

RPC Technologies Pty Ltd

Product Appraisal Report PA 0906

Replaces PA 0313



WATER SERVICES ASSOCIATION  
OF AUSTRALIA

## GRP Vent Stack

DN 150- 400 - 3 to 16 meters above ground

AS 1170.2:2002 Structural Design Actions – Wind Actions

WSA 02 2002 – Sewerage Code of Australia

Published - February 10

## Overview of WSAA

The Water Services Association of Australia (WSAA) is the peak body of the Australian urban water industry. Its 30 members and 31 associate members provide water and wastewater services to approximately 16 million Australians and to many of our largest industrial and commercial enterprises. WSAA membership also includes two members and one associate member from New Zealand.

Urban water service providers have a critical role in ensuring that Australians have access to adequate and high quality water services. As Australia's population continues to grow, with most of this growth occurring in cities, that role becomes increasingly important.

WSAA's vision is for Australian urban water utilities to be valued as leaders in the innovative, sustainable and cost effective delivery of water services. WSAA strives to achieve this vision by promoting knowledge sharing, networking and cooperation amongst members. WSAA identifies emerging issues and develops industry-wide responses. WSAA is the national voice of the urban water industry, speaking to government, the broader water sector and the Australian community.

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## 1. Executive Summary

RPC Technologies Group (RPC) is a major supplier of industrial Glass Reinforced Plastic (GRP) equipment, with over 30 years operating experience, and specializing in the supply of complete turnkey solutions for major projects requiring design, manufacture, supply and installation capacity for composite products that specifically require higher levels of engineering and project expertise.

The RPC Vent Stack is designed and manufactured in sizes DN 150, 200, 225, 250, 300, 350 and 400 and in lengths between 3 m and 16 m. The Vent Stacks are designed for all wind conditions and terrain categories, as defined in AS 1170.2:2002 Wind Actions, including cyclonic conditions.

Subsequent to members' comments regarding validation of the design calculations with respect to AS/NZS 1170:2002, RPC engaged Dennis Southam and Associates to conduct an independent review of the submitted design criteria. The summary pages of the report are contained in Appendix B and the extensive report is available to WSAA members upon request. The finding of the report confirms that the calculations used in the design of Vent Stacks comply with the requirements of the standard.

It is recommended that WSAA Members and Associates, subject to any specific requirements of the Member or Associate, accept or authorise the RPC technologies product range as detailed in this report for use in gravity sewer networks provided pipeline design, installation, acceptance testing and commissioning are in accordance with relevant WSAA Codes, WSAA Member Integrated Codes, and the manufacturer's requirements.

## 2. Company Overview

RPC Technologies Group (RPC) is a major supplier of industrial Glass Reinforced Plastic (GRP) equipment, with over 30 years operating experience, and specializing in the supply of complete turnkey solutions for major projects requiring design, manufacture, supply and installation capacity for composite products that specifically require higher levels of engineering and project expertise.

RPC has recently successfully undertaken major design, supply and installation projects requiring substantial GRP Pipe and Fittings for the Western Corridor Water Recycled Water Plant (approx \$7.0m), the Gold Coast Desalination Plant (approx \$5m) and is currently involved with the Sydney Desalination Plant (approx \$35m) along with numerous other piping projects for which we can provide references and supporting details. RPC has an annual turnover of approx. \$70m, currently employs over 450 employees and operates three (3) manufacturing plants in Australia and one (1) in Batam. RPC is also establishing a new plant in Geelong, Victoria which is expected to be operational by 2nd Qtr 2010.

RPC is able to provide a full range of reinforced plastics and composites products in the areas of;

- Water Treatment, Waste Water Treatment & Water Desalination
- Sewage Treatment & Odour Control
- Power Generation
- Mining & Petrochemical
- Defence
- Renewable Energies
- Transport

RPC also offer Project Management from conception to commissioning utilising an Engineering team using state of the art Computer Aided Design (CAD) & Finite Element Analysis (FEA) and Quality Assurance (QA) systems certified to AS/NZS ISO 9001:2008.

For more information refer to the RPC Technologies Group website @ [www.rpctechnologies.com](http://www.rpctechnologies.com)

### 3. Scope of this Appraisal

The RPC Vent Stack is designed and manufactured in sizes DN 150, 200, 225, 250, 300, 350 and 400 and in lengths between 3 m and 16 m. The Vent Stacks are designed for all wind conditions and terrain categories, as defined in AS 1170.2:2002 Wind Actions, including cyclonic conditions. The design calculations have been independently assessed to comply with the AS 1170.2:2002, refer appendix B. Various caps and inspection hatches are also available on request of the customer

### 4. Quality Criteria

#### 4.1 [Quality Assurance Requirements](#)

The WSAA product appraisal network accepts system (ISO 9001) and product certification by a Certification Body at the manufacturing site of strategic products to appropriate Australian or internationally recognised standards. The Certification Body shall have relevant accreditation by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) or by an equivalent international accreditation system recognised by JAS-ANZ.

#### 4.2 [Performance Requirements](#)

The RPC Vent Stack has been appraised for manufacturing, installation and performance compliance with reference to nominated standards, WSAA Sewerage Code of Australia (WSA 02-2002) Drawing No. SEW 1408 – Ventilation Systems – Educt Vent and AS/NZS 1170.2:2002 Structural design actions – Wind actions

#### 4.3 [Compliance with Quality Requirements](#)

The manufacturer RPC Technologies Pty Ltd is ISO9001:2008 compliant for the *design and manufacture of reinforced plastic composite products (fiberglass) and metal fabrications*. Refer Appendix A

### 5. Appraisal Criteria

Appraisal criteria is determined by the WSAA Infrastructure Products and Materials Network and regularly reviewed to ensure that the criteria reflects the requirements of WSAA members. WSAA Members have determined that the WSAA Sewerage Code of Australia (WSA 02-2002) Drawing No. SEW 1408 – Ventilation Systems – Educt Vent and AS/NZS 1170.2:2002 Structural design actions – Wind actions meet the requirements of WSAA members.

## 6. Compliance to the Appraisal Criteria

The following is an extract from PA 0313. This information is still relevant to this appraisal report

*The vent stack is a free standing structure. To demonstrate 'fit for purpose' capability, RPC Technologies Group has submitted structural design calculations prepared by Southam & Associates Pty. Ltd. Southam is a member of the Standards Australia PL 44 Committee.*

*To validate the design parameters established by Dennis Southam & Associates Pty Ltd, RPC Technologies Group has performed and submitted Finite Element Analysis (FEA) on DN 150, 225 and 300 vent stacks. These sizes are the standard diameters used by Sydney Water and other water agencies. The FEA consists of Elastic Static Analysis and Linear Buckling Analysis. All results are shown to be well within the stated allowable amounts and nominated as acceptable. Dr. Peter Zeman (Sydney Water) verified the FEA model's stress and deflection predictions, subject to input of design wind speeds appropriate to the region and terrain category.*

Subsequent to members' comments regarding validation of the design calculations with respect to AS/NZS 1170:2002, RPC engaged Dennis Southam and Associates to conduct an independent review of the submitted design criteria. The summary pages of the report are contained in Appendix B and the extensive report is available to WSAA members upon request. The finding of the report confirms that the calculations used in the design of Vent Stacks comply with the requirements of the standard.

*WSAA Members have determined that evidence presented in the course of considering this appraisal will meet the requirements of WSAA Sewerage Code of Australia (WSA 02-2002) Drawing No. SEW 1408 – Ventilation Systems – Educt Vent and AS/NZS 1170.2:2002 Structural design actions – Wind actions. No product specification has yet been developed for this range of Vent Shafts*

## 7. Outcomes of Expert Panel Product Review

This product appraisal report updates PA 0313. All WSAA member comments raised in the review have been addressed in the body of this report

## 8. WSAA Member and Field Reports

No field reports have been submitted as part of this appraisal report

## 9. Packaging and Delivery

Standard packaging includes cardboard protection to open ends. Shipping sizes are full length single piece or in two or more parts at specific request.

## 10. Product Warranty/Life Expectancy

The following is a statement provided by the manufacturer:

- The known life is in excess of 25 years.
- The projected life is 50 years plus.

This is proven by:

- a) Existing FRP products in industrial locations exposed to atmosphere and UV attack.
- b) Regression testing performed by resin manufacturers.
- c) Regression testing performed for Sydney Water in respect of the Ocean Outfall projects in Sydney.

## 11. Transport

The Vent Stacks are manufactured and transported at full length or in two parts at specific request from the customer.

## 12. Future Works

No Future works are required

## 13. Discussion

Examination of all of the submitted documented material provides an expectation that the products described here and manufactured and distributed by RPC Technologies Pty Ltd are 'fit for purpose' in gravity sewer, pipeline networks subject to future works items

## 14. Report Recommendation

It is recommended that WSAA Members and Associates, subject to any specific requirements of the Member or Associate, accept or authorise the RPC technologies product range as detailed in this report for use in gravity sewer networks provided pipeline design, installation, acceptance testing and commissioning are in accordance with relevant WSAA Codes, WSAA Member Integrated Codes, and the manufacturer's requirements.

## 15. Disclaimer

This Appraisal Report is issued by the Water Services Association of Australia Ltd. on the understanding that :

- a) This appraisal applies to the product(s) as submitted. Any changes to the product(s) either minor or major shall void this appraisal.
- b) To maintain the recommendations of this appraisal any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the appraisal report and appropriate action. Appraisals and their recommendations will be the subject of continuous review dependent upon the satisfactory performance of products.
- c) WSAA reserves the right to undertake random audits of product manufacture and installation. Where products fail to maintain appraised performance requirements the appraisal and its recommendations may be modified and reissued. Appraisal reports will be reviewed and reissued at regular intervals not exceeding five (5) years.
- d) The following information explains a number of very important limits on your ability to rely on the information in this Product Appraisal Report. Please read it carefully and take it into account when considering the contents of this Product Appraisal Report
- e) Any inquiries regarding this report should be directed to the Appraisal Project Manager, Grant Leslie, Phone: 02 9290 3655 - E-mail [grant.leslie@wsaa.asn.au](mailto:grant.leslie@wsaa.asn.au)

### 15.3. [Issue of Report](#)

This Product Appraisal Report (Report) has been published and/or prepared by the Water Services Association of Australia, Inc and nominated Project Manager and peer group of technical specialists (the Publishers).

The Report has been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Report (the Recipients).

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#### 15.4.1. [Disclaimer of liability](#)

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BUREAU VERITAS  
Certification



**Certification**

Awarded to

**RPC TECHNOLOGIES PTY LTD**  
24 POWERS ROAD, SEVEN HILLS  
26 SANDPIPER CLOSE, KOORAGANG ISLAND  
56 CLYDE STREET, BROADMEADOW  
NEW SOUTH WALES, AUSTRALIA

Bureau Veritas certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

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STANDARD

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**AS/NZS ISO 9001:2008**

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SCOPE OF SUPPLY

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**SEVEN HILLS:**  
MARKETING, DESIGN, PROJECT MANAGEMENT AND  
SPECIALTY FABRICATION WORKSHOP

**KOORAGANG ISLAND:**  
MANUFACTURE OF REINFORCED PLASTIC COMPOSITE PRODUCTS


**BROADMEADOW:**  
DESIGN, MANUFACTURE AND PROCUREMENT OF RAILCAR INTERIOR PRODUCTS,  
GLASS REINFORCED PLASTIC AND COMPOSITES PRODUCTS

Original Approval Date: **05 DECEMBER 1995**

*Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until:* **04 DECEMBER 2011**

To check the validity of this certificate please call: **Bureau Veritas Australia Pty Ltd**  
*Further clarification regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation*

Certificate Number: **9000216 A**      Date: **06 NOVEMBER 2009**

  
**JAS-ANZ**  


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Issuing office: Bureau Veritas Pty Ltd, 26 Colin Street, West Perth, Western Australia, Australia, 6005

**BUREAU VERITAS**  
Certification



## Certification

Awarded to

**PT RPC INDONESIA**

**BATAM ISLAND**

**INDONESIA**

Bureau Veritas certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

STANDARD

**AS/NZS ISO 9001:2008**

SCOPE OF SUPPLY

**MANUFACTURE OF REINFORCED PLASTIC COMPOSITE PRODUCTS**

Original Approval Date : **05 DECEMBER 1995**

Subject to the continued satisfactory operation of the organisation's Management System,  
this certificate is valid until : **04 DECEMBER 2011**

To check the validity of this certificate please call : **Bureau Veritas Australia Pty Ltd**  
Further clarification regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation

Certificate Number: **9000216 B**

Date: **06 NOVEMBER 2009**

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## Appendix B      Independent Assessment of Compliance to AS1170.2:2002

The cover pages of this report is contained in this appraisal. The full report supplied by Southam and Associates is extensive and is available to WSAA members upon request





**DESIGN CALCULATIONS  
JOB No: 3178**

**DENNIS SOUTHAM & ASSOCIATES PTY LTD**  
A.B.N. 63 397 687 450  
3 YELTU COURT NEWPORT S.A. 5015  
phone 08-84495829 FAX 08-84495829 e-mail d.southam@dsapl.com.au

**RPC TECHNOLOGIES PTY LTD**

**GRP VENT SHAFTS**

**DESIGN CALCULATIONS  
FOR REGION A AND REGION C WIND LOADING**

REV No	ISSUE DATE	REVISION SUMMARY	APPROVED	SIGNATURE
01	23/12/2009	Changed stack OD for wind analysis.	D.O.SOUTHAM	
02	5/01/2010	Stack average diam changed, added lap shear strength	D.O.SOUTHAM	
03	6/01/2010	Revise drag coefficients	D.O.SOUTHAM	
04	21/01/2010	Added general note re design standards	D.O.SOUTHAM	

**ITEM: GRP VENT SHAFTS**

**A. DESIGN BASIS**

**1.0 DESIGN CONDITIONS**

DESIGN TEMPERATURE:	AMBIENT
DESIGN PRESSURE:	ATMOSPHERIC
CHEMICAL CONDITIONS:	SEWER VENT GASES
RESIN SYSTEM:	ISOPHTHALIC
WIND LOADING:	AS1170.2, REGION C, TERRAIN CAT 1
SEISMIC:	NOT SIGNIFICANT FOR LIGHTWEIGHT FRP VENTS
CORROSION BARRIER:	ISOPHTHALIC

**2.0 REFERENCE DOCUMENTS:**

RPC TECHNOLOGIES PTY LTD  
EMAILS 6/11/2009, 9/11/2009,  
11/11/2009, 16/11/2009, 24/11/2009 &  
25/11/2009.

**3.0 DESIGN STANDARDS:**

AS2634:1983, ASME RTP-1:2007,  
AS3571:2009, BS4994:1987,  
BS7159:1989, WHERE APPLICABLE,  
AS1170.0:2002, AS1170.2:2002.

**Δ Rev 4**

**NOTE: The design calculations here within comply with AS1170.2:2002 for wind loading. The calculations also comply with the FRP/GRP standards listed above insofar as they are relevant to the design of stacks and with good engineering practice for the design of FRP equipment in corrosive service.**

3 YELTU COURT NEWPORT S.A. phone 61-8-84495829 fax 61-8-84495829  
e-mail d.southam@dsapl.com.au

## Appendix C

## Supplier Contacts

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                  Broadmeadow NSW 2292

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