

MATRIX SUBSEA TEST CENTRE

ASSURED PERFORMANCE



LIGHTER · STRONGER · SMARTER

MATRIX SUBSEA TEST CENTRE

As a global leader in the design and manufacture of subsea solutions and systems, Matrix Composites & Engineering understands the need for rigorous testing and validation of products used in harsh, deep water environments.

Matrix's quality and operational reliability is supported by our Subsea Test Centre located at the company's head office in Western Australia, home to the largest composite syntactic manufacturing plant in the world and Australia's first **Deepwater Hyperbaric Common User Facility**.

Boasting the Southern Hemisphere's largest commercially available hyperbaric chamber, the facility allows for the testing of a wide range of products from large energy exploration support components, to items from the defence forces and small subsea electrical connectors.



HOME TO AUSTRALIA'S
FIRST DEEPWATER
HYPERBARIC COMMON
USER FACILITY

HYPERBARIC TESTING

Matrix's hyperbaric test facilities are a key component of our production process, and have been so for over 10 years. Operating within Matrix's ISO 9001 system and other international standards, such as those prescribed by the American Petroleum Institute, the facility uses state of the art control algorithms and software logging tools to ensure precise control and high quality test data results.

Matrix's standard tests include:

- Uplift determination
- Water ingress
- Instrumented buoyancy loss
- Hyperbaric compression and creep
- Hyperbaric collapse
- Bulk modulus
- Buckle arrestment performance
- Subsea controls testing
- Valve testing
- Variable temperature testing

The facilities are supported by a 40-tonne crane that also services 300 m² of working space with heavy

vehicle access. Consequently, large structures can be easily carried directly to the workspace, unloaded, instrumented and loaded for testing in the same undercover area.

The Matrix facility is licensed to carry out hyperbaric testing up to 5,200 metres sea water.

**LARGEST
HYPERBARIC
CHAMBER IN
THE SOUTHERN
HEMISPHERE**

HYPERBARIC CHAMBERS

Matrix operates a suite of 11 hyperbaric chambers in a variety of sizes, with internal dimensions ranging from Ø0.1 X 0.2 m (450 bar) to Ø1.6 X 6.4 m pressurised up to 520 bar. The chambers are filled and pressurised with environment-friendly fluid (water+glycol) to simulate subsea immersion. Fully instrumented and capable of recording pressure, buoyancy loss and temperature changes over time, the chamber's environmental conditions are regulated from inside a single control room.

Designed with spare penetrations to facilitate functional testing of customer equipment, chambers are orientated vertically to facilitate loading and unloading via our 40-tonne crane, with larger chambers mounted underground for safety and environment stability.

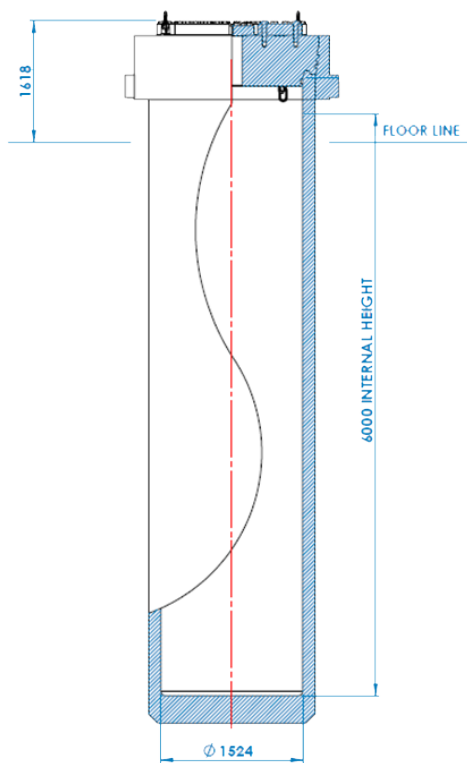
THE MATRIX DEEPWATER HYPERBARIC COMMON USER FACILITY

Comprised of an Equipment Under Test (EUT) frame, our L1 chamber system with interchangeable flanges, and a clean room, the facility provides comprehensive testing and compliance verification of subsea equipment right here in Australia, reducing lead times and carbon emissions. For more details, refer to the Matrix Deepwater Hyperbaric Common User Facility leaflet.

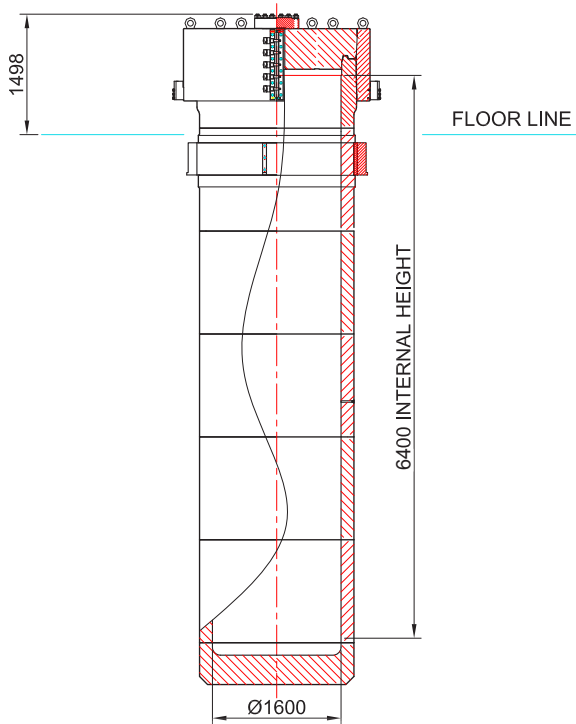
CHAMBER	INTERNAL DIAMETER mm [in]	INTERNAL LENGTH mm [in]	MAXIMUM OPERATING PRESSURE bar [psi]	SIMULATED OCEAN DEPTH m [ft]	OPERATIONAL TEMPERATURE °C [°F]	Data recorded
L1	1,524 [60]	6,000 [236]	340 [4,930]	3,380 [11,090]	Ambient	Load Pressure Temperature Time
L2	1,600 [63]	6,400 [252]	520 [7,540]	5,173 [16,972]	4 [39] to Ambient	
S1	446 [17]	1,235 [48]	100 [1,450]	1,000 [3263]	Ambient to 50 [140]	
S2	350 [13]	1,280 [50]	480 [6,961]	4,775 [15,666]	Ambient to 50 [140]	
S3	350 [13]	1,280 [50]	480 [6,961]	4,775 [15,666]	Ambient to 50 [140]	
S4	350 [13]	1,280 [50]	480 [6,961]	4,775 [15,666]	Ambient to 50 [140]	
S5	350 [13]	1,280 [50]	480 [6,961]	4,775 [15,666]	Ambient to 50 [140]	
S6	100 [4]	200 [8]	450 [6,527]	4,477 [14,688]	Ambient	Pressure Time
S7	100 [4]	200 [8]	450 [6,527]	4,477 [14,688]	Ambient	
S8	100 [4]	200 [8]	450 [6,527]	4,477 [14,688]	Ambient	
S9	100 [4]	200 [8]	680 [9,863]	6,864 [22,520]	Ambient	

HYPERBARIC CHAMBER DIMENSIONS



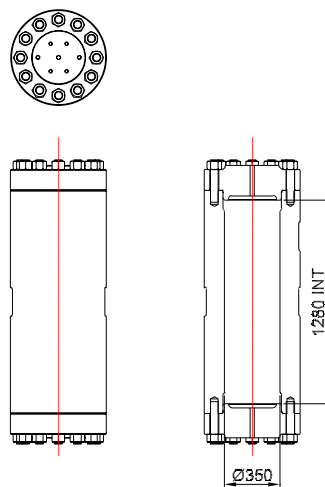


L1: 1,524 x 6,000 mm, 340 bar

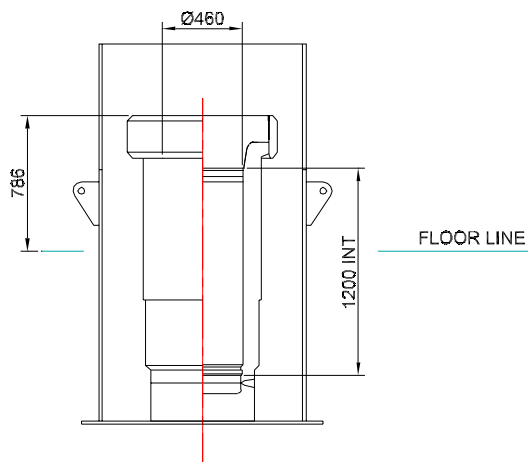


L2: 1,600 x 6,400 mm, 520 bar

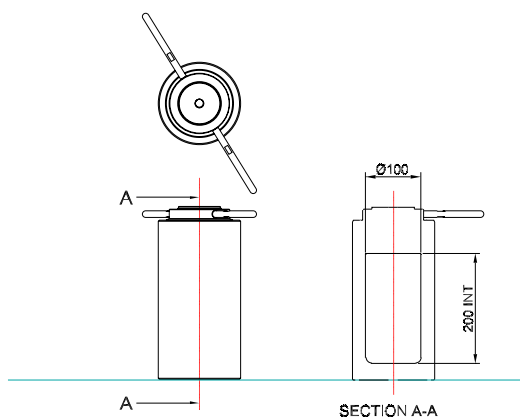
S2 to S5: 350 x 1,280 mm, 480 bar



S1: 446 x 1,235 mm, 100 bar



S6 to S9: 100 x 200 mm, 450/680 bar





ADDITIONAL TEST SERVICES

BUOYANCY VERIFICATION TANK

- Product weight in water and air
- ROV submersion and functionality
- Submersion and gas leakage
- Underwater NDT inspection
- Flotation
- Riser testing
- Abandonment and cutting tool trials

MECHANICAL TESTING

- Axial and lateral slip loads
- Static loading and 3-point bend
- Compression, shear and tensile testing
- Dropped weight and swing arm impact testing
- Lifting point/insert load testing
- Paint adhesion testing
- Function and fit-up

LABORATORY AND MATERIAL TESTING

At Matrix, we invest heavily in research and development (R&D) to continually advance our offerings and embrace new opportunities. Many of our products are registered under international patents to protect intellectual property and demonstrate our culture of innovation.

Matrix's head office boasts a large R&D facility run by scientists and material engineers from a broad spectrum of high performing industry disciplines. A range of on-site testing facilities allows raw materials or finished products to be tested to relevant internal, client and international standards before release.

Standard internal tests include:

- Universal testing machine – for compression and tensile properties
- Differential scanning calorimeter (DSC) – to determine reaction energies and glass transition temperatures of polymers
- Thermo gravimetric analysis (TGA) – for determining decomposition temperatures and inorganic (fibre) content of composite plastics
- Pycnometer – for determination of true density of solids (macrospheres)
- Viscometer – for testing viscosity of liquids
- Thermostatic water baths – for determination of long-term behaviours of polymer materials (creep, seawater resistance)



MATRIX **DELIVERING** **TO THE WORLD**

