

FIVE COURSES RUNNING OVER TWO DAYS VACUUM TECHNOLOGY TRAINING COURSES

Date: Wednesday 12th and Thursday 13th October 2016

Venue: The Ricoh Arena, Coventry, CV6 6GE

INTRODUCTION

Vacuum is a central commodity in the technology for manufacturing a host of products which are now part of everyday living, such as microelectronic and optoelectronic devices, TV screens, photovoltaic panels and pharmaceuticals, as well as in scientific research. Producing and maintaining a vacuum and knowing its properties therefore concerns a large number of people who work in these areas. Although these activities span a wide field there is a relatively small body of basic underlying knowledge that is common to all of them.

The purpose of these courses is to present this basic knowledge in a straightforward and accessible way. The principles and practice that are involved in creating and measuring a vacuum will be dealt with and illustrated by worked examples from various applications. Ultra-high vacuum, important in many applications, will be discussed only briefly in courses VTC1 and VTC2, however they will serve as a good introduction to the course "Ultra High Vacuum" VTC3 which addresses the matter of UHV in more detail.

These courses are aimed at newcomers to the field, those who wish to refresh their knowledge, and those who wish to go further into UHV practicalities.

They will be appropriate for new graduate students in physics, chemistry and engineering for whom vacuum techniques will be a working tool. After attending any of these courses participants should be able to analyse the behaviour of their own vacuum systems with increased understanding, and have the basis for evaluating the effectiveness of proposed designs.

There are two specialist application courses: VTC4 on "Leak Detection" and VTC5 on "The Design and Fabrication of UHV Chambers". Places on each course are very limited, so you are encouraged to register early.

The material is presented in an informal/tutorial style with an effort to address participants' needs. A copy of the Training Slides on a CD + a Certificate of Attendance will be provided.

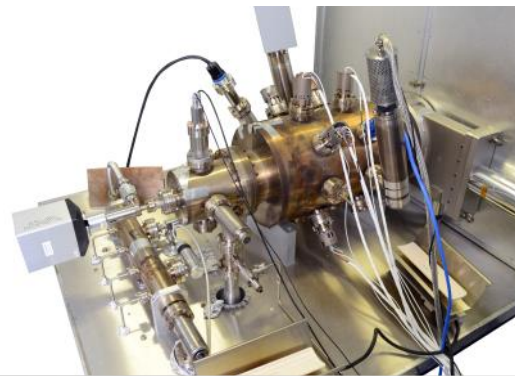
The trainers hand these out after the course .

Delegates may choose to attend one course, two, or perhaps three, it is not possible to attend all due to overlap.

MEETING ADMINISTRATION & MANAGEMENT

Vacuum Symposium Secretariat

Email: info@vacuum-uk.org



**TRAINING at VACUUM
SYMPOSIUM costs
£25* per course**



**VACUUM
SYMPOSIUM**
a forum for scientists,
academics, technicians
and industrial users

12TH & 13TH OCTOBER 2016 · RICOH ARENA COVENTRY

www.vacuum-uk.org

A MEETING AT THE 7TH VACUUM SYMPOSIUM

Please watch out for updates on the website

Five courses will be running
*(please register well in advance to
attend courses—places are limited.)*

- **VTC1 - Vacuum - The Basic Principles**
- **VTC2 - Vacuum in practice - Atmosphere to High Vacuum**
- **VTC3 - Clean vacuum and UHV**
- **VTC4 - An Introduction to Leak Detection**
- **VTC5 - The Design & Fabrication of UHV Chambers**



Co-located with

VacuumExpo

Industrial and Scientific
Conference & Exhibition

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VTC1 (morning, running on both days)

Vacuum - The Basic Principles

Time: 10:00 to 12:00

The trainer is **Dr Austin Chambers**

This course will deal with the principles involved in creating and maintaining a vacuum. The various aspects of gas behaviour that are important for this purpose will be described, together with the characteristics of flowing gas and how they change as pressure falls. On the basis of this analysis flow can be specified quantitatively and performance predicted.

- Schematic representation of a typical vacuum system
- Specifying a vacuum – pressure and partial pressures
- Air, water vapour and rarefied gas
- The molecular description of a gas. Mean free path
- Fluidic and molecular states of gas, Knudsen number
- Gas flow – viscous and molecular
- Specifying flow – throughput, pumping speed and conductance
- Sources of gas in a vacuum vessel. Outgassing
- The pumping process, pumping times and ultimate pressure

VTC2 (afternoon, running on Wednesday)

Vacuum in practice—Atmosphere to High Vacuum

Time: 14:00 to 16:00

The trainer for VTC2 is **Dr Ron Reid** on Wednesday

The subject of this course is how vacuum is produced and measured in a few typical devices whose operation reflects the application of the principles described in the VTC1 course. A representative selection of simple systems will be described and analysed.

- Pumps: working principles and operating range of oil-sealed rotary, dry scroll, turbo-molecular, cryogenic and ion pumps.
- Pressure gauges: classification and operating range. Working principles of Pirani, capacitance diaphragm and ionisation gauges.
- Residual gas analysis. The quadrupole instrument.
- Examples of systems at low and high vacuum.
- Sources of further information.

Participants requiring an introduction to topics/devices not included in this list are invited to submit requests for the consideration of the organisers.

VTC3 (running on Thursday—full day event)

Clean Vacuum & UHV

Time: 10:00 to 16:00

The trainer is **Dr Ron Reid**

The course is primarily aimed at those who need to use equipment operating at vacuum levels of 10^{-9} mbar or lower and is approached mainly from the physics aspects of vacuum science. Therefore, the course will emphasise the physical principles of equipment and processes.

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TRAINING IS SPONSORED BY:

BVC The British Vacuum Council

The full VS7 programme will be available nearer the time on the website at www.vacuum-uk.org.

WHAT TO DO NEXT

1. Register yourself for VS Training
2. Send this information to colleagues and associates who may be interested.
3. Register yourself to attend the event as soon as possible.

ATTENDEES

To register as an attendee and for training for the Symposium and the Vacuum Expo exhibition please go to **WWW.VACUUM-UK.ORG** and register.

Previous Symposium attendees: You may log back into this system - your profile remains in the system from attendance at previous events.

Once registered you will be sent regular updates.

More at: www.vacuum-uk.org



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There will be little mathematics or advanced physics used, so it will be suitable for people with an engineering or technical background. The topics to be covered will include:

- a general introduction to vacuum and UHV in particular;
- the measurement of total and partial pressures in UHV;
- Outgassing and related phenomena;
- processing; elements of system design and operation and quality assurance matters

VTC4 (running on Wednesday afternoon)

An Introduction to Leak Detection

Time: 14:00 to 16:00

The trainer is **Mr Ian Howard (Leybold Academy EN accredited trainer)**

This course discusses the various uses and ever increasing requirements for leak detection, describing and defining what a leak is and the methods of detection, with practical demonstrations of finding leaks using a helium leak detector.

Discussions will include, modes of operation, such as Vacuum Mode vs Sniff Mode; Integral and local leak detection methods; description of various types of leaks that could be encountered and also various applications for Helium leak detection.

Finally, with time permitting, getting some audience participation to find leaks on some components.

VTC5 (running on Thursday afternoon) - to be confirmed

The Design & Fabrication of UHV Chambers

Time: 14:00 to 16:00

The trainer is **Dr Dominik Schwendt & Dr Kai Sturm from the Pfeiffer Trinos organisation in Germany**

This presentation gives an introduction to the basic requirements and properties of UHV chambers. The main focus will be the design and fabrication of chambers with regards to material choice and surface finish, together with a brief introduction to special-purpose solutions such as chamber cooling.

- Chamber design
- Fabrication techniques
- Materials for UHV applications
- Surface finishes
- Measurement of UHV
- Special Purpose / Application Specific solutions

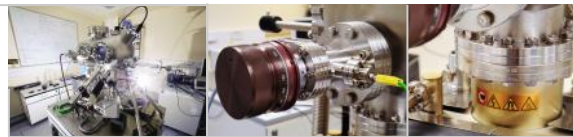
* Training is VAT exempt.

Training fee is to cover certificates, CD and administration.

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Vacuum symposium UK aims to address cutting edge issues associated with Vacuum Science Technology and Applications. This two-day event fosters a multidisciplinary environment that cuts across traditional boundaries between disciplines and features:

- Technical Sessions
- Poster Sessions
- Training Courses
- Exhibition

Other programmes:

"Vacuum Quality in Vacuum Process Engineering – does it matter?"

Cryopumping explained... "it's a trap"

Functional Thin Films

TPW 2016: Technical Plasma Workshop

More at: www.vacuum-uk.org

