

PERFORMANCE BASED ROOF DRAINAGE SOLUTIONS

For too many years the design restrictions within AS3500.3 have hindered the development of cost effective design solutions for box gutter systems, which has resulted in costly roof drainage installations, or forced plumbers and designers into stepping outside the Australian Standards limitations without properly tested and researched roof drainage solutions.

In particular the high capacity overflow device for sumps and the limitations of box gutters to DN150 downpipes at 16L/s flow are preventing cost effective drainage solutions for 1:100 year rainfall events in Queensland. In the past, plumbers and designers have tried to resolve this issue through alternative installations and designs based on experience and other theoretical data available, however these systems have not been tested in a controlled environment and this creates great risks for the plumber and designer, should an insurance claim arise from water ingress into the building.

To resolve this issue, the Association of Hydraulic Services Consultants Australia (AHSCA) collaborated with the University of the Sunshine Coast, built a roof drainage test rig and developed a performance based box gutter design software. Under the supervision of Associate Professor Terry Luke, thousands of tests were carried out to review the performance of different box gutter dimensions, sump sizes, overflow devices and downpipe outlets under various flow conditions.

The result of the research project was the development of an additional 12 downpipe/overflow combination configurations, some of which can drain up to 100 l/s with a single outlet, far in excess of the 16l./s limitation of AS/NZS 3500.3.

These results were then used to develop a modelling software for hydraulic services consultants to provide cost-effective roof Performance Solutions in accordance with the National Construction Code.

Care must be taken however when designing roof drainage systems above 16L/s due to the velocities and pressures occurring in the drainage pipework at these increased flow rates.

Also, a different certification process for the performance-based design must be followed when stepping outside the AS3500.3 limitations. Therefore, the performance based roof drainage design software is only available to appropriately trained and certified AHSCA members. A number of Queensland based AHSCA consultants are already certified and are able to assist in bringing substantial savings to projects for small or large projects.

Engaging a consultant for a performance based roof drainage design may seem cost prohibitive in some instances, however for most projects the savings achieved by reducing the number of downpipes, in ground drainage, surcharge pits and simplifying the box gutter overflow devices will outweigh the costs associated with the initial design. Reducing the impact of the box gutter drainage system on the building structure and architecture provides further benefits and cost savings.

For any further questions or enquiries, please contact your AHSCA state chapter.