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Autumn/Winter Edition 2011



NEWSLETTER OF THE COMMISSIONING SPECIALISTS ASSOCIATION

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BG 29/2011 Pre-commission Cleaning of Pipework Systems

Following the publication of the revised flushing guide in October, Roger Carlin, MD of Ashford Environmental Services Limited reviews the new document to highlight the main changes and assess whether it has covered the issues raised by the industry.

After the Commissioning Specialists Association AGM in 2009 and the subsequent industry consultation later that year, BSRIA set up two groups in 2010, the "Pre-commission Cleaning Guide" group and the "Water Sampling Standard" group. The former would update AG1/2001 taking account of changes in industry practice and feedback from the consultation, and the latter would formalise the sampling methodology for closed circuit water systems in buildings through the life of the building, in particular to improve the consistency of results at the pre-commission cleaning stage. The result of the "Pre-commission Cleaning Guide" group was published in October and for those who haven't got a copy yet, the highlights are set out below. So does this updated version tick all the boxes? Let's find out.

At first glance one notes the document reference number has changed in line with BSRIA's current policy; gone is the AG (Application Guide) to be replaced simply with BG, presumably BSRIA Guide?

Upon opening the cover and reading the Acknowledgements, the intention of the new guide is clear. It states: "It is not intended that contracts or specifications refer to the Guide in its entirety, rather that direct references are made to specific sections to suit the particular circumstances" and the theme continues, the Preface stating: "The latest version of the Guide incorporates industry feedback from nearly twenty years of flushing and cleaning using the guide. In particular it aims to clarify the roles and responsibilities of the parties, improve the exchange of information between them and provide a consistency between service offerings of the pre-commissioning cleaning contractors."

Although the text seems ostensibly the same, there is a lot of additional information and clarifications, most notably the appendices. Also, the addition of advertising marks a sea change in how BSRIA generate revenue. Even though as a company we took up the offer, particularly as we contributed to this and other publications, personally I am uncomfortable with it. I am sure BSRIA would be quick to point out that they are not endorsing the companies or products advertising, however, to me, the fact that an advert is in the guide gives the impression that they are.

Continued on Pages 3, 4 & 5

NEW MEMBERS

Corporate – Airtech Premier Ltd, Essex, and Climacare Commissioning Ltd, Coulsdon, Surrey.

Individual – Alex Derrick, John Whitelaw, Andrew Somerville, Neil Myers, Steve Ashcroft, Shaun Pulman, John Given, Garrath Jones, Adrian Sims, Simon Always, Daniel Davies, Colin Riding, Steven Cross, Sean McCaughey, Carl Mason, Andrew Aldred, Robert Brown, Brian Lawless, Matthew Corlett, Ewen Beattie, Wesley Bates, Damien Twizzell, James O'Connor, Lewis Helme, Graham Watt, Daniel Clark, Aaron Williams, Laurence Scully, Stephen Kelly, Richard Pyne, James Umansky, Robert Scott, Paul Berry.

Individual Associate – Dionysios Koutsouvellis.

We would like to welcome the above new members to the Association



Jules' News

As another year comes to an end and Christmas is once again upon us, I am pleased to report that the CSA has had a record number of new members this year and DLCs are also up compared to last year. There have been 71 DLCs sent out and 132 new members which is extremely encouraging for the CSA.

A new Commissioning Engineers Compendium 2012 is currently being finalised by the Technical Committee and we hope to have this available in the Spring of 2012.

You will soon be receiving your annual membership invoices for 2012 and prompt payment would be very much appreciated. I would urge all members to ensure that their membership for 2012 is maintained as we are issuing new certificates to all categories of membership which will now expire at the end of each year.

There are still some Corporate members who have not adhered to our request to register ALL their engineers as Individual members, despite receiving a massive 60% discount and a reminder letter will be sent to you very soon. If you also enrol the engineer on one of our Distance Learning Courses at the same time, you will receive the **first year's Individual membership free!** All you need to do is download an Individual membership application form from our website www.csa.org.uk membership section and e-mail it to me at the CSA office with your current CV and a photo. This is then sent to our Assessment panel for approval and grading – it is as simple as that!

NVQ LEVEL 3 – INSTALLATION & COMMISSIONING

We currently have 5 students taking the on-line CSA NVQ Level 3 in “Installation & Commissioning” – This is a nationally recognised qualification in the UK and throughout Europe. Unfortunately there will be a **price increase in January 2012** and members will pay **£1,275.00** and non-members will pay **£1,375.00**, so if you have been thinking of taking the NVQ 3 but have not enrolled yet, don't hesitate, enrol now and pay 2011 price. For further information go to our website www.csa.org.uk to download an Information sheet and Enrolment form – so don't delay!

DLC TEST RESULTS

Congratulations to those listed below who have recently passed their DLC A test and DLC C course.

DLC A: Andrew Johnson, Christian Richards, Ross Cripps, Ryan Kiss, Antony Paniadima

DLC C: Craig Foster, Shaun Frawley, Andrew Yates

GRADE 4 EXAM RESULTS (15th October 2011)

Congratulations to those listed below who passed the Grade 4 Exam:

ROBERT BROWN
CURTIS BOUGHTON
RICHARD HILL
CHRIS PRICE
PHILIP SIMPSON

The Next Grade 4 Exam will be held Saturday 19th May 2012 and costs £50. Anyone wishing to take this exam should email the CSA office (office@csa.org.uk) as soon as possible. We always endeavour to make sure you take the exam locally in your area. We do, however, require 2 weeks cancellation notice or you will be charged the full amount.

Insurance for CSA Members



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DATE FOR YOUR DIARIES – CSA ANNUAL GENERAL MEETING FRIDAY 20 APRIL 2012

Please make a note of the date of the next CSA AGM and further information on venue, times, etc. will be available on our website in January 2012.

Finally, I would like to thank all our members for supporting us over the past year and hope you continue to do so in 2012 and all those on the various committees who have again worked tirelessly updating our training material, technical publications and contribute so much to the CSA – which just leaves me to wish you a great Christmas and a Happy New Year!

Julie Parker CSA Secretary

Continued from front page

The Introduction, a new section, explains what pre-commission cleaning is, the parameters for what constitutes a clean system, that the process requires trained and qualified operatives, how success is inferred from post clean sampling, and how success is dependent on sound design and good practice in storage and handling of materials and installation. Most importantly, it emphasises that “*the guidelines relate to pre-commission cleaning activity for new heating and chilled water systems*” and that they are indeed guidelines, and “*intended to demonstrate that the system has been adequately cleaned and that water quality is under control*”. It goes on to say that “*the results of water analysis should always be subject to interpretation by the appointed cleaning or water treatment specialist in the context of the project and water treatment regime*”.

The intention could not be clearer. This guide starts at project conception and ends at practical completion. A new guide, currently being prepared by a joint working group of the Water Management Society (WMS), the British Association of Chemical Specialists (BACS), the Commissioning Specialists Association (CSA) and BSRIA will provide guidance on reducing corrosion risk and the long term maintenance of water quality after practical completion. This is not expected to be published until 2013.

There follows a brief review of the new guide, on a section by section basis, to highlight significant changes. These may not be exhaustive and my interpretation may not be that of others. If you are concerned with pre-commission cleaning, then you should buy a copy and study the sections that are most relevant to you, whatever your discipline.

Section 2 – Design Considerations

This section now contains clear recommendations to the system designer in the respect that he should “*address the requirements for system cleaning at an early stage in the design of the system*”. By involving a suitably qualified and experienced cleaning specialist to review and comment on the proposed design, he can ensure that the assembled system is amenable to successful pre-commission cleaning. Perhaps in time this will become known as the “*cleanability or flushability review*” rather like the commissioning equivalent.

The designer is also requested to consider “*what features need to be avoided (or bypassed) to facilitate the cleaning process*” and provide “*detailed estimates of system volumes (down to sub-branch and terminal unit level) to allow for initial calculation of chemical dosing during cleaning and subsequent treatment*”. He is also encouraged to ensure that a realistic time and resource estimate for pre-commission cleaning is included in the overall project

programme. All of the above items can be easily dealt with by the timely input of a reputable cleaning specialist.

Further changes include the recommendations for the inclusion of corrosion and bio-fouling coupons (or on-line monitoring) and the use of biocides and inhibitors when initially filling the systems; and the recognition that a static flush may not be required on all projects. Recommendations for additional drain points, bypasses and /or the removal of pipeline equipment when dealing with high resistance control/measuring/regulating valves; the avoidance of stagnation due to dead legs (looping) and the metering of pressurisation unit make-up water is also included. Flow-through type pressurisation units are also recommended together with connections being as short as possible. The clause on pressure test points has been expanded to indicate their suitability for the various sampling parameters.

A number of new clauses have been added to the Design Considerations section: “*Physical segregation of zones*” discusses the merits of physical separation, particularly in large projects with phased or protracted pre-commission cleaning programmes; “*Water Conservation*” discusses ways to reduce water consumption during the flushing process with the use of side stream filtration, recirculation filtering etc.

The “*Large bore pipework*” clause now includes a recommendation to design in facilities to allow easy access for physical cleaning.

Plastic pipework gets the recommendation to specify with an oxygen permeation barrier to reduce the risk of corrosion in mixed metal and plastic pipework systems, and stainless steel is now included, alerting us to the risk of mixed metal corrosion and chemical compatibility issues.

The use of automatic dosing is now NOT recommended due to the issues with bacterial resistance and potential immunity. Instead, traditional dosing pots or the use of pumped dosing systems under manual control is recommended. Side stream filters are now recommended for all systems, strongly for systems over 2500 litres, the advice being to use immediately after cleaning for best effect. Other types of filtration such as full flow and magnetic are also discussed.

The schematics section has been given an update, with temporary flushing tank provision being removed and “*Systems with two-port control valve*” arrangements being added. This clause explains the difficulties in achieving an effective back flush and recommends the installation of an additional drain cock between the two-port control valve and the coil.

Continued

Section 3 – Inspection and Witnessing

Timetable

The term “pseudomonads” is now used rather than pseudomonas as this is a more accurate description of the wide variety of pseudomonas like species which exist in our water.

The guide now recommends that the proposed water supply is sampled one to two weeks before filling the system for pressure testing. Between system filling and the commencement of pre-commission cleaning, the guide now recommends sampling at intervals of not more than four weeks and one week prior to the commencement of pre-commission cleaning. Appendix A suggests numbers and locations of samples and analysis should be for TVC, pseudomonads and sulphate reducing bacteria. At the end of pre-clean and dynamic flush, the soluble iron must be lower than three parts per million, down from five.

Chemical and microbiological tests should now be carried out seven days after completion of cleaning and final dosing, the following revised parameters taken from Table 4 apply:

Total alkalinity, chloride, sulphate, pH and conductivity are as recommended by cleaning specialist

Suspended solids <30ppm at the pump

Settled solids <45ppm at extremes in pipework and terminal units

Soluble iron <3ppm

Total iron <6ppm

Total copper <1 (or as recommended by cleaning specialist)

Soluble copper, aluminium and zinc – for information only

Terminal units <45ppm

Bacteria as 1/2001.1 but now reports Pseudomonads as cfu/100ml at 30°C and TVC at 22°C only.

The new guide re-iterates the need to circulate between dosing and sampling and stresses that no work should be carried out on the system that entails the loss of, or introduction of fresh water, as this could re-introduce contaminants and compromise the state of the system and the results of the tests. It goes on to state that any commissioning or maintenance work should ideally be deferred until after the seven day period and successful results are received.

Importantly, this section stresses that the guidelines in Table 4 are based on practical experience of what can be achieved in the majority of new heating and chilled systems. It goes on to say, however, that “*these guidelines may not be achievable for the re-cleaning of old systems*”.

Monitoring to PC

There is now a requirement to monitor and maintain until PC, however, the guide suggests that this should be subject to a separate appointment, highlighting that whoever is contracted to do it cannot be held responsible for parameters at PC as this depends on factors outside of their control. This is hugely important to understand when setting the scope of works.

The recommended scope of this routine monitoring is summarised in Appendix A and defined in the new British Standard (BS8552). Sampling should be at least every two weeks unless agreed otherwise, with chemical and physical parameters being tested using portable test kits or laboratory analysis, however, analysis for PC and ALL microbiological sampling should be carried out at a recognised laboratory, with test methods conforming to the new BS.

A warning is given against the overdosing or repeat dosing of biocide as this can lead to resistance, and we are also told that organic biocide should never be proportionally dosed into makeup water.

The section goes on to say that since the process of sampling may flush that part of the system affecting the settled solids, this should be taken into account when interpreting the results. New tables 5 and 6 give guidance on the requirements for sampling between pre-commission cleaning and PC, and Table 7 for PC if that is within three months of pre-commission cleaning. For longer commissioning periods, the guide suggests obtaining the advice of the cleaning specialist.

Referring to Table 5, the guidelines are as above, with the exception of total iron which increases to 15 mg/l and settled solids. This is where it gets complicated. These should be less than 60 mg/l at the extremes of a system, but less than 45 mg/l if previously sampled within the last 3 weeks. Less than 90 mg/l at terminal units not previously sampled, but less than 45 mg/l if previously sampled (or flushed) within the last 3 weeks. Any individual results of greater than 90 mg/l should be investigated.

Table 6 gives microbiological guidelines for the state of the whole system and uses geometric means of sets of results to establish the acceptability of the system in question. The guidelines are TVC at 22°C should be less than 100,000 cfu/ml, pseudomonads 10,000 cfu/100ml and no increasing trend sulphate reducing bacteria absent and nitrate/nitrite reducing bacteria – for information only.

Table 7 (results for PC) refers back to previous tables using trends to indicate acceptability. Put simply, if the system result is between the guidelines in Table 4 and

Continued

Table 6 with no increasing trend for three successive sets of samples up to and including PC, then the system is acceptable.

Importantly a single result that exceeds the PC guideline will not prevent handover provided that the system result meets the guideline. If, however, PC is more than three months after pre-commission cleaning, the trend is established from linear regression of the logarithmic values of the last five results. Limits to acceptable bacteriological concentrations should be established by agreement between the cleaning specialist and the client.

If PC is within one month of pre-commission cleaning then the system is acceptable if the last set of results meet the guidelines in Table 4.

There is also reference to the problems caused by high levels of dissolved oxygen.

Section 4 – Installation Considerations

There are few changes to this section, but a number of new clauses merit a mention.

Management

It is suggested that the original site inspection is enhanced to include a pre-install design review in terms of the system and operating features relevant to pre-commission cleaning and that results are communicated to the consultant. A full site inspection carried out progressively during the construction phase is also advisable.

The importance of system specific method statements and record keeping is emphasised as is the need to obtain approval to discharge to drain from the local utility provided at an early stage as this can prove a lengthy process.

Consequential damage gets a mention with some brief guidance on mitigating the risks.

Preparation for Flushing and Cleaning

New clauses cover the suitability of the water supply to be used for the flushing process, and stresses that if water quality is inadequate, then treatment may be necessary. Table 8 provides quality parameters.

System filling now includes the recommendation that cleaning specialist should advise on the appropriate measures to protect the system between filling and cleaning to avoid bacteriological problems and bio film development. It also highlights the need to isolate terminal units prior to filling.

Section 5 – System Dynamic Flushing

This section now emphasises that the flushing velocity relates to batch work and gives recommended minimum flushing velocities, found to be effective in practice, in Table 9.

Dynamic flushing of horizontal mains gets a re-write to better explain the batch work process and highlights the requirement to ensure that the section is clean before moving on to the next batch.

Reconnection of terminal units and main plant items now recognises that previously wetted units require treatment in excess of back flushing, and recommends an additional drain point where high loss valves are fitted and the removal of constant flow regulators for this process.

Section 6 – Chemical Cleaning

It is suggested that a biocide wash, prior to the pre-flush may be beneficial if there has been a delay between pressure testing and cleaning to disrupt any accumulated bio-film. The importance of temperature is discussed in detail, highlighting the effects not only of thermal shock, but the extended contact times in cold weather. It also gives a list of factors affecting circulation time.

The document finishes with minor amendments to “Connections between new and existing Systems” and three appendices. These are Appendix A – Numbers and Locations or Samples, Appendix B – Treatment of Results and Appendix C – Examples Framework for Record Keeping.

Conclusion

To sum up, I think the industry will benefit from this revised guidance. The emphasis has been put on better design, better management and stricter control of who does what and when. It clearly defines the responsibilities of all parties and where pre-commission cleaning stops and maintenance begins. The sampling may be greater, particularly on the larger projects, but the potential benefits to the end user are many. I think some of us may initially struggle with the maths used in the interpretation of the results, however, I would hope that this new, statistical approach will alleviate some of the arguments we currently see at PC.

Looking back at my last article on the subject (*Index Summer Edition 2011*) and the key issues raised by the industry listed therein, I think this document has done a pretty good job of addressing them all. I believe the industry will be better for it. Time will tell.

Roger Carlin – Ashford Environmental Services Ltd

CHAIRMAN'S RANT

Another year over and a new one just begun let's hope it's a good one for the Commissioning Specialists Association!

Without doubt these are worrying times on a global economic scale but it never ceases to amaze me the amount of time our committee members are willing to give up for the cause that is the CSA. Many of these guys, myself included, are principals of their own businesses so we are fully aware of the time sacrifices that are made by all in ensuring the continued success of this association, so for all of those that do or have contributed we thank you and your employer for allowing you the time to get involved, and an involving year it has been.

As you will have learnt from Roger's article we had great input into the new Pre-commission Cleaning Guide and the CSA was ably represented by Roger. We are also represented on the BS Water Sampling Committee by Elizabeth Day, so let there be no doubt that the CSA is recognised as the voice of the Building Services Commissioning Industry. We must also thank Julie and Michelle who ensure that the association runs like a well-oiled machine and remain calm and dignified even when subjected to a few "difficult members" telephone calls and enquiries, so please remember guys that when you are having a bad day, it is never their fault that you have not achieved the grading you were expecting or maybe in the time scale you would like!

Other than that with space at a premium in this bumper edition of *Index* I wish you all a Merry Christmas and a Healthy and Happy New Year, hopefully with a return to a profit margin of some description! Enjoy!

Neil White – CSA Chairman

INTERACTIVE TECHNICAL FORUM

The CSA interactive technical forum has been developed to further develop open educational resources for its members. Members of the CSA who register will be able to post technical questions, which in turn will be answered by CSA appointed expert moderators. This resource provides all CSA members with a recognised channel to seek advice on matters such as best practice, career development and training. There is also a topical discussion section with relevant topics for open discussion on the latest issues and developments within the Commissioning industry. It is hoped that through a sharing of knowledge, the forum will generate a better understanding of the practical issues faced within the commissioning industry today. To register go to www.csa.org.uk/technicalquestions.

The screenshot shows the website for the Commissioning Specialists Association (CSA). The header includes the CSA logo, the association's name, and a search bar. Below the header, there are navigation links for 'Board index', 'User Control Panel', and 'FAQ'. The main content area features a table of technical questions and answers, categorized into 'Expert Q&A', 'CSA TOPICAL DISCUSSION', and 'ARCHIVE'. The 'Expert Q&A' section has 4 topics and 6 posts. The 'CSA TOPICAL DISCUSSION' section has two topics: 'HVAC Controls Systems' (1 topic, 5 posts) and 'Air Flow Metering' (1 topic, 5 posts). The 'ARCHIVE' section has 0 topics and 0 posts. Below the table, there is a 'WHO IS ONLINE' section showing 2 users online and a 'STATISTICS' section showing 16 total posts, 6 total topics, and 13 total members. The footer includes a 'Board index' link and a copyright notice for phpBB.

TECHNICAL QUESTIONS AND ANSWERS	TOPICS	POSTS	LAST POST
Expert Q&A Expert Comments Moderator: Expert	4	6	by Member 5 G Wed Sep 22, 2010 5:28 pm

CSA TOPICAL DISCUSSION	TOPICS	POSTS	LAST POST
HVAC Controls Systems Description of your first forum. Moderator: Standard Moderator	1	5	by Member 4 G Mon Sep 20, 2010 10:49 pm
Air Flow Metering Moderator: Standard Moderator	1	5	by Standard Moderator1 G Mon Sep 20, 2010 11:30 pm

ARCHIVE	TOPICS	POSTS	LAST POST
Expert Q&A	0	0	No posts

WHO IS ONLINE
In total there are 2 users online :: 1 registered, 0 hidden and 1 guest (based on users active over the past 5 minutes)
Most users ever online was 6 on Mon Sep 20, 2010 11:43 pm

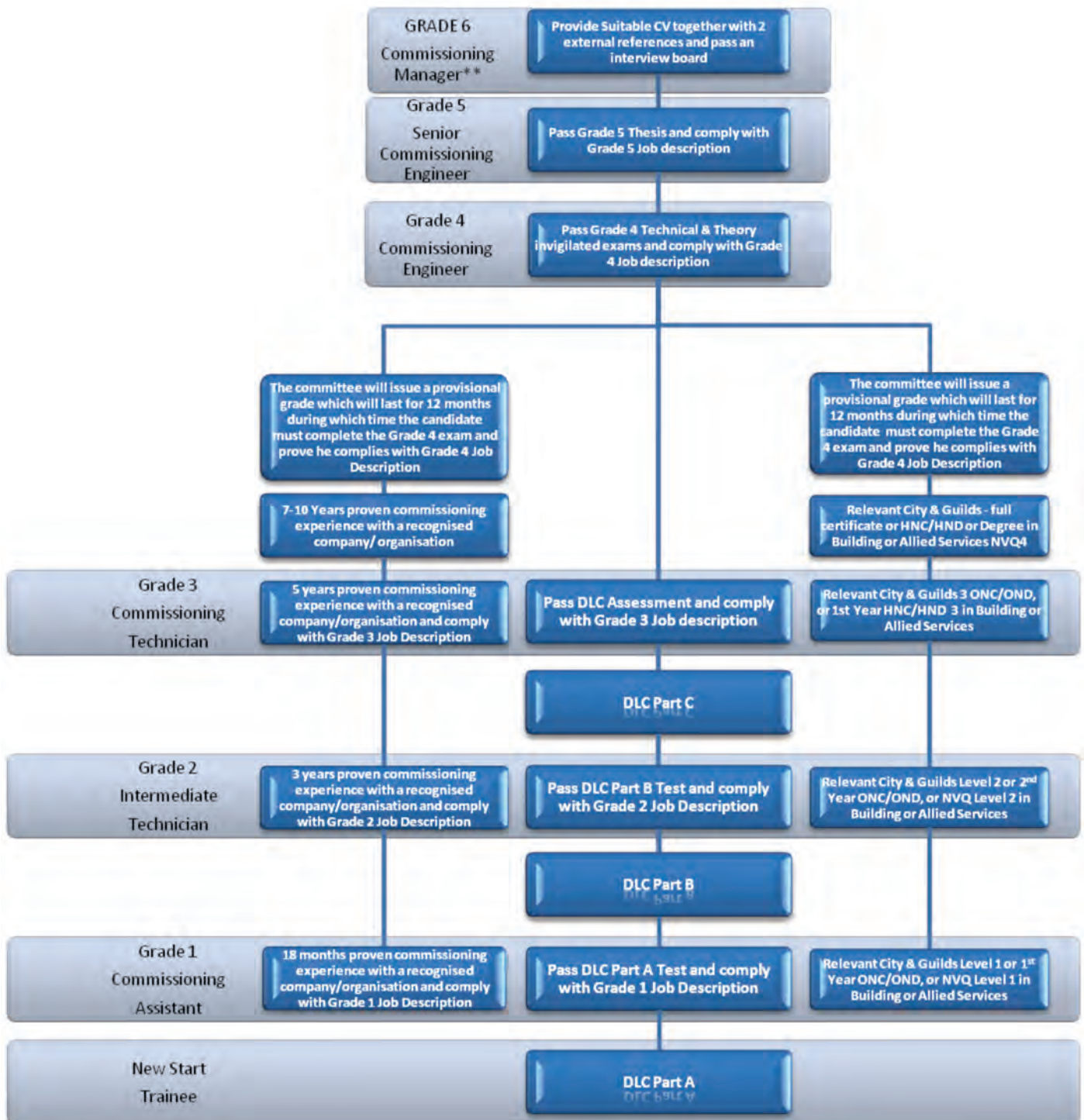
Registered Users: Member 4
Legend: Administrators, Global moderators

STATISTICS
Total posts: 16 • Total topics: 6 • Total members: 13 • Our newest member: Member 5

PATH OF DEVELOPMENT

The Commissioning Specialists Association is at the forefront of career development and training for the Building Services, Commissioning and HVAC industries. The Grading Structure of the CSA is based on seven Job Descriptions and the career development system follows the Path of Development. New entrants (applicants for Individual membership), into the commissioning industry are given an initial grade based on their current capabilities and qualifications. External qualifications are recognised and taken into account when deciding the initial grades. The structure can accommodate all types of experience, including that obtained in electrical and controls activities of building services installation.

You will see below the CSA Path of Development which gives more details on the external qualifications, experience and responsibilities of field commissioning staff.



Notes The above are guideline requirements and do not cover every personal situation and therefore the Committee retains the right to allocate a grade based on the information submitted or obtained.

* Although the Committee accept external qualifications/allied experience, candidates are still encouraged to complete the comprehensive Distance Learning Courses and examinations to assist their own personal development.

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