











THE CLEANROOM MONITOR

The Scottish Society for Contamination Control

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Co-ordinates:

Mrs Kay Johnston,
Administrator,
James Watt Bldg,
Glasgow University,
Glasgow, G12 8QQ
Scotland

Tel:
0141 330 3699

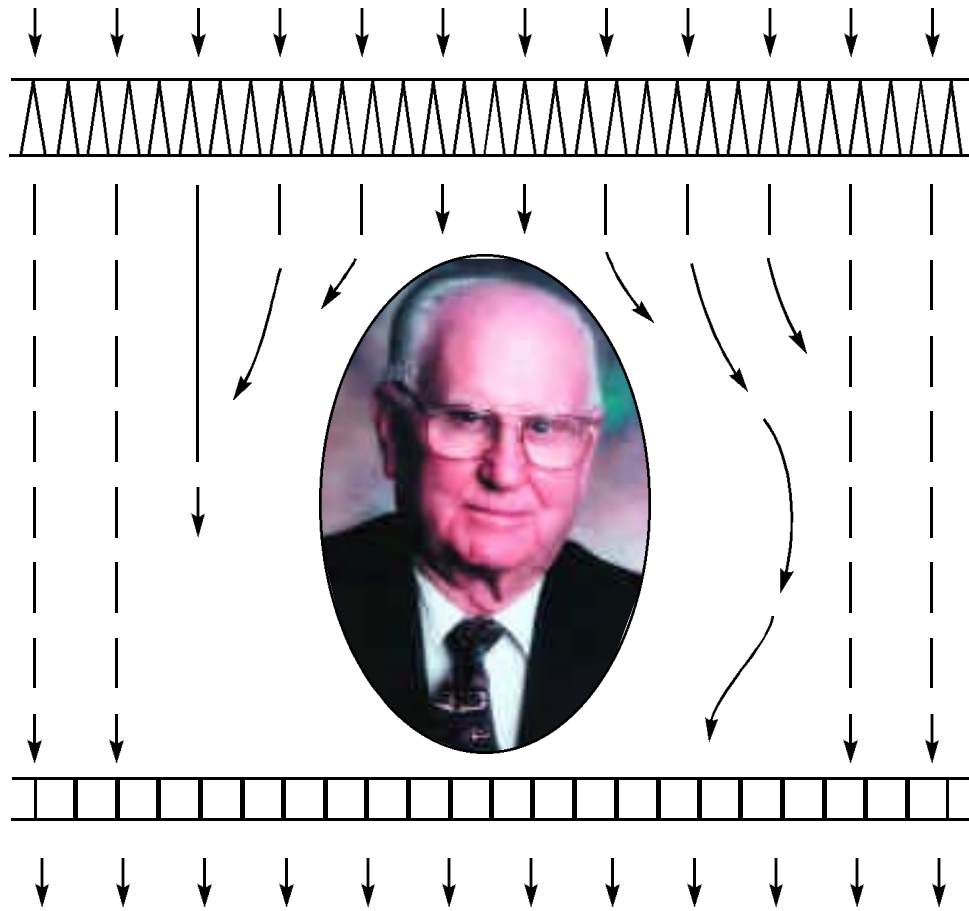
Fax:
0141 330 3501

E-mail:
s2c2@mech.gla.ac.uk

Website:
www.s2c2.co.uk

PROFILE - WILLIS WHITFIELD, INVENTOR

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CLEANROOM TECHNOLOGY CERTIFICATION FOR ALL NOW AVAILABLE

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WORKING WITH THE ISO STANDARDS

Ken Goldstein and Mike Fitzpatrick discuss

INTRODUCTION:

Standards now exist where none existed before. This is because people from different countries have come together and written documents to meet the needs of everyone who has anything to do with cleanrooms. So far 21 countries have been involved who represent about 12 languages with their cultural differences and working practices.

Some are finished and published. Some are out in Draft International Standard (DIS) form. Some are not finished. Two new ones are being considered. See page 5.

To start with 14644-1 and 14644-2 are finished and out. With ISO 14644-1, 95% of it is Fed Std 209E. ISO 14644-2 on monitoring has new material that is of value and is a fairly short document. 14644-4 on design which is basically an extension of IEST RP12 (design) is also now published. After that there are 3 that are out as DIS (Draft International Standard) meaning that they are out for public scrutiny, namely, 14644-3 on metrology and test methods, 14644-5 on operations and 14644-7 on separative enclosures.

That leaves 14644-6 (terms and definitions) which is still in CD (Committee Draft) form and 14644-8 (airborne molecular containment) which is at the CD (Committee Draft) stage as of March 31, 2003.

Bio-contamination standards 14698-1 (general principles) and 14698-2 (evaluation and interpretation) have been issued as Final Draft Standards. 14698-3 (methodology for measuring) is at DIS stage.

In total, this represents an excellent body of work done by a great many people. Now that most of them are published and available how are they being received? Do people know about them? Are they being used? Are they working and, if not, why?

Ken Goldstein and Mike Fitzpatrick (both based in USA*) were talking about *ISO Standards 14644-1 and 2: Fundamentals and Practical Applications* at the Cork 2003 Cleanroom conference and exhibition in May, 2003. They share their thoughts on the issues.

Mike: One of the key improvements of ISO 14644-1 over



Mike Fitzpatrick (L) and Ken Goldstein (R)

Fed Std 209E is that it added 2 cleaner classes that should be of immense interest to the high end of the microelectronics industry. Many companies have been operating "off the chart" for a number of years and didn't have a standard to use to quantify their levels of air cleanliness.

Ken: We are headed in the right direction. While closely related to Federal Standard 209E, ISO 14644-1 is a definite improvement over the older standard. And while ISO 14644-2

leaves something to be desired, it represents the first time anyone has actually suggested specific monitoring intervals in a standard.

THE ISSUES:

1 Access to information:

Mike: One of the issues we have had is that it has been very difficult for us to obtain accurate information about the status of the various documents. In many cases there seems to be a cloak of secrecy drawn around them. If you are writing a contract or a set of specifications and believe that a particular standard will be released next week you will most likely reference it. When the standard is then delayed six months, or another year, it really presents problems.

Ken: We have had trouble getting the updates of the Standards' documents; we've had trouble in learning when the actual documents would be released. Possibly the reason is that they have been delayed and delayed and delayed because of serious disagreement among the committee members. The initial estimates, and I am talking about official pronouncements that I heard from people who were involved in the process 5 or 6 years ago, is that everything would be out within 2 or 3 years. Everything has taken at least twice as long. The framework was laid down almost 10 years ago, some gets published today and we are still awaiting some of the critical materials; for example, terminology and definitions. As a result, some of it doesn't represent anything near current technology, i.e. state of the art.

2 Implementation:

Ken: Certainly, it takes people to drive these issues but also it requires people on the other end to PULL it. The companies are not pulling it nor are the standard setting agencies, namely the FDA, the MCA, people with regulatory authority, PULLING OR PUSHING it. In the US the FDA has only recently said "Yes, we will slowly do away with Fed Std 209E and adopt ISO 14644-1" but they haven't said exactly when or how but they do permit it. The details are left to the individual inspectors.

Mike: We once did a session on ISO 14644-1 and 2 attended by individuals from about six semi-conductor companies. We talked to them afterwards and asked if they were using the documents. Four companies said "No" and one said "Yes - and we are working our way around the wording so it fits our needs."

It would appear that people have heard of the documents, They may not be familiar with them, but they know the documents are available. All in all, there doesn't seem to be any real impetus to use the documents in the U.S.

3 Change:

- 1 There is a lot of reticence and reluctance, at least in the States, to transition from Fed Std 209 to 14644-1.
- 2 It is very difficult to move these things as fast as you anticipate.
- 3 Is there a natural reluctance to change to things metric?

Ken: There is no great impetus to change. For example in Fed Std 209 E and ISO 14644-1 there just isn't that much difference between the 2 documents. If you go with the larger sample sizes that are no longer required but at least permitted under ISO the documents are essentially the same and you can take any document or any testing regime you went through with Fed Std 209E and simply translate into ISO and present it as an ISO certification.

4 Prioritisation:

Ken: An example can be taken from the microelectronics industry. The industry is in dire straits and has been for the past several years. A lot of people have left the industry and have much more important things to worry about than terminology.

5 Attitude to Authority:

There is a cultural difference between Europe and the States in how they view the whole concept of government regulation. An example is in micro-electronic industry.

Ken: There is no regulatory oversight. Regulatory agencies have almost no effect on micro-electronics. They tend to be much more entrepreneurial, free-swinging, moving very quickly in the technology where weeks of market access can mean the difference between product success and failure.

Mike: In Europe the ISO documents are viewed as having the rule of law behind them. In the U.S, they're judged on their own merits. If it is a good document, it will get used. If it is not, it won't be used. Often, it is a case of: "we'll use it if we feel like it, and only if we think it has merit. If we are in a hurry we won't bother".

Ken: In the States, that is correct. ISO was not considered the driving force in terms of regulatory authority unless we are deliberately selling in to Europe. Short of that, Mike is right. Documents are not merely adopted. They are looked at and if it is worthwhile, yes; otherwise, no.

Mike: From our perspective, the European approach to writing standards, in many ways, seems to be about developing a process, monitoring the process and documenting the process, all with little thought to the results or the impacts - as long as the process is followed. Adherence to the process seems to be the goal. It appears aimed at validating the process rather than achieving better results, saying in effect: if we follow the process then everything is well. We're suggesting "Well, maybe. Maybe not." Why would a company in the US chose to change unless they have confidence that the change will produce better results, rather than merely a better process? The cross-pollination you would hope to achieve through creating an international standard is not happening as effectively as we hoped.

6 Interpretation:

Monitor: You often see 2 different interpretations of the same codes. Ironically a standard has to be carefully worded and yet it is addressing a fast-changing, irreverent sector of industry.

Ken: With some of it ambiguous. The document dealing with definitions (ISO 14644-6) has not seen the light of day, even in draft form. I would have liked if that had been one of the first ones released, not one of the last. Because now we are looking at a Tower of Babel.

(This is to do with 'the confusion of tongues' which is part of the Tower of Babel story taken from the Bible. People of different languages were drawn together to undertake a 'building project'. They all knew what needed to be done and they also knew it needed to be expressed in words. The project did not work because while, at one level, they understood the basic logic and requirements, they could not work together because they could not talk together and consequently, did not stay together.)*

Words can mean different things to different people. To take an example:

Ken: The word VALIDATION has no meaning in micro-electronics. Micro-electronics people test, certify and monitor their facilities. They do not validate them because the term has no specific meaning for them. By contrast, the bio-pharm people go to great lengths to validate their

facilities and processes before they are allowed to start turning out products. The reason for this difference is the differing regulatory environments that the two industries inhabit. Because of the immediate life safety effects of pharmaceuticals and medical devices, government agencies such as the FDA and MCA have been granted the authority to exert critical control over all producers of these products. The microelectronics people, by contrast, do not have to meet this high regulatory burden. Instead, their drivers are almost exclusively market oriented. In other words, they only have to satisfy themselves before beginning production. And if they make a mistake, questions of public health are not likely to arise. Rather, they are likely to suffer financially for their errors and no one else is much affected.

7 Need vs Easy Answers:

Mike: Let's say a company has need for the latest in cleanroom technology. An employer and an employee get together and decide that the employee ought to go to the Irish Cleanroom Society show. The boss says "I'm paying a lot of money for this, so bring back value." The employee attends and asks the instructor for a magic number: "What airflow velocity do I need in my cleanroom?" He focuses on an answer, specific to the need back at his factory, and thus overlooks the broader concepts presented in the class. Such an individual is not coming to learn, but to grab information, and run with it. It's like the old saying of "Give a man a fish and you feed him for a day. Teach him to fish and you feed him for life".

Ken: He wants to know "What is the answer?" I tell them that from industry to industry they use completely different approaches. I will go a step further and say that in two identical industries, two identical applications will take two diametrically opposite approaches and both solve the problem successfully.

Mike: And the ISO document that came out covers neither!

The Future:

Ken: Our paradigm for progress and advancement is: build a better mousetrap and the world will beat a path to your door regardless of the process. The process is quite irrelevant except as it leads to the final result. The point to this is that the critical thing is the mouse-trap, i.e. the product, which will determine your success and not the process of designing and creating the mouse-trap. It is the final product which will, in fact, determine whether or not you have been rewarded and successful!

FOOTNOTE:

** Henry M. Morris, *The Biblical Basis of Modern Science*, 1984, discusses The Confusion of Tongues: "If people could not communicate with each other, they could hardly co-operate with each other. This primeval confusion of tongues emphasises what modern man often fails to realise: the real divisions among men are not racial or physical or geographic, but linguistic. When men could no longer understand each other, there was finally no alternative for them but to separate from each other."

He continues: "Dr. Gunther Stent, professor of molecular biology at the University of California (Berkeley) has summarized Chomsky's concepts...Chomsky holds that the grammar of a language is a system of transformational rules that determines a certain pairing of sound and meaning. It consists of a syntactic component, a semantic component, and a phonological component. The surface structure contains the information relevant to the phonological component, whereas the deep structure contains the information relevant to the semantic component, and the syntactic component pairs surface and deep structures. Hence, it is merely the phonological component that has become greatly differentiated during the course of human history, or at least since the construction Tower of Babel. (Limits to the Scientific Understanding of Man, *Science*, 187, Mar. 21, 1975:1054.)

No doubt the Tower of Babel is merely a figure of speech to Stent as well as to Chomsky, but the figure is appropriate precisely because the miraculous confusion of tongues at Babel does provide the only meaningful explanation for the phenomena of human languages. Thus the 'phonological component' of speech (or its surface form) is the corpus of sounds associated with various meanings, through which people of a particular tribe actually communicate with each other. Each phonology is different from the phonology of another tribe so that one group cannot understand the other group. Nevertheless at the 'semantic' level, the deep structure, the 'universal grammar' (the inner man!), both groups have fundamentally the same thoughts that need to be expressed in words. It was the phonologies or surface forms of languages, that were supernaturally confused at Babel, so that even though all still had the same basic logic and understanding of experience, they could no longer work together and, thus, finally they could no longer stay together, simply because they could no longer talk together."

* BIOGRAPHICAL INFORMATION:

[1] **Ken Goldstein** is a principal with Cleanroom Consultants Inc. He has been involved in the planning and design of cleanrooms and high purity systems for the past 20 years with experience with Texas Instruments, Advanced Micro Devices and several engineering design firms. He is an active member of IEST Working Groups 12 (Cleanroom Design) and 28 (Minienvironments). He often teaches at technical meetings, trade shows and short courses in a number of venues around the world.

[2] **Mike Fitzpatrick** has participated in the design and construction of semiconductor facilities for over 24 years and has been instrumental in the development of methods to decrease time-to-market in the construction of manufacturing facilities. A Senior Member of the Institute of Environmental Sciences and Technology, he is Chairman for WG012 (Considerations in Cleanroom Design) and WG028 (Minienvironments) and a vice president of the IEST. Mike is a member of the Arizona State University ACE Cleanroom Task Force and lectures as part of the ASU Cleanroom Construction Program. He also presents tutorials on cleanroom design at the IEST Short Course Series and the CleanRooms Shows in the United States and in Asia.

ISO TC 209 MEETING MILAN 2003

There was a meeting in Milan in April, 2003 attended by people in the photograph below. The various technical committees met to continue the work of writing, amending and creating standards for the cleanroom industry. Twenty-one countries are represented.

ISO Technical Committee 209, the International Standards Organisation's committee concerned with 'Cleanrooms and Associated Controlled Environments' met in Milan at the end of March 2003. Much of the committee time was spent reviewing the progress of existing standards, or standards being written. The progress of these various standards is reviewed in other articles in this edition of *The Monitor*. However, two new work items were considered that readers of *The Monitor* should be interested to read about.

The TC 209 committee agreed to start a new Work Group (WG9) to write a new standard on 'Clean Surfaces'. It is expected that this standard will eventually cover particles, molecular chemicals and micro-organisms but that the work should start with particles, with the expectation that the other two categories will be introduced later. The standard will concentrate on solid, rigid surfaces such as work surfaces but exclude surfaces such as textiles. The country that will convene the group is Switzerland. The work will start soon, as Experts from the various countries were to have been nominated by the end of June 2003.

The ISO TC 209 committee also agreed to set up an Ad-Hoc Committee to consider whether a standard should be written on 'Cleanroom Clothing'. This committee will be the responsibility of Finland. The committee will consider such topics as whether there is a need for such as a Standard as ISO 14644-5 already gives an overview of garments and IEST-RP-CC003 is an excellent document. As well as this, it will have to consider whether gloves and masks should be considered, or only clothing, and whether the standard should only consider protecting the product or include the protection of personnel. It is expected that this committee will have its report ready to submit to ISO TC 209 by 31 October 2003.

Bill Whyte



Front row left to right: Julie Kendrick, Secretariate TC209; Berit Reinmuller, Sweden; Anne Marie Dixon, USA; Miriam Magri, Italy; Eliane Bennett, Brazil.

Second row left to right: (light jacket) Egon Hollander, Switzerland; David Michael, BSI, UK and Secretary of CEN TC243, Fabien Squinazi, France; Bill Whyte, Scotland; Fedorovitch Viatcheslav, Russia; Gaetano Lattanzi, Italy; Susumu Yoshisawa, Japan.

Back row left to right: Werner Straub, Switzerland; Hans Schicht, Switzerland; Richard Matthews, USA, Chairman of ISO TC109; Wander te Kuile, UK; Gordon Farquharson, UK and chairman CEN TC243; Jarmo Saari, Finland; Alexander Fedotov, Russia; Myung-do Oh, Korea; Kang-Ho Ahn, Korea; Kyung-Sun Chae, Korea.

Absent were: Australia, Belgium, Holland, China, Norway, Portugal, Germany and Denmark.

Photo taken and supplied by: Åke L. Möller, R3 Nordic, Sweden.

PROFILE - Willis Whitfield



This man is the inventor of the laminar flow cleanroom and the laminar flow air hood. He has been retired nearly 20 years and lives (where he has always lived and worked) in Albuquerque, New Mexico, USA. His work, and that of his colleagues, is the origin of what is now regarded as “the cleanroom industry”.

The change from “early clean rooms” to “laminar flow clean rooms” in the late 1950’s and 1960’s came at a time when there were many sectors of society (military and civil) which were dealing with increasingly sophisticated technology. Nuclear warheads were being built; there was a drive to put a man on the moon; new medicines and medical equipment were emerging.

In the late 1950’s, Sandia Corporation (later changed to Sandia National Laboratories) were beginning to experience difficulties with excessive contamination levels in clean rooms. (In the weapons laboratory mechanical timers needed to be very precise.) As a result of these difficulties an investigation was started in 1959 to determine a course of action to solve this problem. The investigation started with an analysis of early clean room limitations and what was required to achieve the needed cleanliness levels. The investigation revealed that these clean rooms were being operated at the upper practical limits of cleanliness levels. As a result of this a decision was made to explore alternate clean room designs. A very basic objective was decided upon which, if could be met, would change the role of the clean room from a passive element to an active element in the contamination control chain.

Two goals were set up in an effort to satisfy the active element concept. The first goal was to develop a clean room that was capable of rapidly removing airborne contamination from the clean room. The second goal was to reduce clean room air turbulences that repeatedly carried contaminated air across work locations such as occurred in early clean rooms. The first goal was possible to a limited degree by simply increasing filtered air flow into the clean room. However, it was apparent that this approach could not satisfy the second goal and would likely worsen turbulence problems in clean rooms. One way to achieve both of these goals was to introduce filtered air into the clean room such that it would move only in one direction (straight line unidirectional air

flow). This meant that the entire ceiling would be used for air entry into the room and the floor would be used for air exit.

Changes in design were necessary. This meant: plenums required above and below the clean room; a load-bearing element needed to form a usable floor which would permit air to flow through the floor; final filters to be located as near as possible to the clean room which could be used for air distribution if located in the ceiling; air flow velocities needed to be estimated for use in design of experimental models.

Much larger air handling systems would be needed. Air conditioning and heating of the clean room air to final room temperatures before introduction into the clean room was also necessary. This differed from the early clean room as it was used as the mixing volume for final clean room temperatures.

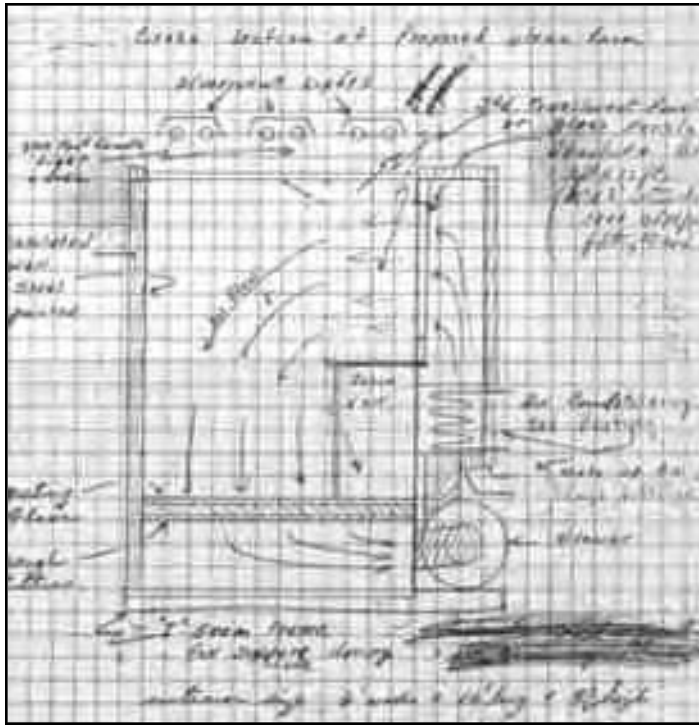
A number of laboratory experiments were completed to establish feasibility of this approach. Larger experimental models were used for scale-up information until data was adequate to construct a 2.4 m (8 ft) x 3 m (10 ft) walk-in mode (below). Data from this model was used to start the design of a full scale 3 m (10 ft) x 12 m (40 ft) vertical down flow model.



The first operating model. (Willis in doorway)

Part 1: INVENTOR - LAMINAR FLOW CLEANROOMS

Of great interest in the development of the laminar flow clean room was the approach taken to determine clean room air velocities. The first air flow parameter to be set was the upper limit of maximum air flow velocity. A velocity of 46 m (150ft)/min was chosen based on laboratory experiments, particle impaction calculations, mechanical system limitations and personnel tolerance of air flow. At first no lower limit was set. However, as experiments progressed in fully operational cleanrooms, a lower limit of 15 m (50ft)/min was established. This lower limit was based mainly on times required



Source: original sketch from engineering note book, October 1959

for air flow to re-establish itself into straight line flow conditions following an air flow interruption. Below this velocity the re-establishment of normal flow condition was too slow to avoid cross room turbulences and air flow instabilities that caused delayed recovery from high particle count conditions. Experiments were conducted over the range of 15 m (50ft)/min to 45 m (150 ft)/min. A velocity of 30 m (100ft)/min was chosen until additional operating clean room data could be obtained. The air flow velocity of 30 m (100 ft)/min was chosen since it appeared to meet preliminary design goals of very quick recovery from air flow disturbances and it effectively removed airborne contamination from the clean room.

“The 90 - 100 feet was in essence a compromise... In our laboratory model we could go up to about 200 feet per minute. We started testing at about 200 feet per minute and worked our way down. What you say about the type of work would go along way toward dictating the type of airflow you needed. Of course, 150 feet a minute provides you with a quicker clean-down. In other words, if you get a cloud of dust in the work area, the 150 feet a minute is going to clear it out quicker. As you go down to 100 it is a little slower but once you get below 50 feet a minute the air becomes unstable. In other words, if you had 50 feet a minute or getting down to 30 or 40 feet a minute, and a person walks across a cleanroom, he leaves a shadow of turbulence behind him. That doesn't re-establish itself nearly as quickly to avoid cross-contamination. A lot of times 30 - 40 feet a minute would be adequate. It depends on what you want your cleanroom to do. You have got to look at the

requirements. I know I consulted a lot for NASA. As a matter of fact I helped design practically every big cleanroom that NASA and their suppliers built. I kept warning them: to avoid excessive expense, define what you want to do. Don't overbuild because these things are expensive. So it is a matter of having a lot of things involved. How clean do you need it to be? What size particle are you looking at? How many of them? How much material are you going to generate in the cleanroom? How quick should it recover? How much interference upstream of the work are you going to have from, say, a microscope or a tool of some kind? So, it is not

a simple, across-the-board judgement. It is a matter, really, of calculating what you need and designing your cleanroom to meet that need.”

By 1965 several vertical down flow rooms were in operation in which the range of air flows between 15 m (50ft)/min and 30 m (100ft)/min was studied in detail. These studies showed that Class 100 could be maintained at lower air flow velocities with well arranged clean room equipment and low density personnel that did little to disturb the air flow. Clean room equipment that caused cross currents of air turbulence, heated devices that created thermal updrafts and moderate to high personnel activity required higher air flow velocities.

Patent No. 3158457 for the laminar flow room was issued May 14, 1962. It was called “ultra cleanroom”. Patent No. 3273323 was for the “laminar flow airhood apparatus” and was issued September 20, 1966.

By the early 1970's the “laminar flow” principle had been carried from the laboratory and applied to production hardware to create a mature industry producing and marketing “laminar flow” equipment in less than 10 years.

As Willis states: “The laminar flow room is a standard room now. Nobody builds these things except laminar flow.”

Sources:

1. Telephone interviews July and August 2003.
2. Willis Whitfield, “The Clean Room: Technical Aspects of Its Evolution”, pre-publication document, late 1970s.
3. Photographs and drawings kindly supplied by Willis Whitfield.

It is now possible to obtain a CTCB Certificate in Cleanroom Technology.

CLEANROOM TECHNOLOGY CERTIFICATION

The Cleanroom Testing and Certification Board (CTCB) has now set up a distance learning course and examination on 'Cleanroom Technology' that is based on a S2C2 course that has been run for over 15 years, and on the book 'Cleanroom Technology - Fundamentals of Design, Testing and Operation' by Bill Whyte. The course covers all aspects of cleanroom technology in a way that is applicable to all types of cleanrooms and industries. A certificate is issued to candidates once the written exam has been passed successfully.

For complete details on the syllabus and also for an application form either telephone the S2C2 office (0141 330 3699) or go to the website where the information and an application form can be downloaded:

www.s2c2.co.uk and click on 'CTCB' and then 'Cleanroom Technology'

If you want certification:

Registration

To go on this course you need to register first. This is so that candidate suitability can be assessed.

The Cost of Registration

Registration is £100 +VAT. This includes (1) being entered as a candidate, (2) a copy of the book 'Cleanroom Technology - Design, Testing and Operation' (if you already have a copy, the cost will be reduced to £55 + VAT), (3) sample questions and answers and (4) a certificate on successfully passing the exam.

The Revision Course and the Exam

This is over one day and includes a revision lecture course and a 2 hour written exam. The cost is £200 + VAT (incl. coffee & lunch).

First opportunity to attend the necessary revision course (and then sit the exam) is October 29, 2003 (see right). This course is open to all but if you are a candidate for certification you attend this course along with everyone else.

If you do not want certification:

The next Cleanroom Technology course is

Wednesday 29th October, 2003

Erskine Bridge Hotel,
Erskine, Near Glasgow

(The S2C2 AGM will also be held at this time)

The Cost of this Course

Price per delegate including lunch and tea/coffee:

Members: £155 (£182.13 incl. VAT)

Non-members: £170 (£199.78 incl. VAT)

This course will be attended by two groups of people: those sitting for certification and those who are not sitting for certification.

THE WEBSITE FORUM

[1] The Forum website has now moved to a new server. This seems to have solved the recurring problems we had of users typing in messages which then disappeared from the system, and lots of error messages about the email notifications. Most of the active users of the old system have registered on the new one, and there are a lot of new registrations as well. It's a lot more versatile than the old system. If you haven't been there yet, try it (www.s2c2.co.uk and select 'Cleanroom Forum').

We are also subscribing to a package which gives much better statistics of usage of the rest of the S2C2 website. For example, in the four weeks to August 8th there were an average of 243 users per day, with an average of 483 pages

opened per day. Apart from the forum (which receives the heaviest use), people seem to want to know mainly about Standards (and how to buy these from S2C2), and then what services can be obtained from members. The website is mainly used from Monday to Friday; it is seldom used at the weekend which suggests most enquiries originate in the workplace.

[2] The ICCCS website is now being managed by S2C2 with Bill Whyte as the Editor and Mike Harrison as Webmaster. The main focus of this site is to provide the links to the different national organisations, but also to promote international events.

Mike Harrison

CLEANROOM TESTING COURSE, JUNE 2003

The matter of training and certifying people who carry out testing and validation of cleanrooms has now been addressed through the Cleanroom Training and Certification Board (CTCB). The aim is to train people who are either employed by a cleanroom firm, or come in from outside to service or run tests in a cleanroom.

A third course was given in June. Assisting Bill Whyte with lectures and demonstrations was Neil Stephenson of DOP Solutions.



Neil Stephenson

Successful Candidates - Professional Level

Gordon Brown, Glaxo SmithKline, Cobden Street, Montrose, DD10 8EA

Joe Featherstone, AGB Scientific Ltd, Slaney Close, Dublin Industrial Estate, Dublin 11, Ireland

Neil Herriott, HEPA Services Ltd, Remount House, Kelfield, York, YO19 6RG

Brian MacPherson, Enbloc Ltd, 40 A Park Lane, Poynton, Cheshire, SK12 1RE

Enda McKeon, Fort Dodge Laboratories, Finisklin Industrial Estate, Sligo, Ireland (* Distinction)

Noel Morrison, DSS Ltd, Ards Business Centre, Jubilee Road, Newtownards, County Down, BT23 4YH

Steven Niven, Clean Air Containment Services, The Atrium Business Centre, North Caldeen Road, Coatbridge, ML5 4EF
Neil Pelling, Moore Environmental Com. Ltd, Quadrant House, 65B Croydon Road, Caterham, Surrey, CR3 6PB

Christopher Thomas, Tecomak Environmental Services Ltd, Unit 3B Valley Industrial Estate, Hadlow Road, Tonbridge, Kent, TN1 1OA

Successful Candidates - Associate Level

Mark Allen, Huddersfield Royal Infirmary, Pharmacy Unit, Huddersfield, HD3 3EA

Anthony Connolly, Smith & Nephew Medical Ltd, PO Box 81, Hessle Road, Hull, HU3 2BN

Alan Davies, Enbloc Ltd, 40A Park Lane, Poynton, Cheshire, SK12 1RE

Peter Fernie, Fernie Technical Services, Tawin Maree, Oranmore, Galway, Ireland

Steve Walker, EPSRC National Centre for III-V Technologies, Dep't of Electronic & Electrical Engineering, University of Sheffield, Sheffield, SH1 3JD

Troy Wilks, Moore Environmental Com. Ltd, Quadrant House, 65B Croydon Road, Caterham, Surrey, CR3 6PB

* Distinction means that the person entered at the Associate Level but demonstrated such a high level of competency that the Professional Level certification was awarded.

Note: The Irish Cleanroom Society will be hosting the next Cleanroom Testing course on November 18-20 in Swords, Co. Dublin. Contact Peter Fernie, Fernie Technical Services, Tawin Maree, Oranmore, Galway, Ireland. Email: emat@iol.ie

CTCB: TRENDS

Candidates are sent the course material before the 2 day lecture and examinations. They attend lectures, a tutorial and then sit a two-hour written exam. The second day finishes with a practical exam where candidates are required to show their ability to carry out 2 tests: (1) determine the air volume coming from a HEPA fan/ filter unit and (2) demonstrate that they can operate a smoke generator and photometer, and use this equipment to find holes in a filter, and its gasket. Finally candidates write a report of these tests.

There are 2 levels of passes, i.e. *Professional* for people who carry out tests for a living and *Associate* for people who want a sound knowledge of testing cleanrooms. Both must attend the same course and examinations but their certificate indicates at which level they are certified.

The trend so far:

This course has now been given on 3 occasions (June 2002, November 2002 and June 2003). This represents a total of 8 plus 12 plus 16 people respectively who have attended (more applied but did not turn up) and put themselves forward for the written and practical examination. Of this total, 6 plus 10 plus 15 people respectively have passed both parts successfully.*

Generally speaking, candidates performed well in the written part of the exam. The main problem in the practical exam was the failure to correctly identify the leaks in the filter. If people did not pass the course usually this was the reason. Lastly, it was noted that some candidates performed outstandingly well in the practical assessment.

* These figures are to show a general trend and do not reflect anomalies, e.g. re-sits.

CLEANROOM MEETING AND VISIT

CLEANROOM DESIGN AND CONSTRUCTION MEETING WITH VISIT

Andersen Caledonia Ltd, Bellshill* near Glasgow

Thursday, 2nd October, 2003

Registration 9.30 - 10.00

restricted to 30 people

MORNING

LECTURES 10.00 - 12.15

1. The Basic Requirements

Neil Thomas, Bassaire Ltd will discuss what information the designer needs from the client, and how the design is achieved. ISO standard 14644-4 gives the requirements essential for the proper design of a cleanroom; this will be considered, as well as how the agreed design can be turned into reality.

2. Cleanroom Designs and their Achievement

Dominic Callan, Thermal Transfer Ltd will discuss the design of a variety of cleanrooms with emphasis on the two cleanrooms to be visited. In particular, how the cleanroom at Controlled Therapeutics was designed and achieved will be explained.

3. Constructional Materials, Clean Construction & Testing

Conor Murray, Ardmac Ltd will consider what special constructional materials should be considered for use in cleanrooms, how cleanrooms should be built to ensure that they are clean, and, how the completed cleanroom should be tested to show that it meets the design brief.

AFTERNOON

VISIT 2 CLEANROOMS 13.00 - 16.30

After lunch, (12.15 - 13.00 at Andersen Caledonia Ltd) the party will be divided into two, each group visiting the two cleanrooms in turn.

They are:

1. Caledonian Medical

This is a medical device cleanroom of a simple but effective design. It has been chosen as it has excellent access round the extensively windowed cleanrooms, and onto the ventilation plant on the roof. It is therefore easy to see how the room is designed, constructed, and run.

2. Controlled Therapeutics

This is a pharmaceutical cleanroom suite with a recently completed extension. The ventilation plant, cleanroom suite and aseptic area will be viewed.

COST

Per delegate including lunch and tea/coffee:

Members: £155 (£182.13 inc. VAT)

Non-members: £170 (£199.78 inc. VAT)

To obtain a booking form, go to the website:

www.s2c2.co.uk/events/Brochure1003.html

or contact:

Kay Johnston

70 Norse Road, Scotstoun

Glasgow G14 9HT

Tel/Fax: 0141 576 8921

E-mail: s2c2@mech.gla.ac.uk



* Andersen Caledonia Ltd
Phoenix Crescent
Strathclyde Business Park
Bellshill, ML4 3NJ
Tel: 01698 84476

Bellshill is a town 8 miles East of Glasgow. People coming by road can access it from junction 5 on the M74. There is a train from Glasgow Central to Bellshill. The best airport is Glasgow Abbotsinch. The Strathclyde Hilton (Tel: 01698 395500) and the Travel Inn (01698 740180) are both close to the venue. Travel and hotel details will be sent with confirmation of the booking.

CALL FOR PAPERS * BONN, SEPTEMBER 6-9, 2004
International Expertise in Cleanroom Technology
17th International Symposium on Cleanroom Technology



This symposium is being organised by the VDI Society for Building Services in cooperation with the Joint Committee for Cleanroom Technology (GAA-RR) of DIN and VDI and the DIN Standards Committee for Heating, Ventilation and Air Conditioning (NHRS), 24 years after the last ICCCS in Germany. This event is held under the auspices of the International Confederation of Contamination Control Societies (ICCCS), who allocates the organization of the symposium to one of its 18 national member societies every 2 years.

The symposium is aimed at users and manufacturers/suppliers of cleanrooms and cleanroom equipment. The scientific papers presented at

ICCCS 2004 will cover the entire range of cleanroom technology. Particular emphasis is put on technological advancement in cleanroom system engineering and innovative cleanroom systems. Furthermore, metrological, safety, automation, and standardization tasks deserve particular attention.

Experts in the fields named above are kindly requested to forward papers to the VDI-Society for Building Services. The deadline is October 1, 2003.

More information and Call for Papers: www.icccs2004.vdi.de

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