

# MATRIX SUBSEA TEST FACILITY

ASSURED PERFORMANCE



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ASSURED PERFORMANCE FOR OVER 10 YEARS

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 Facility located at the company's head office in Western Australia, home to the largest composite syntactic manufacturing plant in the world.

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.



Matrix subsea test facility in action

## 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:
- Total sea level buoyancy
  - Buoyancy loss under hyperbaric load
  - Elastic modulus
  - Water absorption and collapse
  - Long term buoyancy loss
  - Temperature dependent effects.
  - Subsea control pod testing
  - Valve and hull penetration testing.
- The facilities are supported by a 40-tonne crane that also services 300 m<sup>2</sup> 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  
CAPABILITY  
IN THE  
SOUTHERN  
HEMISPHERE**

## HYPERBARIC CHAMBERS

Matrix operates a suite of 11 hyperbaric chambers in a variety of sizes, with the largest having internal dimensions of Ø1.6 X 7.28 m pressurised up to 52 MPa . By default, the chambers are fully instrumented and capable of recording pressure, buoyancy loss and temperature changes over time. Other types of instrumentation can be installed to suit client requirements.

The chambers have been designed to accommodate electrical and hydraulic access, as well as cameras for visual monitoring via a series of penetrations on the lids of each chamber. All chambers are orientated vertically to facilitate loading and unloading via our 40-tonne crane, with larger chambers mounted underground for safety and environment stability.

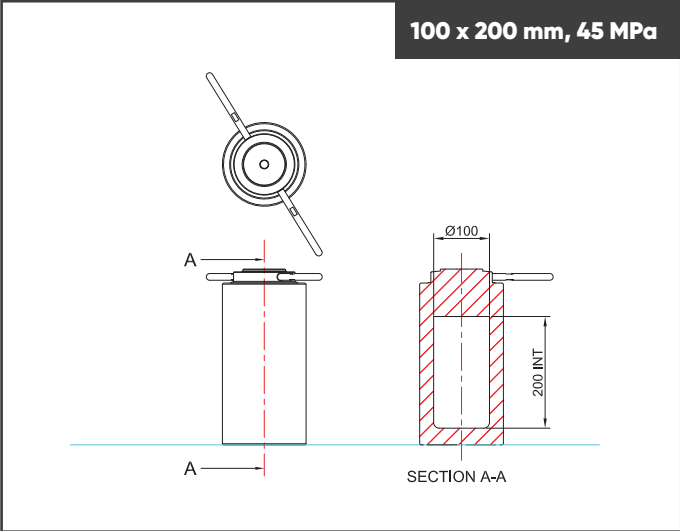
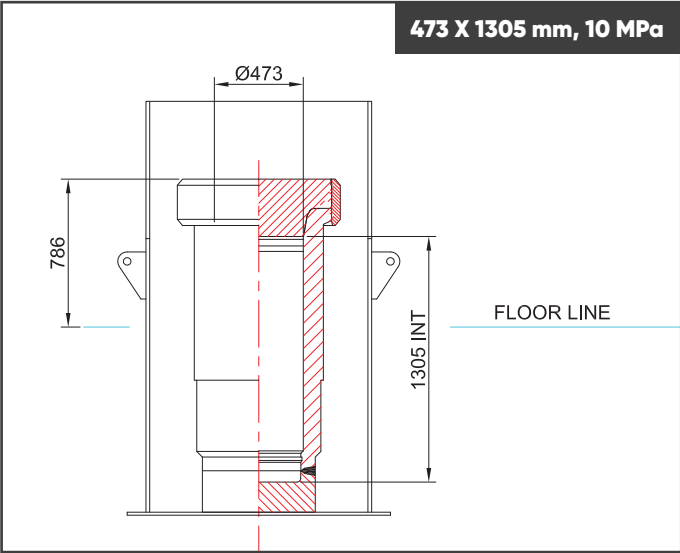
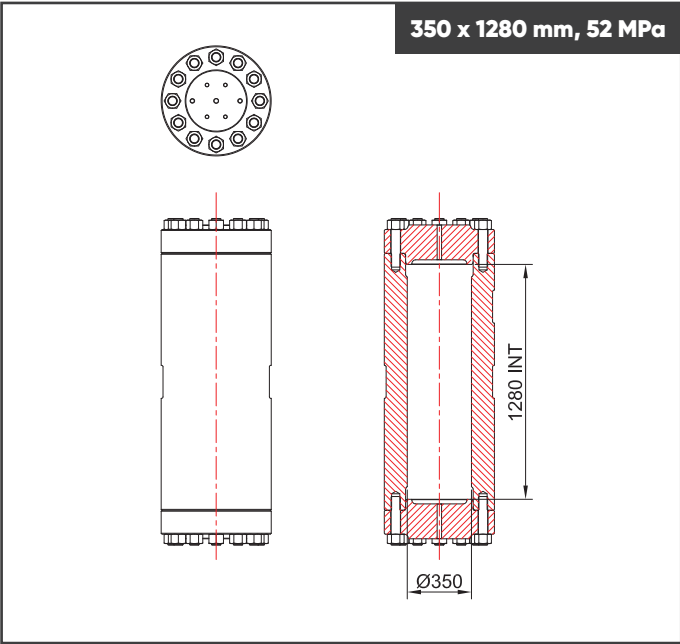
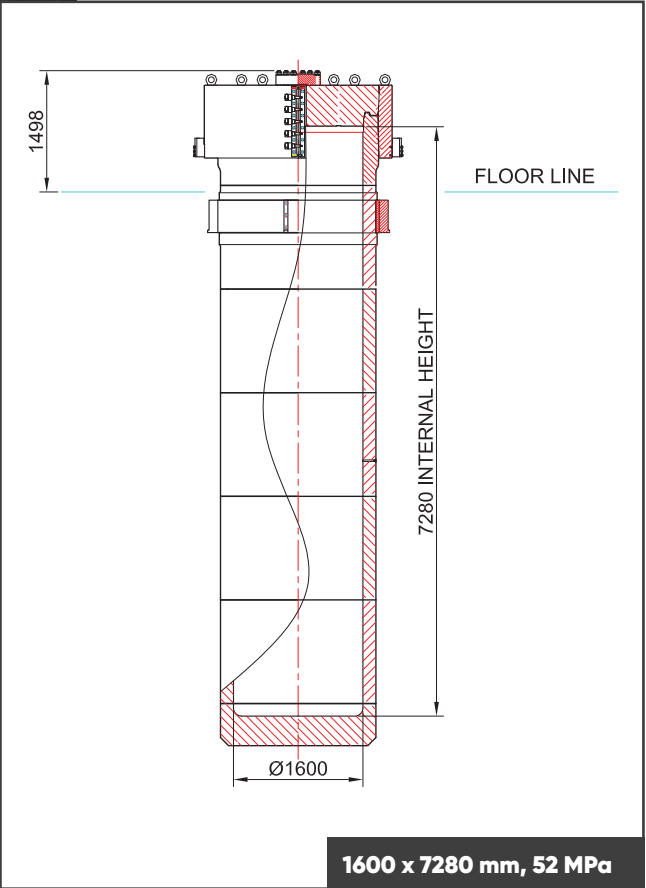
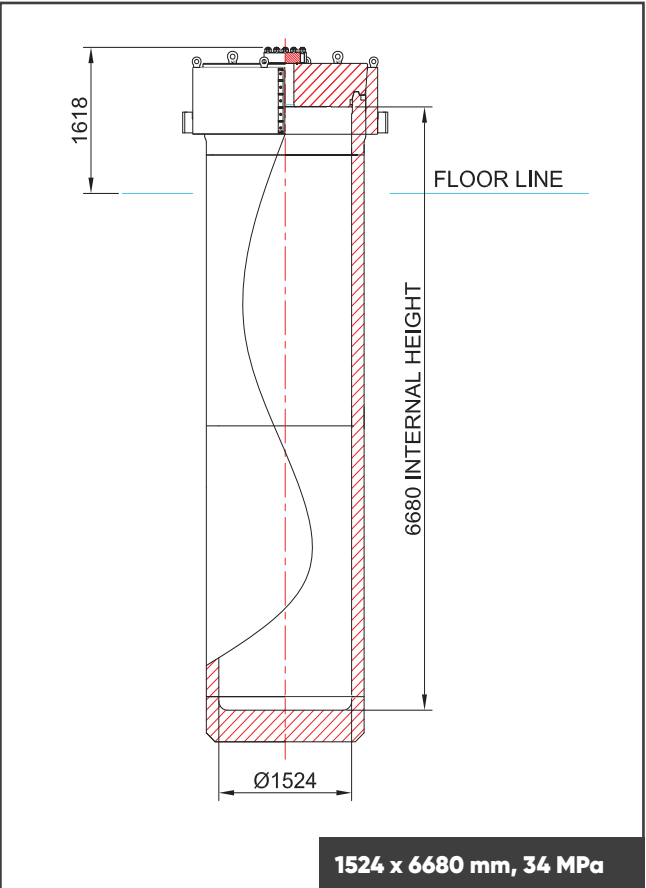
CHAMBER	INTERNAL DIAMETER mm [in]	INTERNAL LENGTH* mm [in]	MAXIMUM OPERATING PRESSURE MPa [psi]	SIMULATED OCEAN DEPTH m [ft]	OPERATIONAL TEMPERATURE °C [°F]	DATA RECORDED
L1	1524 [60]	6680 [263]	34 [4930]	3380 [11090]	5 [41] to Ambient	Load Pressure Temperature Time
L2	1600 [63]	7280 [286]	52 [7542]	5173 [16972]	5 [39] to Ambient	
S1	473 [18]	1305 [51]	10 [1450]	995 [3263]	Ambient to 50 [122]	
S2	350 [13]	1280 [50]	52 [7542]	5173 [16972]	Ambient to 50 [122]	
S3	350 [13]	1280 [50]	52 [7542]	5173 [16972]	Ambient to 50 [122]	
S4	350 [13]	1280 [50]	52 [7542]	5173 [16972]	Ambient to 50 [122]	Pressure Time
S5	350 [13]	1280 [50]	52 [7542]	5173 [16972]	Ambient to 50 [122]	
S6	100 [4]	200 [8]	45 [6527]	4475 [14683]	23 +/-1	
S7	100 [4]	200 [8]	45 [6527]	4475 [14683]	23 +/-1	
S8	100 [4]	200 [8]	45 [6527]	4475 [14683]	23 +/-1	
S9	100 [4]	200 [8]	45 [6527]	4475 [14683]	23 +/-1	

\* All internal length dimensions shown are maximum values excluding any ancillary equipment and fittings.



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**HYPERBARIC CHAMBER  
DIMENSIONS**





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## ADDITIONAL TEST SERVICES

### BUOYANCY VERIFICATION TANK

- Buoyancy verification
- ROV immersion and testing
- Hydrostatic testing and gas leakage
- Surface stability
- Riser testing
- Product density trials.

### MECHANICAL TESTING

- Axial and lateral slip loads
- Static loading and 3-point bend
- Compression, shear and tensile testing
- Dropped weight 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 products to be tested to relevant internal, client and international standards before release.

Standard test equipment include:

- Universal testing machines - for compression and tensile properties
- Differential scanning calorimeters (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 irregular solids
- Rheology - viscosity and gel point for liquids and pastes
- Thermostatic testing - accelerated aging of polymer materials (creep, chemical resistance).





# MATRIX DELIVERING TO THE WORLD



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