

QUALITYFRY

AVDA ARROYO DEL SANTO 6ª PLANTA 1ª ZDA
28042 MADRID

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AIR MONITORING - AIRBORNE CONTAMINANTS - EXECUTIVE SUMMARY

Ref. 02-911-242504 v1



Madrid, November 21th, 2017.

Performed by:

[Handwritten signature]
SGS Tecnos, S.A.
División de Prevención
Trespaderne, 29
Edificio Barajas 1
28042 Madrid

Sr. David Piedrafita Erdociain
T.P.R.L. (S, H)

EXECUTIVE SUMMARY

QUALITYFRY request SGS TECNOS to perform an air monitoring test to quantify the airborne concentration of different pollutants during the normal usage of measurements of two industrial fryers:

- QUALITYFRY (without fumes and odors): FAST CHEF ELITE.
- Traditional model (provided by the client): AUSTRAL (MOD: EF101-V)



QUALITIFRY model and Traditional Fryer model

The scope of the work is to quantify the airborne concentration of Acetic Acid and Oil Mist during the different tests carried out with the two fryers object of the study and then to establish a comparison between them.

The assessment was conducted on October 3th and 4th, 2017 at “Taberna del Chato” restaurant, located in C/ Andres Mellado 88, Madrid.

During the works, two tests were performed to measure the power consumption in different conditions.

Tests	Acetic Acid Test		Oil Mist Test	
Fryers	Test 1. Traditional Fryer (without extractor hood)	Test 2. Qualityfry (without extractor hood)	Test 1. Traditional Fryer (without extractor hood)	Test 2. Qualityfry (without extractor hood)
Date (dd/mm/yyyy)	03/10/2017	04/10/2017	03/10/2017	04/10/2017
Test start time (hh:mm)	15:21	10:04	15:21	10:04
Test finish time (hh:mm)	17:15	11:34	17:15	11:34
Test duration (hh:mm) (*)	1:54	1:30	1:54	1:30

(*) Time needed to get an optimal frying point.

The frying details were defined by the customer:

- **Product:** French fries: 12,5 kg / 200gr portions.
- **Oil:** high oleic sunflower.

- **Frying time:** Time needed to get an optimal frying point.
- **Ventilation conditions:** General ventilation switched off, windows and doors closed.
- **sampling point location:** See annex.



Acetic Acid sampling methodology:

- **Pollutant:** Acetic Acid
- **Sampling method:** NIOSH 1603
- **Sampling media:** Charcoal tube 100/50 mg

Measurement Escenario	Chemical Agent	Date	Sampling media	Sample Ref.	Flow (lpm)	Sampling time	Samplig time (minutes)	Air Volume (liters)	Sample concetration (mg/sample)	Air Concentration (mg/m3)
TRADITIONAL FRYER (Without extract hood)	ACD. ACETICO	03/10/2017	CHARCOAL TUBE	AC/1123	1,0	13:48-15:38	105	105,00	0,1500	1,429
Measurement Escenario	Chemical Agent	Date	Sampling media	Sample Ref.	Flow (lpm)	Sampling time	Samplig time (minutes)	Air Volume (liters)	Sample concetration (mg/sample)	Air Concentration (mg/m3)
QUALITYFRY FRYER (Without extract hood)	ACD. ACETICO	04/10/2017	CHARCOAL TUBE	AC/3570	1,0	10:21-11:41	80	80,00	< 0,0100	< 0,125

Based on the results, it can be concluded that the acetic acid concentration during the QUALITYFRY test were lower than the ones obtained during the traditional fryer test (more than ten times lower).

Oil Mist sampling methodology:

- **Pollutant:** Oil Mist
- **Sampling method:** MDHS 84
- **Sampling media:** Cellulose acetate or fiberglass PVC filter (25 mm)

Measurement Escenario	Chemical Agent	Date	Sampling media	Sample Ref.	Flow (lpm)	Sampling time	Samplig time (minutes)	Air Volume (liters)	Sample concetration (mg/sample)	Air Concentration (mg/m3)
TRADITIONAL FRYER (Without extract hood)	OIL MIST	03/10/2017	PVC FILTER	NB/02	2,0	15:22-17:17	115	230,00	0,1600	0,70
Measurement Escenario	Chemical Agent	Date	Sampling media	Sample Ref.	Flow (lpm)	Sampling time	Samplig time (minutes)	Air Volume (liters)	Sample concetration (mg/sample)	Air Concentration (mg/m3)
QUALITYFRY FRYER (Without extract hood)	OIL MIST	04/10/2017	PVC FILTER	NB/03	2,0	10:15-11:38	83	166,00	0,0800	0,48

Based on the results, it can be concluded that the oil mist concentration during the QUALITYFRY test were lower than the ones obtained during the traditional fryer test (30% lower).



ANNEX 1, SAMPLING LOCATION

Test: Qualityfry (without extractor hood)



Test: Traditional Fryer (without extractor hood)





ANNEX 2, CALIBRATION CERTIFICATE



OBJETO Caudalímetro de pistón
Item

MARCA BIOS DryCal
Mark

MODELO DCL-M
Model

IDENTIFICACION Número de serie: 103332
Identification

SOLICITANTE **SGS TECNOS, S.A.**
Applicant Carrer Llull, 95-97 6ª Planta
08005 Barcelona

FECHA/S DE CALIBRACIÓN 2017-09-28
Date/s of calibration

SIGNATARIO/S AUTORIZADO/S
Authorized signatory/ies

Responsable Técnico / *Technical Manager*

Técnico / *Technician*

Este certificado se expide de acuerdo con las condiciones de la acreditación concedida por ENAC, que ha comprobado las capacidades de medida del laboratorio y su trazabilidad a patrones nacionales.

ENAC es firmante del Acuerdo de Reconocimiento Mutuo (MLA) de certificados de calibración de European Cooperation for Accreditation (EA) y de International Laboratories Accreditation Cooperation (ILAC).

Este certificado no podrá ser reproducido parcialmente, excepto cuando se haya obtenido previamente permiso por escrito de Applus.

This certificate is issued in accordance with the conditions of accreditation granted by ENAC which has assessed the measurement capability of the laboratory and its traceability to national standards.

ENAC is one of the signatories of the Multilateral Agreement of the European Cooperation for Accreditation (EA) and the International Laboratories Accreditation Cooperation (ILAC).

CARACTERÍSTICAS DEL INSTRUMENTO CALIBRADO

El instrumento es un caudalímetro de pistón de la marca BIOS DryCal, modelo DCL-M, con número de serie 103332.

Alcance: (10-12000) cm³/min

Escalón: 0,1 cm³/min

PROCEDIMIENTO DE CALIBRACIÓN

Siguiendo nuestro procedimiento de calibración, C2620522, se ha realizado la calibración del caudalímetro por comparación directa midiendo los diferentes valores de caudal suministrados por un patrón. Se calibra en el alcance de (90-3000) cm³/min.

CONDICIONES DE CALIBRACIÓN

Temperatura ambiente: 21,0 °C ± 2°C

Humedad relativa: <70%hr

Presión ambiente: 1008,52 hPa ± 5 hPa

INCERTIDUMBRE

La incertidumbre de calibración ha sido evaluada como incertidumbre expandida de medida, U, tal y como se muestra en los resultados. Estos valores se han obtenido multiplicando la incertidumbre típica de medida por el factor de cobertura $k=2$ que, para una distribución normal, corresponde a una probabilidad de cobertura de aproximadamente el 95%. La incertidumbre se ha determinado conforme al documento EA-4/02 M.

TRAZABILIDAD

Patrones utilizados en la calibración:

Tipo Equipo	Inventario	Nº Serie
Caudalímetro	102838	770302
Caudalímetro	102701	G511450G20
Termómetro	102894	1239039276
Manómetro	102890	46953

Patrones de referencia:

Tipo Equipo	Inventario	Nº Serie
Caudalímetro	102838	770302
Caudalímetro	102701	G511450G20
Termómetro	102894	1239039276
Manómetro	102890	46953

La trazabilidad de las medidas de caudal se refiere a Tecnatom (ENAC LC/067).

La trazabilidad de las medidas de temperatura se refiere al I.N.T.A.

La trazabilidad de las medidas de presión se refiere al I.N.T.A.

RESULTADOS

PATRÓN dm³/min	INDICACIÓN dm³/min	ERROR dm³/min	U (k=2) dm³/min	Presión línea Pa	Temperatura línea °C
0,0911	0,0926	0,0015	0,0016	93,7	23,0
0,250	0,256	0,006	0,010	80,6	23,0
0,500	0,505	0,005	0,010	99,4	23,0
0,750	0,754	0,004	0,014	101,4	23,0
0,999	1,006	0,007	0,018	111,2	23,0
3,000	3,030	0,030	0,045	213,0	23,0

Fluido: Nitrógeno

Resultados referidos a las condiciones de referencia: T= 0 °C y P=1013,25 hPa

Ecuación de conversión de las condiciones de medida a las condiciones de referencia:

$$I_{q,p,ref} = I_{q,p,N} \left(\frac{273,15K + t_{ref}}{273,15K} \right)$$

$$I_{q,IAC,ref} = I_{q,IAC} \left(\frac{273,15 K + t_{ref}}{273,15 K + t} \right) \left(\frac{P - P_v}{1013,25 \text{ hPa}} \right)$$

P y t son la presión y temperatura del gas durante la calibración.