 11.49 | 5.4 | 62.2 | 0.0 | 87.4 |
| - Branch acc. SP-No.: 19, 22, 99 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 2, Hand washbasin | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 19 | PWC | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.4 | 3.79 | 5.9 | 22.2 | 0.0 | 41.6 |
| 12 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 3, Shower | | | | | | | | | | | | | |
|------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 6 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 1.10 | 7.2 | 4.90 | 6.8 | 33.6 | 0.0 | 40.8 |
| - Connection on SP-No.: 7 | | | | | | | | | | | | | |
| 7 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 0.70 | 4.6 | 0.14 | 6.8 | 1.0 | 0.0 | 5.6 |
| - Branch acc. SP-No.: 8, 32 | | | | | | | | | | | | | |
| 8 | PWH | CU | 20 | 0.36 | 0.28 | 0.89 | 0.10 | 0.4 | 0.90 | 4.3 | 3.9 | 0.0 | 4.3 |
| - Branch acc. SP-No.: 23, 9 | | | | | | | | | | | | | |
| 9 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 4.70 | 6.8 | 10.11 | 1.8 | 18.0 | 0.0 | 24.8 |
| 10 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 1.23 | 1.8 | 2.2 | 0.0 | 6.1 |
| - Branch acc. SP-No.: 11, 20 | | | | | | | | | | | | | |
| 20 | PWH | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.7 | 3.40 | 1.5 | 5.0 | 0.0 | 13.7 |
| 21 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 4, Shower | | | | | | | | | | | | | |
|------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 4, Shower | | | | | | | | | | | | | |
|----------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68.5 | 0.0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 17 | PWC | CU | 20 | 0.62 | 0.41 | 1.31 | 0.10 | 0.9 | 0.71 | 11.2 | 7.9 | 0.0 | 8.7 |
| - Branch acc. SP-No.: 26, 18 | | | | | | | | | | | | | |
| 18 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 6.70 | 25.2 | 11.49 | 5.4 | 62.2 | 0.0 | 87.4 |
| - Branch acc. SP-No.: 19, 22, 99 | | | | | | | | | | | | | |
| 22 | PWC | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.9 | 3.18 | 1.9 | 6.2 | 0.0 | 15.1 |
| 21 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 5, Hand washbasin | | | | | | | | | | | | | |
|----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 6 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 1.10 | 7.2 | 4.90 | 6.8 | 33.6 | 0.0 | 40.8 |
| - Connection on SP-No.: 7 | | | | | | | | | | | | | |
| 7 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 0.70 | 4.6 | 0.14 | 6.8 | 1.0 | 0.0 | 5.6 |
| - Branch acc. SP-No.: 8, 32 | | | | | | | | | | | | | |
| 8 | PWH | CU | 20 | 0.36 | 0.28 | 0.89 | 0.10 | 0.4 | 0.90 | 4.3 | 3.9 | 0.0 | 4.3 |
| - Branch acc. SP-No.: 23, 9 | | | | | | | | | | | | | |
| 23 | PWH | CU | 12 | 0.14 | 0.14 | 1.05 | 1.20 | 6.6 | 0.47 | 9.9 | 4.6 | 0.0 | 11.2 |
| - Branch acc. SP-No.: 29, 24 | | | | | | | | | | | | | |
| 24 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.70 | 7.8 | 1.41 | 2.9 | 4.1 | 0.0 | 11.9 |
| 25 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 6, Hand washbasin | | | | | | | | | | | | | |
|----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |

Section parts per flow path

| Flow path No. 6, Hand washbasin | | | | | | | | | | | | | |
|----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68.5 | 0.0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 17 | PWC | CU | 20 | 0.62 | 0.41 | 1.31 | 0.10 | 0.9 | 0.71 | 11.2 | 7.9 | 0.0 | 8.7 |
| - Branch acc. SP-No.: 26, 18 | | | | | | | | | | | | | |
| 26 | PWC | CU | 12 | 0.27 | 0.21 | 1.61 | 1.20 | 15.6 | 0.71 | 27.6 | 19.7 | 0.0 | 35.3 |
| - Branch acc. SP-No.: 31, 27 | | | | | | | | | | | | | |
| 27 | PWC | CU | 12 | 0.20 | 0.15 | 1.13 | 0.90 | 5.8 | 0.66 | 14.8 | 9.8 | 0.0 | 15.6 |
| - Branch acc. SP-No.: 28, 100 | | | | | | | | | | | | | |
| 28 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.2 | 0.85 | 4.0 | 3.4 | 0.0 | 10.6 |
| 25 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 7, Hand washbasin | | | | | | | | | | | | | |
|----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 6 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 1.10 | 7.2 | 4.90 | 6.8 | 33.6 | 0.0 | 40.8 |
| - Connection on SP-No.: 7 | | | | | | | | | | | | | |
| 7 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 0.70 | 4.6 | 0.14 | 6.8 | 1.0 | 0.0 | 5.6 |
| - Branch acc. SP-No.: 8, 32 | | | | | | | | | | | | | |
| 8 | PWH | CU | 20 | 0.36 | 0.28 | 0.89 | 0.10 | 0.4 | 0.90 | 4.3 | 3.9 | 0.0 | 4.3 |
| - Branch acc. SP-No.: 23, 9 | | | | | | | | | | | | | |
| 23 | PWH | CU | 12 | 0.14 | 0.14 | 1.05 | 1.20 | 6.6 | 0.47 | 9.9 | 4.6 | 0.0 | 11.2 |
| - Branch acc. SP-No.: 29, 24 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 7, Hand washbasin | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 29 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.1 | 0.75 | 2.9 | 2.2 | 0.0 | 9.3 |
| 30 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 8, Hand washbasin | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68.5 | 0.0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 17 | PWC | CU | 20 | 0.62 | 0.41 | 1.31 | 0.10 | 0.9 | 0.71 | 11.2 | 7.9 | 0.0 | 8.7 |
| - Branch acc. SP-No.: 26, 18 | | | | | | | | | | | | | |
| 26 | PWC | CU | 12 | 0.27 | 0.21 | 1.61 | 1.20 | 15.6 | 0.71 | 27.6 | 19.7 | 0.0 | 35.3 |
| - Branch acc. SP-No.: 31, 27 | | | | | | | | | | | | | |
| 31 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.2 | 0.85 | 4.0 | 3.3 | 0.0 | 10.6 |
| 30 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 9, Bathtub | | | | | | | | | | | | | |
|-----------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 6 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 1.10 | 7.2 | 4.90 | 6.8 | 33.6 | 0.0 | 40.8 |
| - Connection on SP-No.: 7 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 9, Bathtub | | | | | | | | | | | | | |
|---------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 7 | PWH | CU | 20 | 0.51 | 0.36 | 1.15 | 0.70 | 4.6 | 0.14 | 6.8 | 1.0 | 0.0 | 5.6 |
| - Branch acc. SP-No.: 8, 32 | | | | | | | | | | | | | |
| 32 | PWH | CU | 20 | 0.15 | 0.15 | 0.48 | 9.40 | 10.5 | 2.41 | 1.4 | 3.5 | 0.0 | 14.0 |
| 33 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Bathtub | | | | | | | | | | | | | |

| Flow path No. 10, Bathtub | | | | | | | | | | | | | |
|----------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68.5 | 0.0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 34 | PWC | CU | 20 | 0.15 | 0.15 | 0.48 | 9.40 | 10.7 | 2.59 | 1.9 | 5.0 | 0.0 | 15.7 |
| 33 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Bathtub | | | | | | | | | | | | | |

| Flow path No. 11, Shower | | | | | | | | | | | | | |
|---------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 35 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 0.10 | 0.3 | 5.97 | 3.0 | 18.2 | 0.0 | 18.4 |
| - Branch acc. SP-No.: 36, 47 | | | | | | | | | | | | | |
| 36 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.20 | 3.2 | 2.84 | 1.8 | 5.1 | 0.0 | 8.2 |

Section parts per flow path

| Flow path No. 11, Shower | | | | | | | | | | | | | |
|------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 37 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 0.70 | 1.0 | 0.92 | 1.8 | 1.6 | 0.0 | 2.7 |
| - Branch acc. SP-No.: 38, 44 | | | | | | | | | | | | | |
| 38 | PWH | CU | 20 | 0.15 | 0.15 | 0.48 | 8.40 | 9.4 | 2.62 | 1.4 | 3.8 | 0.0 | 13.2 |
| 39 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 12, Shower | | | | | | | | | | | | | |
|-------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1.0 | 5.97 | 12.3 | 73.7 | 0.0 | 74.6 |
| - Branch acc. SP-No.: 41, 50 | | | | | | | | | | | | | |
| 41 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 2.20 | 8.3 | 4.25 | 5.4 | 23.0 | 0.0 | 31.3 |
| - Branch acc. SP-No.: 42, 46 | | | | | | | | | | | | | |
| 42 | PWC | CU | 20 | 0.28 | 0.22 | 0.71 | 0.70 | 1.8 | 0.27 | 3.8 | 1.0 | 0.0 | 2.8 |
| - Branch acc. SP-No.: 43, 104 | | | | | | | | | | | | | |
| 43 | PWC | CU | 20 | 0.15 | 0.15 | 0.48 | 8.40 | 9.6 | 3.11 | 1.9 | 6.0 | 0.0 | 15.6 |
| 39 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 13, Hand washbasin | | | | | | | | | | | | | |
|----------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 13, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 35 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 0.10 | 0.3 | 5.97 | 3.0 | 18.2 | 0.0 | 18.4 |
| - Branch acc. SP-No.: 36, 47 | | | | | | | | | | | | | |
| 36 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.20 | 3.2 | 2.84 | 1.8 | 5.1 | 0.0 | 8.2 |
| 37 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 0.70 | 1.0 | 0.92 | 1.8 | 1.6 | 0.0 | 2.7 |
| - Branch acc. SP-No.: 38, 44 | | | | | | | | | | | | | |
| 44 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 4.30 | 5.9 | 1.27 | 2.9 | 3.7 | 0.0 | 9.6 |
| 45 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 14, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1.0 | 5.97 | 12.3 | 73.7 | 0.0 | 74.6 |
| - Branch acc. SP-No.: 41, 50 | | | | | | | | | | | | | |
| 41 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 2.20 | 8.3 | 4.25 | 5.4 | 23.0 | 0.0 | 31.3 |
| - Branch acc. SP-No.: 42, 46 | | | | | | | | | | | | | |
| 46 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 4.30 | 6.0 | 1.37 | 4.0 | 5.4 | 0.0 | 11.4 |
| 45 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 15, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 15, Hand washbasin | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 5 | PWH | CU | 20 | 0.80 | 0.48 | 1.52 | 2.10 | 24.0 | 19.01 | 11.3 | 214.5 | 0.0 | 238.5 |
| - Branch acc. SP-No.: 35, 6 | | | | | | | | | | | | | |
| 35 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 0.10 | 0.3 | 5.97 | 3.0 | 18.2 | 0.0 | 18.4 |
| - Branch acc. SP-No.: 36, 47 | | | | | | | | | | | | | |
| 47 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 2.40 | 3.3 | 14.12 | 2.9 | 41.3 | 0.0 | 44.5 |
| 48 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.70 | 7.8 | 2.51 | 2.9 | 7.3 | 0.0 | 15.1 |
| 49 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 16, Hand washbasin | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1.0 | 5.97 | 12.3 | 73.7 | 0.0 | 74.6 |
| - Branch acc. SP-No.: 41, 50 | | | | | | | | | | | | | |
| 50 | PWC | CU | 12 | 0.33 | 0.26 | 1.95 | 2.40 | 45.7 | 15.55 | 38.5 | 599.0 | 0.0 | 644.7 |
| - Branch acc. SP-No.: 51, 101 | | | | | | | | | | | | | |
| 51 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 5.20 | 7.2 | 1.48 | 4.0 | 5.9 | 0.0 | 13.1 |
| 49 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 17, Shower | | | | | | | | | | | | | |
|-----------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 17, Shower | | | | | | | | | | | | | |
|------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30.3 | 0.0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 53 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 2.10 | 5.5 | 15.96 | 3.0 | 48.6 | 0.0 | 54.1 |
| - Branch acc. SP-No.: 65, 54 | | | | | | | | | | | | | |
| 54 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 5.20 | 7.5 | 10.39 | 1.8 | 18.6 | 0.0 | 26.0 |
| 55 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 3.70 | 5.3 | 1.10 | 1.8 | 2.0 | 0.0 | 7.3 |
| - Branch acc. SP-No.: 56, 62 | | | | | | | | | | | | | |
| 56 | PWH | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.7 | 2.65 | 1.5 | 3.9 | 0.0 | 12.6 |
| 57 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 18, Shower | | | | | | | | | | | | | |
|-----------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 59 | PWC | CU | 20 | 0.49 | 0.35 | 1.12 | 2.10 | 13.2 | 15.96 | 8.5 | 135.8 | 0.0 | 149.0 |
| - Branch acc. SP-No.: 60, 69 | | | | | | | | | | | | | |
| 60 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 8.20 | 30.8 | 10.84 | 5.4 | 58.7 | 0.0 | 89.6 |
| - Branch acc. SP-No.: 61, 64, 105 | | | | | | | | | | | | | |
| 61 | PWC | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.9 | 3.36 | 1.9 | 6.5 | 0.0 | 15.4 |
| 57 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 19, Hand washbasin | | | | | | | | | | | | | |
|----------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 19, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30.3 | 0.0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 53 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 2.10 | 5.5 | 15.96 | 3.0 | 48.6 | 0.0 | 54.1 |
| - Branch acc. SP-No.: 65, 54 | | | | | | | | | | | | | |
| 54 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 5.20 | 7.5 | 10.39 | 1.8 | 18.6 | 0.0 | 26.0 |
| 55 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 3.70 | 5.3 | 1.10 | 1.8 | 2.0 | 0.0 | 7.3 |
| - Branch acc. SP-No.: 56, 62 | | | | | | | | | | | | | |
| 62 | PWH | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.0 | 3.13 | 4.4 | 13.8 | 0.0 | 32.8 |
| 63 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 20, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 59 | PWC | CU | 20 | 0.49 | 0.35 | 1.12 | 2.10 | 13.2 | 15.96 | 8.5 | 135.8 | 0.0 | 149.0 |
| - Branch acc. SP-No.: 60, 69 | | | | | | | | | | | | | |
| 60 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 8.20 | 30.8 | 10.84 | 5.4 | 58.7 | 0.0 | 89.6 |
| - Branch acc. SP-No.: 61, 64, 105 | | | | | | | | | | | | | |
| 64 | PWC | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.4 | 3.09 | 5.9 | 18.1 | 0.0 | 37.5 |
| 63 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 21, Sink | | | | | | | | | | | | | |
|-------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 21, Sink | | | | | | | | | | | | | |
|-------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30.3 | 0.0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 53 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 2.10 | 5.5 | 15.96 | 3.0 | 48.6 | 0.0 | 54.1 |
| - Branch acc. SP-No.: 65, 54 | | | | | | | | | | | | | |
| 65 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 2.80 | 0.7 | 15.52 | 0.4 | 5.8 | 0.0 | 6.5 |
| 66 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 0.70 | 0.2 | 1.98 | 0.4 | 0.8 | 0.0 | 0.9 |
| - Branch acc. SP-No.: 67, 71 | | | | | | | | | | | | | |
| 67 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.0 | 1.79 | 0.4 | 0.7 | 0.0 | 2.7 |
| 68 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Sink | | | | | | | | | | | | | |

| Flow path No. 22, Sink | | | | | | | | | | | | | |
|-------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 59 | PWC | CU | 20 | 0.49 | 0.35 | 1.12 | 2.10 | 13.2 | 15.96 | 8.5 | 135.8 | 0.0 | 149.0 |
| - Branch acc. SP-No.: 60, 69 | | | | | | | | | | | | | |
| 69 | PWC | CU | 20 | 0.14 | 0.14 | 0.45 | 2.80 | 2.8 | 17.51 | 1.7 | 29.9 | 0.0 | 32.7 |
| - Branch acc. SP-No.: 70, 73 | | | | | | | | | | | | | |
| 70 | PWC | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.1 | 1.46 | 0.5 | 0.8 | 0.0 | 2.8 |
| 68 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Sink | | | | | | | | | | | | | |

| Flow path No. 23, Dish washer | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 23, Dish washer | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30.3 | 0.0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 53 | PWH | CU | 20 | 0.29 | 0.23 | 0.73 | 2.10 | 5.5 | 15.96 | 3.0 | 48.6 | 0.0 | 54.1 |
| - Branch acc. SP-No.: 65, 54 | | | | | | | | | | | | | |
| 65 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 2.80 | 0.7 | 15.52 | 0.4 | 5.8 | 0.0 | 6.5 |
| 66 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 0.70 | 0.2 | 1.98 | 0.4 | 0.8 | 0.0 | 0.9 |
| - Branch acc. SP-No.: 67, 71 | | | | | | | | | | | | | |
| 71 | PWH | CU | 20 | 0.00 | 0.00 | 0.00 | 7.90 | 0.0 | 1.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| 72 | PWH | - | - | 0.07 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Dish washer | | | | | | | | | | | | | |

| Flow path No. 24, Dish washer | | | | | | | | | | | | | |
|--------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 59 | PWC | CU | 20 | 0.49 | 0.35 | 1.12 | 2.10 | 13.2 | 15.96 | 8.5 | 135.8 | 0.0 | 149.0 |
| - Branch acc. SP-No.: 60, 69 | | | | | | | | | | | | | |
| 69 | PWC | CU | 20 | 0.14 | 0.14 | 0.45 | 2.80 | 2.8 | 17.51 | 1.7 | 29.9 | 0.0 | 32.7 |
| - Branch acc. SP-No.: 70, 73 | | | | | | | | | | | | | |
| 73 | PWC | CU | 20 | 0.07 | 0.07 | 0.22 | 7.90 | 2.0 | 0.90 | 0.5 | 0.5 | 0.0 | 2.4 |
| 72 | PWH | - | - | 0.07 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Dish washer | | | | | | | | | | | | | |

| Flow path No. 25, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |

Section parts per flow path

| Flow path No. 25, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30.3 | 0.0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 74 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 1.10 | 4.8 | 3.40 | 4.8 | 16.4 | 0.0 | 21.3 |
| - Connection on SP-No.: 75 | | | | | | | | | | | | | |
| 75 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 0.70 | 3.1 | 0.22 | 4.8 | 1.1 | 0.0 | 4.2 |
| - Branch acc. SP-No.: 76, 82 | | | | | | | | | | | | | |
| 76 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 2.90 | 4.0 | 0.73 | 2.9 | 2.1 | 0.0 | 6.1 |
| 77 | PWH | CU | 12 | 0.07 | 0.07 | 0.53 | 5.70 | 7.8 | 1.07 | 2.9 | 3.1 | 0.0 | 10.9 |
| 78 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 26, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 79 | PWC | CU | 20 | 0.42 | 0.32 | 1.00 | 1.10 | 5.5 | 3.87 | 7.0 | 27.0 | 0.0 | 32.6 |
| - Branch acc. SP-No.: 80, 85 | | | | | | | | | | | | | |
| 80 | PWC | CU | 12 | 0.20 | 0.15 | 1.13 | 1.20 | 7.7 | 0.87 | 14.8 | 12.9 | 0.0 | 20.5 |
| - Branch acc. SP-No.: 106, 81 | | | | | | | | | | | | | |
| 81 | PWC | CU | 12 | 0.07 | 0.07 | 0.53 | 6.90 | 9.6 | 1.22 | 4.0 | 4.8 | 0.0 | 14.4 |
| 78 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 27, Sink | | | | | | | | | | | | | |
|------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30.3 | 0.0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 74 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 1.10 | 4.8 | 3.40 | 4.8 | 16.4 | 0.0 | 21.3 |
| - Connection on SP-No.: 75 | | | | | | | | | | | | | |
| 75 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 0.70 | 3.1 | 0.22 | 4.8 | 1.1 | 0.0 | 4.2 |
| - Branch acc. SP-No.: 76, 82 | | | | | | | | | | | | | |
| 82 | PWH | CU | 20 | 0.32 | 0.25 | 0.80 | 1.70 | 5.4 | 1.03 | 3.6 | 3.7 | 0.0 | 9.1 |
| - Branch acc. SP-No.: 87, 83 | | | | | | | | | | | | | |
| 83 | PWH | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.0 | 1.52 | 0.4 | 0.6 | 0.0 | 2.6 |
| 84 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Sink | | | | | | | | | | | | | |

| Flow path No. 28, Sink | | | | | | | | | | | | | |
|------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 79 | PWC | CU | 20 | 0.42 | 0.32 | 1.00 | 1.10 | 5.5 | 3.87 | 7.0 | 27.0 | 0.0 | 32.6 |
| - Branch acc. SP-No.: 80, 85 | | | | | | | | | | | | | |
| 85 | PWC | CU | 20 | 0.22 | 0.17 | 0.54 | 1.70 | 2.5 | 1.03 | 2.4 | 2.5 | 0.0 | 5.0 |
| - Branch acc. SP-No.: 89, 86 | | | | | | | | | | | | | |
| 86 | PWC | CU | 20 | 0.07 | 0.07 | 0.22 | 8.40 | 2.1 | 1.66 | 0.5 | 0.9 | 0.0 | 3.0 |
| 84 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Sink | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 29, Washing machine | | | | | | | | | | | | | |
|---------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 4 | PWH | CU | 20 | 1.48 | 0.65 | 2.08 | 1.20 | 25.6 | 3.08 | 19.8 | 61.0 | 0.0 | 86.6 |
| - Branch acc. SP-No.: 52, 5 | | | | | | | | | | | | | |
| 52 | PWH | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 0.9 | 3.18 | 9.5 | 30.3 | 0.0 | 31.2 |
| - Branch acc. SP-No.: 53, 74 | | | | | | | | | | | | | |
| 74 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 1.10 | 4.8 | 3.40 | 4.8 | 16.4 | 0.0 | 21.3 |
| - Connection on SP-No.: 75 | | | | | | | | | | | | | |
| 75 | PWH | CU | 20 | 0.39 | 0.30 | 0.95 | 0.70 | 3.1 | 0.22 | 4.8 | 1.1 | 0.0 | 4.2 |
| - Branch acc. SP-No.: 76, 82 | | | | | | | | | | | | | |
| 82 | PWH | CU | 20 | 0.32 | 0.25 | 0.80 | 1.70 | 5.4 | 1.03 | 3.6 | 3.7 | 0.0 | 9.1 |
| - Branch acc. SP-No.: 87, 83 | | | | | | | | | | | | | |
| 87 | PWH | CU | 20 | 0.25 | 0.25 | 0.80 | 7.90 | 24.6 | 0.86 | 3.5 | 3.0 | 0.0 | 27.6 |
| 88 | PWH | - | - | 0.40 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Washing machine | | | | | | | | | | | | | |

| Flow path No. 30, Washing machine | | | | | | | | | | | | | |
|---------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 79 | PWC | CU | 20 | 0.42 | 0.32 | 1.00 | 1.10 | 5.5 | 3.87 | 7.0 | 27.0 | 0.0 | 32.6 |
| - Branch acc. SP-No.: 80, 85 | | | | | | | | | | | | | |
| 85 | PWC | CU | 20 | 0.22 | 0.17 | 0.54 | 1.70 | 2.5 | 1.03 | 2.4 | 2.5 | 0.0 | 5.0 |
| - Branch acc. SP-No.: 89, 86 | | | | | | | | | | | | | |
| 89 | PWC | CU | 20 | 0.15 | 0.15 | 0.48 | 7.90 | 9.0 | 0.96 | 1.9 | 1.9 | 0.0 | 10.9 |
| 88 | PWH | - | - | 0.40 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Washing machine | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 31, Shower | | | | | | | | | | | | | |
|---------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 90 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 3.78 | 1.8 | 6.8 | 0.0 | 10.6 |
| 91 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 2.48 | 1.8 | 4.4 | 0.0 | 8.3 |
| - Branch acc. SP-No.: 92, 96 | | | | | | | | | | | | | |
| 92 | PWH | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.7 | 3.18 | 1.5 | 4.7 | 0.0 | 13.4 |
| 93 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 32, Shower | | | | | | | | | | | | | |
|-----------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 94 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 4.70 | 17.7 | 6.41 | 5.4 | 34.8 | 0.0 | 52.4 |
| - Branch acc. SP-No.: 95, 98, 107 | | | | | | | | | | | | | |
| 95 | PWC | PE-X | 20 | 0.15 | 0.15 | 0.48 | 7.80 | 8.9 | 3.77 | 1.9 | 7.3 | 0.0 | 16.2 |
| 93 | PWH | - | - | 0.30 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Shower | | | | | | | | | | | | | |

| Flow path No. 33, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 2 | PWC | CU | 20 | 1.70 | 0.70 | 2.22 | 2.00 | 49.3 | 0.44 | 28.4 | 12.5 | 200.0 | 261.8 |
| - Connection on SP-No.: 3 | | | | | | | | | | | | | |
| 3 | PWH | CU | 20 | 1.70 | 0.70 | 2.22 | 1.00 | 24.2 | 1.51 | 22.2 | 33.6 | 0.0 | 57.8 |
| - Branch acc. SP-No.: 90, 4 | | | | | | | | | | | | | |
| 90 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 3.78 | 1.8 | 6.8 | 0.0 | 10.6 |
| 91 | PWH | CU | 20 | 0.22 | 0.17 | 0.54 | 2.70 | 3.9 | 2.48 | 1.8 | 4.4 | 0.0 | 8.3 |
| - Branch acc. SP-No.: 92, 96 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 33, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 96 | PWH | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.0 | 3.68 | 4.4 | 16.3 | 0.0 | 35.3 |
| 97 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 34, Hand washbasin | | | | | | | | | | | | | |
|-----------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 94 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 4.70 | 17.7 | 6.41 | 5.4 | 34.8 | 0.0 | 52.4 |
| - Branch acc. SP-No.: 95, 98, 107 | | | | | | | | | | | | | |
| 98 | PWC | PE-X | 12 | 0.07 | 0.07 | 0.62 | 10.10 | 19.4 | 3.75 | 5.9 | 22.0 | 0.0 | 41.4 |
| 97 | PWH | - | - | 0.14 | - | 0.00 | 0.00 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 |
| - At outlet armature: Hand washbasin | | | | | | | | | | | | | |

| Flow path No. 35, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68.5 | 0.0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 17 | PWC | CU | 20 | 0.62 | 0.41 | 1.31 | 0.10 | 0.9 | 0.71 | 11.2 | 7.9 | 0.0 | 8.7 |
| - Branch acc. SP-No.: 26, 18 | | | | | | | | | | | | | |
| 18 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 6.70 | 25.2 | 11.49 | 5.4 | 62.2 | 0.0 | 87.4 |
| - Branch acc. SP-No.: 19, 22, 99 | | | | | | | | | | | | | |
| 99 | PWC | PE-X | 12 | 0.13 | 0.13 | 1.15 | 10.10 | 66.8 | 4.07 | 17.3 | 70.3 | 0.0 | 137.0 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

| Flow path No. 36, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |

Section parts per flow path

| Flow path No. 36, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 16 | PWC | CU | 20 | 0.77 | 0.47 | 1.49 | 1.10 | 12.2 | 4.88 | 14.0 | 68.5 | 0.0 | 80.7 |
| - Branch acc. SP-No.: 17, 34 | | | | | | | | | | | | | |
| 17 | PWC | CU | 20 | 0.62 | 0.41 | 1.31 | 0.10 | 0.9 | 0.71 | 11.2 | 7.9 | 0.0 | 8.7 |
| - Branch acc. SP-No.: 26, 18 | | | | | | | | | | | | | |
| 26 | PWC | CU | 12 | 0.27 | 0.21 | 1.61 | 1.20 | 15.6 | 0.71 | 27.6 | 19.7 | 0.0 | 35.3 |
| - Branch acc. SP-No.: 31, 27 | | | | | | | | | | | | | |
| 27 | PWC | CU | 12 | 0.20 | 0.15 | 1.13 | 0.90 | 5.8 | 0.66 | 14.8 | 9.8 | 0.0 | 15.6 |
| - Branch acc. SP-No.: 28, 100 | | | | | | | | | | | | | |
| 100 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.70 | 27.4 | 2.18 | 11.5 | 25.1 | 0.0 | 52.5 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

| Flow path No. 37, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1.0 | 5.97 | 12.3 | 73.7 | 0.0 | 74.6 |
| - Branch acc. SP-No.: 41, 50 | | | | | | | | | | | | | |
| 50 | PWC | CU | 12 | 0.33 | 0.26 | 1.95 | 2.40 | 45.7 | 15.55 | 38.5 | 599.0 | 0.0 | 644.7 |
| - Branch acc. SP-No.: 51, 101 | | | | | | | | | | | | | |
| 101 | PWC | CU | 12 | 0.26 | 0.21 | 1.55 | 0.90 | 10.8 | 0.35 | 25.7 | 9.1 | 0.0 | 19.9 |
| - Branch acc. SP-No.: 103, 102 | | | | | | | | | | | | | |
| 102 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.70 | 27.4 | 2.57 | 11.5 | 29.7 | 0.0 | 57.1 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

| Flow path No. 38, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |

Section parts per flow path

| Flow path No. 38, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1.0 | 5.97 | 12.3 | 73.7 | 0.0 | 74.6 |
| - Branch acc. SP-No.: 41, 50 | | | | | | | | | | | | | |
| 50 | PWC | CU | 12 | 0.33 | 0.26 | 1.95 | 2.40 | 45.7 | 15.55 | 38.5 | 599.0 | 0.0 | 644.7 |
| - Branch acc. SP-No.: 51, 101 | | | | | | | | | | | | | |
| 101 | PWC | CU | 12 | 0.26 | 0.21 | 1.55 | 0.90 | 10.8 | 0.35 | 25.7 | 9.1 | 0.0 | 19.9 |
| - Branch acc. SP-No.: 103, 102 | | | | | | | | | | | | | |
| 103 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.20 | 25.0 | 2.05 | 11.5 | 23.6 | 0.0 | 48.6 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

| Flow path No. 39, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 15 | PWC | CU | 20 | 1.45 | 0.65 | 2.06 | 2.30 | 49.0 | 19.01 | 24.9 | 474.0 | 0.0 | 523.0 |
| - Branch acc. SP-No.: 40, 16 | | | | | | | | | | | | | |
| 40 | PWC | CU | 20 | 0.68 | 0.44 | 1.39 | 0.10 | 1.0 | 5.97 | 12.3 | 73.7 | 0.0 | 74.6 |
| - Branch acc. SP-No.: 41, 50 | | | | | | | | | | | | | |
| 41 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 2.20 | 8.3 | 4.25 | 5.4 | 23.0 | 0.0 | 31.3 |
| - Branch acc. SP-No.: 42, 46 | | | | | | | | | | | | | |
| 42 | PWC | CU | 20 | 0.28 | 0.22 | 0.71 | 0.70 | 1.8 | 0.27 | 3.8 | 1.0 | 0.0 | 2.8 |
| - Branch acc. SP-No.: 43, 104 | | | | | | | | | | | | | |
| 104 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 4.30 | 20.6 | 1.89 | 11.5 | 21.8 | 0.0 | 42.4 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

| Flow path No. 40, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |

Section parts per flow path

| Flow path No. 40, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 59 | PWC | CU | 20 | 0.49 | 0.35 | 1.12 | 2.10 | 13.2 | 15.96 | 8.5 | 135.8 | 0.0 | 149.0 |
| - Branch acc. SP-No.: 60, 69 | | | | | | | | | | | | | |
| 60 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 8.20 | 30.8 | 10.84 | 5.4 | 58.7 | 0.0 | 89.6 |
| - Branch acc. SP-No.: 61, 64, 105 | | | | | | | | | | | | | |
| 105 | PWC | PE-X | 12 | 0.13 | 0.13 | 1.15 | 10.10 | 66.8 | 2.70 | 17.3 | 46.5 | 0.0 | 113.3 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

| Flow path No. 41, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 14 | PWC | CU | 25 | 2.36 | 0.80 | 1.63 | 2.00 | 26.7 | 3.08 | 12.5 | 38.5 | 0.0 | 65.2 |
| - Branch acc. SP-No.: 58, 15 | | | | | | | | | | | | | |
| 58 | PWC | CU | 20 | 0.91 | 0.51 | 1.64 | 0.30 | 4.0 | 2.98 | 16.5 | 49.2 | 0.0 | 53.3 |
| - Branch acc. SP-No.: 59, 79 | | | | | | | | | | | | | |
| 79 | PWC | CU | 20 | 0.42 | 0.32 | 1.00 | 1.10 | 5.5 | 3.87 | 7.0 | 27.0 | 0.0 | 32.6 |
| - Branch acc. SP-No.: 80, 85 | | | | | | | | | | | | | |
| 80 | PWC | CU | 12 | 0.20 | 0.15 | 1.13 | 1.20 | 7.7 | 0.87 | 14.8 | 12.9 | 0.0 | 20.5 |
| - Branch acc. SP-No.: 106, 81 | | | | | | | | | | | | | |
| 106 | PWC | CU | 12 | 0.13 | 0.13 | 0.98 | 5.70 | 27.4 | 1.86 | 11.5 | 21.4 | 0.0 | 48.8 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

| Flow path No. 42, Toilet with flushing tank | | | | | | | | | | | | | |
|----------------------------------------------------|------|----------|----|---------------------|--------------|----------|----------------|----------|--------|------------|--------------|-------------------------|-------------------------|
| Sp. No. | Type | Material | DN | ΣQ_r l/s | Q_s l/s | w m/s | $\Sigma \zeta$ | Z hPa | L m | R hPa/m | R • L hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 1 | PWC | CU | 25 | 4.41 | 1.02 | 2.08 | 1.70 | 36.9 | 1.40 | 19.2 | 27.0 | 0.0 | 63.9 |
| - Branch acc. SP-No.: 13, 2 | | | | | | | | | | | | | |
| 13 | PWC | CU | 25 | 2.71 | 0.85 | 1.73 | 0.70 | 10.5 | 0.49 | 13.8 | 6.8 | 0.0 | 17.2 |
| - Branch acc. SP-No.: 14, 94 | | | | | | | | | | | | | |
| 94 | PWC | CU | 20 | 0.35 | 0.27 | 0.87 | 4.70 | 17.7 | 6.41 | 5.4 | 34.8 | 0.0 | 52.4 |
| - Branch acc. SP-No.: 95, 98, 107 | | | | | | | | | | | | | |
| 107 | PWC | PE-X | 12 | 0.13 | 0.13 | 1.15 | 10.10 | 66.8 | 3.35 | 17.3 | 57.8 | 0.0 | 124.6 |
| - At outlet armature: Toilet with flushing tank | | | | | | | | | | | | | |

Hot water circulation system No. 1

Permitted velocity: 0.50 m/s

Minimum dimension: 12

Regular operation

Temp.of storage tank: 60.0 °C

Permitted temperature difference: 5.0 °C

Heat flow rate through pipe wall with 60.0/55.0°C: $Q = 1822 \text{ W}$

Thermal disinfection

Temp.of storage tank: 75.0 °C

Permitted temperature difference: 5.0 °C

Heat flow rate through pipe wall with 75.0/70.0°C: $Q = 2391 \text{ W}$

Most unfavorable flow path

Flow path no.6/ No.6 (therm. disinfection)

The HW circulation system contains

- 9 Flow paths
- 17 Section parts
- 81 Components
- Amount pumps: 0
- Amount Control valves: 0
- Amount Backflow preventers: 0

Total of pipe lengths

- HW Supply and circulation: 232.2 m

min/ max flow path lengths:

- from 10.5 to 87.3 m

min/ max nom. diameters:

- from DN 12 to DN 20

System volume

- Volume (HW/C): 53.4 liter / Volume (C): 19.7 liter

Hot water circulation - Pressure balance sheet of flow paths

| Flow paths | | | | | | | | | |
|-------------------------------------------|--------|-------------------|--------------|----------|-------------------------|---------------------------|-------------------------|--------------------------|----------------------------|
| Ar. No. | L m | \dot{m} kg/h | R • L hPa | Z hPa | Δp_{arm} hPa | Δp_{valve} hPa | Δp_{tot} hPa | Δp_{pump} hPa | $\Delta p_{resid.}$ hPa |
| Hot water circulation system No. 1 | | | | | | | | | |
| 1 | 10.5 | 12.4 | 3.0 | 1.4 | 0.0 | 0.0 | 4.4 | 0.0 | -4.4 |
| 2 | 24.1 | 16.8 | 13.9 | 4.4 | 0.0 | 0.0 | 18.4 | 0.0 | -18.4 |
| 3 | 64.6 | 21.4 | 25.8 | 5.0 | 0.0 | 0.0 | 30.8 | 0.0 | -30.8 |
| 4 | 78.9 | 57.7 | 33.6 | 6.9 | 0.0 | 0.0 | 40.5 | 0.0 | -40.5 |
| 5 | 22.3 | 16.8 | 13.9 | 4.4 | 0.0 | 0.0 | 18.3 | 0.0 | -18.3 |
| 6 | 79.7 | 89.7 | 39.2 | 10.1 | 0.0 | 0.0 | 49.4 | 0.0 | -49.4 |
| 7 | 87.3 | 50.6 | 31.0 | 5.5 | 0.0 | 0.0 | 36.5 | 0.0 | -36.5 |
| 8 | 68.8 | 65.3 | 32.9 | 7.3 | 0.0 | 0.0 | 40.2 | 0.0 | -40.2 |
| 9 | 57.1 | 89.7 | 32.8 | 7.8 | 0.0 | 0.0 | 40.6 | 0.0 | -40.6 |

Hot water circulation - Pressure losses of section parts

| Circulation section parts | | | | | | | | | | | |
|-------------------------------------------|-------|----|-------------------|----------|--------|-------------|--------------|---------|----------|-------------------------|-------------------------|
| No. | Type | DN | \dot{m} kg/h | w m/s | L m | R hPa /m | R * l hPa | ζ | Z hPa | Δp_{app} hPa | Δp_{tot} hPa |
| Hot water circulation system No. 1 | | | | | | | | | | | |
| 108 | PWH-C | 20 | 420.4 | 0.4 | 1.5 | 1.0 | 1.5 | 1.00 | 0.7 | 0.0 | 2.2 |
| 109 | PWH-C | 12 | 12.4 | 0.0 | 3.7 | 0.0 | 0.1 | 7.90 | 0.0 | 0.0 | 0.1 |
| 110 | PWH-C | 20 | 408.0 | 0.4 | 3.1 | 0.9 | 2.8 | 1.50 | 1.0 | 0.0 | 3.8 |
| 111 | PWH-C | 12 | 156.6 | 0.3 | 3.4 | 1.3 | 4.5 | 2.00 | 1.1 | 0.0 | 5.6 |
| 114 | PWH-C | 20 | 251.4 | 0.2 | 19.0 | 0.4 | 7.4 | 4.00 | 1.0 | 0.0 | 8.4 |
| 112 | PWH-C | 12 | 33.5 | 0.1 | 3.1 | 0.1 | 0.3 | 3.60 | 0.1 | 0.0 | 0.4 |
| 117 | PWH-C | 12 | 123.0 | 0.3 | 16.0 | 0.9 | 14.0 | 5.30 | 1.8 | 0.0 | 15.8 |
| 115 | PWH-C | 12 | 71.9 | 0.2 | 6.0 | 0.3 | 2.1 | 2.00 | 0.2 | 0.0 | 2.3 |
| 120 | PWH-C | 12 | 179.5 | 0.4 | 5.0 | 1.7 | 8.4 | 3.70 | 2.6 | 0.0 | 11.0 |
| 113 | PWH-C | 12 | 16.8 | 0.0 | 0.9 | 0.0 | 0.0 | 5.00 | 0.0 | 0.0 | 0.1 |
| 119 | PWH-C | 12 | 16.8 | 0.0 | 0.1 | 0.0 | 0.0 | 1.70 | 0.0 | 0.0 | 0.0 |
| 118 | PWH-C | 12 | 57.7 | 0.1 | 15.7 | 0.2 | 3.8 | 8.50 | 0.6 | 0.0 | 4.4 |
| 123 | PWH-C | 12 | 65.3 | 0.1 | 10.8 | 0.3 | 3.2 | 10.20 | 1.0 | 0.0 | 4.1 |
| 116 | PWH-C | 12 | 21.4 | 0.0 | 2.7 | 0.0 | 0.1 | 1.70 | 0.0 | 0.0 | 0.1 |
| 122 | PWH-C | 12 | 50.6 | 0.1 | 14.1 | 0.2 | 2.7 | 6.70 | 0.4 | 0.0 | 3.1 |
| 121 | PWH-C | 12 | 89.7 | 0.2 | 11.5 | 0.5 | 5.8 | 13.50 | 2.4 | 0.0 | 8.2 |
| 124 | PWH-C | 12 | 89.7 | 0.2 | 0.1 | 0.5 | 0.0 | 1.70 | 0.3 | 0.0 | 0.3 |
| 3 | PWH | 20 | 420.4 | 0.4 | 1.5 | 0.9 | 1.4 | 1.00 | 0.7 | 0.0 | 2.1 |
| 90 | PWH | 20 | 12.4 | 0.0 | 3.8 | 0.0 | 0.0 | 2.70 | 0.0 | 0.0 | 0.0 |
| 4 | PWH | 20 | 408.0 | 0.4 | 3.1 | 0.9 | 2.8 | 1.20 | 0.8 | 0.0 | 3.6 |
| 52 | PWH | 20 | 156.6 | 0.1 | 3.2 | 0.2 | 0.5 | 0.10 | 0.0 | 0.0 | 0.6 |
| 74 | PWH | 20 | 33.5 | 0.0 | 3.4 | 0.0 | 0.0 | 1.10 | 0.0 | 0.0 | 0.1 |
| 75 | PWH | 20 | 16.8 | 0.0 | 0.2 | 0.0 | 0.0 | 0.70 | 0.0 | 0.0 | 0.0 |
| 76 | PWH | 12 | 16.8 | 0.0 | 0.7 | 0.0 | 0.0 | 2.90 | 0.0 | 0.0 | 0.0 |
| 5 | PWH | 20 | 251.4 | 0.2 | 19.0 | 0.4 | 7.4 | 2.10 | 0.5 | 0.0 | 7.9 |
| 35 | PWH | 20 | 71.9 | 0.1 | 6.0 | 0.1 | 0.3 | 0.10 | 0.0 | 0.0 | 0.3 |
| 36 | PWH | 20 | 21.4 | 0.0 | 2.8 | 0.0 | 0.0 | 2.20 | 0.0 | 0.0 | 0.0 |
| 53 | PWH | 20 | 123.0 | 0.1 | 16.0 | 0.1 | 1.8 | 2.10 | 0.1 | 0.0 | 1.9 |
| 65 | PWH | 20 | 57.7 | 0.1 | 15.5 | 0.0 | 0.5 | 2.80 | 0.0 | 0.0 | 0.5 |

Hot water circulation - Pressure losses of section parts

| Circulation section parts | | | | | | | | | | | |
|---------------------------|------|----|-------------------|----------|--------|-------------|--------------|---------|----------|-------------------------|-------------------------|
| No. | Type | DN | \dot{m} kg/h | w m/s | L m | R hPa /m | R * l hPa | ζ | Z hPa | Δp_{app} hPa | Δp_{tot} hPa |
| 6 | PWH | 20 | 179.5 | 0.2 | 4.9 | 0.2 | 1.1 | 1.10 | 0.1 | 0.0 | 1.2 |
| 7 | PWH | 20 | 89.7 | 0.1 | 0.1 | 0.1 | 0.0 | 0.70 | 0.0 | 0.0 | 0.0 |
| 8 | PWH | 20 | 89.7 | 0.1 | 0.9 | 0.1 | 0.1 | 0.10 | 0.0 | 0.0 | 0.1 |
| 9 | PWH | 20 | 89.7 | 0.1 | 10.1 | 0.1 | 0.7 | 4.70 | 0.1 | 0.0 | 0.8 |
| 47 | PWH | 12 | 50.6 | 0.1 | 14.1 | 0.2 | 2.7 | 2.40 | 0.1 | 0.0 | 2.8 |
| 54 | PWH | 20 | 65.3 | 0.1 | 10.4 | 0.0 | 0.4 | 5.20 | 0.1 | 0.0 | 0.5 |

Hot water circulation - Heat losses of flow paths

| Circulation and flow paths | | | | | | | | | | | | |
|------------------------------------------------------------|-------|----|------------------------|-------------|-----------|--------|---------|------------|----------------------|----------------------|---------|--|
| Sp. No. | Type | DN | t _{iso} mm | λ W/(mK) | q̇ W/m | L m | Q̇ H | ṁ kg/h | T ₁ °C | T ₂ °C | ΔT C | |
| Flow path No. 1, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 90 | PWH | 20 | 30 | 0.040 | 8.8 | 3.8 | 33.3 | 12.4 | 60.0 | 57.7 | 2.3 | |
| 109 | PWH-C | 12 | 30 | 0.040 | 6.9 | 3.7 | 25.9 | 12.4 | 57.7 | 55.9 | 1.8 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 2, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 52 | PWH | 20 | 30 | 0.040 | 8.9 | 3.2 | 28.2 | 156.6 | 59.9 | 59.8 | 0.2 | |
| 74 | PWH | 20 | 30 | 0.040 | 8.8 | 3.4 | 30.0 | 33.5 | 59.8 | 59.0 | 0.8 | |
| 75 | PWH | 20 | 30 | 0.040 | 8.7 | 0.2 | 1.9 | 16.8 | 59.0 | 58.9 | 0.1 | |
| 76 | PWH | 12 | 30 | 0.040 | 7.2 | 0.7 | 5.2 | 16.8 | 58.9 | 58.6 | 0.3 | |
| 113 | PWH-C | 12 | 30 | 0.040 | 7.1 | 0.9 | 6.3 | 16.8 | 58.6 | 58.3 | 0.3 | |
| 112 | PWH-C | 12 | 30 | 0.040 | 7.1 | 3.1 | 22.0 | 33.5 | 58.6 | 58.1 | 0.6 | |
| 111 | PWH-C | 12 | 30 | 0.040 | 6.7 | 3.4 | 22.7 | 156.6 | 55.8 | 55.7 | 0.1 | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 3, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 5 | PWH | 20 | 30 | 0.040 | 8.9 | 19.0 | 168.3 | 251.4 | 59.9 | 59.3 | 0.6 | |
| 35 | PWH | 20 | 30 | 0.040 | 8.8 | 6.0 | 52.3 | 71.9 | 59.3 | 58.7 | 0.6 | |
| 36 | PWH | 20 | 30 | 0.040 | 8.7 | 2.8 | 24.6 | 21.4 | 58.7 | 57.7 | 1.0 | |
| 116 | PWH-C | 12 | 30 | 0.040 | 7.0 | 2.7 | 18.7 | 21.4 | 57.7 | 57.0 | 0.8 | |
| 115 | PWH-C | 12 | 30 | 0.040 | 6.7 | 6.0 | 40.0 | 71.9 | 55.8 | 55.4 | 0.5 | |
| 114 | PWH-C | 20 | 30 | 0.040 | 8.4 | 19.0 | 159.6 | 251.4 | 57.3 | 56.8 | 0.5 | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 4, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |

Hot water circulation - Heat losses of flow paths

| Circulation and flow paths | | | | | | | | | | | | |
|------------------------------------------------------------|-------|----|------------------------|-------------|-----------|--------|---------|------------|----------------------|----------------------|---------|--|
| Sp. No. | Type | DN | t _{iso} mm | λ W/(mK) | q̇ W/m | L m | Q̇ H | ṁ kg/h | T ₁ °C | T ₂ °C | ΔT C | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 52 | PWH | 20 | 30 | 0.040 | 8.9 | 3.2 | 28.2 | 156.6 | 59.9 | 59.8 | 0.2 | |
| 53 | PWH | 20 | 30 | 0.040 | 8.8 | 16.0 | 140.4 | 123.0 | 59.8 | 58.8 | 1.0 | |
| 65 | PWH | 20 | 30 | 0.040 | 8.6 | 15.5 | 133.0 | 57.7 | 58.8 | 56.8 | 2.0 | |
| 118 | PWH-C | 12 | 30 | 0.040 | 6.8 | 15.7 | 106.4 | 57.7 | 56.8 | 55.2 | 1.6 | |
| 117 | PWH-C | 12 | 30 | 0.040 | 6.7 | 16.0 | 106.9 | 123.0 | 56.0 | 55.2 | 0.7 | |
| 111 | PWH-C | 12 | 30 | 0.040 | 6.7 | 3.4 | 22.7 | 156.6 | 55.8 | 55.7 | 0.1 | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 5, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 52 | PWH | 20 | 30 | 0.040 | 8.9 | 3.2 | 28.2 | 156.6 | 59.9 | 59.8 | 0.2 | |
| 74 | PWH | 20 | 30 | 0.040 | 8.8 | 3.4 | 30.0 | 33.5 | 59.8 | 59.0 | 0.8 | |
| 119 | PWH-C | 12 | 30 | 0.040 | 7.2 | 0.1 | 0.4 | 16.8 | 59.0 | 59.0 | 0.0 | |
| 112 | PWH-C | 12 | 30 | 0.040 | 7.1 | 3.1 | 22.0 | 33.5 | 58.6 | 58.1 | 0.6 | |
| 111 | PWH-C | 12 | 30 | 0.040 | 6.7 | 3.4 | 22.7 | 156.6 | 55.8 | 55.7 | 0.1 | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 6, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 5 | PWH | 20 | 30 | 0.040 | 8.9 | 19.0 | 168.3 | 251.4 | 59.9 | 59.3 | 0.6 | |
| 6 | PWH | 20 | 30 | 0.040 | 8.8 | 4.9 | 42.9 | 179.5 | 59.3 | 59.1 | 0.2 | |
| 7 | PWH | 20 | 30 | 0.040 | 8.7 | 0.1 | 1.3 | 89.7 | 59.1 | 59.1 | 0.0 | |
| 8 | PWH | 20 | 30 | 0.040 | 8.7 | 0.9 | 7.9 | 89.7 | 59.1 | 59.0 | 0.1 | |
| 9 | PWH | 20 | 30 | 0.040 | 8.7 | 10.1 | 87.6 | 89.7 | 59.0 | 58.2 | 0.8 | |
| 121 | PWH-C | 12 | 30 | 0.040 | 7.0 | 11.5 | 80.4 | 89.7 | 58.2 | 57.4 | 0.8 | |
| 120 | PWH-C | 12 | 30 | 0.040 | 7.1 | 5.0 | 35.3 | 179.5 | 58.3 | 58.1 | 0.2 | |
| 114 | PWH-C | 20 | 30 | 0.040 | 8.4 | 19.0 | 159.6 | 251.4 | 57.3 | 56.8 | 0.5 | |

Hot water circulation - Heat losses of flow paths

| Circulation and flow paths | | | | | | | | | | | | |
|------------------------------------------------------------|-------|----|------------------------|-------------|-----------|--------|---------|------------|----------------------|----------------------|---------|--|
| Sp. No. | Type | DN | t _{iso} mm | λ W/(mK) | q̇ W/m | L m | Q̇ H | ṁ kg/h | T ₁ °C | T ₂ °C | ΔT C | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 7, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 5 | PWH | 20 | 30 | 0.040 | 8.9 | 19.0 | 168.3 | 251.4 | 59.9 | 59.3 | 0.6 | |
| 35 | PWH | 20 | 30 | 0.040 | 8.8 | 6.0 | 52.3 | 71.9 | 59.3 | 58.7 | 0.6 | |
| 47 | PWH | 12 | 30 | 0.040 | 7.1 | 14.1 | 100.5 | 50.6 | 58.7 | 57.0 | 1.7 | |
| 122 | PWH-C | 12 | 30 | 0.040 | 6.9 | 14.1 | 96.8 | 50.6 | 57.0 | 55.4 | 1.6 | |
| 115 | PWH-C | 12 | 30 | 0.040 | 6.7 | 6.0 | 40.0 | 71.9 | 55.8 | 55.4 | 0.5 | |
| 114 | PWH-C | 20 | 30 | 0.040 | 8.4 | 19.0 | 159.6 | 251.4 | 57.3 | 56.8 | 0.5 | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 8, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 52 | PWH | 20 | 30 | 0.040 | 8.9 | 3.2 | 28.2 | 156.6 | 59.9 | 59.8 | 0.2 | |
| 53 | PWH | 20 | 30 | 0.040 | 8.8 | 16.0 | 140.4 | 123.0 | 59.8 | 58.8 | 1.0 | |
| 54 | PWH | 20 | 30 | 0.040 | 8.6 | 10.4 | 89.4 | 65.3 | 58.8 | 57.6 | 1.2 | |
| 123 | PWH-C | 12 | 30 | 0.040 | 6.9 | 10.8 | 74.4 | 65.3 | 57.6 | 56.6 | 1.0 | |
| 117 | PWH-C | 12 | 30 | 0.040 | 6.7 | 16.0 | 106.9 | 123.0 | 56.0 | 55.2 | 0.7 | |
| 111 | PWH-C | 12 | 30 | 0.040 | 6.7 | 3.4 | 22.7 | 156.6 | 55.8 | 55.7 | 0.1 | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |
| Flow path No. 9, Hot water circulation system No. 1 | | | | | | | | | | | | |
| 3 | PWH | 20 | 30 | 0.040 | 8.9 | 1.5 | 13.4 | 420.4 | 60.0 | 60.0 | 0.0 | |
| 4 | PWH | 20 | 30 | 0.040 | 8.9 | 3.1 | 27.3 | 408.0 | 60.0 | 59.9 | 0.1 | |
| 5 | PWH | 20 | 30 | 0.040 | 8.9 | 19.0 | 168.3 | 251.4 | 59.9 | 59.3 | 0.6 | |
| 6 | PWH | 20 | 30 | 0.040 | 8.8 | 4.9 | 42.9 | 179.5 | 59.3 | 59.1 | 0.2 | |
| 124 | PWH-C | 12 | 30 | 0.040 | 7.2 | 0.1 | 0.4 | 89.7 | 59.1 | 59.1 | 0.0 | |

Hot water circulation - Heat losses of flow paths

| Circulation and flow paths | | | | | | | | | | | | |
|----------------------------|-------|----|------------------------|-------------|------------------|--------|----------------|-------------------|----------------------|----------------------|---------|--|
| Sp. No. | Type | DN | t _{iso} mm | λ W/(mK) | \dot{q} W/m | L m | \dot{Q} H | \dot{m} kg/h | T ₁ °C | T ₂ °C | ΔT C | |
| 120 | PWH-C | 12 | 30 | 0.040 | 7.1 | 5.0 | 35.3 | 179.5 | 58.3 | 58.1 | 0.2 | |
| 114 | PWH-C | 20 | 30 | 0.040 | 8.4 | 19.0 | 159.6 | 251.4 | 57.3 | 56.8 | 0.5 | |
| 110 | PWH-C | 20 | 30 | 0.040 | 8.2 | 3.1 | 25.4 | 408.0 | 56.4 | 56.3 | 0.1 | |
| 108 | PWH-C | 20 | 30 | 0.040 | 8.2 | 1.5 | 12.4 | 420.4 | 56.3 | 56.3 | 0.0 | |

Ejection times of hot water consumers

| Name | | | | | | | | |
|-----------------------------------------------------|-----------------|--------|----------|-------------------|-------------------------|-----------|--------------------------|-----------|
| Review label: Judgement AG Schöneberg (102 C 55/94) | | | | | | | | |
| Testing temp. [°C]: 45 | | | | | | | | |
| Test. Period [s]: 15 | | | | | | | | |
| Fl.p. No. | Consumer | L m | Q l/s | Pipe- volume l | T _{test} °C | Time s | T _{stat.} °C | Time s |
| 1 | Hand washbasin | 5.3 | 0.07 | 0.9 | 45.0 | 13.3 | 59.9 | 16.6 |
| 3 | Shower | 4.6 | 0.15 | 1.5 | 45.0 | 10.2 | 59.9 | 12.1 |
| 5 | Hand washbasin | 1.9 | 0.07 | 0.2 | 45.0 | 3.6 | 60.0 | 4.0 |
| 7 | Hand washbasin | 1.2 | 0.07 | 0.2 | 45.0 | 2.3 | 60.0 | 2.4 |
| 9 | Bathtub | 2.4 | 0.15 | 0.8 | 45.0 | 5.0 | 60.0 | 5.2 |
| 11 | Shower | 3.5 | 0.15 | 1.1 | 45.0 | 7.5 | 59.9 | 8.3 |
| 13 | Hand washbasin | 2.2 | 0.07 | 0.5 | 45.0 | 7.1 | 59.9 | 8.8 |
| 15 | Hand washbasin | 2.5 | 0.07 | 0.3 | 45.0 | 4.8 | 59.9 | 4.9 |
| 17 | Shower | 3.7 | 0.15 | 1.2 | 45.0 | 8.5 | 59.9 | 10.8 |
| 19 | Hand washbasin | 4.2 | 0.07 | 0.7 | 45.0 | 11.1 | 59.9 | 14.4 |
| 21 | Sink | 3.8 | 0.07 | 1.2 | 45.0 | 17.1 | 59.9 | 18.1 |
| 25 | Hand washbasin | 1.1 | 0.07 | 0.1 | 45.0 | 2.0 | 60.0 | 2.2 |
| 27 | Sink | 2.5 | 0.07 | 0.8 | 45.0 | 11.4 | 59.9 | 12.1 |
| 29 | Washing machine | 1.9 | 0.25 | 0.6 | 45.0 | 2.4 | 60.0 | 2.5 |
| 31 | Shower | 5.7 | 0.15 | 1.8 | 45.0 | 11.9 | 59.9 | 12.7 |

Ejection times of hot water consumers

| Name | | | | | | | | |
|-----------------------------------------------------|----------------|--------|----------|-------------------|-------------------------|-----------|--------------------------|-----------|
| Review label: Judgement AG Schöneberg (102 C 55/94) | | | | | | | | |
| Testing temp. [°C]: 45 | | | | | | | | |
| Test. Period [s]: 15 | | | | | | | | |
| Fl.p. No. | Consumer | L m | Q l/s | Pipe- volume l | T _{test} °C | Time s | T _{stat.} °C | Time s |
| 33 | Hand washbasin | 6.2 | 0.07 | 1.2 | 45.0 | 18.5 | 59.8 | 22.8 |

Building project / Building section _____

Building Owner / Representative _____

Contractor / Representative: _____

Material of pipe system _____

Ambient temperature _____°C

Temperature water _____°C

The potable water syst.was checked as entire system in section parts

¹⁾ Consider the notes of the data sheet ZVSHK »Impermeability tests of potable water installations« Paragraph 4.5. Plastic materials.

- | | Yes | No |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| • During the pressure check, all tanks, devices and armatures which are not suitable for the applied pressure have to be removed from the system or section part that is checked. | <input type="checkbox"/> | <input type="checkbox"/> |
| • The system or the section part to be checked is filled with filtrated water and is completely deaerated. | <input type="checkbox"/> | <input type="checkbox"/> |

Operational test of the press fittings

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| • In case of large temperature differences (approx. 10 K) between the ambient temperature and the fill-up water temperature, a waiting time of 30 minutes was adhered to after the filling of the system. | <input type="checkbox"/> | <input type="checkbox"/> |
| • The pressure equates the available supply pressure of _____ bar, but maximum 6,5 bar! | <input type="checkbox"/> | <input type="checkbox"/> |
| • The visual inspection of the pipe system and the inspection per manometer (measurement precision 0,1 bar) '. | <input type="checkbox"/> | <input type="checkbox"/> |
| • No pressure drop was detected during the operational test. | <input type="checkbox"/> | <input type="checkbox"/> |
| • No leakage was detected during the operational test. | <input type="checkbox"/> | <input type="checkbox"/> |

Pressure checking of the system

- | | | |
|-------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| • The pressure test for the potable water system was realized with a min. testing pressure of 11 bar. | <input type="checkbox"/> | <input type="checkbox"/> |
| • Testing time 30 minutes. | <input type="checkbox"/> | <input type="checkbox"/> |
| • No pressure drop was detected during the operational test. | <input type="checkbox"/> | <input type="checkbox"/> |
| • No leakage was detected during the operational test. | <input type="checkbox"/> | <input type="checkbox"/> |

Comments

The test of the system has been realized correctly!

Location _____

Date _____

Signature Building owner

Signature Contractor

Building project / Building section _____

Building Owner / Representative _____

Contractor / Representative: _____

Material of pipe system _____

System pressure _____ **bar** **Testing medium** Oil-free compr.air Nitrogen CO₂

Ambient temperature _____ °C **Temp. of test medium** _____ °C

The potable water syst.was checked as entire system in section parts

1) Consider the notes of the data sheet ZVSHK »Impermeability tests of potable water installations« Paragraph 4.5. Plastic materials.

- | | Yes | No |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| • All pipes are closed with metal plugs, caps, isolating plates or black flanges. | <input type="checkbox"/> | <input type="checkbox"/> |
| • Appliances, pressure tanks or potable water heaters are separated from the pipelines. | <input type="checkbox"/> | <input type="checkbox"/> |
| • If only press connectors, shut-off armatures and flanges with press fitting system were applied, merely a visual inspection or manual control concerning threaded connections and screw connections is required. | <input type="checkbox"/> | <input type="checkbox"/> |

Impermeability test - testing pressure 150 mbar

Untill 100 liters of pipe volume the testing time has to amount 120 minutes.
The testing time has to be raised about 20 minutes for each further 100 liters.
It will be waited for the temperature balancing and steady-state condition concerning plastic materials; after that, the testing period begins.

- | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------|--------------------------|
| • Pipe volume: _____ liters | • Test.time: _____ minutes | <input type="checkbox"/> | <input type="checkbox"/> |
| • The visual inspection of the pipe system and the inspection per manometer (measurement precision 1mbar) with U-pipe or standpipe water head was conducted. | | <input type="checkbox"/> | <input type="checkbox"/> |
| • No leakage was detected during the operational test. | | <input type="checkbox"/> | <input type="checkbox"/> |

Loading test with increased pressure

It will be waited for the temperature balancing and steady-state condition when coming to plastic materials; after that, the testing

- | | | |
|--------------------------------------------------------|--------------------------|--------------------------|
| • Testing time: 10 minutes | <input type="checkbox"/> | <input type="checkbox"/> |
| • Manometer with measurem.precision 0,1 bar | <input type="checkbox"/> | <input type="checkbox"/> |
| • DN ≤ 50 with testing pressure _{max} = 3 bar | <input type="checkbox"/> | <input type="checkbox"/> |
| • DN > 50 with testing pressure _{max} = 1 bar | <input type="checkbox"/> | <input type="checkbox"/> |

Comments

The test of the system has been realized correctly!

Location _____

Date _____

Signature Building owner

Signature Contractor

Building project: _____

Building Owner repres. by: _____

Contractor represented by: _____

1. The pressure test took place on _____
2. Material of pipe system: _____

3. Table: Recommended value for the minimum amount of tapping points to be opened, related to the biggest nominal diameter of the distribution pipe.

| | | | | | | | |
|-------------------------------------------------------------------------------|----|----|----|----|----|----|-----|
| Biggest nominal diameter of distribution pipe in the current flushing section | 25 | 32 | 40 | 50 | 65 | 80 | 100 |
| Minimum number of tapping points to be opened DN 15 | 2 | 4 | 6 | 8 | 14 | 22 | 32 |

4. Within a storey, water outlets are to be opened completely, beginning with the farthest tapping point from the ascending pipe-run.

After a flushing period of 5 minutes at the location of last flushing the tapping points will be closed one after another in reversed order.

5. The potable water used for flushing is filtrated.

Static pressure $P_w =$ _____ bar

6. Maintenance work (Shut-off valves for individual storeys, shut-off valves are fully opened.)

7. Sensitive armatures and appliances are removed and replaced by adjusting pieces or bypassed by flexible pipes.

8. Maintenance work (Shut-off valves for individual storeys, shut-off valves are fully opened.)

9. Build-in filters and dirt-traps of armatures have to be cleaned after the water flushing.

10. The flushing is effected beginning from the main shut-off armature to the farthest tapping point

The flushing of potable water system has been realized correctly:

Location: _____

Date: _____

(Signature Building Owner/ Representative)

(Signature Contractor/ Representative)

Sampling date: _____ (DDMMYYYY) Intern.sampl.identifier _____

Water outl./Meas.point: _____

Extracting plant: _____

Water works: _____

Water distribution company (WDC): _____

Water works operating during sampling: 1=yes, 2=no

Time of day of sampling: _____ (hh:mm)

Type of sampling: 1=hydrant, 2=nozzle,
3=armature in indoor installation, 4=sampling valve

Coloration: 0=transparent, 1=white, 2=grey, 6=green, 7=yellow, 8=brown

Turbidity, qualitative: 0=none, 1=low, 2=medium, 3=strong

Sediment: 1=yes, 2=no

Turbidity, qualitative: 1=imperceptible, 2=perceptible, 3=strongly perceptible

_____ **NTU**

Smell: 0=without, 1=low, 2=medium, 3=strong

00=odorless, 01=aromatic, 02=earthy, 03=septic (e.g. H₂S),
05=sanious (e.g. NH₃), 06=moldily, 09=chlorine, 12=mineral oil, 16=phenol,
15=others

Taste: 0=without, 1=low, 2=medium, 3=strong

00=unremarkable, 01=insipid, 02=salty, 03=acetous, 04=like base, 05=acerbic,
06=sweet, 12=like chlorine, 13=soapy, 14=metallic, 15=others

Disinfectant: 1=chlorine,2=chlorine diox.,3=H₂O₂,4=others _____ mg/l

Building Owner/Representative

Contractor/Representative:

| System parts put into operation | Tick as appropriate | Comments |
|---------------------------------------------------|--------------------------|----------|
| 1 House service connection | <input type="checkbox"/> | |
| 2 Main shut-off armature | <input type="checkbox"/> | |
| 3 Backflow preventer | <input type="checkbox"/> | |
| 4 Pipe disconnecter | <input type="checkbox"/> | |
| 5 Filter | <input type="checkbox"/> | |
| 6 Pressure relief station | <input type="checkbox"/> | |
| 7 Distribution pipes | <input type="checkbox"/> | |
| 8 Ascending pipes/ Shut-off armatures | <input type="checkbox"/> | |
| 9 Storey pipes/ Shut-off armatures | <input type="checkbox"/> | |
| 10 Tapping points with individual valve safeguard | <input type="checkbox"/> | |
| 11 Water heater / Potable water heater | <input type="checkbox"/> | |
| 12 Safety relief valves/ Exhaust line | <input type="checkbox"/> | |
| 13 Circulation pipe/circulation pump | <input type="checkbox"/> | |
| 14 Dosing system | <input type="checkbox"/> | |
| 15 Softening installation | <input type="checkbox"/> | |
| 16 Booster station/ Potable water tank | <input type="checkbox"/> | |
| 17 Fire fighting and fire protection system | <input type="checkbox"/> | |
| 18 Swimming pool water inlet | <input type="checkbox"/> | |
| 19 Other system parts | <input type="checkbox"/> | |

Instruction / handing over of documents

- . Notes for the operation of the system and appliances were given - the required operating documents and service and maintenance documents available, were handed over for the system parts named above.
- . It was pointed out that, despite thoroughly planning and execution of the installation, proper quality potable water can only be provided to all tapping points when regularly water changes are assured in all parts of the system.
- . In large systems the temperature at the hot water outlets always has to be $\geq 60^{\circ}\text{C}$.
In circulation systems this temperature may only be under-run by 5K.
In small systems a danger has to be pointed out when temperatures exceed 50°C .
- . Potable water heating systems and potable water pipe systems are to be maintained and inspected regularly acc. DIN 1988-8. A conclusion of a maintenance contract is suggested.

Comments

Location:

Date:

(Signature Building Owner/ Representative)

(Signature Contractor/ Representative)

| Pipes | | | | |
|--------|------|---------------------------------|-------------|------|
| Amount | Dim. | Short text | Item number | Alt. |
| 149.6 | m | Copper, DIN EN 1057 15 x 1 | | |
| 259.7 | m | Copper, DIN EN 1057 22 x 1 | | |
| 5.0 | m | Copper, DIN EN 1057 28 x 1,5 | | |
| 31.7 | m | PE-X pipe 16 x 2 | | |
| 19.6 | m | PE-X pipe 25 x 2,5 | | |

| Insulation | | | | |
|------------|------|-------------------------------------------------------------------------------------------------|-------------|------|
| Amount | Dim. | Short text | Item number | Alt. |
| 115.1 | m | Rockwool rockwool mat Klimarock / aluminium cladded ID=15mm, Thickness=30mm for pipe DN12 | | |
| 10.9 | m | Rockwool rockwool mat Klimarock / aluminium cladded ID=16mm, Thickness=30mm for pipe DN12 | | |
| 143.4 | m | Rockwool rockwool mat Klimarock / aluminium cladded ID=22mm, Thickness=30mm for pipe DN20 | | |
| 9.2 | m | Rockwool rockwool mat Klimarock / aluminium cladded ID=25mm, Thickness=40mm for pipe DN20 | | |

| Fittings and accessory | | | | |
|------------------------|------|-----------------------------------------------------------------------------------------|-------------|------|
| Amount | Dim. | Short text | Item number | Alt. |
| 49 | Pce | Pipe bend 90° Further material for connection if necessary: CU DN12 | | |
| 1 | Pce | Pipe bend 15° Further material for connection if necessary: CU DN12 | | |
| 78 | Pce | Pipe bend 90° Further material for connection if necessary: CU DN20 | | |
| 2 | Pce | Pipe bend 15° Further material for connection if necessary: CU DN20 | | |
| 2 | Pce | Pipe bend 45° Further material for connection if necessary: CU DN20 | | |
| 1 | Pce | Pipe bend 90° Further material for connection if necessary: CU DN25 | | |
| 1 | Pce | T-piece Further material for connection if necessary: CU DN12 - CU DN20 - CU DN12 | | |
| 14 | Pce | T-piece Further material for connection if necessary: CU DN20 - CU DN12 - CU DN20 | | |
| 4 | Pce | T-piece Further material for connection if necessary: CU DN20 - CU DN20 - CU DN12 | | |

| Fittings and accessory | | | | |
|------------------------|------|-----------------------------------------------------------------------------------------|-------------|------|
| Amount | Dim. | Short text | Item number | Alt. |
| 1 | Pce | T-piece Further material for connection if necessary: CU DN20 - CU DN25 - CU DN20 | | |
| 1 | Pce | T-piece Further material for connection if necessary: CU DN25 - CU DN20 - CU DN25 | | |
| 1 | Pce | T-piece Further material for connection if necessary: CU DN25 - CU DN25 - CU DN20 | | |
| 13 | Pce | T-piece Further material for connection if necessary: CU DN12 | | |
| 14 | Pce | T-piece Further material for connection if necessary: CU DN20 | | |

| Armatures and built-in parts | | | | |
|------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|
| Amount | Dim. | Short text | Item number | Alt. |
| 1 | Pce | Potable water heater, indirectly heated, potable water in reservoir, circulation connection Further material for connection if necessary: CU DN20 | | |

| Consumer | | | | |
|----------|------|----------------------------------------------------------------------------|-------------|------|
| Amount | Dim. | Short text | Item number | Alt. |
| 8 | Pce | Toilet with flushing tank Further material for connection if necessary: | | |
| 8 | Pce | Hand washbasin Further material for connection if necessary: | | |
| 1 | Pce | Bathtub Further material for connection if necessary: | | |
| 1 | Pce | Washing machine Further material for connection if necessary: | | |
| 2 | Pce | Sink Further material for connection if necessary: | | |
| 1 | Pce | Dish washer Further material for connection if necessary: | | |
| 4 | Pce | Shower Further material for connection if necessary: | | |

| Miscellaneous | | | | |
|---------------|------|----------------------------------------------------------------------------------------------|-------------|------|
| Amount | Dim. | Short text | Item number | Alt. |
| 1 | Pce | Valve drilling and tapping clamp Further material for connection if necessary: CU DN25 | | |