

BUILDING WATER SERVICES
A Seminar to look beyond minimum standards
Perth, Western Australia – 28 February 2018

3 of 3 - Copy of Slides provided by Third Speaker:

Guest Speaker: Colin Kirkland – Air Valve Product Manager & Technical Representative
Bermad Water Technologies

With over 30 years' experience working in water supply and over 16 years' at Bermad Water Technologies Colin Kirkland is a leader in his field. His success in the water industry flows from his practical engineering background and years of onsite commissioning and project management. He also credits his training at Weir pumps in his native Scotland for providing him with a solid grounding in pipeline design.

Colin is based in Bermad's Melbourne office and covers a sales territory that spans across Tasmania, Victoria and southern NSW. In addition to his sales experience, Colin manages the air valve range within Bermad Australia. This role sees him conducting seminars across the country – showcasing his expertise on the operation, design and functionality of air release valves.

There is no Audio available and the following slides are provided for information only and as a memory jogger for those who attended. Further Seminars will be held during 2018 in different parts of Australia.

BERMAD WATER TECHNOLOGIES

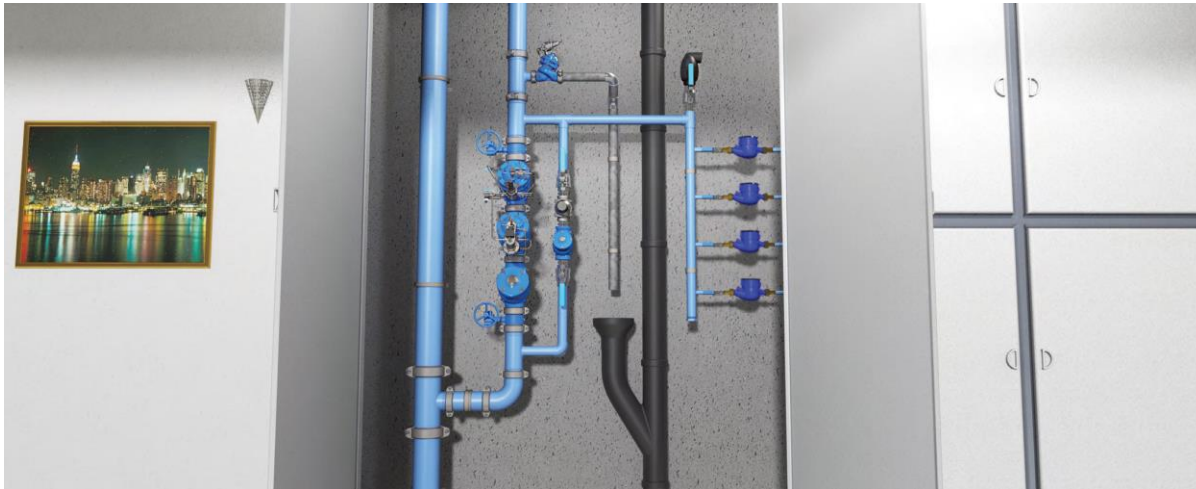
AIR ENTRAPMENT IN BUILDINGS WATER SYSTEMS



PRESENTED BY: COLIN KIRKLAND
DATE: FEB 2017

CONTENTS

- Company Introduction
- How does air get in a building water system
- Effects entrapped air has in buildings
- How air moves in a pipeline
- How to effectively release the air



WHO IS BERMAD WATER TECHNOLOGIES?

Australia's first choice for water technology:

- Suppliers of industry-leading water technology solutions, control valves and meters.
- 1989 – Bob Stephens with over 27 years in business.

OUR VAULES



CONTROL



PROTECT



MEASURE

WE WORK WITH.



THE MARKETS WE
OPERATE IN.



WATERWORKS &
MINING



IRRIGATION



FIRE & BUILDING



METERING

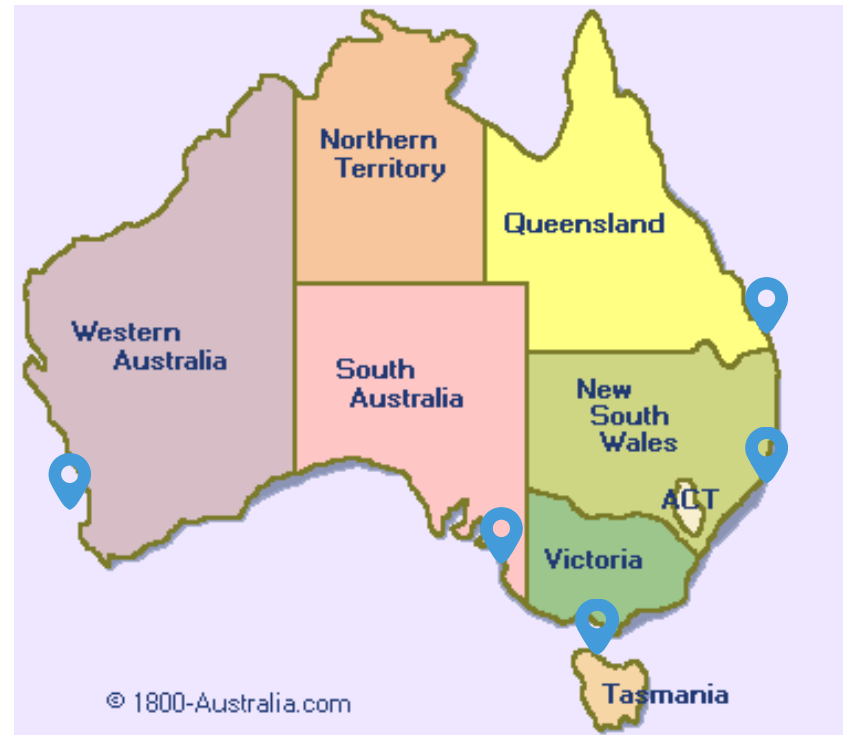
FIRE & BUILDING MARKET

Buildings through out Australia using Bermad



YOUR LOCAL BWT OFFICE.

- VICTORIA**
03 9464 2374 26 Brand Dr Thomastown VIC 3074
- NSW - Sydney**
02 9746 1788
Unit 31, 42-50 Hampstead Rd Homebush West NSW 2140
- QLD**
07 3205 3431
Unit 105, 193 South Pine Rd Brendale QLD 4500
- SA / NT**
08 8359 8696
Unit 2, 43 Douglas Dr Mawson Lakes SA 5095
- WA**
08 9227 0014
Unit 4 , 21 Harris Road , Malaga WA 6090



SETTING THE INDUSTRY STANDARD.

We're dedicated to the highest quality, and all of our products are designed to set industry standards. As part of that, we ensure that every product fully complies with a certain standard too. Specifically, the standard AS5081, AS4020, AS4956.

We're the only company in Australia to apply for and receive this industry accreditation.



Australian Government
Department of Industry,
Innovation and Science

**National
Measurement
Institute**

**Certificate of Approval
NMI 14/3/36**



HOW DOES AIR GET INTO A BUILDING NETWORK

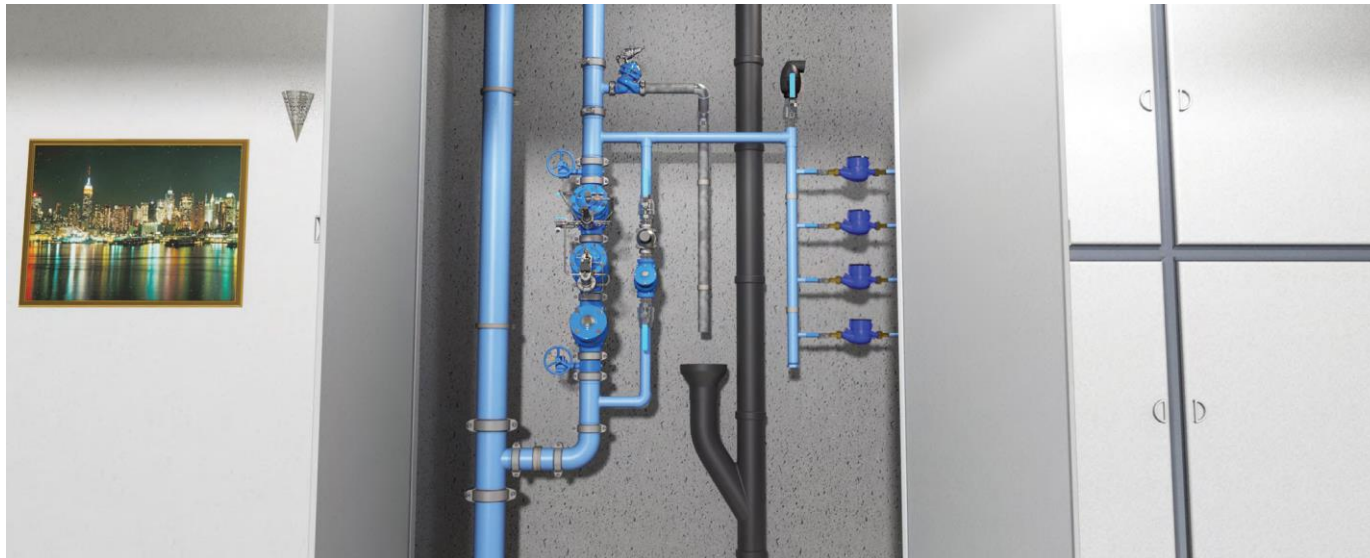


WATERWORKS
& MINING

PRESSURE REDUCTION STATIONS



- Reduction of pressure from high to low in pressure reduction stations or pressure reduction in tall buildings



HOW DOES AIR GET INTO A BUILDING NETWORK



WATERWORKS
& MINING

HOT WATER SYSTEMS



- As temperature increases percentage of air in solution reduces



HOW DOES AIR GET INTO A BUILDING NETWORK



WATERWORKS
& MINING

PUMPING STATIONS



- Highly agitated water that changes in pressure suddenly releases air from solution



HOW DOES AIR GET INTO A BUILDING NETWORK

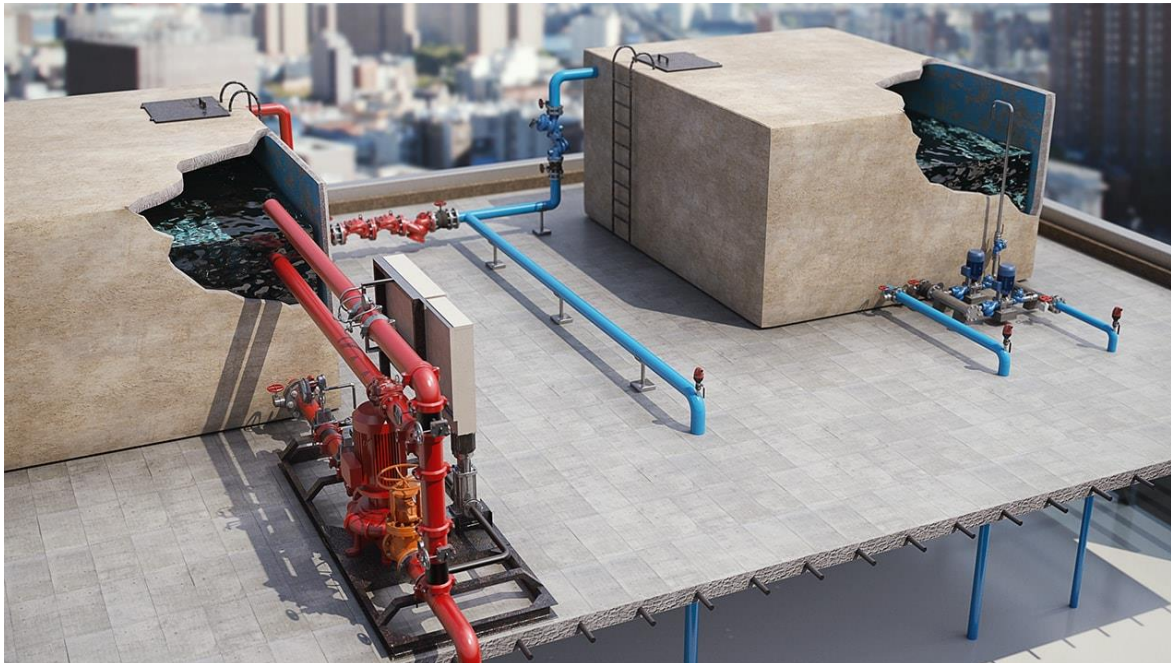


WATERWORKS
& MINING

CHANGES IN EXTERNAL TEMPERATURE TO EXTERNAL PIPEWORK



- External pipework subject to changes in temperature via cooling towers, or hot water circulation systems etc



HOW DOES AIR GET INTO A BUILDING NETWORK

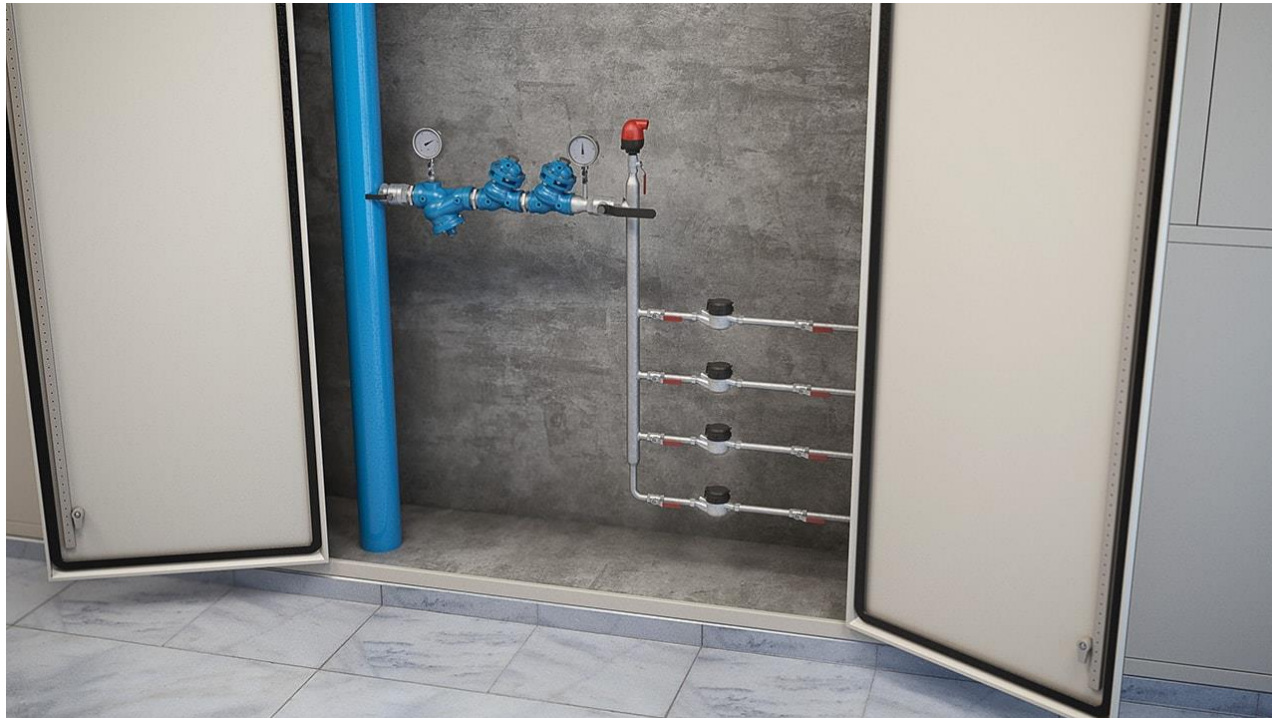


WATERWORKS
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LOCALISED SMALLER REDUCING STATIONS



- Smaller pressure reducing stations prior to metering with vertical pipework



HOW DOES AIR GET INTO A BUILDING NETWORK



WATERWORKS
& MINING

POOR MANUAL DRAINAGE OF NEW SYSTEMS

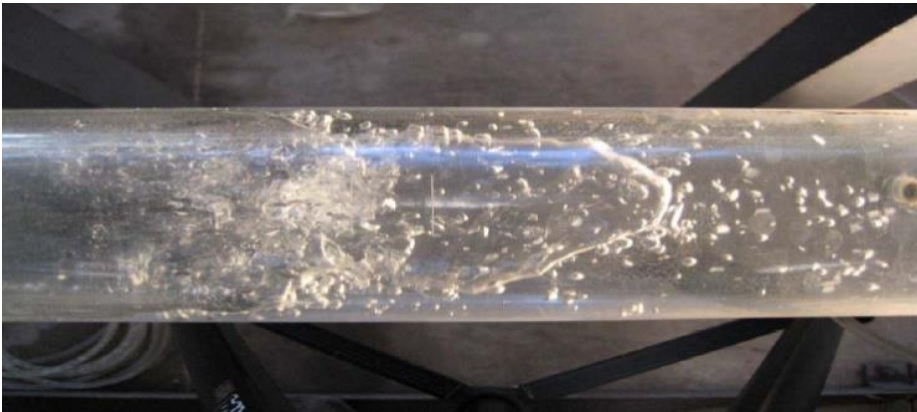


- Dead ends must be properly vented to avoid bouncing of dead ends.

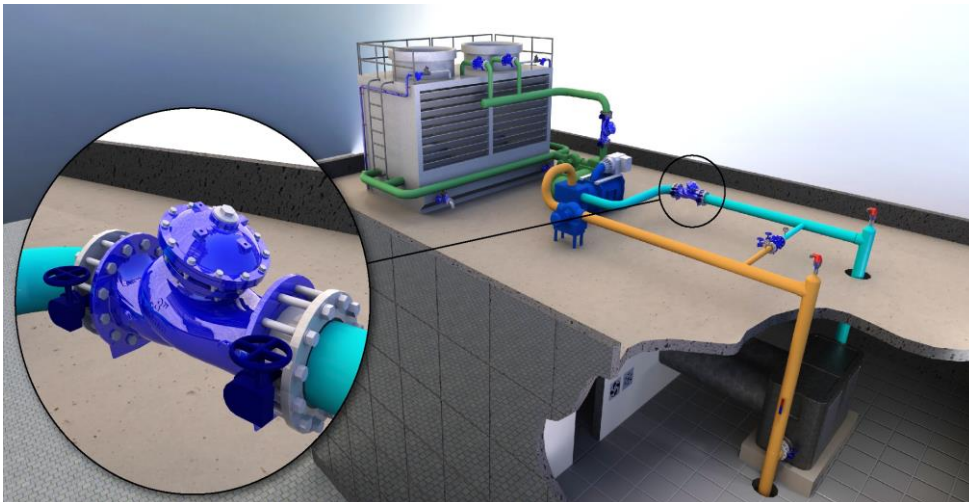


ENTRAPPED AIR IN PIPELINES

PROBLEMS ASSOCIATED WITH AIR LOCKS

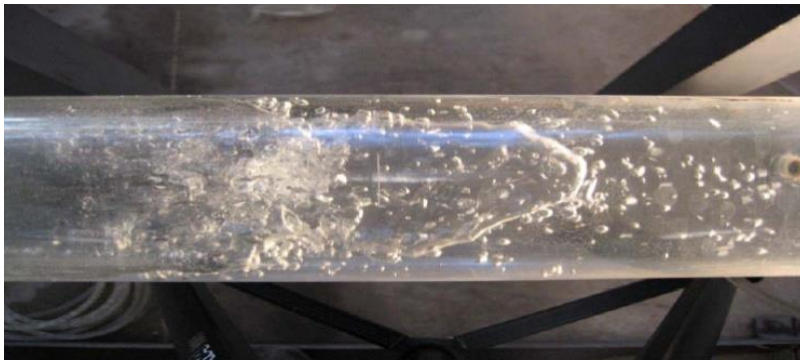


- Reduced flow due to restrictions in the pipeline
- Water hammer due to compressible media in the pipeline.
- Internal corrosion to metallic pipework.
- Problems with flow measurement
- Inability for regulating valves to operate with stability



WILL AIR MOVE IN THE BUILDING NETWORK ?

CRITICAL VELOCITY



Depends on pipe diameter.

Depends on pipe flow rate

Depends on pipe configuration

Examples of flat pipe air movement

200mm pipe = 0.9 m/s

150mm pipe = 0.77 m/s

100mm pipe = 0.63 m/s

80mm pipe = 0.56 m/s



MOVING AIR IN PIPELINES



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CRITICAL VELOCITY CALCULATIONS

The critical velocity

Air movement

It is the value below which the air pocket remains trapped or moves upstream, Up to now, there are no well accepted analytical solutions for the transport of air bubbles and air pockets. Therefore, the design of water pipelines is done using experimental investigations.

The threshold can be expressed by one of the following:



Kent

$$v_s = \frac{4\sqrt{gD}}{\pi} \sqrt{\left(\frac{\tan \alpha}{\sqrt{2}}\right)}$$

Gonzalez

$$V_s = 1,27\sqrt{gDS}$$

Wisner

$$V_c \frac{1}{\sqrt{gD}} = 0,25\sqrt{S} + 0,825$$

Kalinske

$$\frac{V_c}{\sqrt{gD}} = C_o^{1/2} \sqrt{\sin \alpha}$$

AIR VALVE SPECIFICATION OF FOX-AS-HR



VALVE SPECIFICALLY FOR HIGH RISE BUILDINGS



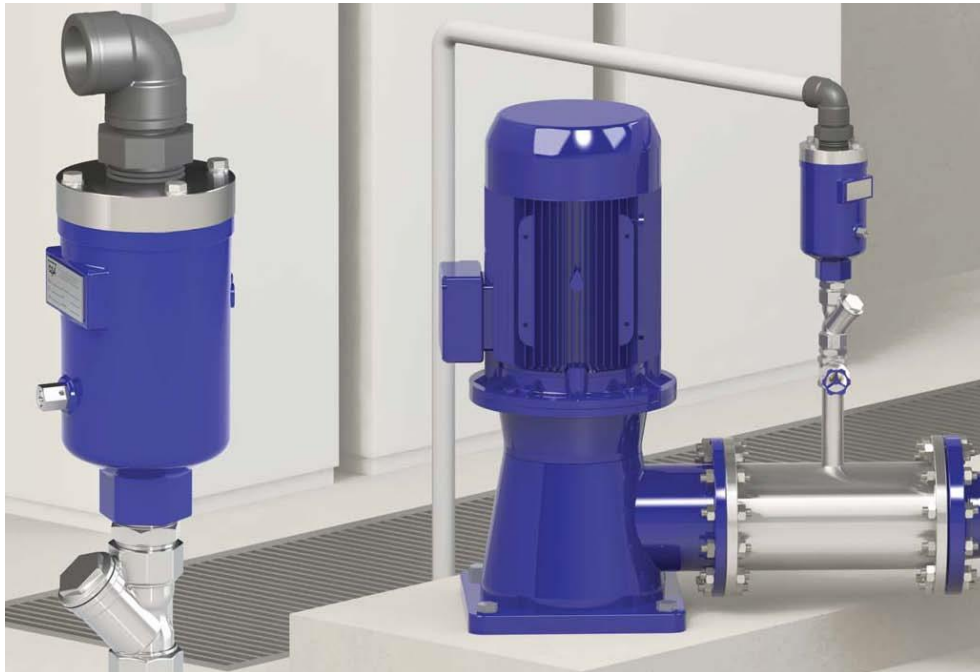
- Full port (nominal bore) air valve
- Low pressure sealing <math>< 0.9\text{m}</math>
- PN16 rated
- Threaded BSP 25mm female
- Test drain valve standard
- Approved to 4020 drinking water
- D.I. / 316SS / PP construction
- Metallic drain port to tundish
- Inlet strainer to avoid contamination
- Anti-slam mechanism to avoid excessive filling and potential water hammer

FOX-AS-HR

2017 FOX-AS DEDIGN



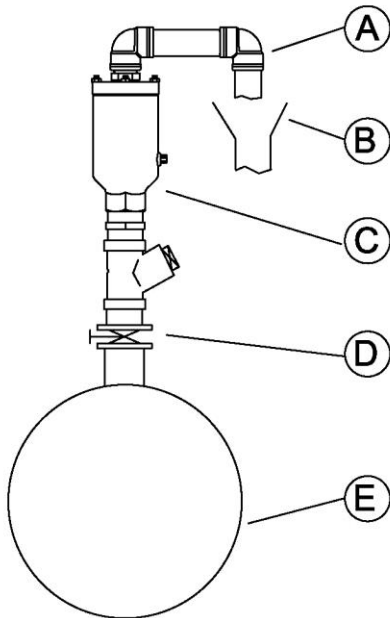
WATERWORKS
& MINING



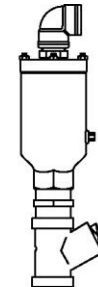
FOX-AS-HR INSTALLATION



**WATERWORKS
& MINING**



Components	
A	discharge pipework to a drain or tundish (by others)
B	Tundish or drain with air gap between air valve outlet
C	CSA Fox-AS-BS air valve, strainer assembly
D	Inlet isolation valve (gate or ball valve by others)
E	Top of the pipeline



Fox-AS-HR Anti-slam air valve assembly for building services

Connections
 Inlet 1" BSP female (to strainer)
 Outlet 3/4" BSP female from outlet

Pressure rating PN16
 Materials Ductile Iron FBE coated & stainless steel



CSA srl - Strada San Giuseppe 16
 43028 Salsomaggiore Terme (PR)
 Tel. 0514823878 Fax. 0514031

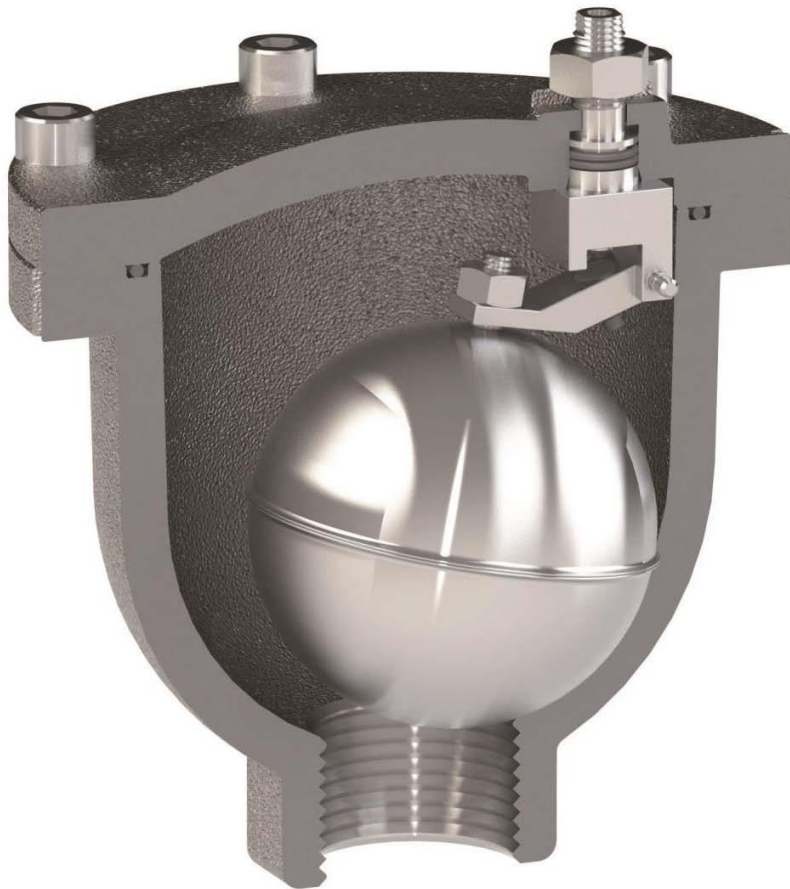
Technical drawing
 Fox



ENTRAPPED AIR RELEASE HOT WATER SYSTEMS



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Ventolo

WHERE TO FIND INFORMATION ON THE PRODUCTS



WWW.BERMAD.COM.AU

A screenshot of the BERMAD website's product page for the "Fox 3 RFP Rapid Filling Preventer with mesh". The page features a navigation menu at the top with links for "About", "Technical Assistance", "Products", "Knowledge Hub", "News and Info", "Approvals", "Contact Us", and "Interactive Training Facility". A search bar is also present. The main content area includes a breadcrumb trail: "Home > Product Categories > Air Release > Fox 3 RFP Rapid Filling Preventer with mesh". The product title "CSA Fox 3 RFP Rapid Filling Preventer with mesh" is displayed prominently. Below the title is a 3D cutaway image of the blue valve. To the right of the image is a descriptive paragraph: "The CSA Mod. FOX 3F-RFP, is a full bore high quality single chamber double function combination air valve with a built in anti-water hammer non-slam surge prevention system. The air valve allows release of air packets from pressurized pipelines, and admits large volume of air in the event of pipe draining/fluid, to prevent vacuum and negative pressure conditions. During suction line air valves senses the increase in air velocity and differential pressure using, if required by excessive values, the RFP (anti-surge) Rat to control the air suction rate thus avoiding fast approaches of water column with potential sudden closures of the mobile block and the risk of water hammer. Entirely made in ductile cast iron, with an release system and seat in stainless steel, FOX 3F-RFP stands out for its long lasting performance and reliability." Below the text are two call-to-action buttons: "Watch 'NEW' Features and benefits including operation of Fox-RFP" and "Watch Animations of Fox-RFP air valve". On the left side of the page, there is a vertical list of other product categories with expandable arrows.

- Data sheets
- Manuals
- Animation on valve functions
- Auto-cad drawings
- Engineering and sizing data
- <http://www.bermad.com.au/category/air-release/>

THANKYOU

COLIN KIRKLAND

