



**Prof. em. Dr. Ir. Alfons Buekens**  
born in Aalst (1942), Flanders, Belgium;

**Pof. Dr. Buekens was one of the first who researched about the environmental impact of dioxins and furans the and he did a great documentation of this scientific area. Next to that his speciality was research on the recycling and treatment of chemical and hazardous wastes.**

**On the european level he released impulse to modern waste management.**

### **Studies and Training**

- Secondary school: Royal Athenaeum Aalst, 1947-59 (greatest distinction)
- State University of Ghent: Degree in Chemical Engineering 1959-64 (great distinction; M.Sc. (1964) and Ph.D (1967) at Ghent University (RUG);
- Applied Sciences, Ph. D. on “The thermal cracking of Hydrocarbons”, 1964-67 (greatest distinction)
- Intensive course German (1962-64)
- Trainee in the R&D section of Photo Products Gevaert (now Agfa-Gevaert), Mortsel, Belgium. Assignment: Solvent recovery in the Film Sub-layer Division, august 1963
- Politecnico di Milano (Istituto di Chimica Industriale), Milan, Italy. Collaborator of Prof. Pasquon and Prof. Dente. Assignment: computer simulation of free radical mechanisms in the pyrolysis of hydrocarbons, May-June 1971

**He was full professor at the Vrije Universiteit Brussel (VUB) until 2008, since 2002 emeritus.**

### **Professional Background**

- 1964 - 1966 : Preparation of Ph.D. work, with a grant from I.W.O.N.L.
- 1968 - 1970 : Assistant and First Assistant at the University of Ghent
- 1970 - 1976 : Junior Professor V.U.B. (“Docent”)
- 1976 – 2002: Full Professor at the Free University of Brussels (V.U.B.)
- Part-time professor at
  - The Catholic University of Louvain (1976-85),
  - The University of Antwerp (1982-97)
  - The Technical University of Delft – The Netherlands
  - The Bosphorus (formerly American) University of Istanbul – Turkey - Teaching a NATO course on environment and waste management
  - The Technical University of Surabaya – Indonesia
  - The Technical University of Sofia – Bulgaria

- Universidad San Simon de Cochabamba - Bolivia
- Universität Essen - Deutschland
- External Examiner Eötvös Universiteit/ Technical University Budapest
- TEMPUS Teaching: environment and waste management
- October 1, 2002 Emeritus status; with still some assignments (Safety, Human Ecology VUB) and Research work in the Field of Dioxins
- 2001 – 2002: 5 months assignment as a guest professor
- 2002 – 2003: 5 months assignment as a guest professor both at Tohoku University, Sendai, Japan
- 1988 - 1989: Principal Advisor of the Minister of Environment, Housing and Industrial Plant, (1 June 1988 - 11 July 1989)
- He lectured at numerous universities:  
Ankara (Turkey), Antwerp (B), Cochabamba (Bolivia), TU Delft (NL), Uni Essen-Duisburg (D), Ghent (B), Hasselt (B), Louvain (B), Sofia (Bulgaria), Surabaya (Indonesia), and was in 2002 and 2003 Invited Professor at the Tohoku University of Sendai (Japan). Since 2008 he is Yongqian Professor and at present Pao Yue-Kong Professor at Zhejiang University (Hangzhou, P. R. of China).

**Prices and Awards**

- First Students Prize - Royal Association of Flemish Engineers for the M.Sc. Thesis on "The catalytic alkylation of toluene", 1965
- Robert De Keyser Award, donated by Shell Belgium, for the Ph.D Thesis on "The thermal cracking of hydrocarbons", 1967
- Mentoring-award of the Körber Foundation, Hamburg, 1988
- Recycling Award, donated by the Coca-Cola Foundation, for the Research Work on Activated Carbon Production from Wastes, 1989
- Award from Tokyo Metropolitan Government, 1977
- Award from Mendeleyev Institute, Moscow, 1988
- Award from Kyushu University, Fukuoka, 1999

**Major Research themes**

- Thermal conversion of waste, including biomass, plastics, rubber, hazardous waste
- Air Pollution Problems, Dioxins, Products of Incomplete Combustion, arising from Thermal and Metallurgical Units.

**Scientific and Technical activities**

- 70 publications in scientific magazines
- 180 papers (e.g. conferences, seminars, ...)
- 20 articles in books and other works
- 600 advising reports
- 130 lectures in more than 30 countries

There are about 80 contributions in the field of dioxins, one of his favourite research areas

**Organizer of Seminars and Symposia**

- Organizer of a yearly seminar on the topic "Waste Management and treatment" since 1981 – now = 25<sup>th</sup> edition
- Principal Organiser of the International Symposium on "Materials and Energy from Refuse", K.V.I.V., Antwerp, 1976, 1981, 1986, 1992
- Vice-Chairman of the International Recycling Symposium, Berlin, 1979, 1982
- Eco-Audits and Environmental Assessment in the E.C., Brussels, 28-29/10/1992
- Körber Stiftung, Colloquium on Pyrolysis, Brussels, 21/02/1994
- Co-organiser of "Integrated rehabilitation of environmentally devastated areas in river basins in Eastern Europe", NATO/ARW, Moscow, 12-16/09/1994
- Organiser of the Karasek Meeting, Durbuy, Belgium
- Co-organizer ISFR (International Seminar on Feedstock Recycling)  
1<sup>st</sup> edition: Sendai - Japan, 1999; 2<sup>nd</sup> edition: Ostend – Belgium, 2002

**Acts or Acted as an Expert for:**

- The World Health Organisation (**W.H.O.**), in Germany, Turkey, and Malta United Nations Organisation for Industrial Development (**UNIDO**) in the P.R. of Romania, the P.R. of China
- E.C. (D.G. VIII, XI, XII and XVII) in England, France, Republic of Guinea-Conakry, Sierra Leone
- The Belgian General Agency for Cooperation of Development, Zaire (now Congo), Indonesia
- The Council of the Prosecution during the Dioxin crisis in Belgium - May 1999, with testing at
- The Japanese academic an industrial world

Led projects and assignments in a lot of countries, e.g. the E.U., USA, Algeria, Australia (Tasmania), Bolivia, Canada, China, Estonia, Guinea (Conakry), Indonesia, Kyrgyzstan, Rumania, Sierra Leone, Turkey, Venezuela, Zaire, and many others.

**Project Coordination**

- Prof. Buekens successfully coordinated three EU projects:
- Treatment of Fly ash for sound material utilization, Upcycle, EC Project n° ENV4-CT95-0085, (1996-1999)
- Chemical (pyrolytic) and mechanical recycling of plastics and composites, Cycleplast, EC Project n° PL964158, (1997-2000), with as partner Academy of Sciences of the

Czech Republic and Hungarian Academy of Sciences

- Minimization of dioxins in the thermal industrial processes : mechanisms, monitoring, abatement, Minidip, EC, Project n° PL970492, (1998-2001)
- and participated in Haloclean. He currently acts as Principal Technical Advisor (PTA) on a number of E.U. research projects.

#### Other functions

- Member of the Advisory or Editorial Board of about 10 scientific journals
- Vice Chairman of the Board of the Belgian Consumers Association (250,000 paying members) and Member of the Board of Conseur (> 1,000,000 paying members), active in Belgium, France, Italy, Luxemburg, Spain, Portugal, Brazil
- Member of Board of the Royal Association of Flemish Engineers (1971-75)
- Technical/Financial Advisor to N.M.K.N./S.N.C.I. (main Belgian industrial banker, today Fortis Group) from 1975 – 2001
- **Past** president of the Belgian Professional Association of private waste contractors (BVAV / UPEED)
- **Founding** father (1981) of the Flemish Solid Waste Management Agency O.V.A.M. (Mechelen)
- **Founding** father (1989) of the Brussels Environmental Agency B.I.M./I.B.G.E. (Brussels)
- **Founding** father (1985) of Indaver S.A., of Pollution Control S.A., Research Development & Consulting S.A. and RDB S.A.
- Past Member of an Advisory Board of several scientific institutions, Vito (Mol), TNO (Apeldoorn) and Forschungs Zentrum Karlsruhe.

#### Member of Scientific Societies

- Royal Association of Flemish Engineers (K.V.I.V.)
- Flemish Chemical Association (V.C.V.)
- Royal Dutch Chemical Association (K.N.C.V.)
- Belgian Petroleum Institute (B.P.I.)
- International Association for Waste Pollution Research (I.A.W.P.R.C.)
- Institution of Incinerator Engineers
- The Flemish Chapter of the Filtration Society

Since 1976 he acted as an Environmental Consultant for the European Union (D.G. VIII, XI, XII, XVII), for UNIDO and WHO, and as an Advisor to T.N.O. (NL), Forschungszentrum Karlsruhe (D), and VITO (B). For 25 years, he advised the major industrial Belgian Bank (NMKN/SNCI) and conducted more than 600 audits of enterprise.

Main activities are in waste management, thermal and catalytic processes, and flue gas cleaning, with emphasis on heavy metals, dioxins, and other semi-volatiles. He coordinated

diverse national and international E.U.-research projects (Acronyms Cycleplast, Upcycle, and Minidip) and participated in many others worldwide.

He is author of a book on Waste Management (1975), edited several books, countless Seminar Proceedings (>50), and a large Technical Encyclopedia (10,000 pages) and authored numerous scientific publications in refereed journals and more than 150 presentations at international congresses. He is a member of Editorial Boards for different journals and book series.

He played a role at the foundation of the Flemish Waste Management Authority O.V.A.M., of a hazardous waste enterprise INDAVER, and of the Brussels Environmental Protection Agency B.I.M./I.B.G.E. He was principal ministerial advisor in Brussels for matters regarding Environment, Housing, and Classified Enterprise (1988/89). He was a Member of the Board of the Belgian Consumer Association and of Conseur, grouping more than 1.5 million members in Belgium, Brazil, Italy, Portugal, and Spain.

He used to be licensed expert for conducting Environmental Impact Assessments (Air, Water, Soil) and Safety Studies regarding large accidents (Seveso Directive).

**Publication list****1968**

A.G. Buekens: Ketenmechanismen bij de thermische kraking van koolwaterstoffen, Ann. Belg. Petr. Inst. 1, 27-38, 1968

A.G. Buekens, G.F. Froment: Thermal Cracking of Propane-Kinetics and Product Distribution, I and EC Process Des. Development 7, 435-477, 1968

A.G. Buekens, G.F. Froment: Fundamental aspects of the design of tubular cracking units, Proceedings of the fourth European Symposium, Brussels 9-11 September, 287-298, Pergamon Press, 1968

**1970**

A.G. Buekens: Simulation d'un Réacteur Tubulaire de Cracking, 17 p, Colloque sur les modèles mathématiques, Société de Chimie Industrielle, Pau, 23-25 février 1970

**1971**

A.G. Buekens, G.F. Froment: Thermal Cracking of Isobutane-Kinetics and Product Distribu-

tion, I and EC Process Des. Development, 10, 109-315, 1971

A.G. Buekens: Kinetic Models in Paraffin Pyrolysis, 1971

**1974**

A.G. Buekens: Recycleren in België, Internationaal congres Kringloop Grondstoffen, Rotterdam, Gepubliceerd in MPC Milieutechniek, november 1974

A.G. Buekens: Studie van de valorisatie van gemengde plastiekafval in opdracht van Antwerp Metaalbedrijf nv, 1974

**1975**

A.G. Buekens: Feiten en fictie in de Recycling van plastiek, Studiedag K.VIV, maart 1975,  
27 p. + 13 p. figuren

A.G. Buekens: Studies omtrent de verbranding in roosterovens, wervelbedovens, smelt-ovens, 1975

**1976**

A.G. Buekens

Verbrandings-, vergassings- en pyrolysetesten op talrijke soorten afval, o.m. biomassa, kunststoffen, rubber, gedroogd zuiveringsslib, enz, 1976

**1977**

A.G. Buekens: Assesment of Current Technology of Thermal Processes for Waste Disposal, with particular Emphasis on Resource Recovery, EEC-Contract nr 282-76-9 ECI B, Preliminary Report 1 Jan. 1977, Interim Report 1 July 1977, Final Report 1 November 1977

A.G. Buekens: Perspectieven van de pyrolyse in België, 14 p. + 5 p. figuren. Nationaal R & D programma : Economie van de afvalstoffen en van de secundaire grondstoffen.  
Studiedag 25-26 oktober 1977

A.G. Buekens: Industrial Waste Incineration, Proceedings of the Third Iranian Congress of Chemical Engineering, Part III, p. 27-114, Shiraz, Iran (63 p. + 23 p. figu.), November 1977

A.G. Buekens, J. Marivoet: Steam reforming of methane. Proceedings of the Third Iranian Symposium of Chemical Engineering, Part IV, p. 91-8, Shiraz, Iran, November 1977

A.G. Buekens: Some observations on the recycling of plastics and rubber. Conservation and Recycling, 1, p. 247-271, 1977

A.G. Buekens: Assesment of current technology of thermal processes for waste disposal with particular emphasis on energy recovery, 1977

## **1978**

A.G. Buekens, J. Mertens, J. Schoeters, P. Steen: Experimental techniques and mathematical models in the study of waste pyrolysis and gasification, 24 p. + 9 p. figuren.  
Proceedings of the first world recycling conference in Basel, 6-8 maart 1978

A.G. Buekens: Verwertung von Schlacken aus der Müllverbrennung in : Thermische behandlung von Haushaltabfällen, p. 502-553, uitgave : Karl Thomé-Kozmiensky (Techn. Univ. Berlijn), E. Schmidt Verlag, 1978

A.G. Buekens: Grundlagen der Abfallpyrolyse and Ubersicht über in Europa angeboten Verfahren. Abfalltechnischen Kolloquium der Univ. Stuttgart am 13. okt 1978. In : Müll und Abfall, 10 (12), p. 353-62, 1978

A.G. Buekens: Pyrolysesystemen; Symposiumboek Metaalrecycling, uitgegeven door dispuit Agricola, T.H.Twente, p. 27-53 , 26 September 1978

J.J.R. Mertens, A.J.A. Callaerts, E. Jacobs, A.G. Buekens: A simple method for determination of the temperature rise time and temperature profile for different PyroprobeR sample holders, both uncoated or with sample applied

J.J.R. Mertens, A.J.A. Callaerts, A.G. Buekens: Physical Aspects of Pyrolysis Gas Chromatography

A.G. Buekens and J.G. Schoeters: Basic principles of waste pyrolysis and review of European processes, the 175th Meeting of the American Chemical Society, Anaheim, CA, March 13-17, 1978. American Chemical Society, Symposium Series N° 76, J.L. Jones, S.B. Radding (Eds.), "Solid Wastes and Residues - Conversion by Advanced Thermal Processes", 397-421, 1978

## **1979**

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A.G. Buekens: Pyrolyse von Kunststoffen in einem Wasserdampf-Wirbelbett (D), p. 728-35, Pyrolysis of plastics in a steam fluidized bed (E), p. 674-80, International Recycling Congress CRE/MER, K.J. Thomé-Kozmiensky, E. Freitag, Verlag für Umwelttechnik, Berlin, 1-3 oktober 1979

A.G. Buekens, J. Mertens, J. Schoeters, P. Steen: De verwerking van afvalstoffen door pyrolyse - Wetenschappelijk eindrapport. Nationaal onderzoeks- en ontwikkelingsprogramma op het gebied van de afvalstoffen en van de secundaire grondstoffen,

**1979**

A.G. Buekens, J. Schoeters, H. Masson: La pyrolyse et la gazéification de déchets cellulaires en couche fluidisée. Journées Scientifiques sur la Technologie des Lits Fluidisés et Dispersés de Compiègne, 22-23 oktober 1979

A.G. Buekens, J. Schoeters: Utilization of Incinerator Residue, Proc. of the Second World Recycling Conference, Manila, March 1979, Session II, p. 121-38. Exhibitions for Industry, Oxted, Surrey, 1979

A.G. Buekens, G. Borighem: Disposal & reutilisation of fly ash, 1979

A.G. Buekens, J. Schoeters: European PTGL technology, Presented before the Division of Environmental Chemistry, ACS, September 11-14, 1979

**1980**

A.G. Buekens, H. Masson: Wood Waste Gasification as a source of Energy, Conservation and Recycling, 3, (3/4), p. 275-284, 1980

A.G. Buekens: Feasibility of incineration or alternative thermal methods of solid waste treatment report on a visit to Turkey, WHO Regional Office for Europe, Restricted, 7 juli - 6 augustus 1980

A.G. Buekens, J. Schoeters: Basic principles of Waste Pyrolysis and Review of European Process. Symposium on Thermal Conversion of Solid Waste and Biomass, Am. Chem. Soc. Meeting, Washington D.C., 1979, Invited Lecture, Published in : ACS Symposium Series 130, p. 397-421, 1980

A.G. Buekens: Schlussfolgerungen hinsichtlich der praktischen Anwendung der Hausmüllpyrolyse aufgrund weltweiter Erfahrungen. Müll und Abfall 12 (6), p. 184-

91, 1980

A.G. Buekens: Current research in the EEC on energy from waste. Invited Lecture at the Talking Rubbish Conference, Greater London Council, London, January 1980

A.G. Buekens, J. Schoeters: De vergassing van biomassa, Chemie Magazine, 1/80, p. 20-21, 1980

A.G. Buekens, P. Steen: De pyrolyse van huisvuil, Chemie Magazine, 1/80, p. 23-25, 1980

## **1981**

A.G. Buekens, J. Schoeters: Pyrolysis and Gasification - theory - Processes - Practical experience, in K. Curi (Ed.), NATO Course, Bosforus University, 6-8 juli 1981

A.G. Buekens, J. Schoeters, K. Maniatis: Fuel gas from agricultural residues in a fluidized bed reactor. Chemical Engineering World Conference, Montreal, p. 313-6, 5-9 oktober 1981

A.G. Buekens, J. Marivoet: Kinetics and mechanism of the steam reforming of natural gas using an industrial catalyst, Chemical engineering World Conference, Montreal, 5-9 oktober 1981

A.G. Buekens, H. Masson, J. Schoeters: Gasification of biomass in a fluidized bed: some fundamental investigations about the reactor performance, Materials and Energy from Refuse II (symposium), Antwerpen, oktober 1981

A.G. Buekens: Waste recycling technologies in 1980, Prospects in the EEC-Countries (in English and Japanese), Invited Lecture, 1st international Waste Recycling Symposium, Clean Japan Centre, Tokyo, Japan, 16-18 november 1981

**1982**

A.G. Buekens, K. Maniatis: Fluidized bed gasification, EPE (Tijdschrift voor primaire energie) 17 (3-4), p. 35-43, 1982

A.G. Buekens, L. Jacob: Emissions and pollution abatement systems in incinerator plants for special wastes (Eng.), Emissionen und Emissionsminderung bei der Verbrennung von Sondermüll (Duits), in: Recycling International III, E. Freitag Verlag für Umwelttechnik, Hrsg. Karl J. Thomé-Kozmiensky, p. 538-548, Berlin, april 1982

A.G. Buekens, J. Mertens, E. Jacobs, A. Callaerts: Kinetic study on the thermal decomposition of polystyrene by means of pyrolysis gas chromatography, Macromolek. Chem., Rapid Comm., 3, p. 349-356, 1982

A.G. Buekens, J. Mertens, E. Jacobs, A. Callaerts: Determination of temperature rise time and temperature profiles for three commercial pyrolyzer sample holders, Anal. chem., p. 2620-2622, 1982

A.G. Buekens, K. Maniatis: Practical experience in fluidized bed gasification of biomass, The Beyer Institute (Stockholm, Sweden), Producer gas conference, Mt Lavinia, Sri Lanka, 8-12 november 1982

A.G. Buekens, J. Schoeters: Modelling of biomass gasification (Invited lecture), Congress : Fundamentals of thermochemical biomass conversion, Organized by Solar Energy Research Institute, Estes Park Colorado, 1982

A.G. Buekens: Onderzoek naar het thermisch gedrag van kaliumcyanidecomplexen, Report prepared by request of MOURIK b.v. The data contained served in the design of the triple rotary kiln of ATM, Moerdijk destined for the thermal treatment of contaminated soil, e.g. from gas works, 1982

J. Schoeters, A.G.Buekens: De thermische werking van electronic scrap. Testen op labora-

toriumvergassingsoven en testen op fluid-bed pyrolyseoven. In opdracht van Metallurgie Hoboken, januari 1982

A.G. Buekens: Valorisatie van autobanden, industrieel rubber en kunststofafval door pyrolyse, juni 1982

**1983**

A.G. Buekens, L. Jacob, J. Schoeters, K. Van Cauwenberghe: Erfahrungen aus den Messungen von organischen Schadstoffen an Verbrennungs-analagen für Haus- und Sondermüll. in : Müllverbrennung und Rauchgasreinigung, Karl. J. Thomé-Kozmien-sky (Hrsg), E. Freitag -Verlag für Umwelttechnik, Berlin, 1983

A.G. Buekens, V. De Proost: Experience in sludge incineration in Belgium (Eng.), Die Schlammverbrennung in Belgien (Duits), 3. Abfallwirtschaftliches Fachkolloquim "über die Behandlung, Verwertung und Beseitigung von Abwasserschlamm", Saarbrücken, 28-29 april 1983

A.G. Buekens: Waste Incineration, 1983 (zie ook 1977)

A.G. Buekens, G. Borighem: Thermisch gedrag van ijzercyanide complexen, 1983

A.G. Buekens, J. Schoeters: De fluid bed verbranding van RDF, Seminarie "Grondstoffen uit Konsumptieafval", Brussel, 8-9 juni 1983

A.G. Buekens: Effect van kalkinjectie op de emissie van HCl, HF en SO<sub>2</sub> + SO<sub>3</sub>

A.G. Buekens, K. Maniatis, J. Schoeters: Eindrapport betreffende polluenten veroorzaakt door de verbranding van destillatieresidus in opdracht van De Neef Chemie – 01/02/1983

**1984**

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A.G. Buekens, J. Schoeters, K. Maniatis, W. De Nijs, L. Jacob: Measurement of the performance of dry removal systems for gaseous pollutants on a municipal refuse incinerator, "Emissions from combustion and their control", 6 th EWPCA/ISWA Symposium, Munich IFAT, mei 1984

A.G. Buekens, J. Schoeters, L. Jacob: Emissionsbegrenzung bei der Müllverbrennung mittels nasser, halbtrockener und trockener Verfahren, 4. Abfallwirtschaftliches Fachkolloquium, "Sonderstoffproblematik in der Abfallwirtschaft", KBAV, Saarbrücken, 26-27 april 1984

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A.G. Buekens: Opportunities in the sorting of plastic waste, Plastic waste and scrap tires, p. 531-541. In : Recycling International, Karl J. Thomé-Kozmiensky (Hrsg.), EF Verlag für Energie und Umwelttechnik, p. 531-541, Berlin, 1984

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J. Schoeters, A.G. Buekens: Voorstudie betreffende de toepassing van een moving bed

vergasser voor de retrofitting van bestaande boilers, in opdracht van Denayer Thermal Industries, augustus 1984

**1985**

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K. Maniatis, A.G. Buekens, M. Rosid: Biomass Gasification: An Overview, Lokakarya Energi 1985, Komite Nasional Indonesia - World Energy Conference, Jakarta, Indonesia, 8-9 mei 1985

K. Maniatis, A.G. Buekens : Producer Gas for small and large scale irrigation in rural areas", IWRA, Vth World Congress on Water Resources, Brussels, Belgium, 9-15 juni 1985

J. Schoeters, A.G. Buekens: The fundamentals of Wood gasification, Symposium on Forest Products Research International - Achievements and the Future, South-Africa, 22-26 april 1985

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## **1986**

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