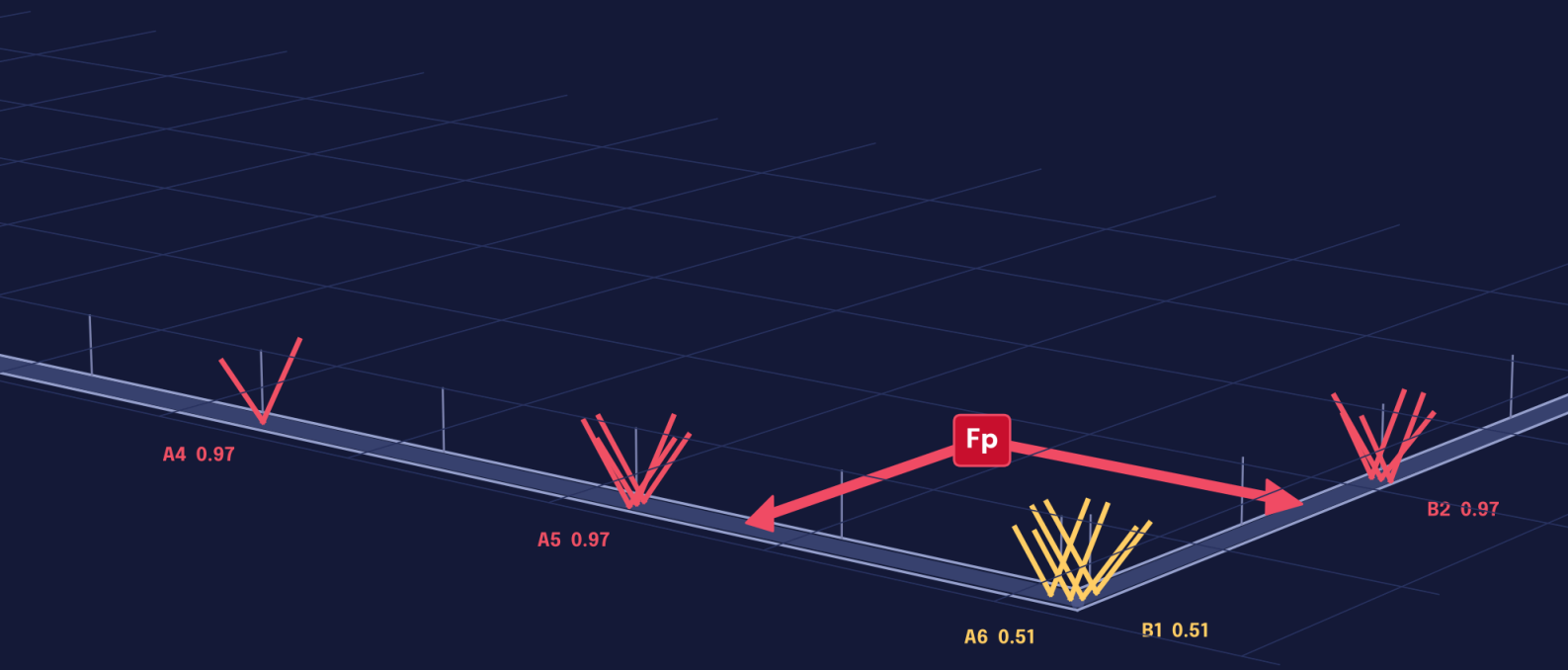
ACREFINE ENGINEERING

SAMPLE REPORT

NON-STRUCTURAL SEISMIC RESTRAINT

Seismic Bracing of a Chilled Water Main

Cable bracing layout, brace spacing and anchorage under ASCE/SEI 7-22 — results summary



Cable braces at the elbow end of the run, to scale, coloured by brace anchor utilisation · Fp: seismic design force on each run

DOCUMENT	REVISION	DATE	STATUS
ACR-SAMPLE-SB-01	S1	28 October 2026	Summary edition

VERIFY THIS DOCUMENT

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The system, project and site in this report are fictitious. Not a design document; not to be relied on for any real installation.

Sample report — summary edition. The system, project and site are fictitious and all values are illustrative. This edition shows what an Acrefine seismic bracing design delivers; the calculations behind it are not reproduced. Not a design document and not to be relied on for any real installation.

AT A GLANCE

A water-filled DN250 chilled water main hangs below a concrete slab in a data centre. We calculated how far apart its cable braces can be, laid them out and checked every braced line. The anchors in the slab, not the cables, decide the spacing.

8 m	**9**	**4**	**0.97**
Transverse brace spacing 16 m longitudinal	**Brace locations** On 57 m of main	**Rod stiffeners** Only where the rod needs one	**Governing utilisation** Brace anchors in the slab

DOCUMENT CONTROL

Rev	Date	Description	Prepared	Checked	Approved
S1	28/10/2026	Sample issue — summary edition	[Engineer]	[Checker]	[Engineering Director]

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SAMPLE

01 The system and the question

How many seismic braces does the chilled water main need, where do they go, and what holds each one to the slab?

The main carries chilled water from the riser to the data halls, so the owner classes it as an essential system. The bracing design holds it to the structure in the design earthquake; the equipment it connects is outside this design. It runs 57 m below the level-3 slab in two straight runs joined by one elbow, hung from M16 rods, 900 mm long, at 4 m centres.

DN250	117 kg/m	57 m	Level 3	M16 rods
Welded steel, water-filled	With water and insulation	Two runs, one elbow	Below a concrete slab	900 mm long

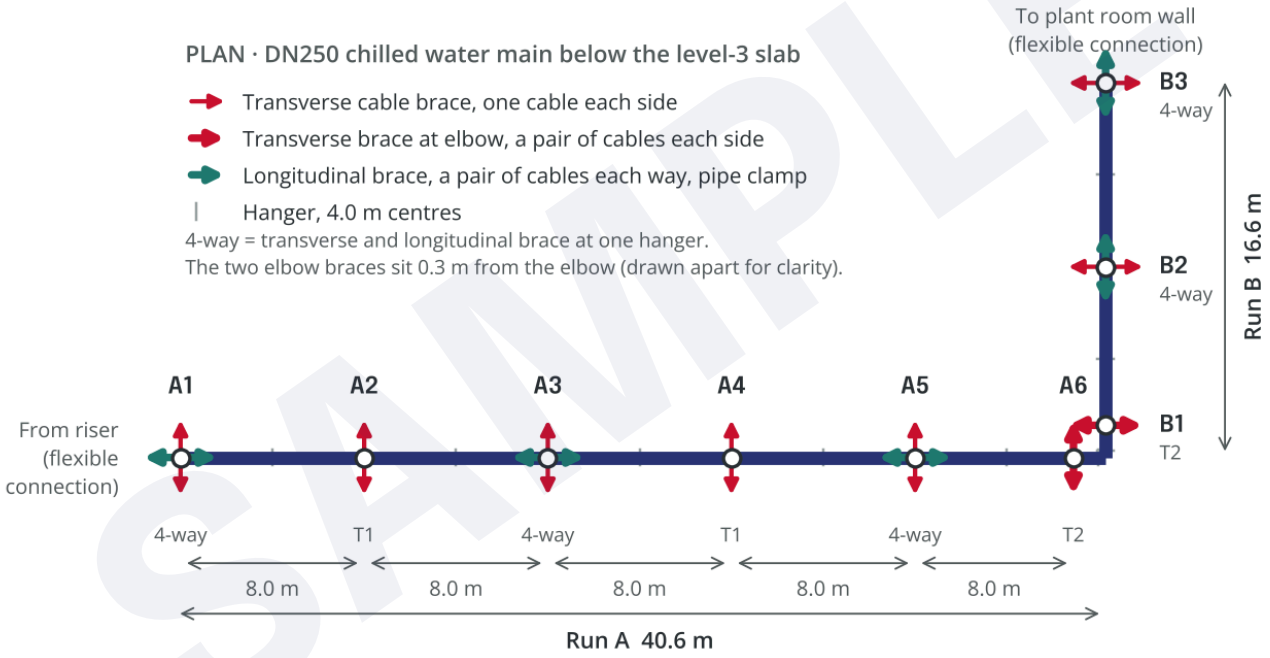


Figure 1 The bracing layout delivered: brace locations, types and spacing. Fictitious system.

SAMPLE

02 How we assess it

Every Acrefine bracing design follows the same six steps, from the weight of each line to the typical brace that holds it, and ends in a layout a contractor can install.

01
System and loads
Pipe, contents and fittings, run by run, with the supporting slab

→

02
Seismic demand
Design force on the braces, to ASCE 7-22

→

03
Brace spacing
The spacing every element of the load path allows; the shortest governs

04
Bracing layout
Transverse, longitudinal, elbow and 4-way braces placed on the hangers

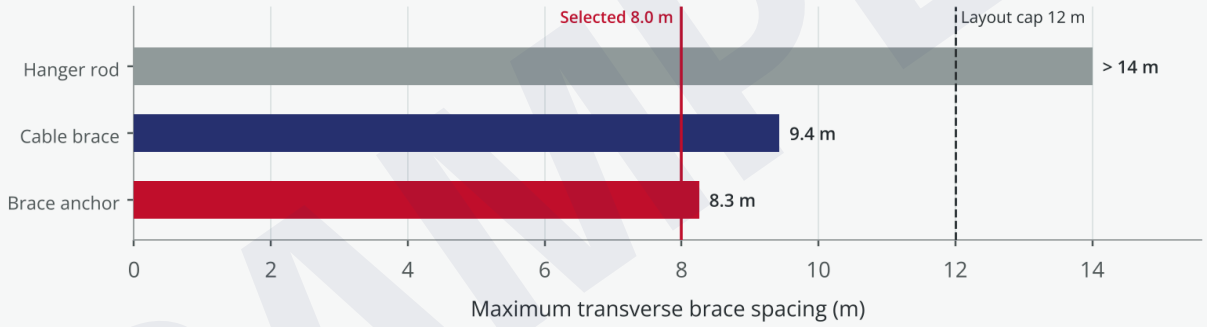
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05
Brace checks
Cables, anchors in concrete, hanger rods and their stiffeners

→

06
Verdict and fixes
Results summarised, with practical installation recommendations

The spacing each element of the load path allows



The brace anchors allow the shortest spacing, so they set it. A smaller anchor would add braces along the whole run.

The spacing is calculated, not taken from a table. Here the anchors limit it to 8.3 m; with hangers every 4 m, braces go on every second hanger.

SAMPLE

03 What the analysis shows

Each cable brace carries the design seismic force sideways into the slab. Because the cable is inclined, that force also has an upward component.

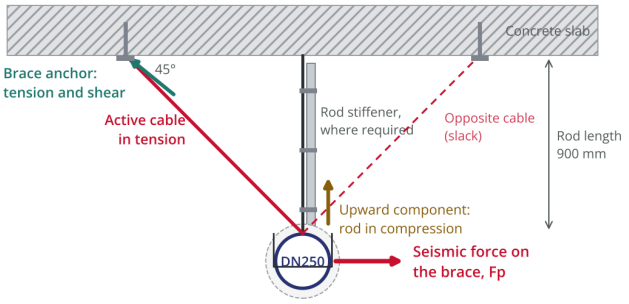


Figure 2 A transverse brace under the design force: the active cable in tension, its upward component on the hanger rod, the anchor loaded in tension and shear.

Where the upward component of the brace force, together with the vertical seismic effect, exceeds the weight on the hanger, the rod goes into compression. At 4 of the 9 brace locations a plain rod would buckle, so only those rods get a rod stiffener.

The same cable force loads the slab anchor in tension and shear together, and the code asks for an extra margin on anchors in concrete. That is why the anchors, not the cables, govern.

Calculation extract: the typical transverse brace, worst case

01 Seismic design force

02 Force in the cable

03 Brace anchor in the slab

Blurred in this edition. The full report carries every step, for each typical brace type.

SAMPLE

04 Verdict and recommendations

The main is adequately braced with cable braces at 8 m transverse and 16 m longitudinal spacing, provided the measures below are put in place.

Check	Result	Status
Brace spacing	Within the capacity of every element	PASS
Cables	0.85 utilisation	PASS
Brace anchors in the slab	0.97 utilisation, governs	PASS
Hanger rods, stiffened where required	0.86 utilisation	PASS
Cable installation	To be confirmed on site	OPEN

01 Install the braces exactly as laid out, with a pair of cables at the elbow and longitudinal braces.

02 Use seismic-qualified anchors of at least the capacity the full report sets. A smaller anchor changes the spacing, so it is never swapped on site.

03 Fit a rod stiffener to the hanger rod at every designated location.

04 Install the cables taut, with no visible slack.

The full report goes further

A project design carries every step in full, signed by the preparing, checking and approving engineers:

- Seismic demand on the braces
- Brace spacing from every element of the load path
- Bracing layout with typical brace details
- Cable, anchor and hanger rod checks, with the calculation appendix

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Ask for the full sample, or tell us about your project. Every message is read by an engineer.