

Summary of Case 2 meshes for HLPW-5

As of 04/29/2024

TEST CASE 2 is Configuration Buildup

Most of the provided grids are "free air" (half-model with symmetry plane in free air). They are given a Mesh Series designation X.a.YY. The X indicates the test case number (1, 2, or 3). The a indicates the grid type (R=fixed-grid RANS, A=ADAPT, H=High-Order, L=HRLES, W=WMLLES). The YY is used to order the meshes within a category; these are simply numbers starting at 01 and incrementing up. If any grid series gets superseded by a revision, this will be designated by a () in its designation. For example, version 2 would be designated by (2).

In-tunnel grids are indicated with "T" designation at the end.

Disclaimer: The grids available for download may or may not be appropriate for your solver, and may or may not be of sufficient density and quality to yield accurate results. You must judge for yourself.

Note that the mesh sequences have been given somewhat arbitrary labels by their creators regarding their size: sometimes by sequential letter (A, B, C,...), sometimes by increasing number, and sometimes by XC,C,M,F. These are all arbitrary designations with little practical meaning, and there is no consistency between different mesh series. Mesh size comparisons should instead be gauged by looking at the README files.

IMPORTANT: Please double-check the BCs in any grid that you download. We have noticed small mistakes/typos/inconsistencies occasionally.

RANS grids

2.R.01 (HELDENMESH, mixed element unstructured)

Config 2.1:

C – 4.5M cells, 1.5M nodes
M – 11M cells, 3.9M nodes
F – 59M cells, 24M nodes
G – 128M cells, 54M nodes
R – 394M cells, 171M nodes

Config 2.2:

C – 11M cells, 3.6M nodes
M – 26M cells, 9.3M nodes
F – 141M cells, 57M nodes
G – 301M cells, 126M nodes
R – 914M cells, 398M nodes

Config 2.3:

C – 14M cells, 4.4M nodes

M – 32M cells, 11M nodes
F – 168M cells, 69M nodes
G – 360M cells, 153M nodes
R – 1.1B cells, 485M nodes

Config 2.4:

C – 20M cells, 6.0M nodes
M – 44M cells, 15M nodes
F – 205M cells, 82M nodes
G – 429M cells, 178M nodes
R – 1.3B cells, 555M nodes

2.R.02 (HELDENMESH, same point distribution as 2.R.01, except all tetrahedra)

Config 2.1:

C – 8.7M cells, 1.5M nodes
M – 23M cells, 3.9M nodes
F – 143M cells, 24M nodes
G – 320M cells, 54M nodes
R – 1.0B cells, 171M nodes

Config 2.2:

C – 21M cells, 3.6M nodes
M – 55M cells, 9.3M nodes
F – 337M cells, 57M nodes
G – 749M cells, 126M nodes
R – 2.4B cells, 398M nodes

Config 2.3:

C – 26M cells, 4.4M nodes
M – 67M cells, 11M nodes
F – 408M cells, 69M nodes
G – 908M cells, 153M nodes
R – 2.9B cells, 485M nodes

Config 2.4:

C – 35M cells, 6.0M nodes
M – 87M cells, 15M nodes
F – 484M cells, 82M nodes
G – 1.1B cells, 178M nodes
R – 3.3B cells, 555M nodes

2.R.03 (POINTWISE, mixed element unstructured)

Config 2.1:

A – 18.6M cells, 10.4M nodes
B – 72.5M cells, 53.1M nodes
C – 112.0M cells, 76.4M nodes
D – 449.0M cells, 370.6M nodes

Config 2.2:

A – 33M cells, 18.7M nodes
B – 118M cells, 80.7M nodes
C – 203M cells, 142M nodes
D – 663M cells, 521.5M nodes

Config 2.3:

A – 80M cells, 40M nodes
B – 148M cells, 99M nodes

C – 340M cells, 229M nodes
D – 720M cells, 484M nodes

Config 2.4:

A – 61.1M cells, 36.4M nodes
B – 198M cells, 133M nodes
C – 433.8M cells, 316.8M nodes
D – 1.2B cells, 936M nodes

2.R.04 (Simcenter STAR-CCM+, mixed element polyhedral with prismatic boundary layer cells)

Config 2.1:

C – 11M cells, 32M nodes
M – 23M cells, 62M nodes
F – 30M cells, 79M nodes
VF – 54M cells, 138M nodes

Config 2.2:

C – 18M cells, 54M nodes
M – 38M cells, 105M nodes
F – 49M cells, 128M nodes
VF – 88M cells, 228M nodes

ADAPT grids

Nothing available yet

HO grids

2.H.01 (BSC curving solver, all tet, isotropic, Q2, intended for WMLES)

Config 2.2:

C Q2 mesh – 2.8M cells, 4.2M nodes

Config 2.4:

C Q2 mesh – 3.6M cells, 5.4M nodes
F Q2 mesh – 10.4M cells, 15.9M nodes
XF Q2 mesh – 83.5M cells, 119M nodes

2.H.02 (Pointwise, linear and Q2 meshes, with Trex versions intended for RANS)

Config 2.2:

A variety of meshes and sizes are provided

HRLES grids

2.L.01 (ANSA, hex-dominant)

Config 2.1:

C – 67M cells, 59M nodes

Config 2.2:

A – 55M cells, 45M nodes
B – 97M cells, 81M nodes
C – 178M cells, 157M nodes
D – 274M cells, 246M nodes
E – 566M cells, 515M nodes

Config 2.3:

B – 126M cells, 107M nodes
C – 226M cells, 200M nodes
D – 374M cells, 336M nodes

Config 2.4:

B – 130M cells, 111M nodes
C – 247M cells, 220M nodes
C+ – 281M cells, 249M nodes
D – 396M cells, 356M nodes

2.L.02 (HELDENMESH, mixed element unstructured)

Config 2.1:

A – 88M cells, 30M nodes
B – 129M cells, 43M nodes
C – 239M cells, 75M nodes
D – 400M cells, 118M nodes
E – 929M cells, 247M nodes

Config 2.2:

A – 166M cells, 59M nodes
B – 237M cells, 82M nodes
C – 413M cells, 169M nodes
D – 647M cells, 207M nodes
E – 1.3B cells, 395M nodes

Config 2.3:

A – 191M cells, 71M nodes
B – 273M cells, 101M nodes
C – 474M cells, 169M nodes
D – 737M cells, 252M nodes
E – 1.5B cells, 472M nodes

Config 2.4:

A – 281M cells, 81M nodes
B – 309M cells, 114M nodes
C – 528M cells, 189M nodes
D – 813M cells, 280M nodes
E – 1.7B cells, 526M nodes

WMLES grids

2.W.01 (HELDENMESH, mixed element unstructured)

Config 2.1:

XC – 210M cells, 76M nodes
C – 463M cells, 170M nodes
M – 1.51B cells, 575M nodes
F – 3.48B cells, 1.35B nodes

Config 2.2:

XC – 277M cells, 98M nodes
C – 623M cells, 225M nodes
M – 1.99B cells, 742M nodes
F – 4.57B cells, 1.73B nodes

Config 2.3:

XC – 297M cells, 104M nodes
C – 668M cells, 241M nodes
M – 2.13B cells, 792M nodes
F – 4.89B cells, 1.85B nodes

Config 2.4:

XC – 376M cells, 131M nodes
C – 846M cells, 304M nodes
M – 1.59B cells, 998M nodes
F – 6.20B cells, 2.33B nodes