REPORT OF THE RESULTS
No.1
PROOF OF FUEL SAVINGS

EMPRESA	CEMENTOS ARGOS
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SUBJECT: Measuring the Efficiency of SUPERTECH Technology for the Fuel Economy in the mining trucks of CEMENTOS ARGOS.

DESCRIPTION OF THE TECHNOLOGY

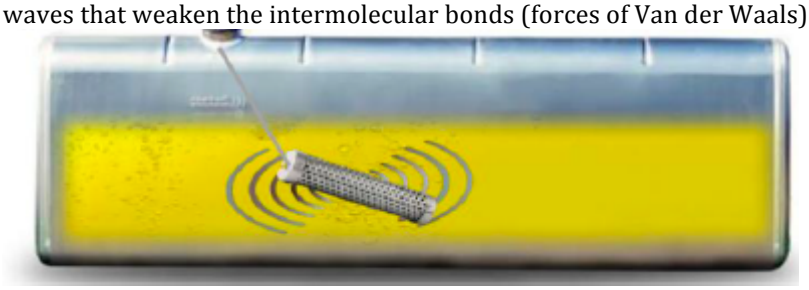
WHAT IS SUPERTECH?

It is an innovative device that optimises the combustion, reduces gas emissions and improves the performance of the engine.

It is a combustion optimiser that weakens the intermolecular bonds, increasing the surface of reaction. It creates a partial vaporization that optimises the process of combustion and improves the stoichiometric report (report between oxygene and fuel)

It is installed inside the fuel tank without any electric, mechanic or hydraulic connection to the engine and it does not release any substance that could in any way damage the engine.

Once, that it is in contact with the fuel, thanks to the vibration of the vehicle and the aspiration of the fuel pump, it emits waves that weaken the intermolecular bonds (forces of Van der Waals) improving the interaction between fuel and oxygene.

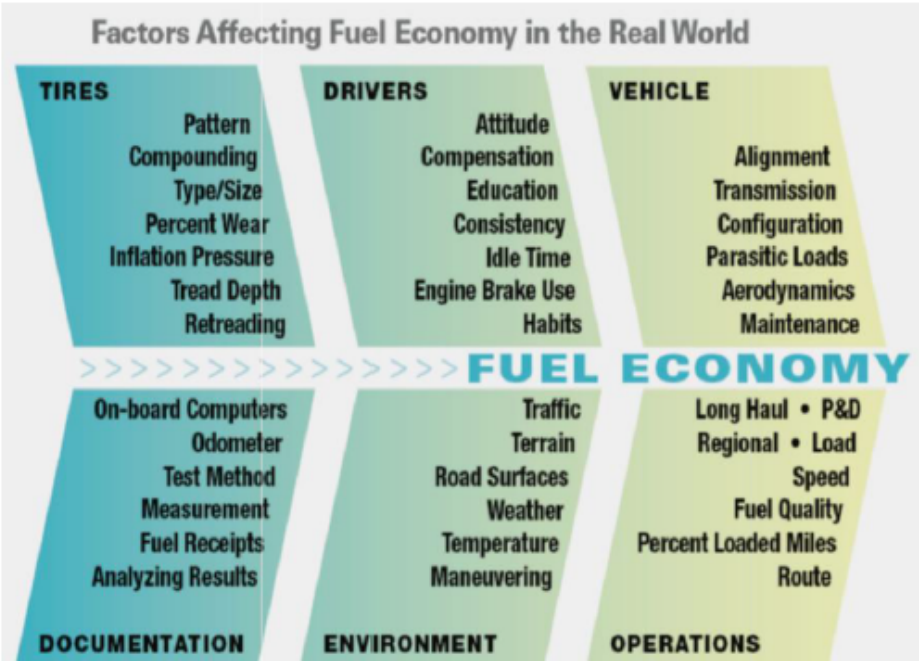


IT RESOLVES THE PROBLEM OF UNCOMPLETE COMBUSTION.

The vibration created by the movement of the vehicle, thanks to SUPERTECH, emitselectromagnetic waves that weaken the intermolecular bonds and give a better interaction with oxygene, which leads to an almost perfect combustion (law of Van der Waals)

ANALYSIS OF THE TEST METHOD

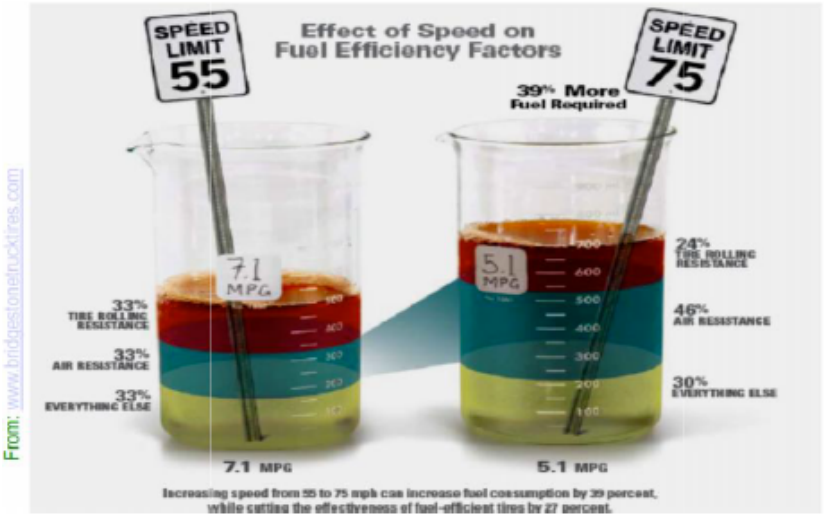
The fuel saving has been analyzed in developed countries in a detailed way, identifying the factors that affect fuel consumption and that should be considered when wanting to measure the efficiency of fuel savings with any technology; These include the following:



As noted, there is a great combination of factors that can vary the results of the measurement of fuel consumption.

Likewise, to measure the fuel savings that any technology can generate, it is necessary to compare the fuel consumption under two scenarios with very similar conditions that allow the comparison of the results, where the affectation generated by all these factors can be controlled

For example, speed is one of the most sensitive factors, increasing the speed from 55 to 75 mph can reduce the performance from 7.1 MPG to 5.1 MPG, which increases fuel consumption by 39%.



1. The opposite wind determines by itself a higher fuel consumption of around 20%
2. The increase in speed from 90 to 100 km / h determines higher consumption in a range of 15%
3. The increase in traffic can cause a greater consumption of 30%
4. 44 tons instead of 40 tons leads to an increase of 15%.
5. A vehicle, immediately after maintenance consumes less but you will gradually lose this advantage. Therefore it is necessary to maintain under control the intervals between each servicing.

TEST METHODS

There are several test procedures to evaluate the effectiveness of components, such as for instance chassis and engine dynamometer tests, computational fluid dynamics, wind tunnel tests and tests in real road conditions or test track. Each of these methods has its strengths and weaknesses, depending on the type of component being tested and the available resources .

Método	Tecnologías[6]	Métrica[7]	Procedimiento
Dinamómetro de Chasis	AyL	Combustible Ahorrado	SAE J2711, CFR 40 1065
Dinamómetro de Motor	AyL	Combustible Ahorrado	CFR 40 1065
Prueba en Ruta/Pista	ADyn,AyL,R	Combustible Ahorrado	SEE J1321, SAE J1526, SAE J1264, NCh 3331
Dinámica de Fluidos Computacional	ADyn	Cd	SAE J2966
Prueba de Desaceleración	ADyn, R	Cd/Crr	-
Túnel de Viento	ADyn	Cd	SAE J1252
Prueba de Resistencia a la Rodadura	R	Crr	SAE J1269, SAE J2425, ISO 28580

Selected Method

Testing in route or track.- This method consists of operating vehicles through a previously designed circuit that can be a closed track or a route.
The procedure with greater application at a global level is SAE J1321, being the most used method to verify components in the SmartWay program in the USA. In addition, adaptations have been made to the same, as in the case of the National Standardization Institute of Chile (INN) with 6-15 03/15/2018 its NCh 3331 standard, which seeks to adapt the procedures established in the SAE procedure to the local reality of the country.

This type of procedure allows to evaluate the impact on fuel consumption due to the use of different technologies in driving conditions much closer to real conditions, and hence its great value and the large number of experiments that are done in this way. Its great versatility allows testing of any type of components, such as aerodynamic improvement, low consumption wheels, lubricants, and even to compare vehicles and see the effect of the load on consumption.

METHODOLOGY

In summary, this protocol uses two similar vehicles that make the same route under the same conditions of speed, vehicular traffic and climate conditions. In a first journey, the difference in fuel consumption between the two vehicles is calculated, after which the technology to be tested is installed, in this case SUPERTECH, on the vehicle that had the highest fuel consumption.

In the second route of the two vehicles, under the same conditions and distances, the difference in consumption between the two vehicles is recalculated. If the difference in consumption between the vehicles is reduced in this second route, it is because there is a saving of fuel and this is calculated from these consumption differences between the two routes.

The detail of the test protocol is presented in Annex 1.
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APPLICATION OF THE TEST IN VEHICLES

The company CEMENTOS ARGOS chose two mining trucks of the same model, dedicated to the hauling of crude material from the Santana mine that supplies cement, identified with numbers 5 and 6.

DESCRIPTION OF THE ROUTE

A circuit of 5Kms was chosen that includes a route with a flat area inside the internal roads of the Santana - Membrillal Mine – Cartagena

ENLISTMENT

Prior to the initial tour, the operators were sensitized about the importance of maintaining the RPMs so that the conditions were similar in all the vehicles under test.

Prior to the initial tour, the operators were sensitized about the importance of maintaining the RPMs so that the conditions were similar in all the vehicles under test.
Also, they were explained the test protocol, to sensitize them that they only had to maintain their driving style and that the test was not intended to evaluate the driving efficiency of each operator.
The trucks were adapted with external fuel tanks that could be weighed before and after each trip in order to calculate the consumption in kilograms of fuel.

These external tanks were conditioned to connect the suction and return hoses of the injection system.

DEVELOPMENT OF THE TEST AND RESULTS

Base line

Once the vehicles were ready, we proceeded to weigh the external tanks and then turn on the vehicles, from which 16 minutes of travels were recorded in the selected circuit until returning again to the starting point to again turn off the vehicles at the same time and weigh the external tank in each of them in order to know the net consumption of fuel in that time.
Given that vehicles consume an average of 10 gallons per hour, in consideration of the size of the external tanks, a period of each 16-minute journey was selected in order to reduce the risk that vehicles will run out of fuel and suck air.

These trips were made in triplicate in order to reduce the error in the measurements and achieve an average that was more stable. The summarized results are presented in the following table:

Tabla No.1Línea base -Ensayo de ahorro de combustible - SIN SUPERTECH

RESULTADOS DIESEL CORRIENTE	CAMION 5			CAMION 6		
Prueba No.	1	2	3	1	2	3
Tiempo Recorrido (min)	15,19	16,27	15,35	16,0	15,5	15,5
Km inicial (Km)	27.091	27.096	27.102	59.885	59.891	59.896
Km final (Km)	27.096	27.102	27.107	59.891	59.896	59.901
Recorrido Neto (km)	5	6	5	6	5	5
Peso Incial (Kg)	20,550	24,070	19,960	18,714	18,764	20,470
Peso Final(Kg)	11,100	14,548	12,090	6,975	9,820	11,340
Consumo Neto (Kg)	9,450	9,522	7,870	11,739	8,944	9,130
Promedio Consumo Neto-CN (Kg)			8,947			9,938
Desviacion Standard (Kg)			0,934			1,563
Coeficiente de Variacion (%)			10%			16%
Diferencia de Consumo (Δ1) (Kg)				0,990		

With these results, we can conclude that the difference between the two vehicles averaged 0.990 kg of fuel prior to the installation of the SUPERTECH

Test SUPERTECH

SUPERTECH test
At the end of the baseline, the SUPERTECH device was installed on truck 5, before returning to weighing and leaving for the second test, the results of which are presented in the following table:

Table No.2 Results of the second fuel savings test- WITH SUPERTECH

RESULTADOS DIESEL + SUPERTECH	CAMION 5			CAMION 6		
Prueba No.	1	2	3	1	2	3
Instalacion Supertech (Si/No)	NO			SI		
Tiempo Recorrido (min)	16,08	15,61	15,10	15,46	15,55	16,02
Km inicial (Km)	27.107	27.112	27.117	59.901	59.907	59.912
Km final (Km)	27.112	27.117	27.122	59.907	59.912	59.917
Recorrido Neto (km)	5	5	5	6	5	5
Peso Incial (Kg)	23,875	15,196	17,725	21,898	18,407	22,322
Peso Final(Kg)	15,196	7,755	8,807	13,248	10,180	14,010
Consumo Neto (Kg)	8,679	7,441	8,918	8,650	8,227	8,312
Promedio Consumo Neto (Kg)			8,346			8,396
Desviacion Standard (Kg)			0,793			0,224
Coeficiente de Variacion (%)			9%			3%
Diferencia de Consumo (Δ2) (Kg)				0,050		

RESULTS
When finishing the second route, we observed that the difference between the two vehicles on average was reduced to 0.050 Kg of fuel.
The difference of consumption in the second route appears as DELTA 2 (Δ2) in the previous table, and the reduction between the two routes corresponds to (Δ1- Δ2), that is to say 0.990-0.050 = 0.940Kg.

Tabla No.3% ahorro de combustible - CON SUPERTECH

RESULTADOS		%
% DE AHORRO DE COMBUSTIBLE	$(\Delta_1-\Delta_2)/CN$ %	9,5%

When dividing this difference between the average weighing of the route of the base line of Truck 6, (9,938 kg), a saving of 9.4% is obtained. Given that the only difference between the TEST VEHICLES and the CONTROL VEHICLE between the first and second route was the installation of SUPERTECH, this saving is associated with the use of this technology.

ECONOMIC ANALYSIS

Based on the results obtained, the annual estimated projected savings with SUERTECH are presented below.
The value of the gallon of diesel has been estimated at $ 6,412 pesos and 20 hours of daily work.

Tabla No.4 Ahorros proyectados al año - CON SUPERTECH

DATOS INICIALES	Und	Valor			
Consumo de Combustible por Hora	Gal/hora	10			
Tiempo de Operación por dia	hrs	20			
Precio del Combustible	$/gal	$ 6.412			
Consumo Diario	$	$ 1.282.400			
Dias Trabajados al mes	Dias	26			
% Ahorro de Combustible	**%**	**5%**	**8%**	**10%**	**12%**
Ahorrado Diario de Combustible	$	$ 64.120	$ 102.592	$ 128.240	$ 153.888
Ahorrado Mensual	$	$ 1.667.120	$ 2.667.392	$ 3.334.240	$ 4.001.088

According to the results obtained in the field and other tests carried out by SENA and the University of Antioquia, the savings estimated with the implementation of SUPERETCH are significant.

With regard to investment and period ROI then detailed in the following table:

Tabla No.4Análisis de la Inversión - CON SUPERTECH

VALOR DE LA INVERSION		COP			
SUPERTECH TIPO E	$	$ 1.300.000			
INSTALACION	$	$ 300.000			
SUBTOTAL		$ 1.600.000			
DESCUENTO POR BENEFICIO TRIBUTARIO (25%)		-$ 400.000			
SUBTOTAL		$ 1.200.000			
% Ahorro de Combustible		**5%**	**8%**	**10%**	**12%**
RECUPERACION DE LA INVERSION	**Dias**	**29**	**18**	**14**	**12**

CONCLUSION
The measurement of fuel savings is not an easy task due to many controllable and uncontrollable variables that can affect consumption measurements. That is why the SAE Protocol J1321 was used, which is the most widely used method internationally.

The analyzes carried out with field tests have yielded results of 9.5% fuel savings, perfectly comparable with those obtained in many countries, as detailed in Annex 2.

On the other hand, the low cost of technology allows the recovery of your investment to be immediate.

ANNEX 1. SAE J1321 PROTOCOL
This protocol consists of testing two or three vehicles that make the same route with the same weight, environmental conditions and vehicular traffic.

It involves comparing fuel consumption between vehicles and analyzing the differences between them, before and after installing SUPERTECH.

You must choose vehicles of the same model that do not show fuel leaks, air leakage in your tires, or with adaptations that carry additional deadweight.

You must select a route between 80 and 100 Kmsaprox, which has flat and preferably broken ground. In each journey, half of it will be the exchange of drivers between vehicles.

The path is the difference between the initial and final odometer. There must be no deviations of route by any vehicle in order to ensure the same route.

Routes with short routes are not recommended for the test given that the
consumption will not be representative

Before making the routes, agree with the drivers the same conditions of RPMs, Air Conditioning and drivers exchange site, so that the style of the drivers is distributed among the vehicles in order that there is no bias in the results.

Before starting the first journey, the odometer readings are recorded in each vehicle.

The installed external tanks are filled by taking their weight in the balance to register it in the predesigned format.

The filling of these tanks is the operation that requires greater precision, so that there should be no spills or drips. Be very careful with tankers that have too much pressure because they can generate small spills.

Once the initial route of the vehicles has finished, weigh the tank again as accurately as possible to determine the difference and also the kilograms consumed of fuel. These courses can be repeated to take an average of several repetitions.

After the first route, and before installing SUPERTECH, the vehicle with the lowest fuel consumption is chosen as the CONTROL VEHICLE. The other vehicles will be called TEST VEHICLES

For each TEST VEHICLE the difference of its consumption will be calculated, less the VEHICLE OF CONTROL. This difference will be denominated DELTA 1. (Δ1)

This DELTA 1 represents the additional consumption of the vehicles in relation to the best vehicle available (CONTROL VEHICLE) due to atmospheric conditions, mechanical conditions of the vehicle, traffic conditions, among others.

SUPERTECH is installed on the TEST VEHICLES only and the CONTROL VEHICLE remains in the same conditions.

We prepare for the second route, weighing all the external tanks in the vehicles again and scoring again. If it is necessary to place fuel, it must be done before weighing.

We perform exactly the same route, with the same conditions of load, air conditioning, change of conductors and RPM

At the end of the route, we again weigh the tanks each vehicle with the same care.

Again we calculate the difference between the consumption in kilograms of each TEST VEHICLE and the CONTROL VEHICLE. We call this difference DELTA 2. (Δ2)

The difference between Δ1-Δ2, corresponds to the volume of fuel that is left to be consumed by the use of SUPERTECH, as other controlled variables remain such as traffic conditions, travel, environmental conditions, driving style when drivers rotate, among others.

Finally, we calculate for each TEST VEHICLE the saving percentage with the difference between (Δ1 - Δ2) divided by the initial consumption made in the first run for the TEST VEHICLE

Keep in mind that for DELTA 1 and DELTA 2 always use the subtraction order: TEST VEHICLE - CONTROL VEHICLE.

In case the gas emission test can be performed on all vehicles before and after installing SUPERTECH, the results may be recorded in this format. The gas test after installing SUPERTECH must be done after the vehicle travels at least 5 km with the equipment installed.

ANEXO2. REFERENCIA DE OTRAS EMPRESAS O INSTITUCIONES

Referencias 1/3

Fecha	*Instituto/Compañía*	Pruebas		Resultadoss		Documentos Adjuntos
		Lab.	Calle	Reducción Emisiones gas	Reducción consumo	
23/05/97	ALEMANIA TUV	x		Ver informe		Informe de prueba
Dic.1997	ITALIA ARCESE TRASPORTI Spa - Trento		x	70%	7% ÷ 10%	Comunicación + entrevista
09/04/1998	ITALIA AMAT		x	>50%		Relación Convenio "Per una mobilità pulita"
14/04/1999	RUSIA Mosavtoprogress Moscow	x	x	>50%	8% ÷ 12%	Informe de prueba
12/12/2000	RUMANIA S.N.P. "PETROM" S.A.		x	82% - 88%	12% - 15%	Declaración
17/04/2001	Gobierno de CHILE Centro de Control y certificacion Vehicular		x	71%		Declaración
03/07/2001	MEXICO Protección Ambiental Estado de Guanajuato		x	45,28%		Declaración
04/02/2002	RUMANIA Certificado de homologación RAR	x	x	65%	10,54%	Certificado
2003	ITALIA APT of Verona		x	50%		Declaración
6//2003	MEXICO Instituto de ecologia del Estado de Guanajuato		x	70%		Informe de prueba
10/2003	MEXICO Municipio de Salamanca		x	80%		Informe de prueba
11/2003	EGIPTO - CAIRO Universidad de Helwan Al Mataerya	x	x	70%	10%	Informe de prueba
16/12/03 23/09/05 25/09/03 27/03/04 1999	BRASIL 1) Rinatur Turismo 2) Viação Graciosa Ltda 3) Ouro Verde Trasp E Loc 4) Viação Tamandaré Ltda 5) Ouro e Prate Cargas		x	42% 42%	 9% 5% 8-10 %	Informe de prueba Informe de prueba Informe de prueba Informe de prueba
19/05/04	LITUANIA 1) University of Vilnius	x		75%	7%	Informe de prueba
03/12/04	TURQUIA I.E.T.T. Istanbul		x	80%		Informe de prueba
13/10/04	ITALIA - Modena Lusuardi Claudio e C. snc	x			+3,34 HP	Informe de prueba
21/01/05	HONG KONG Universidad de Hong Kong Departamento de Ingenieria Mechanica	x			3,7%	Informe de prueba

Referencias 2/3

Fecha	Instituto/Compañía	Pruebas		Resultados		Documentos Adjuntos
		Lab	Calle	Reducción Emisiones gas	Reducción consumo	
21/03/05	BRASIL Retimaq	x			11%	Informe de prueba
Enero/Febr 2005	POLONIA Transportes Urbanos de Varsovia		x	58%		Informe de prueba
07/06/05	FRANCIA Grupo Moncassin		x	67%	12%	Informe de prueba Declaración
29/06/05	UCRANIA Instituto "Transport Technologies" de la ciudad de Dnepropetrovsk	x			11,4%	Informe de prueba
01/09/05	ISRAEL Shindler Nechushtan		x		10%	Informe de prueba
04/09/05	REINO UNIDO (BTAC)		x		2,4%	Informe de prueba
04/11/05	BRASIL (SOUL)		x		19,58%	Informe de prueba
Nov 2005	BRASIL IBAMA (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis)		x			Declaración
10/11/05	BRASIL FABET		x		13-20%	Declaración
24/11/05	BRASIL COOPERCARGA		x		12,74%	Declaración
Nov 2005	IRAN IFCO (Iranian Fuel Conservation Organization)		x		6%	Declaración
Nov 2005	HONG KONG Golden Fame Holding Limited		x		20%	Informe de prueba
21/11/05	ISRAEL S.C.L. Kibbuz Lahav		x		15%	Declaración
Dec 2005	SIRIA Universidad de Damasco		x		7-12%	Informe de prueba
10/01/06	BRASIL Konquest		x		12,33%	Declaración
06/03/06	HUNGRIA MM Import Kft		x		18,54%	Informe de prueba
23/05/06	BRASIL LACTEC	x		70,82%	6,13%	Informe de prueba
20/06/06	CHINA INSTITUTO DALIAN		x		12,49-13,06%	Informe de prueba
26/06/06	BRASIL COLORADO		x	8,07%	2,69%	Informe de prueba
10/07/06	HUNGRIA Elektro Profi		x		20,05%	Informe de prueba
16/07/06	VIETNAM Instituto Técnico de Vehículos Militares		x		10,95%	Informe de prueba

Referencias 3/3

Fecha	Instituto/Compañia	Pruebas		Resultados		Documentos Adjuntos
		Lab	Calle	Reducción Emisiones gas	Reducción consumo	
26/09/06	SUIZA Supertech Swiss		x		8,45 %	Informe de prueba
28/09/06	BRASIL Cossisa		x		12,67%	Informe de prueba
04/10/06	MEXICO Altocarbono		x		14,7%	Informe de prueba
12/10/06	TURQUÍA Ak- Ege		x		10,96%	Informe de prueba
4/12/06	TURQUÍA Cankaya		x		7,98%	Informe de prueba
12/03/07	MEXICO Pemex		x		24.14%	Informe de prueba
21/03/07	MEXICO Medio Ambiente		x	35%	9,4%	Informe de prueba
24/05/07	TURQUÍA Cinar		x		5,8%	Informe de prueba
6/7/07	TURQUÍA Izulas				8%	Informe de prueba
11/07	LETONIA Instituto Vehículos de motor	x			5,8 % - 13 %	Informe de prueba
4/01/08	MEXICO Unam	x		Ver informe	Ver informe	Informe de prueba
18/05/09	LETONIA Prueba con camión Volvo	x			8,36 % - 11,77 %	Informe de prueba
25/05/09	CROACIA Libertas		x		6% - 9%	Declaración
9/07/2009	HOLANDA Beets Groep		x		6,2 %	Informe de prueba
25/09/2009	BRASIL Sudeste		x	35 % 40 %		Declaración
21/11/2009	HOLANDA Van Paridon		x		8,3 %	Informe de prueba

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