**Table 1**
Synthesis of dimensionless design factors characterizing the power-to-volume scaling (top level hierarchy factors).

| No | Design factor | Scaling of: | Zone of the ITF | Notes |
|---|---|---|---|---|
| 1 | $K_v = K_{v\text{-max}}$ | Volume | Each Zone | The largest is the best. |
| 2 | $K_h = 1$ | Elevation change | CO, CO-BY, UP, HL-v, PRZ, SU-LI, LS, MCP, DC, SGI, SGO, SG UT PS, SG UT SS, SG DC | In the case of LS, the pipe axis or the bottom edge of the pipe in the prototype should be considered. |
| 3 | $K_{N.L.} = 1$ | Number of loops | System | To study asymmetries. |
| 4 | $K_h \leq 1$ | Elevation change | LP, UH, SG UP-SEP, SG UH-DRY | |
| 5 | $K_L = 1^*$ | Length of horizontal components | HL-h, CL-h | * Not possible in general. Friction pressure drop must be preserved (see also row 7). |
| 6 | $K_A = K_{Abr} = K_v$ | Cross and break area | Each vertical zone | Related to fluid flow. |
| 7 | $K_{D.eq.} = 1$ | Hydraulic diameter | CO and SG UT, primarily. Each zone as far as possible. | Froude number scaling is preferred for horizontal pipes. |
| 8 | $K_W = K_v$ | Power | CO, SG UT | Energy to fluid shall be scaled. |
| 9 | $K_t = 1$ | Time | System | Key target for transient simulation. |
| 10 | $K_{q'} = 1$ | Linear power | CO, SG UT | Number of heated rods and of U-Tubes scaled as $K_v$. Volumetric power is a target. |
| | $K_{q'''} = 1$ | Volumetric power | | |
| 11 | $K_{f.r.g.m.} = 1$ | Fuel rod geometry and material | CO | Target for the design together with previous condition. |
| 12 | $K_T = 1$ | Fluid temperature | Each zone | Initial condition. Target for transient simulation. |
| 13 | $K_P = 1$ | Pressure | | |
| 14 | $K_{r.s.T.} = 1$ | Rod surface temperature | CO (primarily) and SG UT | Target for transient simulation. |
| 15 | $K_{r.s.h.f.} = 1$ | Rod heat flux | | |
| 16 | $K_{p.h.t.a.} = K_v$ | Passive heat transfer area | Each zone | Impossible to achieve. Resulting distortions to be characterized. |
| 17 | $K_{th.p.s.} = 1$ | Thickness of passive structures | | |
| 18 | $K_{h.l.e.} = 1$ | Environment heat losses | | Impact to be minimized. |
| 19 | $K_G = K_v$ | Mass flow rate | | – |
| | $K_U = 1$ | Fluid velocity | | |
| 20 | $K_{\Delta p} = 1$ | Pressure drops (friction and local) | | Flexibility (e.g. orifice optimization) needed. |
| 21 | $K_{G.ECC} = K_v$ | ECC flow | ECCS | ECCS injection ports shall be preserved. |
| 22 | $K_{T.ECC} = 1$ | ECC temperature | | |
| 23 | $K_{G.SL} = K_v$ | Steam line flow-rate | SG UH-DRY | Quality at steam line inlet shall be the same. |
| 24 | $K_{G.FW} = K_v$ | Feed-water flow | SG DC | Boundary condition. |
| 25 | $K_{T.FW} = 1$ | Feed-water temp | | |
| 26 | $K_{RR} = 1$ | Recirculation ratio | | Target for the design. |
| 27 | $K_{MCP.ch} = 1$ | Non-dimensional characteristics for pumps and valves | MCP | Boundary condition. |
| 28 | $K_{VLV.ch} = 1$ | | Valves of PS and SS | |