Curriculum vitae

PERSONAL INFORMATION

Giulio Buffo

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Sex Male | Date of birth 29/08/1993 | Nationality Italian

JOB APPLIED FOR

Engineer

EDUCATION AND TRAINING

21/10/2015–13/12/2017

Master's degree in Energy and Nuclear Engineering - Degree: 110/110 cum Laude

Politecnico di Torino, Torino (Italy)

Thesis in Polygeneration and Advanced Energy Systems

Title: Modeling, techno-economic analysis and optimal operation of a Reversible Solid Oxide Cell (ReSOC) polygeneration system

Abstract:

This work presents a completely carbon-free Reversible Solid Oxide Cell (ReSOC) concept plant for the combined heat and power production.
The simulations of steady-state operation at full and partial loads in SOFC and SOEC modes were performed with software Aspen Plus™. After a step of pinch analysis aiming to optimize the recovery of heat in the Balance of Plant, a MATLAB™ model interfaced the map of steady-state operating points with both the simulated loads of the residential district and a heat storage unit (HSU) containing molten salts.
It was possible to identify two relevant schedules with completely different features: a power-driven profile and a heat-driven profile.
Three strategies for the optimal thermal management and cyclic functioning of HSU were elaborated performing a crossing-over of power- and heat-driven profile with the aim of combining their alternative effects.
A techno-economic assessment was required to perform a discounted cash-flow analysis of the investment over the system lifetime. The obtained result was the key element for the definition of the optimal operating schedule of the modeled plant.
A preliminary and conservative evaluation of incidental events involving the hydrogen storage, like fires and explosions, highlighted that the area for the installation of this hazardous component is not so vast and can fit the urban pattern in the city of Leicester.

30/09/2012–15/10/2015

Bachelor's degree in Energy Engineering - Degree: 104/110

Politecnico di Torino, Torino (Italy)

Thesis in Building physics

Title: Evaluation of the performance of fibrous filtering materials (original title in Italian: Determinazione delle prestazioni di materiali filtranti fibrosi)

Abstract:

The aim of this work is to perform tests to determine the performance of filtering materials used mainly for air conditioning. The data collected will be processed critically, highlighting the peculiarities of the tools used and the influence of the operating conditions. The results of the spectral efficiency tests, conducted as part of this experimental study in the context of the European Commission's M / 461 research mandate (Standardization activities on nanotechnologies and nanomaterials), confirmed the key points of the theory of filtration mechanisms. The performance of standard tests has allowed a first validation of the test rig, providing the collected data a good degree of reliability: this is the prerequisite

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

for the inter-laboratory comparison of the results obtained, of the methods followed and the experiences gained in this and other studies. The main objective is the definition of an experimental protocol for the determination of the performance of the filtering materials, in order to support the development of the nanotechnology and nanomaterial supply chain.

2007–2012

Classical high school degree, "sperimentazione Brocca Linguistico" - Degree: 100/100 cum laude

Liceo classico statale "Virgilio", Lecce (Italy)

Related document(s): Buffo_Giulio_Certificato_Diploma_Scuola_Media_Superiore.pdf

WORK EXPERIENCE

15/12/2016–15/04/2018

Website localization

Infocom S.r.l.
Via Leuca 172, 73100 Lecce (Italy)
www.infocomsrl.com

Management, translation and localization of websites

Business or sector Information and communication

06/03/2017–29/05/2017

Politecnico di Torino, Torino (Italy)

Teaching part-time assistance (30 hours) - Course in Thermal design and optimization:
- support to students during lab sessions.

26/09/2016–19/01/2017

Politecnico di Torino, Torino (Italy)

Teaching part-time assistance (100 hours) - Course in Building physics:

- tutoring and support to students;
- writing and collection of teaching material.

22/10/2015–02/02/2016

Politecnico di Torino, Torino (Italy)

Teaching part-time assistance (100 hours) - Course in Building physics:

- tutoring and support to students;
- writing and collection of teaching material;
- check of students' reports.

19/03/2015–07/07/2015

E.Di.S.U. Piemonte - Office for Halls of Residence
Via Montebello 1, 10124 Torino (Italy)
https://www.edisu.piemonte.it/it/servizi/abitare/residenze-universitarie

Part-time collaboration (200 hours):
- management of Halls of residence;
- support to evaluation of the final operating balance in year 2014.

Business or sector Administrative and support service activities

PERSONAL SKILLS

Mother tongue(s) Italian

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2
	First Certificate English (FCE)				
	Related document(s): Buffo_Giulio_Certificazione_Inglese_Livello_B2.pdf				
Spanish	B2	B2	B2	B2	B2
	Diploma de Español como Lengua Extranjera (DELE) - nivel B2: 91,17/100				
	Related document(s): Buffo_Giulio_DELE_Diploma_de_espanol_como_lengua_extranjera_B2_2010.pdf				
French	B1	B1	B1	B1	B1
	Diplôme d'études en Langue Française (DELF) - niveau B1: 92,5/100				
	Related document(s): Buffo_Giulio_DELF_Diplome_d'etudes_en_langue_française_B1_2012.pdf				
German	A2	A2	A2	A2	B1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Proficient user	Proficient user	Independent user

Digital skills - Self-assessment grid

Patente Europea del Computer - conseguimento del certificato ECDL in data 26/3/2012

Operating systems (advanced knowledge):
- Microsoft Windows

Programming language (good knowledge):
- C
- C++

Programs and applications

Advanced knowledge:

- MATLAB
- FreeFem++
- Aspen Plus

Good knowledge:

- Code::Blocks
- Comsol Multiphysics

Basic knowledge:

- Polysun
- Tonatiuh
- EES (Engineering Equation Solver)
- Star-CCM+

Database (basic knowledge):
- Microsoft Access

CAD (good knowledge):
- Solidworks

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Spreadsheet (advanced knowledge):
- Microsoft Excel

Other skills

For six years I have been swimming at a competitive level. For two years I have been part of a volleyball team, also participating in a provincial tournament.

I edited and moderated the blog of my high school class on the Splinder platform, from 2008 to 2012.

I took part in the 6th edition of the "Certamen Archeologico Prenestino", getting the 6th award with a report about Trajan's Market in Rome and the "Casa delle Nozze d'Argento" in Pompeii.

I was an "Apprendista Cicerone" during 2010 FAI Spring Days, guiding visitors inside the historic center of Castro (LE). In the same year, I took part as a tour guide in the "Cortili Aperti" event in the center of Lecce.

I have a keen interest in the history, art and folklore of my own and other countries, as well as classical and Italian and foreign music of the second half of the last century.

Driving licence

B

ADDITIONAL INFORMATION

Conferences

Filtech Conference 2018 - Cologne, 13-15 March 2018

Poster session and short oral presentation of the research activity "Analysis of aerosol emissions from a rubber vulcanization process"

Conference Abstract

Related document(s): Buffo_Giulio_Abstract_Filtech_Conference_2018.pdf

Projects

Scholarship for research activity about "Determination of performance of filtering materials" (scientific tutor: prof. Paolo Tronville. Period: 04/04/2016 - 30/09/2016)

Abstract:

We monitored and analyzed the emission control systems of some post-curing ovens, serving a production unit manufacturing small parts containing rubber for the automotive industry.
We measured the emissions exhausted by two different types of ovens: in-line and batch ones. Each emission control unit was equipped with a heat exchanger cooling the exhaust gases to a value suitable for the operation of the downstream two-stage electrostatic precipitator.
The goals in performing the measurements were:

- To assess the performance of the exhaust fume purifying unit, with emphasis on the electrostatic precipitator performance and its assessment;
- To evaluate the adequacy and efficacy of the current maintenance schedule, whose time interval may significantly influence the performance of the electrostatic precipitators;
- To develop a robust measurement protocol to evaluate the reliability of innovative solutions for removing the pollutants.

Projects

Analysis of possible long-term scenarios for electricity production in Germany: a macro-scale modeling approach

Abstract:

The aim of this project work is the study of possible long-term scenarios for power production in Germany, starting from the collection and analysis of historical data and projections regarding the main socioeconomic drivers of the electric demand.

Open-access report (ResearchGate)

Projects A simplified model for the electrical energy consumption of household refrigerator-freezers

Abstract:

This project work aims at defining the crucial parameters for the simulation of base energy consumption of refrigerator-freezers in dwellings, starting from the data published by producers in datasheet. A preliminary correlation between these parameters and the energy consumption is searched.

Open-access report (ResearchGate)

Projects Feasibility study of a residential CHP system based on SOFC

Abstract:

The following project work aims at performing the design of a SOFC micro-CHP system for a residential unit: it provides a preliminary feasibility study and the cash flow analysis in a certain number of economic scenarios and compares the results of simulations with the present configuration involving traditional systems and dynamics for heat production and power purchasing.

Open-access report (ResearchGate)

Projects Valutazione preliminare della variazione dello stato di qualità dell'aria conseguente alla realizzazione di un impianto di cogenerazione a servizio di una rete di teleriscaldamento

Abstract:

Si intende valutare la variazione dello stato di qualità dell'aria conseguente alla realizzazione di un progetto, come previsto nell'ambito di uno Studio di Impatto Ambientale.
Nel caso specifico, l'opera oggetto della valutazione è rappresentata dall'impianto di cogenerazione realizzato presso il polo di Torino Nord per la produzione di energia elettrica e calore, quest'ultimo a servizio di una rete di teleriscaldamento.

Open-access report (ResearchGate)

Projects Valutazione preliminare e mitigazione del potenziale impatto acustico di una centrale cogenerativa a servizio di una rete di teleriscaldamento

Abstract:

Nell'ambito della progettazione preliminare di una centrale cogenerativa asservita ad una piccola rete di teleriscaldamento, si vuole valutare il potenziale impatto acustico da essa generato in modo da evidenziare eventuali criticità o interventi di mitigazione da adottare.

Open-access report (ResearchGate)

Projects Determination of a correlation between friction factor and Reynolds number in a fully-developed turbulent flow in a triangular duct

Abstract:

The aim of this project work is to determine by numerical tests using the software Star-CCM+ a friction factor correlation as a function of the Reynolds number in a triangular duct and validate it with correlations available in scientific literature. A preliminary convergence analysis is performed in order to build the proper 3D mesh, which should satisfy some quality criteria in order to be adopted for the duct geometry.

Open-access report (ResearchGate)

Projects Exergo-economic analysis, design improvement and investment analysis of a CAES system

Abstract:

This report is devoted to the study of the compressed air energy storage (CAES) plant operating in Huntorf, Germany. After having modelled the system with the software Aspen Plus fixing the default operating thermodynamic conditions, we have performed the exergy cost and exergo-economic analysis of the system; these data are then exploited in order to assess the cost formation process according to the design improvement methodology, that allows to identify the components that can be improved. Furthermore, we have modified the system configuration, the operating conditions and the design parameters aiming to reduce the cost of the products. Finally, an investment analysis and a revenue account of this final optimized layout has been carried out.

Open-access report (ResearchGate)

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Projects Optimal design of a storage unit for a desalination system

Abstract:

The aim of this practice is to analyse the configuration and the operation of a heat storage that can be exploited in a water multi-stage desalination system.

Open-access report (ResearchGate)

Projects Simulation of a solar residential DHW installation

Abstract:

The aim of the exercise is to analyse the performance of a DHW solar system, using the software Polysun.

Open-access report (ResearchGate)

Courses English Language Course (3 weeks: 27/08/2011 - 17/09/2011)

Ardmore Language Schools, Reading (United Kingdom)

Courses Curso intensivo de lengua española (1 semana: 13/06/2011 - 20/06/2011)

Academia Mester, Salamanca (España)

ANNEXES

- Buffo_Giulio_Certificato_Diploma_Scuola_Media_Superiore.pdf
- Buffo_Giulio_Certificazione_Inglese_Livello_B2.pdf
- Buffo_Giulio_DELE_Diploma_de_espanol_como_lengua_extranjera_B2_2010.pdf
- Buffo_Giulio_DELF_Diplome_d'etudes_en_langue_française_B1_2012.pdf
- Buffo_Giulio_Abstract_Filtech_Conference_2018.pdf

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Giulio Buffo

Mother tongue(s)	Foreign language(s)
Italian	English, Spanish, French, German

English

Self-assessment of language skills

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	Writing
B2 Independent user	B2 Independent user	B2 Independent user	B2 Independent user	B2 Independent user

Certificates and diplomas

Title	Awarding body	Date	Level*
First Certificate English (FCE)	Cambridge ESOL	09/12/2011	B2

Linguistic and intercultural experience

Description	Duration
Using languages for study or training: Stay for a 3-week English language cours in Reading (UK). Constant use of technical English during the Master in Energy and Nuclear Engineering	27/8/11–17/9/11

Spanish

Self-assessment of language skills

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	Writing
B2 Independent user	B2 Independent user	B2 Independent user	B2 Independent user	B2 Independent user

© European Union and Council of Europe, 2004-2018 | http://europass.cedefop.europa.eu

Certificates and diplomas			
Title	Awarding body	Date	Level*
Diploma de Español como Lengua Extranjera (DELE) - nivel B2: 91,17/100	Instituto Cervantes	05/2010	B2

Linguistic and intercultural experience	
Description	Duration
Using languages for study or training: Stay for a 1-week Spanish language course in Salamanca (ES)	13/6/11–20/6/11

French

Self-assessment of language skills				
UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	Writing
B1 Independent user	B1 Independent user	B1 Independent user	B1 Independent user	B1 Independent user

Certificates and diplomas			
Title	Awarding body	Date	Level*
Diplôme d'études en Langue Française (DELF) - niveau B1: 92,5/100	Ministère de l'Education nationale française	05/2012	B1

German

Self-assessment of language skills				
UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	Writing
A2 Basic User	A2 Basic User	A2 Basic User	A2 Basic User	B1 Independent user

© European Union and Council of Europe, 2004-2018 | http://europass.cedefop.europa.eu

Common European Framework of Reference for Languages - Self-assessment grid

		A1 Basic user	A2 Basic User	B1 Independent user	B2 Independent user	C1 Proficient user	C2 Proficient user
Understanding	Listening	I can understand familiar words and very basic phrases concerning myself, my family and immediate concrete surroundings when people speak slowly and clearly.	I can understand phrases and the highest frequency vocabulary related to areas of most immediate personal relevance (e.g. very basic personal and family information, shopping, local area, employment). I can catch the main point in short, clear, simple messages and announcements.	I can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc. I can understand the main point of many radio or TV programmes on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.	I can understand extended speech and lectures and follow even complex lines of argument provided the topic is reasonably familiar. I can understand most TV news and current affairs programmes. I can understand the majority of films in standard dialect.	I can understand extended speech even when it is not clearly structured and when relationships are only implied and not signalled explicitly. I can understand television programmes and films without too much effort.	I have no difficulty in understanding any kind of spoken language, whether live or broadcast, even when delivered at fast native speed, provided I have some time to get familiar with the accent.
	Reading	I can understand familiar names, words and very simple sentences, for example on notices and posters or in catalogues.	I can read very short, simple texts. I can find specific, predictable information in simple everyday material such as advertisements, prospectuses, menus and timetables and I can understand short simple personal letters.	I can understand texts that consist mainly of high frequency everyday or job-related language. I can understand the description of events, feelings and wishes in personal letters.	I can read articles and reports concerned with contemporary problems in which the writers adopt particular attitudes or viewpoints. I can understand contemporary literary prose.	I can understand long and complex factual and literary texts, appreciating distinctions of style. I can understand specialised articles and longer technical instructions, even when they do not relate to my field.	I can read with ease virtually all forms of the written language, including abstract, structurally or linguistically complex texts such as manuals, specialised articles and literary works.
Speaking	Spoken interaction]	I can interact in a simple way provided the other person is prepared to repeat or rephrase things at a slower rate of speech and help me formulate what I'm trying to say. I can ask and answer simple questions in areas of immediate need or on very familiar topics.	I can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar topics and activities. I can handle very short social exchanges, even though I can't usually understand enough to keep the conversation going myself.	I can deal with most situations likely to arise whilst travelling in an area where the language is spoken. I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life (e.g. family, hobbies, work, travel and current events).	I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible. I can take an active part in discussion in familiar contexts, accounting for and sustaining my views.	I can express myself fluently and spontaneously without much obvious searching for expressions. I can use language flexibly and effectively for social and professional purposes. I can formulate ideas and opinions with precision and relate my contribution skilfully to those of other speakers.	I can take part effortlessly in any conversation or discussion and have a good familiarity with idiomatic expressions and colloquialisms. I can express myself fluently and convey finer shades of meaning precisely. If I do have a problem I can backtrack and restructure around the difficulty so smoothly that other people are hardly aware of it.
	Spoken production	I can use simple phrases and sentences to describe where I live and people I know.	I can use a series of phrases and sentences to describe in simple terms my family and other people, living conditions, my educational background and my present or most recent job.	I can connect phrases in a simple way in order to describe experiences and events, my dreams, hopes and ambitions. I can briefly give reasons and explanations for opinions and plans. I can narrate a story or relate the plot of a book or film and describe my reactions.	I can present clear, detailed descriptions on a wide range of subjects related to my field of interest. I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.	I can present clear, detailed descriptions of complex subjects integrating sub-themes, developing particular points and rounding off with an appropriate conclusion.	I can present a clear, smoothly-flowing description or argument in a style appropriate to the context and with an effective logical structure which helps the recipient to notice and remember significant points.
Writing	Writing	I can write a short, simple postcard, for example sending holiday greetings. I can fill in forms with personal details, for example entering my name, nationality and address on a hotel registration form.	I can write short, simple notes and messages. I can write a very simple personal letter, for example thanking someone for something.	I can write simple connected text on topics which are familiar or of personal interest. I can write personal letters describing experiences and impressions.	I can write clear, detailed text on a wide range of subjects related to my interests. I can write an essay or report, passing on information or giving reasons in support of or against a particular point of view. I can write letters highlighting the personal significance of events and experiences.	I can express myself in clear, well-structured text, expressing points of view at some length. I can write about complex subjects in a letter, an essay or a report, underlining what I consider to be the salient issues. I can select a style appropriate to the reader in mind.	I can write clear, smoothly-flowing text in an appropriate style. I can write complex letters, reports or articles which present a case with an effective logical structure which helps the recipient to notice and remember significant points. I can write summaries and reviews of professional or literary works.

Common European Framework of Reference for Languages (CEF): © Council of Europe

Buffo_Giulio_Certificato_Diploma_Scuola_Media_Superiore.pdf

REPUBBLICA ITALIANA

MINISTERO DELL'ISTRUZIONE, DELL'UNIVERSITÀ E DELLA RICERCA

MINISTRY OF EDUCATION, UNIVERSITY AND RESEARCH
MINISTÈRE DE L'INSTRUCTION, DE L'UNIVERSITÉ ET DE LA RECHERCHE
MINISTERIUM FÜR UNTERRICHT, WISSENSCHAFT UND FORSCHUNG
MINISTERIO DE EDUCACIÓN, UNIVERSIDAD E INVESTIGACIÓN

ANNO SCOLASTICO 2011/2012
SCHOOL YEAR - ANNÉE SCOLAIRE - SCHULJAHR – CURSO ACADÉMICO

Il Presidente della Commissione n. LEISEX004
The President of Board of Examiners no.
Le Président du Jury n.
Die Präsidentin/Der Präsident der Kommission Nr.
El Presidente del Tribunal n.

operante nel Liceo/Istituto LICEO CLASSICO STATALE
based at Lyceum/Vocational Institute/Technical Institute
auprès du Lycée/de l'Institut
eingesetzt an der Oberschule
con sede en el Liceo/Instituto

LICEO CLASSICO STATALE " VIRGILIO " - LECCE

CERTIFICA
CERTIFIES
ATTESTE
BESCHEINIGT
CERTIFICA

che (*nome e cognome del candidato*) **Giulio BUFFO**
that (*candidate's name and surname)*
que (*prénom et nom du candidat)*
dass *(Vor- und Nachname der Kandidatin/des Kandidaten)*
que *(nombre y apellidos del candidato)*

nat o a LECCE
born in
né(e) à
geboren in
nacido/a en

Provincia LE
District
Province de
Provinz
Provincia de

il 29/08/1993
on
le
am
el día

ha superato l'esame di Stato conclusivo degli studi di istruzione secondaria di secondo grado nell'indirizzo:
has passed the State Exam at the conclusion of secondary school studies in the course:
a obtenu l'examen d'État de fin d'études secondaires, série :
die staatliche Abschlussprüfung der Oberschule mit Fachrichtung:
ha superado el Examen de Estado tras finalizar los estudios de secundaria superior en la modalidad de:

LINGUISTICO BROCCA

con la votazione complessiva di 100/100 (LODE) , derivante dalla somma dei seguenti punteggi parziali:
(il punteggio minimo complessivo per superare l'esame è di 60/100)
with an overall mark of ...../100…… corresponding to the sum of the following partial scores:
(minimum overall mark 60/100)
avec la note globale de …./100 , résultant de la somme des points partiels suivants :
(la note globale pour réussir à l'examen est d'au moins 60/100)
mit der Gesamtpunktezahl von……. /100..... bestanden hat, wobei folgende Teilergebnisse erzielt wurden:
(die Mindestpunktezahl, um die Prüfung zu bestehen, beträgt 60/100)
con la calificación global de ……./100....., obtenida a partir de la suma de las siguientes puntuaciones parciales:
(la puntuación minima global para superar el examen es de 60/100)
(*) - Menzionare la lode, qualora attribuita dalla Commissione.
(*) - Cite commendation if awarded by Board of Examiners
(*) - Ajouter la mention éventuelle attribuée par le Jury
(*) - Die Auszeichnung angeben, sofern sie von der Kommission vergeben wurde.
(*) - Anotar la Mención, en caso de ser concedida por la Comisión

TIMBRO DELLA SCUOLA E FIRMA
SCHOOL STAMP AND SIGNATURE
CACHET DE L'ÉTABLISSEMENT SCOLAIRE ET SIGNATURE
STEMPEL DER SCHULE UND UNTERSCHRIFT
SELLO DEL CENTRO Y FIRMA

LICEO CLASSICO STATALE "VIR

[redacted]

Allegato del diploma N.**323720/12**
Diploma attachment no
Pièce jointe au diplôme n°
Anlage zum Dipolm Nr.
Anexo al diploma n°

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Nome e Cognome **Giulio BUFFO**	Corso **LINGUISTICO BROCCA**	Anno scolastico **2011/2012**	Pag .2/4
Name and Surname	Course of studies	School year	Page 2/4
Prénom et nom	Cursus scolaire	Année Scolaire	.Page2/4
Vor- und Nachname	Studiengang	Schuljahr	Seite2/4
Nombre y appellidos	Nivel	Curso académico	Pág. 2/4

Prove scritte **punti 45/45**
Written exams..... /45 points
Épreuves écrites ..... /45 points
Schriftliche Prüfungen..... /45 Punkte
Pruebas escritas..... /45 puntos

La prima prova è intesa ad accertare la padronanza della lingua ufficiale d'insegnamento e le capacità espressive, logico-linguistiche, critiche e creative.
The first paper is aimed at testing the candidate's mastery of the official language and his/her expressive, logical, linguistic, critical and creative skills.
La première épreuve vise à vérifier la maîtrise de la langue officielle d'enseignement et les capacités d'expression, d'organisation du discours, de critique et de créativité
Die erste schriftliche Prüfung weist die Sprachkompetenz in der offiziellen Unterrichtssprache nach, sie überprüft die Ausdrucksfähigkeit, die Sprachlogik, das kritische Denkvermögen und die kreativen Fähigkeiten.
La primera prueba tiene como objetivo medir el dominio de la lengua oficial de la enseñanza y las capacidades expresivas, lógicolingüísticas, críticas y creativas.

La seconda prova è intesa ad accertare le conoscenze specifiche relative alla seguente materia caratterizzante il corso di studi seguito:
The second paper is aimed at testing the candidate's specific knowledge concerning the following core subject in his/her course:
La deuxième épreuve vise à vérifier les connaissances spécifiques relatives à la discipline suivante, caractérisant le cursus scolaire suivi:
Die zweite schriftliche Prüfung stellt die spezifischen Kenntnisse im hier angeführten und für die Oberschulrichtung kennzeichnenden Fach fest:
La segunda prueba tiene como objetivo medir los conocimientos especificos relativos a la siguiente materia propia de la modalidad de los estudios cursados:

La terza prova, a carattere pluridisciplinare, è intesa ad accertare le conoscenze, competenze e capacità acquisite relativamente alle materie dell'ultimo anno del corso di studi, nonché le capacità di collegare ed integrare conoscenze e competenze.
The third paper, covering various subjects, is aimed at testing the candidate's knowledge, competence and skills in the subjects studied in the final year of the course and his/her ability to connect and integrate knowledge and competence.
La troisième épreuve, "pluridisciplinare" (transversale), vise à vérifier les connaissances, les compétences et les savoir-faire acquis dans les disciplines de la dernière année du cursus scolaire, ainsi que les capacités de relier et d'intégrer les connaissances et les compétences.
Die dritte schriftliche Prüfung umfasst mehrere Fachbereiche und stellt fest, welche Kenntnisse, Kompetenzen und Fähigkeiten die Kandidatin/der Kandidat sich in den Fächern des letzten Studienjahres angeeignet hat und inwieweit sie/er in der Lage ist, entsprechende Zusammenhänge herzustellen.
La tercera prueba tiene carácter pluridisciplinar y su finalidad es medir los conocimientos, competencias y capacidades adquiridas relativas a las materias del último curso de estudios, además de las capacidades de relacionar e integrar conocimientos y competencias.

Colloquio **punti 30/30**
Oral exam ...../30 points
Épreuve orale ...../30 points
Prüfungsgespräch...../30 Punkte
Prueba oral...../30 puntos

È inteso ad accertare la padronanza della lingua, la capacità di utilizzare le conoscenze acquisite e di collegarle nell'argomentazione e di discutere ed approfondire sotto vari profili i diversi argomenti.
The interview is aimed at testing the candidate's mastery of the language, his/her ability to use and connect the knowledge acquired in the final year of the course and to discuss in depth the various subjects from different points of view
Elle vise à vérifier la maîtrise de la langue, la capacité d'utiliser les connaissances acquises et de les développer dans une argumentation, de discuter et d'approfondir sous plusieurs points de vue les différents sujets.
Das Prüfungsgespräch ermittelt die Sprachkompetenz, weist aber auch die Fähigkeit nach, die erworbenen Kenntnisse zu nutzen und sie in der Argumentation zu verknüpfen sowie die verschiedenen Themen von unterschiedlichen Gesichtspunkten aus zu betrachten und zu vertiefen.
Tiene como objetivo verificar el dominio de la lengua, la capacidad de poner en práctica y relacionar entre sí los conocimientos adquiridos y la competencia para debatir y profundizar sobre éstos desde diversos puntos de vista.

Credito scolastico **punti 25/25**
School credit ...../25 points
Crédit scolaire ...../25 points
Schulguthaben...../25 Punkte
Crédito escolar...../25 puntos

È la somma dei punteggi attribuiti dal [1]..... in relazione all'esito degli ultimi tre anni scolastici del corso di studi e ad eventuali crediti formativi documentati.
These are the total marks awarded by the [1] ..... with reference to the results attained over the last three years of the course and to any documented credits.
Total des points attribués par [1] ..... considérant les résultats des trois dernières années du cursus scolaire ainsi que les attestations d'éventuels crédits de formation.
Es handelt sich um die Summe der Punkte, die [1] ..... aufgrund der Ergebnisse der letzten drei Oberschuljahre und etwaiger nachgewiesener Bildungsguthaben zugeteilt wurde.
Es la suma de las puntuaciones otorgadas por [1] ..... en relación a las calificaciones de los tres últimos cursos y a otros posibles créditos formativos justificados documentalmente.

Punteggio aggiunto **punti 0/5**
Extra score ...../5 points
Bonus ...../5 points
Zusätzliche Punkte...../5 Punkte
Puntuación añadida...../5 puntos

È attribuito dalla Commissione a candidati particolarmente meritevoli e integra il punteggio totale conseguito nel limite massimo di 100 punti complessivi.
These are awarded by the Examination Board to students of particular merit and are added to the total mark, up to a maximum of 100 points overall.
Bonus attribué par le Jury aux candidats particulièrement méritants. Il intègre la note globale, sans permettre de dépasser le maximum de 100 points.
Sie werden besonders verdienstvollen Kandidatinnen/Kandidaten von der Kommission zugewiesen und ergänzen die erreichte Punktezahl im Rahmen des vorgesehenen Maximums von 100 Punkten.
Los concede el Tribunal a los candidatos con méritos especiales y se añaden a la puntuación total obtenida con el límite máximo de 100 puntos.

TIMBRO DELLA SCUOLA E FIRMA
SCHOOL STAMP AND SIGNATURE
CACHET DE L'ÉTABLISSEMENT SCOLAIRE ET SIGNATURE
[redacted]DER SCHULE UND UNTERSCHRIFT
[redacted]L CENTRO Y FIRMA

Nome e Cognome **Giulio BUFFO**	Corso **LINGUISTICO BROCCA**	Anno scolastico **2011/2012**	Page 3/4
Name and Surname	Course of studies	School year	Page 3/4
Prénom et nom	Cursus scolaire	Année Scolaire	Page 3/4
Vor- und Nachname	Studiengang	Schuljahr	.Seite 3/4
Nombre y appellidos	Nivel	Curso académico	Pág. 3/4

Crediti formativi documentati:
Credits for which documentation has been provided:
Justificatifs de crédits de formation:
Nachgewiesene Bildungsguthaben:
Créditos formativos justificados documentalmente:

ECDL – FIRST (certificate in English b2)
Ulteriori specificazioni valutative della Commissione con riferimento anche a prove sostenute con esito particolarmente positivo:
Further specific Board of Examiners' evaluation, including tests passed with extremely high results:
Autres appréciations du Jury concernant également des épreuves soutenues avec des résultats particulièrement positifs:
Zusätzliche Anmerkungen der Kommission zur Bewertung und weitere Hinweise zu Prüfungsteilen, die besonders erfolgreich abgelegt wurden:
Otros méritos valorados por el Tribunal referidos a pruebas realizadas con resultados positivos:

Il candidato ha confermato e migliorato il giudizio eccellente della scuola, e, sia nelle prove scritte che nel colloquio, ha dimostrato di aver acquisito ampie e approfondite conoscenze e competenze in tutte le materie, espresse in forma appropriata e con interessi, originali spunti critici personali

L'indirizzo di istruzione secondaria di secondo grado cui si riferisce il diploma prevede un corso della durata di 5 anni:
The secondary school course to which the diploma refers covers a period of ……... years.
La série d'enseignement secondaire du second degré à laquelle le diplôme se réfère établit un cursus scolaire de ……... ans.
Die Fachrichtung der Oberschule, auf die sich das Diplom bezieht, umfasst einen Studiengang von ..... Jahren.
La modalidad de enseñanza secundaria superior a la que se refiere el diploma tiene una duración de ..... cursos.

N.	**Materie del curricolo degli studi** [2] Subjects included in the curriculum [2] [1] Disciplines au programme [2] Fächer des Curriculums [2] Materias del currículo [2]	**Anni del corso di studi** Years of course Années du cursus scolaire suivi [2] Anzahl der Studienjahre Cursos académicos	**Durata oraria complessiva** Total number of hours Volume horaire d'ensemble Gesamtstundenzahl Total de horas
1	ITALIANO	5	726
2	LATINO	5	528
3	1^ LINGUA STRANIERA-INGLESE	5	495
4	2^ LINGUA STRANIERA-SPAGNOLO	5	561
5	3^ LINGUA STRANIERA-FRANCESE	3	462
6	ARTE	2	132
7	STORIA	5	429
8	STORIA DELL' ARTE	3	198
9	DIRITTO ED ECONOMIA	2	132
10	GEOGRAFIA	2	132
11	FILOSOFIA	3	264
12	MATEMATICA ED INFORMATICA	2	264
13	MATEMATICA	3	297
14	FISICA	2	198
15	SCIENZE DELLA TERRA	1	99
16	CHIMICA	1	132
17	BIOLOGIA	2	165
18	EDUCAZIONE FISICA	5	330
19	RELIGIONE	5	165
Totale delle ore di insegnamento Total curricular hours Total des heures d'enseignement Gesamtsumme der Unterrichtsstunden Total de horas de enseñanza			5709

TIMBRO DELLA SCUOLA E FIRMA
SCHOOL STAMP AND SIGNATURE
CACHET DE L'ÉTABLISSEMENT SCOLAIRE ET SIGNATURE
STEMPEL DER SCHULE UND ERSCHRIFT
SELLO DEL CENTRO Y FIRMA

IL DIRIGENTE SCOLASTICO

[redacted]

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Nome e **Cognome** **Giulio BUFFO**	Corso **LINGUISTICO BROCCA**	.Anno scolastico **2011/2012** Pag. 4/4
Name and Surname	Course of studies	School year Page 4/4
Prénom et nom	Cursus scolaire	Année Scolaire Page 4/4
Vor- und Nachname	Studiengang	Schuljahr Seite 4/4
Nombre y appellidos	Nive	Curso académico Pag.4/4

Ulteriori elementi caratterizzanti il corso di studi seguito:
Further characteristics of the course attended:
Autres éléments caractérisant le cursus scolaire suivi:
Weitere Angaben, die den Studiengang kennzeichnen:
Otros elementos significativos de los estudios cursados:

.....

.....

.....

PROGRESSIONE NEGLI STUDI:
CONTINUATION OF STUDIES:
POURSUITE D'ETUDES:
STUDIENBERECHTIGUNG:
CONTINUACIÓN DE LOS ESTUDIOS:

Il titolo acquisito dà diritto alla prosecuzione degli studi in ambito universitario e alla frequenza di corsi postsecondari [3]).
The diploma permits the holder to continue studies at University level or to attend post-secondary courses [3]).
Le titre obtenu ouvre un accès de droit à l'enseignement supérieur de type universitaire et permet de fréquenter les cours d'enseignement post-secondaire [3]).
Der erworbene Studientitel berechtigt zum Weiterstudium an Universitäten und zum Besuch von postsekundären Kursen [3]).
El título obtenido otorga el derecho a continuar estudios en el ámbito universitario y a la asistencia a cursos postsecundarios [3]).

.....

.....

.....

LECCE	**li 10/07/2012**
Place	date
Fait à	le
In	am
En	a

LICEO CLASSICO STATALE "VIRGILIO" LECCE

IL PRESIDENTE DELLA COMMISSIONE
PRESIDENT OF THE BOARD OF EXAMINERS
LE PRÉSIDENT DU JURY
DER PRÄSIDENT DER KOMMISSION
EL PRESIDENTE DEL TRIBUNAL

[redacted]

---

[1]) Il consiglio di classe o la Commissione.
Class Council or Board of Examiners.
Le conseil de classe ou le jury d'examen.
Vom Klassenrat oder von der Kommission.
La Junta de Evaluación o el Tribunal del examen.

[2]) La tabella deve essere compilata a cura della scuola. Se esiste la ripartizione delle materie tra area di base e area d[redacted] essere indicate con asterisco (es. :Italiano*) e le seconde con due asterischi (es. :Topografia**).
The table is to be completed by the school. If there is a division between core and specialization subjects, the former must be marked with an asterisk (e.g.: Italian*) and the latter with two asterisks (e.g.: Topography **).
Le tableau doit être rempli par l'établissement scolaire. S'il existe une distinction entre les disciplines de base et les disciplines spécifiques, les premières doivent être marquées par un astérisque (ex.: Italien **) et les secondes par deux (ex.: Topographie **).
Die Tabelle muss von der Schule ausgefüllt werden. Bei der Unterscheidung von Kernfächern und fachrichtungsspezifischen Fächern müssen erstere mit einem Sternchen versehen werden (z. B.: Italienisch *), die letzteren mit zwei Sternchen (z. B.: Vermessungslehre **).
El cuadro se completará por parte del centro. Si las materias estuviesen repartidas entre comunes y específicas de la modalidad, se deberán señalar las primeras con un asterisco (ejemplo: Italiano *) y las segundas con dos asteriscos (ejemplo: Topografía **).

[3]) In relazione alla natura dell'indirizzo di studi, indicato nel frontespizio del presente certificato, la Commissione segnalerà anche l'eventuale diritto a partecipare al tirocinio professionale abilitante all'esercizio della professione.
In keeping with the type of course studied, as specified on page 1 of this certificate, the Board will also indicate possible entitlement to take part in professional training to qualify to practise in the profession.
Selon la série d'enseignement, mentionnée à la première page du certificat, le jury indiquera également le droit éventuel à participer au stage professionnel conférant l'aptitude à l'exercice de la profession.
In Bezug auf die angegebene Fachrichtung spricht die Kommission gegebenenfalls auch das Recht auf den Besuch eines berufsbefähigenden Praktikums aus.
Según el tipo de la modalidad cursada, indicado en el encabezamiento del presente certificado, el Tribunal señalará la posibilidad de realización de las prácticas profesionales que habilitan al ejercicio de la profesión

[redacted]

LA SCUOLA E FIRMA
AMP AND SIGNATURE
L'ÉTABLISSEMENT SCOLAIRE ET SIGNATURE
DER SCHULE UND
CENTRO Y FIRMA

Buffo_Giulio_Certificazione_Inglese_Livello_B2.pdf

UNIVERSITY of CAMBRIDGE
ESOL Examinations

English for Speakers of Other Languages

Cambridge ESOL Level 1 Certificate in ESOL International*

This is to certify that

GIULIO BUFFO

has been awarded

Grade B

in the

First Certificate in English

Council of Europe Level B2

Date of Examination	DECEMBER (F2) 2011
Place of Entry	LECCE
Reference Number	11CIT3060053
Accreditation Number	500/2705/0

Michael Milanovic
Chief Executive

*This level refers to the UK National Qualifications Framework

Date of Issue 03/02/12

Certificate Number 0033669576

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

cea
Rewarding Learning

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

FIRST CERTIFICATE IN ENGLISH (FCE)

FCE is a general proficiency examination at Level B2 in the Council of Europe's Common European Framework of Reference. It is at Level 1 in the UK National Qualifications Framework.

Further details of FCE are given in the FCE Handbook, and at www.cambridgeesol.org

For FCE, there are three passing grades, A, B and C. Candidates who have achieved a Grade A have demonstrated ability at Council of Europe Level C1. Candidates who have not achieved a FCE passing grade (Council of Europe Level B2) but have demonstrated ability at the level below this, are awarded a certificate stating Council of Europe Level B1.

A † symbol next to the grade indicates that the candidate was exempt from satisfying the full range of assessment objectives in the examination.

The Council of Europe's Common European Framework of Reference covers six levels of language proficiency. Research carried out by the Association of Language Testers in Europe (ALTE) shows what learners can typically do at each level. The table below gives examples of typical ability in each of the skill areas for Council of Europe Levels C1, B2 and B1.

Level C1	**Listening and Speaking**	**Reading and Writing**
Overall general ability	CAN contribute effectively to meetings and seminars within own area of work or keep up a casual conversation with a good degree of fluency, coping with abstract expressions.	CAN read quickly enough to cope with an academic course, and CAN take reasonably accurate notes in meetings or write a piece of work which shows an ability to communicate.
Level B2	**Listening and Speaking**	**Reading and Writing**
Overall general ability	CAN follow a talk on a familiar topic.	CAN scan texts for relevant information.
	CAN keep up a conversation on a fairly wide range of topics.	CAN make notes while someone is talking or write a letter including non-standard requests.
Social & Tourist	CAN ask for clarification and further explanation, and is likely to understand the answer.	CAN read the media for information quickly and with good understanding.
	CAN keep up a conversation on a fairly wide range of topics.	CAN express opinions and give reasons.
Work	CAN ask for factual information and understand the answer.	CAN understand the general meaning of non-routine letters and understand most of the content.
	CAN express her/his own opinion, and present arguments to a limited extent.	CAN write a simple report of a factual nature and begin to evaluate, advise etc.
Study	CAN answer predictable or factual questions.	CAN make simple notes that are of reasonable use for essay or revision purposes, capturing most important points.
	CAN check that all instructions are understood.	CAN present arguments, using a limited range of expression (vocabulary, grammatical structures).
Level B1	**Listening and Speaking**	**Reading and Writing**
Overall general ability	CAN understand straightforward instructions or public announcements.	CAN understand routine information and articles.
	CAN express opinions on abstract/cultural matters in a limited way or offer advice within a known area.	CAN write letters or make notes on familiar or predictable matters.

Further information and examples of the ability statements can be found at www.alte.org

Any alteration to this certificate renders it invalid and use of an altered certificate could constitute a criminal offence.

University of Cambridge ESOL Examinations provides a results verification service to help organisations and agencies quickly and securely validate candidates' Cambridge ESOL examination results at https://verification.cambridgeesolonline.org

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Buffo_Giulio_DELE_Diploma_de_espanol_como_lengua_extranjera _B2_2010.pdf

Instituto Cervantes

Diplomas de Español como Lengua Extranjera

El Ministro de Educación y, en su nombre, la Directora del Instituto Cervantes, considerando que, conforme a la legislación vigente,

Don GIULIO BUFFO

que nació el 29 de agosto de 1993 en LECCE (ITALIA), ha superado las pruebas previstas en el Real Decreto 1137/2002, de 31 de octubre (BOE de 8 de noviembre), modificado por el Real Decreto 264/2008, de 22 de febrero (BOE de 12 de marzo), celebradas en mayo de 2010 en MAGLIE (ITALIA), expide el presente

DIPLOMA DE ESPAÑOL COMO LENGUA EXTRANJERA (Nivel B2)

Dado en Madrid, a 30 de julio de 2010

El interesado,

La Directora del Instituto Cervantes,

Carmen Caffarel Serra

El Director Académico,

Francisco Moreno Fernández

RCM-FNMT

Registro de la Oficina de Diplomas : 1000188726

Nº de inscripción: 1005043802401000 2

Nº Cartulina: A188726

Instituto Cervantes

Diplomas de Español como Lengua Extranjera

Los Diplomas de Español se relacionan con el Marco común europeo de referencia para las lenguas: aprendizaje, enseñanza y evaluación del modo que sigue:

Marco de Referencia	Diplomas de Español
Nivel C2: Maestría	Diploma de Español (Nivel C2)
Nivel C1: Dominio operativo eficaz	Diploma de Español (Nivel C1)
Nivel B2: Avanzado	Diploma de Español (Nivel B2)
Nivel B1: Umbral	Diploma de Español (Nivel B1)
Nivel A2: Plataforma	Diploma de Español (Nivel A2)
Nivel A1: Acceso	Diploma de Español (Nivel A1)

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Instituto Cervantes

NOTIFICACIÓN DE CALIFICACIÓN

NIVEL B2

Diplomas de Español como Lengua Extranjera

El candidato cuyos datos constan a continuación ha obtenido los resultados que se reseñan en las pruebas celebradas en **mayo 2010**, conducentes a la obtención del **Diploma de Español como Lengua Extranjera:**

Datos personales:

Apellidos: **BUFFO**

Nombre: **GIULIO**

Fecha de nacimiento: **29/08/1993**
día - mes - año

Lugar de nacimiento: **LECCE**

País de nacimiento: **ITALIA**

Género: **H** H (hombre) M (mujer)

Código de inscripción: **10050438024010002**
Adscripción: **Instituto Cervantes de Nápoles**

Resultados obtenidos en las pruebas:

	GRUPO 1		GRUPO 2	GRUPO 3	
	Comprensión de lectura	Expresión escrita	Gramática y Vocabulario	Comprensión auditiva	Expresión oral
Puntuación máxima	15 puntos	20 puntos	20 puntos	15 puntos	30 puntos
Puntuación mínima exigida	24,5 puntos		14 puntos	31,5 puntos	
Puntuación obtenida	**33.0 puntos**		**17.67 puntos**	**40.5 puntos**	
CALIFICACIÓN GLOBAL	**APTO**				

En caso de que no esté usted de acuerdo con la puntuación obtenida, le comunicamos que el plazo para presentar solicitudes de revisión de las pruebas finaliza el día **29 de octubre de 2010**, y que éstas deberán remitirse al Departamento de Certificación Lingüística del Instituto Cervantes haciendo constar de forma breve y concisa el objeto de reclamación. Las solicitudes deberán remitirse firmadas y fechadas y en ellas se incluirá una dirección postal de contacto.

Este documento acredita la obtención del Diploma de Español como Lengua Extranjera **NIVEL B2** solo si la calificación global es de APTO, en cuyo caso el Instituto Cervantes expedirá el diploma correspondiente.

Madrid, 30 de julio de 2010

José Ramón Parrondo Rodríguez
Jefe del Dpto. de Certificación Lingüística

Dirección Académica
Instituto Cervantes
C/ Alcalá, 49
E-28014 Madrid (España)
Tel.: +34 91 436 7600 / 885 6100
Fax: +34 91 587 0098
http://diplomas.cervantes.es

Si se observara algún error u omisión en los datos personales, se ruega comunicación al Instituto Cervantes: http://diplomas.cervantes.es/adicional/contacto.jsp

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Buffo_Giulio_DELF_Diplome_d'etudes_en_langue_française_B1_2012.pdf

RÉPUBLIQUE FRANÇAISE
MINISTÈRE DE L'ÉDUCATION NATIONALE, DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE

COMMISSION NATIONALE DU DELF ET DU DALF

ATTESTATION DE RÉUSSITE

Je soussigné Vergne Michel
Président du Jury DELF
au Centre d'examen de : LECCE (ITALIE)

atteste que :

BUFFO GIULIO
né le 29/08/1993 à LECCE (ITALIE)
de nationalité : ITALIENNE
n° de candidat : 039832-006276

a présenté avec succès les épreuves de l'examen :

DELF B1

Niveau B1 du Cadre européen commun de référence pour les langues

session : 2012-05-S **à : Alliance Française**

avec les résultats suivants :

ÉCRIT	Compréhension	note :	23,50 / 25	
	Production	note :	23,00 / 25	
ORAL	Compréhension	note :	24,00 / 25	
	Production	note :	22,00 / 25	NOTE FINALE : 92,50 /100

fait le 22/05/2012

le Président du jury

p.a. Andrea Carli

Le DELF et le DALF comportent 7 diplômes indépendants :

DELF A1.1 DELF A1 DELF A2
DELF B1 DELF B2
DALF C1 DALF C2

Le présent document atteste de la réussite au diplôme correspondant, en l'attente de la délivrance du diplôme définitif.

Important : cette attestation comporte votre numéro d'identification DELF-DALF. Ce numéro est définitif. Vous devez le communiquer à chacune de vos inscriptions, dans le même centre d'examen ou dans un centre différent.

Cette attestation est délivrée en un seul exemplaire. Aucun double ne pourra être établi. Ne vous en dessaisissez jamais.

© European Union, 2002-2018 | http://europass.cedefop.europa.eu

Buffo_Giulio_Abstract_Filtech_Conference_2018.pdf

ANALYSIS OF AEROSOL EMISSIONS FROM A RUBBER VULCANIZATION PROCESS

Giulio Buffo, Stefano Barale, Paolo Tronville*

Politecnico di Torino – Corso Duca degli Abruzzi 24, 10129 Torino – Italy

*Corresponding and presenting author

ABSTRACT

Vulcanization is a non-reversible chemical process, which greatly improves the useful properties of natural rubber gum or certain synthetic polymers. The vulcanization process generates a complex mixture of gaseous substances in the exhaust gases that must be removed before discharging them outdoors.

We monitored and analyzed the emission control systems of some post-curing ovens, serving a production unit manufacturing small parts containing rubber for the automotive industry. Concentrations and size distributions of particles in the exhaust streams were measured using optical particle spectrometers (size ranges from 300 nm to 10000 nm) and electric particle mobility analyzers (mobility diameter between 10 nm and 420 nm).

We measured the emissions exhausted by two different types of ovens: in-line and batch ones. Each emission control unit was equipped with a heat exchanger cooling the exhaust gases to a value suitable for the operation of the downstream two-stage electrostatic precipitator. Each single exhaust treatment unit collects the gases exhausted by 3 to 5 ovens, treating a flow rate of less than 1000 m^3/h at a duct velocity of about 3.8 m/s.

The goals in performing the measurements were:

- To assess the performance of the exhaust fume purifying unit, with emphasis on the electrostatic precipitator performance and its assessment;
- To evaluate the adequacy and efficacy of the current maintenance schedule, whose time interval may significantly influence the performance of the electrostatic precipitators;
- To develop a robust measurement protocol to evaluate the reliability of innovative solutions for removing the pollutants.

KEYWORDS

Charged particles, Collection efficiency, Corona discharge, Electrostatic precipitation, In situ testing, In situ measurement, Test procedures

© European Union, 2002-2018 | http://europass.cedefop.europa.eu