INSTITUTO NACIONAL DE ESTADISTICA

Use of water in manufacturing industry (2007-2010)

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1. Introduction

In 2009, the National Statistics Institute released a pilot study on water use in the industry with reference to year 2006, based on the exploitation of the module on water use that was included that same year in the *Waste Production in Industry Survey* (WPIS)) questionnaire. The study variables of that module were estimated only for the national total.

Now, an extension of that study for the years 2007, 2008 and 2010 is released, which makes it possible to plan a temporary series of the main values that make up the entire water cycle. The statistical study has been restricted to manufacturing industry branches, as estimations for the extractive industry sector have not reached the reliability level needed for their release. This has been due to the intrinsic difficulty of the study of water flows in this sector, where water production units and water use units coexist.

Unlike the 2006 study, physical variables have been broken down by Autonomous Community and economic activity branch. Nevertheless, data exploitation by crossing Autonomous Community and activity branch has not been carried out, as the sample of the aforementioned survey is not designed to go on to estimations for that level of disintegration. In turn, for data referring to year 2010, there has been investigated only the variables related to water collection and supply because in that module variables related to wastewater dumping were not included. The reason for this omission was that in 2010 the *Waste Production in Industry Survey* was integrated along with the *Environmental Expenditure Survey* in one only questionnaire (*Environment in Industry Survey),* as there was thought to be more convenient not to include more variables on water use in order to avoid an enlargement of the burden of response of the informants.

Once the data for the years 2007, 2008 and 2010 were presented, preliminary analysis were made on it so that it would be possible to calculate a series of indicators that would make possible the specific study of water use in manufacturing industry. In this context, correlation studies on used volumes and number of employed persons by Autonomous Community and economic activity branch have been carried out. Additionally, and as a pilot study, the average amounts of water demand by employed persons and economic activity and the average water productivity (considered to be a production resource) by generated gross added value and economic activity have been calculated.

It is worth noting that, for the classification of the economic activity branches of the collected data from the temporary reference 2008 on, the National Classification of Economic Activities 2009 (NACE-2009) is effective. So, in order to make it possible for the user to establish a relationship between the 2007 data and that from previous years, in the annex (table no. 60) there are included some illustrative correspondences between the subsections of the NACE-93 (Rev.1) which is applicable for the data related to 2007 year, and the divisions of the NACE-2009 which - as it has been said before - is the current classification for the

years 2008 and 2010. The aforementioned correspondence is for water use, and it is substantially correct if we take into account that, despite the activity *"Publishing of books"* is included in DE subsection of NACE-1993 and not in division 18 of NACE-2009 (but in the new 58 division), this economic activity does not use water as a part of its production process. This reasoning is also effective for the economic activity related to equipment and machinery installation and repairing, which in NACE-93 was classified within the manufacture of the corresponding items, and it has been classified in NACE-2009 both independently and jointly in division 33 *"Equipment and machinery installing and repairing".*

As for the rest of the manufacturing industry, the changes between those two classifications have just created new divisions in order to represent an appropriate level for new industries that are considered to be important, or for the existing ones that have increased their economic relevance.

2. Statistical background and legal framework

Water supply to industrial establishments may have several sources. One part may come from owned collections, directly from the environment or through self-supplied industrial areas. Another way of supply, which is usually related to low-consumption industries located in population centres, normally comes from the municipal water supply network. Finally, a rather small portion of industrial establishments use water from both two sources.

In the introduction of the water use in industry of 2006, the difficulties created by the measurement of physical flows and the monetary amounts related to them was already highlighted. This difficulty is due to the great variety of water sources, the different uses of this element during the production process and the dependency from water demand of the existing water supply around the industrial establishment.

Water supply is an important determinant factor when choosing the location of and industrial establishment, both as for its availability and as for its scarcity, low quality or price. Another determinant factor when establishing an industry may be the waste dumping, in relation with the effective regulation related to it and to the environmental setting where they are produced.

To summarize, it can be stated that the water needs in industry are determined by its different ways of application (incorporation to the product, solvent, vapour production, transport agent, cleaning, cooling, etc.) and they are functions of a series of specific variables, such as the quantity and type of the final manufactured product, the number of employees, the production system in use or the existence or not of water recycling (re-use within the company). It is worth noting that a a lack of uniform statistical information on water in the manufacturing industry sector can be noticed. It is true that the River Basin Management Plans approved on the late XXth century carried out an estimation for Hydrographical Basins of the industrial demand of the industries that were not connected to municipal supply networks, but they were gross estimations that not always comparable between them due to the different interpretation made on the industrial consumption that is included in the supply for cities.

On the other hand, water demand might be quite changeable through years as it has to fit the supply, and the supply depends on the intensity of rainfall, the amount of water on reservoirs, drought periods, water ecological flows, etc.. To sum up, it depends on the scarcity or plenty of water. Sea water from estuaries or bordering areas, which usually is used for cooling, has to be added to the abovementioned collection of groundwater and surface water. In short, it can be stated that water private collection is highly changeable, and this makes it difficult its study and the estimation of its basic magnitudes.

As for manufacturing industries that are supplied by the corresponding municipal supply network, the volume of water used can be known via its invoicing if industrial water fees are different from household water ones (dwellings and services), or when the amount is for industrial areas. As for

manufacturing companies that require for their production process a huge amount of water, it might happen that they own a specific water intake apart from the general supply network.

The previous reconditioning of water in order to meet the needs for improving the quality levels of water consumption is a matter that can be quite relevant when it has to do with water supply problems. So, sometimes water has to be softened so that it reduces its saltiness or in order to avoid the deterioration of the piping. In other cases, water is deionised (demineralised) in order to remove ions that may interfere in chemical reactions related to the production process. This type of water is also used in cleaning to remove polluting of products or equipment without corrosion risk. Finally, in sectors such as the beverage one or the pharmaceutical one, a highly pure water is needed. So, gross water or drinkable water is distilled by heating it in order to obtain water steam with no stains, which is condensed afterwards. In these cases, the cost of water reconditioning might have a great impact on total water consumption costs.

The 24th September 1992 Ministerial Order from the former Ministry of Transport and Public Works (in the 17th October BOE) approved the Complementary Technique Recommendations and Instructions for the preparation of the Inter-Community River Basin Plans, and it suggested a series of illustrative amounts expressed in m^3 / *employee / year* , in order to assess the total water demand in a series of economic activity branches of the manufacturing industry. Subsequently, 10th September Order 2656/2008 from the Ministry of Environment, Rural and Marine Affairs approved the water planning instruction (22nd September BOE) and established a series of standard amounts of supply for manufacturing industry expressed in m^3/ *employee / year,* and in m^3 /*1.000* € *of GAV*.

Now then, given the aforementioned differences between the water demand within industries belonging to the same economic activity branch and the weather factors that may affect water private collection, some experts question the use of this type of amounts in order to assess reliably water demand in the manufacturing industry sector. These amounts may provide initially reasonable average estimations if they are used for sectors whose production features are previously known, but they can lead to significant mistakes if they are used in a lower level.

In this context, it might be interesting to point out that *The White Water Book*, which was released by the Ministry of Environment in 2000 with the purpose of achieving a better understanding of water problems in Spain, and it highlighted the need of making an effort in order to improve the available statistics on real water consumption in industry.

Industrial water dumping have different features from the water supply, as they perform severe risks for human health and environmental pollution issues. Legal concern on water pollution began in Spain in the late fifties, when the Police Regulation of Water Flows was approved by the 14th November 1958 Decree from the Ministry of Public Works (2nd December BOE). The 4th September 1959 Order from the aforementioned Ministry (10th September BOE) established its

normative development by regulating wastewater dumping and classifying river flows in " *protected, surveyed*, *normal and industrial"*. Even when the preamble of that order reflected clearly the legislator's concern (“*Bearing in mind the enlargement and severity of river impurities due to the increasing industrialisation of the country, it is necessary to complete with effective and practical regulations those included in the Police Regulation of Water Flows”),* the aforementioned regulation was not always effective, maybe because of the lack of lack of means to force its compliance.

In any case, these orders were abrogated when the Water Law 1985 entered in force. Its promulgation was at the same time as Spain's entrance in the European Union. Lately and up to now, environmental regulation on industrial wastewater has increased in line with national transpositions of the community Leaderships and the subsequent development of State basic regulation by the Autonomous Communities. In turn, the current Spanish tax system takes into account the fact that Autonomous Communities might establish their own taxes on taxable events not taxed by the State or on events not taxed by local administrations. That has caused the creation of autonomic environmental taxes, and among them there are worth noting the water tax, the wastewater dumping tax and the so-called sanitation tax.

This environmental regulation has obliged the industrial sector to make great investments in prevention of the pollution caused by its water dumping. The treatment processes for this type of water are expensive and complicated from a technical point of view, as each industrial activity dumps wastewater with a certain polluting potential depending on its production process. This is the reason why for facing the treatment of the above mentioned dumps it is necessary to take into account the features of those flows (organic, inorganic, heavy metals, suspended materials, etc.).

The need for industrial wastewater treatment, the increase in water cost and the drought periods that happen regularly have fostered the search for solutions that promote water saving. In order to achieve this goal, there are several modifications in the production process that can be carried out, such as turning open cooling circuits into closed circuits, recycling water coming from the production process, re-using treated water from the industry itself and optimizing the installation and equipment cleaning. At this stage, it is necessary to clarify the concepts of "*recycled water*" and "*re-used water"*, which sometimes might be overlapped or confused.

In effect, *water recycling* in industry consists on the use of wastewater coming from the production process in an application that is compatible with the quality of those waters, for example, cleaning, watering of green areas, cooling water or sometimes process water. For this industrial use of water a specific treatment is not required, as it only necessary to apply processes of division or cooling.

Nevertheless, *water re-using* implies a previous treatment and, if necessary, disinfection of the generated wastewater before it is used for another purpose. Both techniques mean saving water as they minimise its use and enlarge its lifespan. The re-using of water treated by the company itself is convenient, not

just because of the saving in water consumption that it implies, but also because of the amortization of the investment made for the dumping sanitation, which is compulsory due to the environmental regulation.

In the last few years and in the framework of policies for water resources conservation, the use of wastewater treated in wastewater treatment plants (WWTPs) has been fostered. In this context, the 7th December Royal Decree 1620/2007 (8th December BOE) established the legal regime for re-using treated water coming from those treatment plants. This wastewaters is called *"reclaimed water*", according to the aforementioned legal regulation the physical-chemical quality levels from both points of view, the environmental one and the health one, for the several possible uses. The purpose of this environmental policy is using this type of water for uses that do not require the quality level that is mandatory for drinkable water. This maximises the efficient use of fresh water resources. Generally, wastewater *reclaiming* is carried out in tertiary treatment plants.

For the industry, the use of reclaimed water has not had the significance that was forecasted at the beginning due to the prohibition that the aforementioned Royal Decree establishes on the use of this type of waters in cooling towers and evaporative condensers, precisely when these are the biggest potential users of reclaimed water in industry. The restriction of the use in cooling waters is due to health reasons and it may be delaying the introduction of advanced treatments for obtaining water that could be re-used. On the other hand, the compliance requirements for hygienic health criteria imposed by the above mentioned legal regulation have also made it difficult the use of reclaimed water in food industry, which is precisely the one that uses the most process water, and where water incidence in production costs is the most significant.

Because of all of this, the volume of reclaimed water used in industry does not reach even 2% of the total reclaimed water coming from wastewater treatment plants (WWTPs).

3. Framework and incidences when collecting information (year 2007)

Given that the module on water use in industry is included in the Waste Generation in Industry Survey (WGIS), the framework and the sample type are those used in that survey. The design stratum of the industrial establishment size (IES) that are connected in table no. 1 are those effective for the sample design of the *Annual Industrial Products Survey* (AIPS). Stratums 18 to 21 are studied exhaustively. The term "*employed person*" means "*salaried or non-salaried employee*", even when it is worth noting that in the manufacturing industrial sector 98% of employed employees are salaried, that is to say, that they receive some periodic pay.

Table 1
Size of the establishment by number of employees

IES	Range of employees
14	10-19
15	20-49
16	50-99
17	100-199
18	200-499
19	500-999
20	1000-4999
21	>5000

Table 2
Number of establishments by IES

IES	Range of employees	No. of establishments in the sample	No. of establishments in AIPS-2007
14	10-19	750	20,997
15	20-49	1,160	17,337
16	50-99	835	4,445
17	100-199	856	1,981
18	200-499	926	1,047
19	500-999	161	184
20	1000-4999	50	53
21	>5000	5	5
Total		4,743	46,049

Table 3
Number of employed persons by IES

IES	Range of employees	No. of employees in the sample	No. of employees in AIPS-2007
14	10-19	10,544	307,225
15	20-49	36,040	525,056
16	50-99	60,045	332,822
17	100-199	116,630	284,822
18	200-499	290,675	334,177
19	500-999	106,954	119,151
20	1000-4999	84,064	91,760
21	>5000	35,464	44,330
Total		740,416	2,039,343

Given that industrial establishments with more than 200 employed persons are surveyed exhaustively, the coverage of the WGIS and, therefore, of the module on water use is quite high when it comes to the "salaried" variable conforming the sample design. So, as it is shown in table no. 3, the theoretical sample (740,416 salaried persons) reaches 36% of the framework of the survey (2,039,343).

3.1 Lack of local response

In general terms, it is worth noting that the difficulties found when collecting data that were connected afterwards to the most significant variables are founded on the absence of physical accounting in industrial establishments. This causes the subsequent impact on errors that have nothing to do with the sampling.

Total non-response is determined by the difference between the theoretical survey sample and the real sample, that is, by the units from which a completed questionnaire is not obtained once the survey fieldwork is finished. The total response rate is expressed as the quotient between the real sample and the theoretical sample. Total non-response may be caused by a multitude of factors that affect the survey framework (units that de-list before the fieldwork begins, mergers, acquisitions, etc.), localisation incidences (not locatable, temporary de-listings, etc.) or different types of refusal to cooperate. These incidences affect both the main sample (WPI) and the water use module.

The partial response rate for a specific variable of the questionnaire can be expressed as the quotient between the number of registers in which said variable takes on an accepted value, and the real sample. Given that, in the blank responses, it is not possible to distinguish between the *"does not apply"*(zero value) and "*no* data recorded" (*missing* or unknown value) incidences, we cannot speak of "partial response rates" in a strict sense. That is the reason why in the tables of the present study the phrase "*partial response proportion*" is used and

it can be understood, excluding the above mentioned exceptions, as the partial response rate.

The theoretical sample is made out of 5,994 units, whereas the real one, which includes the units where information has been taken from, is made out of 4,856 units.

In table no. 4 the distribution between both samples by the establishment size (IES) is presented. We can see in it that the response rate has an increasing trend as the number of employed employees in the establishment increases. For the total manufacturing industries the response rate in the water module was 81%. It is worth noting that the establishment IES in the real sample is the one corresponding the questionnaire filled in by the informant, and it can change as compared with the IES stratus where the establishment was included in the theoretical sample.

Table 4
Theoretical and real sample, by IES

IED	14 or less	15	16	17	18 or more	TOTAL
Theoretical	1,212	1,460	1,018	1,025	1,279	5,994
Real	908	1,166	837	836	1,109	4,856
%	74.9%	79.9%	82.2%	81.6%	86.7%	81.0%

3.2 Amount of partial response

96.2% of the surveyed persons have complied a value in the private water collection or in the water supplied from network volume; therefore, the remaining 3.8% does not provide water supply data. This is caused by the fact that the industry store is rented and the lessor pays for the water consumption receipts, it is part of an industrial area which has a shared water input, it does not have any meters, or it has any type of payment reduction. Other informant units stated that in their amount of water invoiced there is no breakdown of the used water volume, or that they just pay for a global amount without disaggregation of the costs in concept of supply and treatment. As a general rule, the companies that do not provide any data about water supply are those with less than 200 employees.

In table no. 5 it can be noticed that from a real sample of 4,856 establishments, the rubric related to the *total volume of water supplied by a public network*, a total of 4,198 units has answered, which represents 86.4% of the real sample.

The response proportion in the variable *amount paid for water supply,* it is 85.5% and in *amount paid for treatment* it is 67.4%. As it has already been pointed out, the reason for this difference is that sometimes the informant only knows the global amount of the water receipt. According to the compliance instructions, in this case the total amount should be allocated to the "supply" variable, writing down that incidence in the observations rubric of the WPI questionnaire.

Almost a fifth part of the industrial establishments (22.5%) carries out private water collection right from nature (self-supply). The most relevant water source

then is groundwater (18.8%), followed by surface water (5.8%). Only 45 information units make at the same time surface and groundwater collection.

As compared with the total information units that carries out direct water collection, 23.1% collects surface water, 74.6% does so with groundwater, 0.3% collects sea water for desalination, 1.7% does so with non-desalinated sea water and 5.5% collects other types of water (rain water, irrigation communities, water purchase from water wagons, reclaimed water or, if necessary, using the water contained in the raw material itself).

There are 747 establishments, 15.5% of the surveyed establishments, which are supplied by the supply network and carry out at the same time private water collection. Out of them, 70% has more than 100 employed persons.

Out of the establishments that do private collection, in 46.4% there is a value for the variable *value of the water collection tax*. 131 establishments collect surface water and pay the tax, that is, 46.2%, while 441 establishments collect groundwater and pay the tax (48.2%).

Regarding wastewater, 74.3% stated that they dumped their spills into a public sewage network, 1.7% into the sea, 7.5% into a fluvial channel, 5.8% into a septic tank and 6.5% dumps them into other recipient media (collectors, treatment systems, atmosphere, decanting areas and tips for mud or silt generation, etc.). Furthermore, 449 establishments (9.2%) did not fill in the variable related to the destination of the dumped water.

The amount paid for the dumping control tax has been filled in by 12.4% of the information units, but if we take into account that only those industrial establishments that dump into the sea or a fluvial channel pay that tax, then the response percentage would be 87.4%. So, 389 establishments dump into the sea or a river and pay the tax, while 56 establishments do not pay it. As for the 156 remaining ones, the amount paid does not correspond to this type of tax but to the treatment tax (for dumping into the sewage system) or to amounts paid to waste managers when the dumping places are septic tanks or other recipient media such as decanting areas or dumping sites. These response inconsistencies will be offset by the re-encoding process.

Table 5
Amount of partial response

Variable	Units	Percentage of response
Total volume of water supplied by a public network	4,198	86.4%
Amount paid for water supply	4,153	85.5%
Amount paid for treatment	3,271	67.4%
Private water collection	1,095	22.5%
Surface water collection	283	5.8%
Groundwater collection	914	18.8%
Sea water collection: for desalination	4	0.1%
Sea water collection: non-desalinated	22	0.5%
Other type of water resources	68	1.4%
Price of water collection tax	568	11.7%
Wastewater dumped into the public sewage system	3,608	74.3%
Into the sea	81	1.7%
Into a fluvial channel	364	7.5%
Into a septic tank	280	5.8%
Into other recipient media	318	6.5%
Price of the dumping tax	601	12.4%

3.3 Validation regulations

With the aim of improving the quality of the questionnaires and increase the proportion of response, several validation regulations have been established in order to create range control system. The objective of this statistical control is enclosing in numerical ranges the sample values that can be considered admissible and detecting weak or out-of-range values. Right afterwards, inconsistencies with the highest relevance, as well as the proportions of non-compliance with the range control and validation regulations, are specified.

- The obligatory nature of having any volume of water supply is broken by 3.8% of the information units.
- If there is any water supplied through a public network, the amount of fees paid for it has to be filled in (and vice versa), but this regulation is broken by 2% of information units.
- If there is any direct collection of surface or groundwater, there must be a value in water collection tax rubric (and vice versa). This validation regulation is broken by 13% of the surveyed units.
- The average price of the cubic meter of water supplied through a public supply network must be in a range between 0.4 and 2 euros. This rule is broken by 21.1% due most of the times to the aforementioned incidence of accumulation in this variable of the amounts paid as sewage and wastewater treatment (sanitation)

- If industrial spills are dumped into a public sewage network, there must be a value in the price of treatment tax variable (and vice versa). This rule is broken by 9.7% of the surveyed establishments.
- If industrial spills are dumped into the sea or a fluvial channel, there must be a figure in the dumping tax price (and vice versa). This is broken 5.5% of times.
- The total volume of dumped water cannot exceed the total of volume of the addition of the water volume coming from a public network and from private collection. This rule is broken 1.3% of times.
- There is no data recorded either for the supply water volume, nor for the dumped water volume in 3.5% of the cases.

3.4 Other incidences

When collecting information, some variables might have values that can be impossible from a physical point of view, or that do not make sense according to the legal regulation effective for the environmental field. These incidences are mainly due to errors when interpreting the questionnaire or to confusion of the information unit, and they have to be re-encoded or sometimes imputed. For dumped water, it is not correct the lack of existence of those spills, as the state of them might be semi-solid (mud or silt) or gaseous with emission to the atmosphere.

The most significant incidences that have taken place in the field described in the previous paragraph were:

- 202 establishments pay any amount for treatment services and do not dump water into a public network.
- 5 establishments pay collection tax and do not carry out direct collection.
- 212 pay dumping tax and do not dump water into the sea or a fluvial channel.
- 15 pay dumping tax and only dump into a septic tank.
- 709 collect water through a public water supply network and do not dump it into the sewage system.
- 213 have supply network and do not dump anywhere.
- 276 have water supply (from network or direct collection) and do not dump anywhere.
- 26 dump wastewater and do not have water collection or supply.

There are also 235 questionnaires where there is more than one response in 5.1 section, that is to say, that the industrial wastewater is dumped into several natural places.

4. Sample values (year 2007)

4.1 Physical variables

With the aim of pointing out the high sample coverage and therefore the statistical power of the present study, in this section information about the sample data is provided. This way, the total water supply to manufacturing industries in the sample reaches 856,874 thousands of m^3, the volume of water supplied through public network is 220,625 thousands of ^{3} (56% of the high-value) and the total water of direct collection by the establishment itself reached 636,249 thousands of m^3 (74.3%).

There are 554 establishments whose water supply is higher than 100,00 m^3. Among them, there are worth noting beverage and food industry, paper industry, petroleum refining, chemical industry, other non-metallic mineral products industry, metallurgy and manufacture of metallic products. Among them, 234 establishments (42%) correspond to companies with more than 100 employed persons.

As for low water consumption, the establishments whose supply is lower than 500m^3 are 1,141 (23%); among them 1,086 (95%) are establishments with less than 100 salaried people. In table no. 6 there are presented the sample values of water supplied trough a public network according to IES, and their average value by industrial establishment according number of salaried persons in each IES. As it has already been pointed out, it can be observed that the volume of water supplied through the public network increases according to the number of employees, and there is a significant difference between the companies with more than 500 employed persons and the rest of them.

As for private collection of non-desalinated sea water, 22 establishments have been surveyed and half of them had a water supply of more than 500,000 m^3. The main industrial use of this type of water is cooling or liquid gas regasification.

Table 6
Average water supply from network by establishment according to IES

IES	No. of establishments with network water supply	Network water supply (m3)	Average network water supply
14	691	1,273,527	1,843
15	1,048	5,437,061	5,188
16	750	8,897,794	11,864
17	743	34,358,885	46,243
18	857	122,371,990	142,791
19	144	34,571,596	240,081
20	46	10,460,747	227,408
21	3	3,253,905	1,084,635
Total	4,282	220,625,505	51,524

4.2 Monetary variables

The calculation of the unit sample costs expressed in € / m^3 has a series of methodological difficulties. As it is an indicator, its value is affected both by the values that make up the quotient and by the incidence of the lack of response in the variables that make it up. In order to address this problem, the quotients of the amounts paid as water supply and volume of water supplies were calculated. The second step was considering as extreme values ("outliers") those out of the range (L1, L2), where L1 = Q1 - 1.5(Q3 - Q1) = -0.54204, and L2 = Q3 + 1.5 (Q3 - Q1) = 2.2754, (being Q1 and Q3 the first and third quartiles in the marginal distribution of the calculated variable *average price*).

Taking then into account the values of those ranges, the unit cost of water supplied by the network was 0.84 € / m^3, with 913 questionnaires excluded from the calculation of the indicator, among which there were included those with no data recorded. If we include the registers with no value recorded for the calculation of the average price, 271 questionnaires would be excluded and the average price would be 0.71 € / m^3.

The structure of unit costs according to the volume of water used (m^3) is the following:

- In the stratum (0 - 500) that includes 1,131 registers, among which the 658 ones with no volume recorded are excluded, 1,020 registers are within the range and their unit cost is 0.92 € / m^3.
- Stratum (500 - 5,000) includes 1,548 registers. There are 1,461 within the range and their unit cost is 0.88 € / m^3.
- Stratum (5,000 - 100,00) includes 1,274 registers. There are 1,225 within the range and their unit cost is 0.79 € / m^3.
- The stratum of 100,000 volumes and over includes 245 registers, and 238 of them are within the range. The unit cost of these values is 0.58 € / m^3.

The unit cost of the amounts paid as sanitation (sewage and treatment) is 0.28 € / m^3. This value is obtained by calculating the quotient of the treatment taxes and the total volume of water supplied through a public network. In this calculation the 254 values out of the range have been included.

The establishments whose total volume of water supplied by the network is higher than one cubic hectometre (one million m^3) are 34, and their unit cost is 0.33 € / m^3. Among the establishments with the highest volume of water use, there are worth noting those related to chemical industry, paper, metallurgy, beverage manufacture and petroleum refining.

The establishments whose total volume of water supplied is over 500,000 m^3 are 57, and their unit cost is 0.40 € / m^3. By the way, 271 registers have an unit cost higher than 2 € / m^3.

5. Re-encoding and imputation

5.1 Re-encoding

During the process of module purification, inconsistencies related to the answers to sections "*other type of water resources"* , in the case of direct water collection, and "*other recipient media"* , for dumped wastewater, have been detected.

In the first case, there are 67 registers, and 29 of them have been re-encoded. In the re-encoding process there has been adopted the agreement of assigning the public supply network code to "*irrigator communities*", the groundwater code to "*springs and wells*", and the reclaimed water code to "*wastewater treatment*". Rain water and water purchase to companies remain coded as "*other water resources".*

Moreover, 55 establishments dump into a septic tank, pay treatment or dumping tax and do not dump into the public network, the sea or a river. In this cases, the re-encoding criteria used is considering this amounts as paid to waste managers.

In the case of the "*other recipient media*" variable (417 registers), 167 of them have been re-encoded, and it has to be taken into account that the "*collector"* and "*treatment plan"* answers have been assigned to the sewage section. Answers as the literals "*management companies" o "trucks"* have been assigned to the "*septic tank"* section.

Finally, out of the 61 establishments that dump more water than they collect, the 11 that have a negative consumption over 100,000 m^3 have been re-encoded, as it has been considered that the informant had expressed the date in annual period instead of daily period, as it was required in the questionnaire. The re-encoding regulation taken has been dividing the volume of water dumped by the number of days worked.

5.2 Imputation

For the 26 questionnaires where there were the amount paid for water but not the volume, the volume has been imputed by dividing the amount by the 0.71 euros / m^3 average price, which was obtained in section 4.2.

For the 74 questionnaires that have volume date but not paid amount, the amount has been imputed by multiplying the volume by the 0.71 € / m^3 average price.

For the 165 questionnaires where there is no value either for the supply nor for the direct water collection, the volume of water supplied through a public network has been imputed by assigning the average volume by establishment according to IES to it. Its amount paid has been imputed with the average price (0.71 € / m^3).

In order to impute the amounts paid as treatment costs, the 428 registers with no value recorded as treatment cost, those who dump into the sewage and that pay an amount for supply have been selected.

In these cases, there has been considered that the information unit had not been able to break down the receipt, including the amount paid for the supply related to treatment as it was required in the instructions for the compliance of the questionnaire. In order to face this incidence, 65% of the total supply amount and 35% of the treatment amount (sewage and wastewater treatment) has been assigned according to the breakdown obtained in the *Water Supply and Treatment Survey*. The same relation has been assigned to the 39 registers with the same data in the amount and treatment, as it has been understood it was a compliance error.

For the 449 registers where there was no volume of dumped water this variable has been imputed by assigning as a value in the "*sewage dumping"* the total input of water multiplied 0.6 times and divided by the number of dumping days, where 0.6 is the quotient of the total water dumped and the total water collected.

5.3 Estimators

The estimation procedure is applied to sample values in order to calculate values that estimate the real values of the variables in the water use in industry module. The same guidelines that were used for the 2006 module exploitation have been followed, but, unlike that year, there has not been used a post-stratified ratio estimator based of the cross of three groups of stratum of size and NACE, where the auxiliary variable was the number of employees. The reason for not having used this stratification afterwards has to do with the fact that the accuracy improvement achieved with that estimator was not significant.

On the other hand, in order to obtain high-level results related to all the manufacturing industry sector field it is necessary to take into account the establishments with less than 10 employees and those that are business owners without employees. The external source used has been the *Annual Industrial Companies Survey* (AICS) carried out by the INE each year. The high-level results obtained by the estimation procedure have been adjusted to the total population by a water volume ratio per employee for each variable. On average, the water volume target of adjustment by this procedure has represented approximately 6% of the total.

6. Final results (year 2007)

6.1 Physical variables

6.1.1 PHYSICAL VARIABLES BY ECONOMIC ACTIVITY

As it is shown in table no. 7, manufacturing industries water supply in the year 2007 reached 1,284,850 thousands of m^3. The total volume of water supplied through a public network was 393,676 thousands of m^3 (30.6% of the total), while the volume of water collected by the establishment itself (private collection) was 891,174 thousands of m^3 (69.4% of the total).

Direct collection of surface water increased, reaching 413,561 thousands of m^3 a year, which represents 46.4% of the total private collection 232,022 thousands of m^3 are collected from groundwater (26%), and 245,591 thousands of m^3 are collected from other resources (27.6%), among which there is included sea water.

The economic activities that use the most water are chemical industry and plastic materials and natural rubber transformation (35.2%), tobacco, beverage and food industry (17.7%), metallurgy and manufacture of metallic products (14%) and paper industry (12.8%).

As for *"other resources"*, it is worth noting that huge volumes of water corresponding to chemical and metallurgical branches that collect non-desalinated sea water, which is mainly used in cooling processes. The breakdown of the other resources is as follows: 231,101 thousands of m^3 of non-desalinated sea water, 2,211 thousands of m^3 of sea water for desalination, and 12,279 thousands of m^3 of other type of resources. Among the last ones, approximately seven cubic hectometres are reclaimed waters coming from WWTPs and the rest comes from other sources (rain water, decanting areas, water contained in the raw material itself, supply by water wagons or tanks, etc.).

Table 7

Water supply from network and private collection by economic activity (thousands of m^3) (2007)

Economic activity	Network supply	Private collection	Total	%
DA	101,244	126,609	227,853	17.7%
DB y DC	17,818	22,647	40,465	3.1%
DD	2,223	9,095	11,318	0.9%
DE	21,614	142,287	163,901	12.8%
DF	48,965	3,802	52,767	4.1%
DG y DH	100,869	352,268	453,137	35.2%
DI	22,407	81,680	104,087	8.1%
DJ	42,490	136,976	179,466	14.0%
DK, DL y DM	32,326	14,875	47,201	3.7%
DN	3,720	935	4,655	0.4%
Total	393,676	891,174	1,284,850	100.0%
%	30.6%	69.4%	100.0%	

Table 8

Percent distribution of network supply and of private collection by economic activity (2007)

Economic activity	Total	Network supply	Private collection
DA	227,853	44.4%	55.6%
DB y DC	40,465	44.0%	56.0%
DD	11,318	19.6%	80.4%
DE	163,901	13.2%	86.8%
DF	52,767	92.8%	7.2%
DG y DH	453,137	22.3%	77.7%
DI	104,087	21.5%	78.5%
DJ	179,466	23.7%	76.3%
DK, DL y DM	47,201	68.5%	31.5%
DN	4,655	79.9%	20.1%
Total	1,284,850	30.6%	69.4%

Table 9

Source of private collection by economic activity (thousands of m^3) (2007)

Economic activity	Surface water	Groundwater	Other sources	Total	%
DA	34,010	87,105	5,494	126,609	14.2%
DB y DC	1,797	14,108	6,742	22,647	2.5%
DD	592	8,390	113	9,095	1.0%
DE	110,522	30,218	1.,546	142,287	16.0%
DF	2,031	1,267	504	3,802	0.4%
DG y DH	150,385	36,200	165,684	352,268	39.5%
DI	38,702	40,014	2,965	81,680	9.2%
DJ	69,676	10,999	56,300	136,976	15.4%
DK, DL y DM	5,788	2,904	6,182	14,875	1.7%
DN	58	817	61	935	0.1%
Total	413,561	232,022	245,591	891,174	100.0%
%	46.4%	26.0%	27.6%	100.0%	

Table 10
Percent distribution of private collection by source and economic activity (2007)

Economic activity	Total	Surface water	Groundwater	Other sources
DA	126,609	26.9%	68.8%	4.3%
DB y DC	22,647	7.9%	62.3%	29.8%
DD	9,095	6.5%	92.3%	1.2%
DE	142,287	77.7%	21.2%	1.1%
DF	3,802	53.4%	33.3%	13.3%
DG y DH	352,268	42.7%	10.3%	47.0%
DI	81,680	47.4%	49.0%	3.6%
DJ	136,976	50.9%	8.0%	41.1%
DK, DL y DM	14,875	38.9%	19.5%	41.6%
DN	935	6.2%	87.3%	6.5%
Total	891,174	46.4%	26.0%	27.6%

It has been considered to be appropriate to breakdown in the NACE division level the volume of water used by economic activity branches DA (food, beverages and tobacco) and DG chemical industry), due to their complexity and their relevance in water consumption. The results are presented in tables no. 11 and no. 12, respectively. Taking into account only the establishments with ten or more employees, we can observe than food, beverage and tobacco industry, apart from the significant use of water in food products and beverages manufacture and dairy industries divisions, where water is the raw material in the production process, it is worth noting the volume of water used in meat industry (particularly in slaughterhouses as cleaning water) and in vegetable preparation. In these activities water is used as a cleaning element in order to comply with the food handling and health requirements. As for chemical industry, the manufacture of basic chemical products captures almost two thirds of water use, as this element is a part of every basic chemical product manufacture process (both in liquid and steam form).

Table 11
DA branch (Food, beverages and tobacco) (thousands of m^3) (2007)

Economic activity	Network	% regarding network total	Private collection	% regarding private collection total
Meat industry	20,654	20.4%	15,700	12.4%
Fish and fish products manufacture and preserving	8,201	8.1%	3,545	2.8%
Fruit and vegetable preparation and preserving	12,352	12.2%	28,867	22.8%
Manufacture of oils and fats (animal and vegetable)	3,240	3.2%	2,152	1.7%
Dairy industries	16,807	16.6%	23,676	18.7%
Manufacture of grain mill products, starches and starch products	1,620	1.6%	5,951	4.7%
Manufacture of animal feeds	1,215	1.2%	1,139	0.9%
Manfacture of other food products	11,238	11.1%	10,002	7.9%
Drink preparation	25,716	25.4%	35,451	28.0%
Tobacco industry	202	0.2%	127	0.1%
TOTAL	101,244	100.0%	126,609	100.0%

Table 12
DG branch (Chemical) (thousands of m^3) (2007)

Economic activity	Network	% regarding network total	Private collection	% regarding private collection total
Manufacture of basic chemical products	76,344	80.6%	295,573	87.5%
Manufacture of pesticides and other agro-chemical products	172	0.2%	338	0.1%
Manufacture of paints, varnishes and similar coatings, printing ink and mastics	799	0.8%	1,217	0.4%
Fabricación de productos farmacéuticos	5,611	5.9%	11,170	3.3%
Manufacture of soap, detergents, and other cleaning and polishing articles; Perfumes and toilet articles	3,828	4.0%	18,834	5.6%
Manufacture of other chemical products	7,066	7.5%	5,504	1.6%
Manufacture of synthetic or man-made fibres	923	1.0%	5,092	1.5%
TOTAL	94,742	100.0%	337,728	100.0%

In table no. 13 the information of water dumping (spills) is presented. Its volume reaches 721,785 thousands of m^3 a year, which means 56% of the total water supply. The destination of 35.4% of dumped water is the sewage system, 35.3%

of it goes to the sea, 25.5% to a fluvial channel ("river") and 3.8% to other destinations. However, it has to be noted that the volume of sea dumping is biased upwards due to the return of sea water used for cooling in metallurgical and chemical branches.

Table 13
Volume of dumped water and destination by economic activity (thousands of m^3) (2007)

Economic activity	Sewage system	Sea	River	Septic tank	Other	Total	%
DA	85,631	14,515	29,296	2,228	7,213	138,883	19.2%
DB and DC	15,251	8,265	3,981	680	432	28,609	4.0%
DD	1,596	234	4,624	65	235	6,754	0.9%
DE	31,950	16,960	58,803	286	2,065	110,064	15.2%
DF	567	19,897	3,697	1	9	24,171	3.3%
DG and DH	38,688	152,106	38,122	195	4,086	233,197	32.4%
DI	21,420	1,555	11,734	2,431	6,263	43,403	6.0%
DJ	37,180	35,381	28,660	139	248	101,608	14.1%
DK, DL and DM	20,353	5,812	4,439	621	570	31,795	4.4%
DN	2,629	0	378	180	114	3,301	0.5%
Total	255,265	254,725	183,734	6,826	21,235	721,785	100.0%
%	35.4%	35.3%	25.5%	0.9%	2.9%	100.0%	

6.1.2 OTHER WATER FLOWS

In simple terms, the different functions of water in the manufacturing industry sector can be classified in five large groups: process water, steam production, cooling, cleaning and sanitary use (human use). The first of these groups is quite important for the sectors of food, pulp manufacture, textile, water branch, leathery, chemical, glass and metallic derivatives. Steam production and cooling function are also important in the plastic and natural rubber derivatives, chemical and petroleum refining sectors. Cleaning water is used mainly in meat, wine, food and chemical industries. Finally, as for sanitary water, its relative relevance in usually low, but it can be important as compared with the total water supply in activity branches with low demand of this resource.

6.1.2.1 Cooling water

Cooling water is included in water supply. Having said that, as it has already been pointed out, the module on water use does not include information about the several types of cooling circuits and, therefore, about the volume that is actually recirculated, so it has not been possible to feed back the sample data. In the research carried out in 2006, the sample marginal distribution of the

"*percentage of volume of cooling water out of the total water supplied"* (network plus private collection) was presented, broken down by water source.

This distribution has not been affected by significant variations, so it presents a high strength. This way, for 2007 the percentage of network water intended for cooling is 14%, 19% of surface water, 12% of groundwater, almost 100% of sea water and 11% of other resources.

6.1.2.2 Re-used/ recycled water

The volume of spills treated by the industrial establishment itself (5.5.1 rubric of the module) reaches 318 hm^3, which is 44% of the dumped water volume. This figure has to be considered as a maximum, as some misunderstanding might have taken place when approaching liquid industrial wastewater treated by the establishment itself and wastewater treated in a WWTP. As for re-used/recycled water volume (5.6 item), the estimation is 181 hm^3, that is to say 25% of the dumped water and 57% of the wastewater treated in treatment facilities among the establishment itself.

Due to their pilot nature, these estimations should be taken into account carefully, but in any case they show the great investments that industry has made during the last few years in order to prevent polluting emissions coming from their wastewater and to minimise the use of water by re-using the water resources of their production processes.

6.1.2.3 Reclaimed water

The estimation for the volume of reclaimed water supplied by third parties (4.4 rubric), that is to say wastewater treated in a WWTP, is 7 hm^3. That is approximately 1.4% of the total reclaimed water used in Spain, a volume that is quite few significant but according with the restrictions for the use of this type of water established by the aforementioned Royal Decree 1620/2007. By the way, it is worth noting that due to the low response obtained for the amount paid for this type of water it has not been possible to estimate an unit cost - average price - for this type of water.

6.1.2.4 Sanitary water

Sanitary water refers to the water used by the employees of the industrial establishment for self-cleaning, cleaning and hygiene. It is generally used in washbasins, showers and WC, and almost all of it comes from urban supply networks, as it has to be drinkable water. As it has been already pointed out, the module on water use does not require information on this type of water. Some international researches have estimated an average amount of a manufacturing industry employee expenditure on sanitary water. It was among the range of 40 - 50 litres per employee and day, with a maximum of 500 litres for petroleum refining activities and a range of 120 - 150 litres for paper and metallurgy

industries. By applying these amounts to the estimations of the present study, a sanitary water volume of around hm^3 would be obtained. It would mean approximately 8-10% of the water supplied by the public supply network, which matches the results obtained in some countries of the European Union.

6.1.3 WATER CONSUMPTION BY ECONOMIC ACTIVITY

In table no. 14 it is presented the information on water consumption in economic activity branches that is defined as the percent variation between the volume of water used and the volume of water dumped, that is to say the percentage of water supply that does not return to the environment. It should be noted that the phrase "*water use*" in industry, refers to the volume of water used (that may come from supply networks or from private collection), that is, that has an entry into the industrial establishment to provide for the needs of the productive process, whereas the expression "*water consumption"* refers to the volume of water that, after being used, does not return to the environment. Therefore, regarding the total water cycle, the terms "*use*" y "*consumption*" are not synonyms, as they are in other scientific or economic fields. An assessment of national water consumption (water supply 1,284 hm^3, dumping 722 hm^3 and consumption 562 hm^3) indicates that cooling water considered to be a water taking does not affect the assessment, as most of it returns to the environment with evaporation losses between 5-10%.

Table 14
Water consumption by economic activity (2007)

Economic activity	Consumption %
DA	39.0%
DB and DC	29.3%
DD	40.3%
DE	32.8%
DF	54.2%
DG and DH	48.5%
DI	58.3%
DJ	43.4%
DK, DL and DM	32.6%
DN	29.1%
Total	43.8%

6.1.4 DUMPING AND WATER SUPPLY BY AUTONOMOUS COMMUNITY

In tables no. 15 to 20 results related to water supply and dumping by Autonomous Community are presented. For a better understanding of this information, it has to be noted that sea water collection (for cooling) is done in industrial establishments located in the Autonomous Communities of Cantabria, Comunitat Valenciana and Región de Murcia.

As compared to the total, the Autonomous Communities with the highest water supply through a public network are Cataluña (23.4%), Andalucía (16.6%), Comunidad de Madrid (7.9%) and Comunitat Valenciana (7.8%).

As for private groundwater collection, 31.8% of the total belongs to Cataluña, 13% to Castilla - La Mancha and 10.8% to Aragón.

Regarding water dumped into the sewage system, Cataluña stands out with 26.1% of the national total, Comunitat Valenciana with 11% and País Vasco with 10.3%. Cataluña dumps 20.1% into a fluvial channel, Castilla y León does so with 12.4% and Andalucía with 13.2%. Lastly, Andalucía dumps into the sea 34.2%, Comunitat Valenciana 20.7% and Asturias 13%.

Table 15

Source of water by Autonomous Community (thousands of m^3) (2007)

Autonomous Community	Network supply	Private collection	Total	%
Andalucía	65,439	163,791	229,230	17.9%
Aragón	13,351	48,172	61,523	4.8%
Asturias, Principado de	18,123	68,905	87,028	6.8%
Balears, Illes	1,085	697	1,782	0.1%
Canarias	6,311	18,043	24,354	1.9%
Cantabria	4,803	57,972	62,775	4.9%
Castilla y León	22,061	42,657	64,718	5.0%
Castilla - La Mancha	29,588	51,951	81,539	6.3%
Cataluña	91,860	184,485	276,345	21.6%
Comunitat Valenciana	30,786	72,156	102,942	8.0%
Extremadura	2,361	13,454	15,815	1.2%
Galicia	19,890	34,000	53,890	4.2%
Madrid, Comunidad de	31,129	12,182	43,311	3.4%
Murcia, Región de	15,682	10,375	26,057	2.0%
Navarra, Comunidad Foral de	12,400	20,916	33,316	2.6%
País Vasco	25,223	84,623	109,846	8.5%
Rioja, La	3,584	6,795	10,379	0.8%
Total	393,676	891,174	1,284,850	100.0%
%	30.6%	69.4%	10.0%	

Table 16
Percent structure of water source by Autonomous Community (2007)

Autonomous Community	Network supply	Private collection	Total
Andalucía	16.6%	18.4%	17.9%
Aragón	3.4%	5.4%	4.8%
Asturias, Principado de	4.6%	7.7%	6.8%
Balears, Illes	0.3%	0.1%	0.1%
Canarias	1.6%	2.0%	1.9%
Cantabria	1.2%	6.5%	4.9%
Castilla y León	5.6%	4.8%	5.0%
Castilla - La Mancha	7.5%	5.8%	6.3%
Cataluña	23.4%	20.7%	21.6%
Comunitat Valenciana	7.8%	8.1%	8.0%
Extremadura	0.6%	1.5%	1.2%
Galicia	5.1%	3.8%	4.2%
Madrid, Comunidad de	7.9%	1.4%	3.4%
Murcia, Región de	4.0%	1.2%	2.0%
Navarra, Comunidad Foral de	3.1%	2.3%	2.6%
País Vasco	6.4%	9.5%	8.5%
Rioja, La	0.9%	0.8%	0.8%
Total	100.0%	100.0%	100.0%

Table 17
Percent distribution of water source by Autonomous Community (2007)

Autonomous Community	Network supply	Private collection
Andalucía	28.5%	71.5%
Aragón	21.7%	78.3%
Asturias, Principado de	20.8%	79.2%
Balears, Illes	60.9%	39.1%
Canarias	25.9%	74.1%
Cantabria	7.7%	92.3%
Castilla y León	34.1%	65.9%
Castilla - La Mancha	36.3%	63.7%
Cataluña	33.2%	66.8%
Comunitat Valenciana	29.9%	70.1%
Extremadura	14.9%	85.1%
Galicia	36.9%	63.1%
Madrid, Comunidad de	71.9%	28.1%
Murcia, Región de	60.2%	39.8%
Navarra, Comunidad Foral de	37.2%	62.8%
País Vasco	23.0%	77.0%
Rioja, La	34.5%	65.5%
Total	30.6%	69.4%

Table 18
Source of water (private collection) by Autonomous Community (thousands of m^3) (2007)

Autonomous Community	Surface water	Groundwater	Other sources	Total
Andalucía	19,107	22,922	121,762	163,791
Aragón	21,787	24,966	1,419	48,172
Asturias, Principado de	63,382	3,631	1,892	68,905
Balears, Illes	406	254	38	698
Canarias	15,587	1,416	1,040	18,043
Cantabria	39,154	7,629	11,189	57,972
Castilla y León	28,528	13178	951	42,657
Castilla - La Mancha	20,971	30,165	815	51,951
Cataluña	61,770	73,841	48,874	184,485
Comunitat Valenciana	2,354	22,709	47,093	72,156
Extremadura	10,789	2,516	149	13,454
Galicia	26,984	4,521	2,495	34,000
Madrid, Comunidad de	5,671	6,092	420	12,183
Murcia, Región de	487	4,734	5,154	10,375
Navarra, Comunidad Foral de	17,228	3,331	356	20,915
País Vasco	78,163	4,614	1,846	84,623
Rioja, La	1,193	5,503	98	6,794
Total	413,561	232,022	245,591	891,174
%	46.4%	26.0%	27.6%	100.0%

Table 19
Percent distribution of water source (private collection) by Autonomous Community (2007)

Autonomous Community	Surface water	Groundwater	Other sources
Andalucía	11.7%	14.0%	74.3%
Aragón	45.2%	51.9%	2.9%
Asturias, Principado de	92.0%	5.3%	2.7%
Balears, Illes	58.2%	36.4%	5.4%
Canarias	86.4%	7.8%	5.8%
Cantabria	67.5%	13.2%	19.3%
Castilla y León	66.9%	30.9%	2.2%
Castilla - La Mancha	40.4%	58.1%	1.5%
Cataluña	33.5%	40.0%	26.5%
Comunitat Valenciana	3.3%	31.5%	65.2%
Extremadura	80.2%	18.7%	1.1%
Galicia	79.4%	13.3%	7.3%
Madrid, Comunidad de	46.5%	50.1%	34%
Murcia, Región de	4.7%	45.6%	49.7%
Navarra, Comunidad Foral de	82.4%	15.9%	1.7%
País Vasco	92.4%	5.5%	2.1%
Rioja, La	17.6%	81.0%	1.4%
Total	46.4%	26.0%	27.5%

Table 20
Destination of dumped water by Autonomous Community (thousands of m^3) (2007)

Autonomous Community	Sewage system	Sea	River	Septic tank	Other	Total	%
Andalucía	16,998	87,155	24,213	651	923	129,940	18.1%
Aragón	11,165	0	14,870	161	530	26,726	3.7%
Asturias, Principado de	6,416	33,125	16,044	12	0	55,597	7.7%
Balears, Illes	833	0	68	235	1,454	2,590	0.4%
Canarias	2,500	1,778	134	305	600	5,317	0.7%
Cantabria	3,721	26,666	5,911	7	91	36,396	5.0%
Castilla y León	21,014	0	22,861	401	490	44,766	6.2%
Castilla - La Mancha	7,168	0	5,397	809	7,738	21,112	2.9%
Cataluña	66,594	28,475	36,911	2,892	2,373	137,245	19.1%
Comunitat Valenciana	28,203	52,662	2,586	405	1,395	85,251	11.8%
Extremadura	6,890	0	7,699	35	72	14,696	2.0%
Galicia	12,991	11,680	4,294	355	477	29,797	4.1%
Madrid, Comunidad de	23,244	0	6,922	47	92	30,305	4.2%
Murcia, Región de	8,783	7,021	539	333	2,002	18,678	2.6%
Navarra, Comunidad Foral de	7,362	0	14,208	16	422	22,008	3.0%
País Vasco	26,317	6,163	19,643	153	2,576	54,852	7.6%
Rioja, La	5,066	0	1,434	9	0	6,509	0.9%
Total	255,265	254,725	183,734	6826	21,235	721,785	
%	35.4%	35.3%	25.5%	0.9%	2.9%	100.0%	

6.2 Monetary variables

Unit cost (average price) of water is defined as the quotient between the amount paid for the service (of water supply or treatment) and the volume of water supplied and invoiced. So, this unit cost can be integrated to an average amount or price of the payment for the services of the total water cycle, but it is never a price or fee.

When calculating the "*unit cost*" indicator those establishments with less than then employees are not included; there only take part those registers where the "*amount and volume"* variables have some value. In "*treatment*" rubric both amounts paid for sewage and wastewater treatment, including treatment tax, are included. Right after that, the above mentioned indicator is defined regarding its different modalities.

- Unit cost of water supplied by the network is the quotient between the total amount paid and the total volume of invoiced supplied water.
- Unit treatment cost is the quotient between the amount paid for sewage and wastewater treatment and the total volume of invoiced supplied water.

– Unit costs of surface water collection and groundwater collection are respectively the quotient between the amount paid as surface or groundwater collection tax and the volume of water collected.

Those four unit costs and their respective collected amounts are presented in table no. 21.

Table 21
Unit cost (euros/m^3) and invoiced amounts (millions of **€**)

	euros/m^3	Millions of euros
Network supply	0.56	220.4
Treatment (sewage system and wastewater treatment)	0.24	94.4
Surface water collection tax	0.11	45.4
Groundwater collection tax	0.18	41.7

As it is shown on table no. 22, industrial establishments with more than 200 employees have lower unit costs than those with less than 200 employees.

Table 22
Unit water costs by number of employees of the industrial establishment

	<200 employees	>200 employees
Supply	0.65	0.48
Treatment	0.32	0.11

As for dumping taxes (5.3 rubric of the module) that variable has been crossed with rubrics 5.1.2 (sea dumping) and 5.1.3 (fluvial channel dumping). Out of the first cross the value of the dumping tax would be obtained, with the exceptions explained above in previous rubrics of the present study. By dividing this total by the volume dumped into the sea (for information units that have paid that tax) an unit cost for sea dumping tax is obtained, with a value of 0.04 € / m^3 and being the total amount 9.9 million euros. From the second cross the total dumping control tax paid to Basin Districts would be estimated. By calculating the quotient between this total and the total volume of water dumped into a fluvial channel an unit cost of 0.08 € / m^3 is obtained, whit an amount of 11.4 million euros. Either way, it has to be noted that these values are affected by errors that have nothing to do with sampling. This is due to the existence of a certain defining confusion related to the term "*tax*" that can lead to errors regarding the right assignation of the aforementioned amounts to the specific rubrics of the module.

As for the industrial establishments expenditure when dumping into places different from the sewage network, fluvial channel or the sea, the amounts paid to waste managers that treat that waste reach 1.1 million euros. In this case, it is

not possible to calculate an unit cost per cubic metre of dumped water, as that waste might be solid or semi-solid (mud or silt).

The incidence of water cost in the production is generally low. In effect, if production costs are considered to be the addition of raw material consumption and other supplies plus external services, according to the *2007 Industrial Companies Survey* carried out by the INE, water cost would be 1% of the aforementioned costs. Having said that, there some economic activity branches where that cost is significantly higher, due to their intensive use of water or to the need for previous reconditioning of it. In this rubric milk and beverage sectors, as well as meat industry slaughterhouses and pharmaceutical industry, can be included.

7. Final results (year 2008)

7.1 Water supply by economic activity

Next, the results of the module introduces in the 2008 Waste Generation in the Industrial Sector Survey are presented, which have been obtained by applying the same statistical procedures than those used for year 2007. As it has already been pointed out in the introduction of this study, NACE-2009 is effective for data related to 2008 and over.

The information related to water dumped and its destinations is not presented, as its volume decrease in a proportion similar to that of the water supply, and the percent distribution and structure of the water dumped by destination has not changed as compared to 2007.

Table 23
Water supply from network and private collection by economic activity (thousands of m^3) (2008)

Economic activity	Network supply	Private collection	Total	%
10,11,12	94,487	127,582	222,069	20.8%
13,14,15	10,022	11,785	21,807	2.0%
16	2,472	3,389	5,861	0.5%
17,18	19,381	116,795	136,176	12.7%
19	46,320	1,086	47,406	4.4%
20,21,22	86,390	261,627	348,017	32.5%
23	18,884	52,796	71,680	6.7%
24,25	40,218	149,579	189,797	17.7%
26,27,28,29,30	17,439	8,827	26,266	2.4%
31,32,33	3,099	526	3,625	0.3%
Total	338,712	733,992	1,072,704	100.0%
%	31.6%	68.4%	100.0%	

Table 24
Percent distribution of network supply and of private collection by economic activity (2008)

Economic activity	Total	Network supply	Private collection
10,11,12	222,069	42.5%	57.5%
13,14,15	21,807	46.0%	54.0%
16	5,861	42.2%	57.8%
17,18	136,176	14.2%	85.8%
19	47,406	97.7%	2.3%
20,21,22	348,017	24.8%	75.2%
23	71,680	26.3%	73.7%
24,25	189,797	21.2%	78.8%
26,27,28, 29,30	26,266	66.4%	33.6%
31,32,33	3,625	85.5%	14.5%
Total	1,072,704	31.6%	68.4%

Table 25
Source of private water collection by economic activity (thousands of m^3) (2008)

Economic activity	Surface water	Groundwater	Other sources	Total	%
10,11,12	47,652	71,928	8,002	127,582	17.4%
13,14,15	2,735	4,827	4,223	11,785	1.6%
16	780	2,423	185	3,388	0.5%
17,18	89,521	25,990	1,285	116,795	15.9%
19	539	384	162	1,086	0.1%
20,21,22	76,571	35,656	149,400	261,627	35.6%
23	17,793	32,067	2,936	52,796	7.2%
24,25	78,660	9,948	60,971	149,579	20.4%
26,27,28,29,30	3,998	1,749	3,081	8,828	1.2%
31,32,33	119	369	38	526	0.1%
Total	318,368	185,341	230,283	733,992	100.0%
%	43.3%	25.3%	31.4%	100.0%	

Table 26
Percent distribution of private collection by source and economic activity (2008)

Economic activity	Total	Surface water	Groundwater	Other sources
10,11,12	127,582	37.4%	56.3%	6.3%
13,14,15	11,785	23.2%	41.0%	35.8%
16	3,388	23.0%	71.5%	5.5%
17,18	116,795	76.6%	22.3%	1.1%
19	1,086	49.7%	35.4%	14.9%
20,21,22	261,627	29.3%	13.6%	57.1%
23	52,796	33.7%	60.7%	5.6%
24,25	149,579	52.5%	6.7%	40.8%
26,27,28,29,30	8,828	45.3%	19.8%	34.9%
31,32,33	526	22.6%	70.2%	7.2%
Total	733,992	43.3%	25.3%	31.4%

7.2 Water supply by Autonomous Community

Table 27

Source of water by Autonomous Community (thousands of m^3) (2008)

Autonomous Community	Network supply	Private collection	Total	%
Andalucía	56,033	158,579	214,612	20.1%
Aragón	15,952	61,626	77,578	7.2%
Asturias, Principado de	21,843	63,091	84,934	7.9%
Balears, Illes	2,965	371	3,336	0.3%
Canarias	6,004	1,676	7,680	0.7%
Cantabria	6,359	63,853	70,212	6.5%
Castilla y León	16,877	27,911	44,788	4.2%
Castilla - La Mancha	18,530	13,155	31,685	3.0%
Cataluña	61,512	123,011	184,523	17.3%
Comunitat Valenciana	29,550	86,624	116,174	10.8%
Extremadura	7,073	10,953	18,026	1.7%
Galicia	19,114	20,765	39,879	3.7%
Madrid, Comunidad de	21,694	9,754	31,448	2.9%
Murcia, Región de	15,477	8,279	23,756	2.2%
Navarra, Comunidad Foral de	10,028	28,436	38,464	3.6%
País Vasco	23,911	51,634	75,545	7.0%
Rioja, La	5,790	4,274	10,064	0.9%
Total	338,712	733,992	1,072,704	
%	31.6%	68.4%	100.0%	

Table 28

Percent structure of water source by Autonomous Community (2009)

Autonomous Community	Network supply	Private collection	Total
Andalucía	16.5%	21.6%	20.1%
Aragón	4.7%	8.4%	7.2%
Asturias, Principado de	6.4%	8.6%	7.9%
Balears, Illes	0.9%	0.1%	0.3%
Canarias	1.8%	0.2%	0.7%
Cantabria	1.9%	8.7%	6.5%
Castilla y León	5.0%	3.8%	4.2%
Castilla - La Mancha	5.5%	1.8%	3.0%
Cataluña	18.1%	16.8%	17.3%
Comunitat Valenciana	8.7%	11.8%	10.8%
Extremadura	2.1%	1.5%	1.7%
Galicia	5.6%	2.8%	3.7%
Madrid, Comunidad de	6.4%	1.3%	2.9%
Murcia, Región de	4.6%	1.1%	2.2%
Navarra, Comunidad Foral de	3.0%	3.9%	3.6%
País Vasco	7.1%	7.0%	7.0%
Rioja, La	1.7%	0.6%	0.9%
Total	100.0%	100.0%	100.0%

Table 29

Percent distribution of water source by Autonomous Community (2008)

Autonomous Community	Network supply	Private collection
Andalucía	26.1%	73.9%
Aragón	20.6%	79.4%
Asturias, Principado de	25.7%	74.3%
Balears, Illes	88.9%	11.1%
Canarias	78.2%	21.8%
Cantabria	9.1%	90.9%
Castilla y León	37.7%	62.3%
Castilla - La Mancha	58.5%	41.5%
Cataluña	33.3%	66.7%
Comunitat Valenciana	25.4%	74.6%
Extremadura	39.2%	60.8%
Galicia	47.9%	52.1%
Madrid, Comunidad de	69.0%	31.0%
Murcia, Región de	65.1%	34.9%
Navarra, Comunidad Foral de	26.1%	73.9%
País Vasco	31.7%	68.3%
Rioja, La	57.5%	42.5%
Total	31.6%	68.4%

Table 30

Source of water (private collection) by Autonomous Community (thousands of m^3) (2008)

Autonomous Communities	Surface water	Groundwater	Other sources	Total
Andalucía	28,142	12,538	117,899	158,579
Aragón	36,265	22,423	2,938	61,626
Asturias, Principado de	60,104	2,211	776	63,091
Balears, Illes	6	212	153	371
Canarias	123	980	573	1,676
Cantabria	55,367	4,716	3,770	63,853
Castilla y León	14,540	12,750	621	27,911
Castilla - La Mancha	3,215	8,950	990	13,155
Cataluña	24,724	52,327	45,960	123,011
Comunitat Valenciana	2,110	41,878	42,636	86,624
Extremadura	9,321	1,456	176	10,953
Galicia	14,747	4,876	1,142	20,765
Madrid, Comunidad de	4,038	5,334	382	9,754
Murcia, Región de	1,363	3,998	2,918	8,279
Navarra, Comunidad Foral de	20,800	7,293	343	28,436
País Vasco	39,403	3,295	8,936	51,634
Rioja, La	4,100	104	70	4,274
Total	318,368	185,341	230,283	733,992
%	43.3%	25.3%	31.4%	100.0%

Table 31
Percent distribution of water source (private collection) by Autonomous Community (2008)

Autonomous Community	Surface water	Groundwater	Other sources
Andalucía	17.7%	7.9%	74.4%
Aragón	58.8%	36.4%	4.8%
Asturias, Principado de	95.3%	3.5%	1.2%
Balears, Illes	1.6%	57.2%	41.2%
Canarias	7.3%	58.5%	34.2%
Cantabria	86.7%	7.4%	5.9%
Castilla y León	52.1%	45.7%	2.2%
Castilla - La Mancha	24.4%	68.1%	7.5%
Cataluña	20.1%	42.5%	37.4%
Comunitat Valenciana	2.4%	48.3%	49.3%
Extremadura	85.1%	13.3%	1.6%
Galicia	71.0%	23.5%	5.5%
Madrid, Comunidad de	41.4%	54.7%	3.9%
Murcia, Región de	16.5%	48.3%	35.2%
Navarra, Comunidad Foral de	73.2%	25.6%	1.2%
País Vasco	76.3%	6.4%	17.3%
Rioja, La	96.0%	2.4%	1.6%
Total	43.3%	25.3%	31.4%

8. Final results (year 2010)

As it has already been pointed out, in the module related to year 2010 there were only included variables related to water supply - those related to dumping volume were not included.

8.1 Water supply by economic activity

Table 32
Water supply from network and private collection by economic activity (thousands of m^3) (2010)

Economic activity	Network supply	Private collection	Total	%
10,11,12	91,281	134,238	225,519	21.0%
13,14,15	9,006	16,104	25,110	2.3%
16	1,162	2,549	3,711	0.3%
17,18	15,483	126,286	141,769	13.1%
19	48,626	26,494	75,120	7.0%
20,21,22	85,997	270,099	356,096	32.9%
23	9,361	19,763	29,124	2.7%
24,25	38,619	142,240	180,859	16.7%
26,27,28, 29,30	29,789	8,249	38,038	3.5%
31,32,33	4,526	891	5,417	0.5%
Total	333,850	746,913	1,080,763	100.0%
%	30.9%	69.1%	100.0%	

Table 33
Percent distribution of network supply and of private collection by economic activity (2010)

Economic activity	Total	Network supply	Private collection
10,11,12	225,519	40.5%	59.5%
13,14,15	25,110	35.9%	64.1%
16	3,711	31.3%	68.7%
17,18	141,769	10.9%	89.1%
19	75,120	64.7%	35.3%
20,21,22	356,096	24.1%	75.9%
23	29,124	32.1%	67.9%
24,25	180,859	21.4%	78.6%
26,27,28, 29,30	38,038	78.3%	21.7%
31,32,33	5,417	83.6%	16.4%
Total	1,080,763	30.9%	69.1%

Table 34

Source of private water collection by economic activity (thousands of m^3) (2010)

Economic activity	Surface water	Groundwater	Other sources	Total	%
10,11,12	50,665	77,128	6,446	134,239	18.0%
13,14,15	1,051	7,678	7,376	16,105	2.2%
16	664	1,759	126	2,549	0.3%
17,18	96,836	28,092	1,358	126,286	16.9%
19	23,375	1,737	1,381	26,493	3.5%
20,21,22	81,881	40,226	147,991	270,098	36.3%
23	7,533	10,526	1,704	19,763	2.6%
24,25	67,915	10,914	63,411	142,240	19.0%
26,27,28,29,30	4,063	1,776	2,410	8,249	1.1%
31,32,33	147	582	162	891	0.1%
Total	334,130	180,418	232,365	746,913	100.0%
%	44.7%	24.2%	31.1%	100.0%	

Table 35

Percent distribution of private collection by source and economic activity (2010)

Economic activity	Total	Surface water	Groundwater	Other sources
10,11,12	134,239	37.7%	57.5%	4.8%
13,14,15	16,105	6.5%	47.7%	45.8%
16	2,549	26.0%	69.1%	4.9%
17,18	126,286	76.7%	22.2%	1.1%
19	26,494	88.2%	6.6%	5.2%
20,21,22	270,099	30.3%	14.9%	54.8%
23	19,763	38.1%	53.3%	8.6%
24,25	142,240	47.7%	7.7%	44.6%
26,27,28,29,30	8,249	49.3%	21.5%	29.2%
31,32,33	891	16.5%	65.3%	18.2%
Total	746,913	44.7%	24.2%	31.1%

8.2 Water supply by Autonomous Community

Table 36
Source of water by Autonomous Community (thousands of m^3) (2010)

Autonomous Community	Network supply	Private collection	Total	%
Andalucía	55,630	126,548	182,178	16.9%
Aragón	7,139	45,701	52,840	4.9%
Asturias, Principado de	31,782	63,255	95,037	8.8%
Balears, Illes	1,448	657	2,105	0.2%
Canarias	3,017	5,208	8,225	0.8%
Cantabria	3,579	56,285	59,864	5.5%
Castilla y León	13,044	33,715	46,759	4.3%
Castilla - La Mancha	14,401	35,304	49,705	4.6%
Cataluña	83,514	144,804	228,318	21.0%
Comunitat Valenciana	24,456	83,628	108,084	10.0%
Extremadura	3,556	16,351	19,907	1.8%
Galicia	19,630	23,329	42,959	4.0%
Madrid, Comunidad de	15,384	13,741	29,125	2.7%
Murcia, Región de	13,573	9,849	23,422	2.2%
Navarra, Comunidad Foral de	16,657	30,507	47,164	4.4%
País Vasco	23,922	56,138	80,060	7.4%
Rioja, La	3,124	1,893	5,017	0.5%
Total	333,850	746,913	1,080,763	100.0%

Table 37
Percent structure of water source by Autonomous Community (2010)

Autonomous Community	Network supply	Private collection	Total
Andalucía	16.7%	16.9%	16.9%
Aragón	2.1%	6.1%	4.9%
Asturias, Principado de	9.5%	8.5%	8.8%
Balears, Illes	0.4%	0.1%	0.2%
Canarias	0.9%	0.7%	0.8%
Cantabria	1.1%	7.5%	5.5%
Castilla y León	3.9%	4.5%	4.3%
Castilla - La Mancha	4.3%	4.7%	4.6%
Cataluña	25.0%	19.5%	21.0%
Comunitat Valenciana	7.3%	11.2%	10.0%
Extremadura	1.1%	2.2%	1.8%
Galicia	5.9%	3.1%	4.0%
Madrid, Comunidad de	4.6%	1.8%	2.7%
Murcia, Región de	4.1%	1.3%	2.2%
Navarra, Comunidad Foral de	5.0%	4.1%	4.4%
País Vasco	7.2%	7.5%	7.4%
Rioja, La	0.9%	0.3%	0.5%
Total	100.0%	100.0%	100.0%

Table 38

Percent distribution of water source by Autonomous Community (2010)

Autonomous Community	Network supply	Private collection
Andalucía	30.5%	69.5%
Aragón	13.5%	86.5%
Asturias, Principado de	33.4%	66.6%
Balears, Illes	68.8%	31.2%
Canarias	36.7%	63.3%
Cantabria	6.0%	94.0%
Castilla y León	27.9%	72.1%
Castilla - La Mancha	29.0%	71.0%
Cataluña	36.6%	63.4%
Comunitat Valenciana	22.6%	77.4%
Extremadura	17.9%	82.1%
Galicia	45.7%	54.3%
Madrid, Comunidad de	52.8%	47.2%
Murcia, Región de	57.9%	42.1%
Navarra, Comunidad Foral de	35.3%	64.7%
País Vasco	29.9%	70.1%
Rioja, La	62.3%	37.7%
Total	30.9%	69.1%

Table 39

Source of water (private collection) by Autonomous Community (thousands of m^3) (2010)

Autonomous Community	Surface water	Groundwater	Other sources	Total
Andalucía	23,860	12,371	90,316	126,547
Aragón	23,044	22,508	149	45,701
Asturias, Principado de	53,814	7,976	1,465	63,255
Balears, Illes	198	454	6	658
Canarias	27	4,153	1,028	5,208
Cantabria	42,010	8,303	5,972	56,285
Castilla y León	16,219	17,131	366	33,716
Castilla - La Mancha	26,698	6,708	1,898	35,304
Cataluña	31,867	53,952	58,984	144,803
Comunitat Valenciana	3,539	24,708	55,382	83,629
Extremadura	14,510	1,815	26	16,351
Galicia	19,684	3,166	479	23,329
Madrid, Comunidad de	11,374	1,595	771	13,740
Murcia, Región de	1,978	2,826	5,045	9,849
Navarra, Comunidad Foral de	24,165	6,282	60	30,507
País Vasco	40,087	5,633	10,418	56,138
Rioja, La	1,056	837	0	1,893
Total	334,130	180,418	232,365	746,913
%	44.7%	24.2%	31.1%	100.0%

Table 40
Percent distribution of water source (private collection) by Autonomous Community (2010)

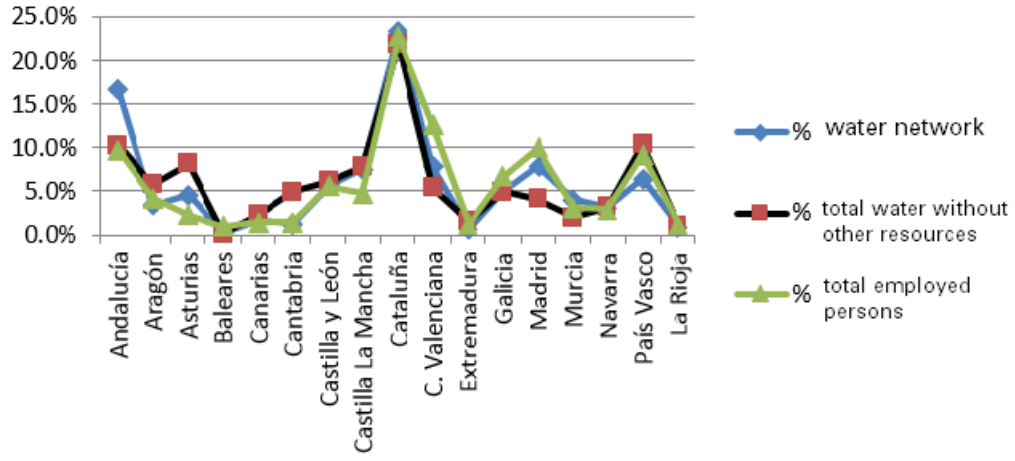
Autonomous Community	Surface water	Groundwater	Other sources
Andalucía	18.9%	9.8%	71.3%
Aragón	50.4%	49.3%	0.3%
Asturias, Principado de	85.1%	12.6%	2.3%
Balears, Illes	30.1%	69.0%	0.9%
Canarias	0.5%	79.8%	19.7%
Cantabria	74.6%	14.8%	10.6%
Castilla y León	48.1%	50.8%	1.1%
Castilla - La Mancha	75.6%	19.0%	5.4%
Cataluña	22.0%	37.3%	40.7%
Comunitat Valenciana	4.2%	29.5%	66.3%
Extremadura	88.7%	11.1%	0.2%
Galicia	84.3%	13.6%	2.1%
Madrid, Comunidad de	82.8%	11.6%	5.6%
Murcia, Región de	20.1%	28.7%	51.2%
Navarra, Comunidad Foral de	79.2%	20.6%	0.2%
País Vasco	71.4%	10.0%	18.6%
Rioja, La	55.8%	44.2%	0.0%
Total	44.7%	24.2%	31.1%

9. Volume of water used and number of employed persons by Autonomous Community

In this rubric a comparison by Autonomous Community between the percent distribution - according to the total national - of the volume of water used, depending of the supply made through the public network or by means of private collection, and the number of employed persons is going to be carried out. Thanks to these comparative studies it can be assessed the relative weight regarding the national total of water use in each Autonomous Community, with its relative contribution to the total of the production expressed in the relative percentage of employed employees.

For the Spanish total, there is a positive correlation of 0.90 between the volume of network water used and the number of employed persons, a 0.83 one between the *"total water without other resources"* (that is, considering only groundwater, surface water and network water) and the aforementioned variable related to employed persons. In Cataluña, both correlations are 0.98, and they are high also in Andalucía and in País Vasco. The graph for these correlations for every Autonomous Community is presented in graph no. 1.

Graph 1
Distribution of water source and number of employed persons by Autonomous Community (2007)



By analysing the information on table no. 41 and regarding water supply through the network, Andalucía and Comunidad Valenciana have a weak correlation. In the first of them the use of that type of water is quite higher than the percentage of employed persons, while it is the other way round in Comunidad Valenciana.

As for *"total water without other resources"* variable, in the Autonomous Communities of Principado de Asturias and Cantabria the relative use of that type of water is higher than the weight related to the number of employed

persons. This might be due to the plenty of water resources. This relation is the other way round in Comunidad Valenciana and Madrid.

These relative variations between volume of water used and relative weight of employed persons in each Autonomous Community regarding the total national are due to the presence of industries that use water resources intensively and workforce, which can be high or low in each case, and also it is due to factors related to the availability of water resources and its cost. For instance, in Cataluña, that groups a fifth of the population employed in manufacturing industry, there have great importance chemical industry and textile industry of the water branch, which are important users of water resources. This is offset by the remaining industries (such as manufacturing of machinery and cars and graphic arts industry, for instance) that are intensive for workforce but do not use intensively water resources. Furthermore, Comunidad Valenciana groups most of manufacturing textile industry, in particular footwear and leathery, which are intensive regarding the use of workforce but do not require a high amount of water resources.

Finally, in Comunidad de Madrid, where almost all manufacturing industry branches are represented (except for metallurgy and textile of the water branch) with a particular influence of manufacture of electronic capital goods, there can be observed that the relative weight of the number of employed persons doubles the total use of water. This result might be affected somehow by the fact that in Madrid there are the headquarters of a large number of companies, but we estimate that this bias is not significant regarding the total volume of water supply. It is also worth noting that in this Community water from the public supply network is quite important, due to the wide coverage of those networks, and this make it clearly easier to use it.

In years 2008 and 2010 there have not been significant variations of the studied variables as compared to 2007.

Table 41.
Percent structure of water source and number of employed persons by Autonomous Community (2007)

2007 Autonomous Community	Water network supply	Water without other resources	Total employed
Andalucía	16.6%	10.3%	9.8%
Aragón	3.4%	5.8%	4.2%
Asturias, Principado de	4.6%	8.2%	2.2%
Balears, Illes	0.3%	0.2%	1.0%
Canarias	1.6%	2.2%	1.4%
Cantabria	1.2%	5.0%	1.4%
Castilla y León	5.6%	6.1%	5.6%
Castilla - La Mancha	7.5%	7.8%	4.7%
Cataluña	23.4%	21.9%	22.8%
Comunitat Valenciana	7.8%	5.4%	12.6%
Extremadura	0.6%	1.5%	1.2%
Galicia	5.1%	4.9%	6.7%
Madrid, Comunidad de	7.9%	4.1%	10.0%
Murcia, Región de	4.0%	2.0%	3.1%
Navarra, Comunidad Foral de	3.1%	3.2%	2.9%

País Vasco	6.4%	10.4%	9.2%
Rioja, La	0.9%	1.0%	1.2%
Total	100.0%	100.0%	100.0%

Table 42

Percent structure of water source and number of employed persons by Autonomous Community (2008)

2008 Autonomous Community	Water network supply	Water without other resources	Total employed
Andalucía	16.5%	11.5%	9.7%
Aragón	4.7%	8.9%	4.4%
Asturias, Principado de	6.4%	10.0%	2.3%
Balears, Illes	0.9%	0.4%	1.0%
Canarias	1.8%	0.8%	1.4%
Cantabria	1.9%	7.9%	1.4%
Castilla y León	5.0%	5.2%	5.8%
Castilla - La Mancha	5.5%	3.6%	4.8%
Cataluña	18.1%	16.5%	22.7%
Comunitat Valenciana	8.7%	8.7%	12.6%
Extremadura	2.1%	2.1%	1.2%
Galicia	5.6%	4.6%	6.9%
Madrid, Comunidad de	6.4%	3.7%	9.3%
Murcia, Región de	4.6%	2.5%	3.1%
Navarra, Comunidad Foral de	3.0%	4.5%	3.0%
País Vasco	7.1%	7.9%	9.2%
Rioja, La	1.7%	1.2%	1.2%
Total	100.0%	100.0%	100.0%

Table 43

Percent structure of water source and number of employed persons by Autonomous Community (2010)

2010 Autonomous Communities	Water network supply	Water without other resources	Total employed
Andalucía	16.7%	11.2%	9.4%
Aragón	2.1%	6.0%	4.4%
Asturias, Principado de	9.5%	10.7%	2.4%
Balears, Illes	0.4%	0.2%	1.0%
Canarias	0.9%	0.8%	1.3%
Cantabria	1.1%	6.2%	1.6%
Castilla y León	3.9%	5.3%	6.0%
Castilla - La Mancha	4.3%	5.5%	4.7%
Cataluña	25.0%	20.6%	22.4%
Comunitat Valenciana	7.3%	6.0%	11.6%
Extremadura	1.1%	2.3%	1.3%
Galicia	5.9%	4.9%	7.0%
Madrid, Comunidad de	4.6%	3.2%	9.5%
Murcia, Región de	4.1%	2.2%	3.1%
Navarra, Comunidad Foral de	5.0%	5.4%	3.2%
País Vasco	7.2%	8.9%	9.8%
Rioja, La	0.9%	0.6%	1.3%
Total	100.0%	100.0%	100.0%

10. Average amount of water demand by employed person and economic activity

As it has already been indicated, water demand average amounts by employed employee have to be considered as an assessment of water demand at a high level, and they must be completed by specific studies in the case of particular economic activities. Figures related to number of employed persons come from the *Industrial Companies Survey* the INE carries out every year.

Table 44

Average water demand amounts by employed person and economic activity (thousands of m^3) (2007)

Economic activity	Network supply	Total water without other resources	Number of employed persons	Cubic metres per employed person (only network)	Cubic metres per employed person (total water without other resources)
DA	101,244	222,359	381,681	265	583
DB and DC	17,818	33,723	197,214	90	171
DD	2,223	11,205	92,835	24	121
DE	21,614	162,355	196,772	110	825
DF	48,965	52,263	9,268	5,283	5,639
DG	94,742	266,995	136,979	692	1.949
DH	6,127	20,458	118,207	52	173
DI	22,407	101,122	196,634	114	514
DJ	42,490	123,166	439,736	97	280
DK	10,084	13,027	185,281	54	70
DL	6,096	7,744	147,692	41	52
DM	16,146	20,248	211,888	76	96
DN	3,720	4,594	159,805	23	29

Table 45

Percent structure of water source and number of employed persons by economic activity (2007)

Economic activity	Network supply	Total water without other resources	Employed persons
DA	25.7%	21.4%	15.3%
DB and DC	4.5%	3.2%	8.0%
DD	0.6%	1.1%	3.8%
DE	5.5%	15.6%	8.0%
DF	12.4%	5.0%	0.4%
DG	24.1%	25.8%	5.5%
DH	1.6%	2.0%	4.8%
DI	5.7%	9.7%	7.9%
DJ	10.8%	11.9%	17.7%
DK	2.6%	1.3%	7.5%
DL	1.5%	0.7%	6.0%
DM	4.1%	1.9%	8.6%
DN	0.9%	0.4%	6.5%
Total	100.0%	100.0%	100.0%

Table 46

Average water demand amounts by employed person and economic activity (thousands of m^3) (2008)

Economic activity	Network supply	Total water without other resources	Number of employed persons	Cubic metres per employed person (only network)	Cubic metres per employed person (total water without other resources)
10,11,12	94,487	214,067	385,343	245	556
13,14,15	10,022	17,584	178,131	56	99
16	2,472	5,676	86,033	29	66
17,18	19,381	134,891	139,146	139	969
19	46,320	47,244	8,823	5,250	5,355
20,21	81,140	181,362	133,896	606	1,354
22	5,250	17,255	114,436	46	151
23	18,884	68,744	180,499	105	381
24,25	40,218	128,826	431,442	93	299
28	3,091	3,631	130,742	24	28
26,27	3,791	5,040	122,584	31	41
29,30	10,557	14,514	211,915	50	68
31,32,33	3,099	3,587	219,655	14	16

Table 47

Percent structure of water source and number of employed persons by economic activity (2008)

Economic activity	Network supply	Total water without other resources	Employed persons
10,11,12	27.9%	25.5%	16.4%
13,14,15	3.0%	2.1%	7.6%
16	0.7%	0.7%	3.7%
17,18	5.7%	16.0%	5.9%
19	13.7%	5.6%	0.4%
20,21	24.0%	21.5%	5.7%
22	1.5%	2.0%	4.9%
23	5.6%	8.2%	7.7%
24,25	11.9%	15.3%	18.5%
28	0.9%	0.4%	5.6%
26,27	1.1%	0.6%	5.2%
29,30	3.1%	1.7%	9.0%
31,32,33	0.9%	0.4%	9.4%
Total	100.0%	100.0%	100.0%

Table 48

Average water demand amounts by employed person and economic activity (thousands of m^3) (2010)

Economic activity	Network supply	Total water without other resources	Number of employed persons	Cubic metres per employed person (only network)	Cubic metres per employed person (total water without other resources))
10,11,12	91,281	219,073	366,578	249	598
13,14,15	9,006	17,734	131,918	68	134
16	1,162	3,585	63,409	18	57
17,18	15,483	140,411	116,881	132	1,201
19	48,626	73,739	9,112	5,336	8,093
20,21	80,600	185,402	124,480	647	1,489
22	5,397	22,703	95,907	56	237
23	9,361	27,420	128,727	73	213
24,25	38,619	117,448	335,027	115	351
28	1,963	2,552	106,433	18	24
26,27	18,171	20,341	102,861	177	198
29,30	9,655	12,735	185,453	52	69
31,32,33	4,526	5,255	185,623	24	28

Table 49

Percent structure of water source and number of employed persons by economic activity (2010)

Economic activity	Network supply	Total water without other resources	Employed persons
10,11,12	27.4%	25.8%	18.7%
13,14,15	2.7%	2.1%	6.8%
16	0.3%	0.4%	3.2%
17,18	4.6%	16.6%	6.0%
19	14.6%	8.7%	0.5%
20,21	24.1%	21.9%	6.4%
22	1.6%	2.7%	4.9%
23	2.8%	3.2%	6.6%
24,25	11.6%	13.8%	17.1%
28	0.6%	0.3%	5.5%
26,27	5.4%	2.4%	5.3%
29,30	2.9%	1.5%	9.5%
31,32,33	1.4%	0.6%	9.5%
Total	100.0%	100.0%	100.0%

Table 50

Water demand amounts average in 2007-2010 period

NACE - 93 economic activity	NACE - 2009 economic activit	m3 per employed person (only network)	m3 per employed person (total water without other resources)
DA	10,11,12	253	579
DB and DC	13,14,15	72	135
DD	16	24	81
DE	17,18	127	999
DF	19	5,290	6,362
DG	20,21	648	1,598
DH	22	51	187
DI	23	97	369
DJ	24,25	102	310
DK	28	32	41
DL	26,27	83	97
DM	29,30	59	78
DN	31,32,33	21	24

11. Average productivity of water by gross added value

With the aim of completing the analysis of the study data from the economic point of view, it is necessary to carry out some estimations about the average productivity of the water resource in Spanish manufacturing industry. In this type of studies, the accounting magnitude that is generally used is the Gross Added Value (GAV), which is the economic value generated by the production unit and that is obtained as the balance of the production account. In other words, it is the difference between goods and services production and the intermediate consumption used for that production. The calculated indicator (GAV / volume of water used) will be expressed in euros per cubic metre (€ / m^3), and it tells about the average productivity of *water resources* in manufacturing industry economic activity branches. Having said that, this indicator should not be confused with the marginal productivity of water resources, which would be the production increase obtained by adding one extra cubic metre of water *ceteris paribus.*

So, the purpose of the average value that has been calculated for water productivity is just measuring the relative importance of water in manufacturing industry production processes.

In tables no. 51 and 52 the calculation for the above mentioned indicator is presented both for the national level and for some economic activities. The GAV data come from the Spanish Accounting that the INE carries out every year. For example, for year 2007 if we consider just water used "*without other resources*", that is to say only surface and groundwater and water from the network (water for cooling of liquid gas regasification would be therefore excluded, as it has been already pointed out), the average productivity of water was 131 € / m^3. If we consider the total volume of water used, that productivity would be 106 € / m^3. In other words, each cubic metre of water is related to the production of 106 € of additional product. To summarise, we can state that regarding production technologies and cost and goods produced by manufacturing industry in 2007 structures, the production of 106 € of gross added value in manufacturing industry would need the use of one cubic metre of water.

The average productivity calculated above changes in a significant way in each branch of the manufacturing industry sector where water use is important. As it is shown in table no. 52, the sectors with the highest average productivity of water are wood and cork industries and manufacture of plastic materials and natural rubber, although it is worth noting that the first of them does not use water in an intensive way.

Table 51

Average productivity by GAV in manufacturing industry by type of water (€ / m^3)

	2007	2008	2010*	2007-2010 average
Total volume of water used (hm^3)	1,285	1,073	1,081	1,146
Average productivity of the total water(€/m^3)	106	122	111	113
Total volume of water used (without "*other resources")*(hm^3)	1,040	843	848	910
Average productivity of the total water (without "*other resources")*(€/m^3)	131	156	142	143

*Provisional data

Note: the source for GAV in manufacturing industry is the Spanish National Accounts base 2008. It has been used as a reference for the water productivity calculations of 2007.

Table 52

Average water productivity by GAV in some branches of manufacturing industry. €/m^3(GAV in thousands of €; volume of water (without any other resources) in hm^3) (2007)

NACE-1993	NACE-2009	Economic activity branches	GAV	Volume of water	Average productivity
DA	10 11 and 12	Food, beverages and tobacco	22,551	222	101
DB + DC	13 and 14	Textile, leathery, footwear	6,399	34	188
DD	16	Wood and natural rubber	3,426	11	311
DE	17 and 18	Paper	7,841	162	48
DF	19	Coke and refined petroleum	2,438	52	47
DG	20 and 21	Chemistry	12,902	267	48
DH	22	Rubber and plastic materials	5,520	20	276
DI	23	Non-metallic ores	11,705	101	116
DJ	24+25	Metallurgy	22,994	123	187

12. Temporary series (2006-2010)

In rubric seven of the 2006 water use in the industrial sector report, it was already said that data were experimental estimations as it was a pilot study, and a temporary series was needed in order to get reliable conclusions. It was also pointed out that the use of water in industry depends on its price, local supply and the economic cycle. Either way, the variations in used water volume might be used as an indicator of the economic activity of manufacturing industry sector.

As it has been previously pointed out, given that there is no biunivocal correspondence between NACE-93 subsections and NACE-2009 subsections, annual variations might be affected by some bias apart from the studied phenomenon.

In tables no. 53 and 54, as well as in graphs no. 2 and 3, water supply temporary series for the studied period and for each economic activity are presented.

Table 53
Network supply by economic activity (2006-2010)
(thousands of m^3)

NACE 93 economic activity	NACE 2009 economic activity	2006 network supply	2007 network supply	2008 network supply	2010 network supply
DA	10,11,12	111,395	101,244	94,487	91,281
DB and DC	13,14,15	13,866	17,818	10,022	9,006
DD	16	2,033	2,223	2,472	1,162
DE	17,18	14,094	21,614	19,381	15,483
DF	19	47,285	48,965	46,320	48,626
DG and DH	20,21,22	133,627	100,869	86,390	85,997
DI	23	24,408	22,407	18,884	9,361
DJ	24,25	51,847	42,490	40,218	38,619
DK, DL and DM	26,27,28,29,30	29,485	32,326	17,439	29,789
DN	31,32,33	3,987	3,720	3,099	4,526
Total	Total	432,027	393,676	338,712	333,850

Graph 2

Volume of network water by economic activity (2007, 2008 and 2010) (thousands of m^3)

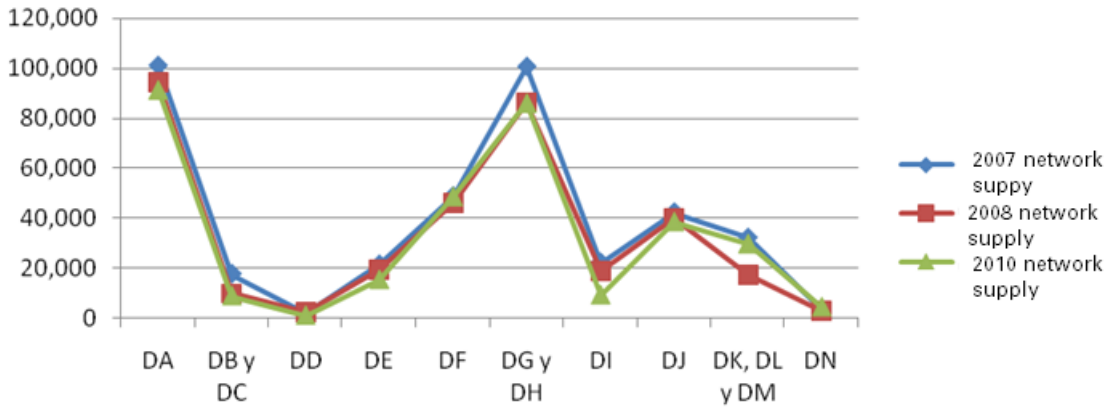


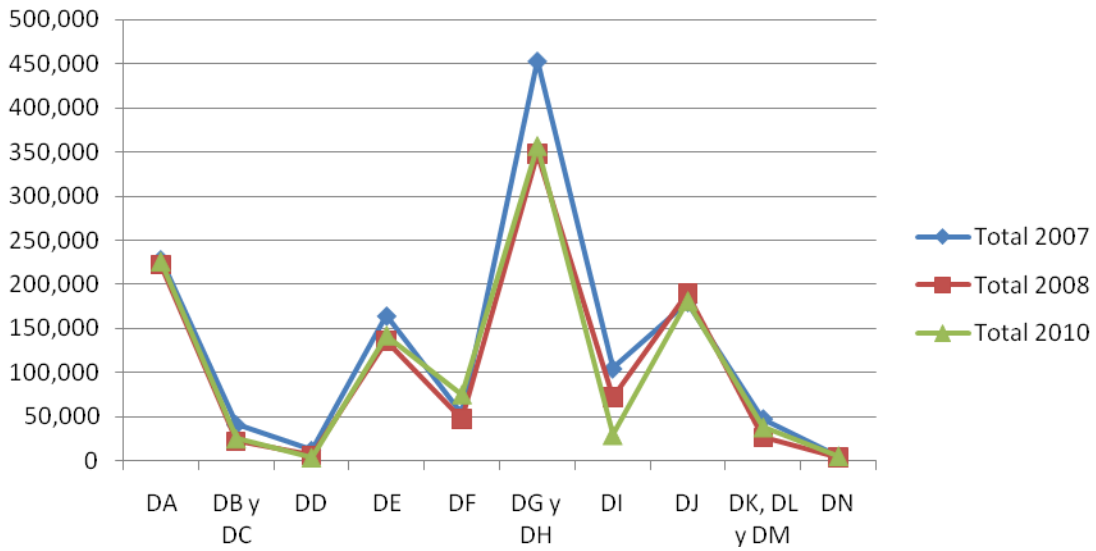
Table 54

Total volume of water used by economic activity (2006-2010) (thousands of m^3)

NACE 93 economic activity	NACE 2009 economic activity	2006 total water	2007 total water	2008 total water	2010 total water
DA	10,11,12	337,830	227,853	222,069	225,519
DB and DC	13,14,15	52,726	40,465	21,807	25,110
DD	16	5,995	11,318	5,861	3,711
DE	17,18	168,343	163,901	136,176	141,769
DF	19	55,265	52,767	47,406	75,120
DG and DH	20,21,22	484,904	453,137	348,017	356,096
DI	23	64,518	104,087	71,680	29,124
DJ	24,25	166,622	179,466	189,797	180,859
DK, DL and DM	26,27,28, 29,30	44,022	47,201	26,266	38,038
DN	31,32,33	12,488	4,655	3,625	5,417
Total	Total	1,392,713	1,284,850	1,072,704	1,080,763

Graph 3

Total volume of water used by economic activity (2007, 2008 and 2010) (thousands of m^3)



In table no. 55 the temporary series of total volume of water used by the manufacturing industry in relation with the number of employed employees in it are presented. From the study of the date, it can be observed that the decrease in water used that took place in that period has a strong correlation with the decrease of employed population.

Table 55

Volume of water used and number of employed persons in manufacturing industry (hm^3y thousands of employed persons) (2006-2010)

	2006	2007	2008	2010	2006-2010 variation
Network supply	432	394	339	334	-22.7%
Private collection (surface water and groundwater)	792	646	504	514	-35.1%
Total water used (including *other resources*)	1,393	1,285	1,073	1,081	-22.4%
Number of employed persons	2,521	2,474	2,343	1,952	-22.6%

13. Planning of a specific survey on water use in the manufacturing industry

In the conclusions of the aforementioned study of 2006 water use in the industry sector, it was pointed out that, although the exploitation of the water use module included in the WPIS had been quite useful, it was advisable to face a specific survey that would make it possible to progress in the quality and coverage of both physical and monetary magnitudes that characterise the different stages of water cycle in an industrial process (source, use, treatment, re-use). As a statistical project, it could be convenient to list the variables that would make up the questionnaire questions of a specific survey in order to start with the study on water use in the industrial sector.

Regarding water supply, apart for the variables that are already in the module, it should be investigated whether the industrial establishment carries out any water reconditioning activities, what type those activities are and the expenditure they suppose. Water supply should be disintegrated according to its different uses, that have already listed, adding to those the sanitary one (WC, washbasins and showers). As for cooling water, it would be interesting to search for information on its circulation; whether its circulation regime is open, semi-open or closed, and, for the two first cases, the net water contribution that offsets evaporation.

For the study of the industrial wastewater dumping, both variables should be included in order to get in a separate way information on dumping control tax (dumping into a fluvial channel) and sea dumping tax. The opportunity of including a third section could also be taken, so that it would be possible to include other type of taxes such as public water domain occupation or others. The fact that the two taxes mentioned above are only effective when there are fluvial channel or sea dumping should be pointed out, so that there is no confusion with the treatment tax. It would be also interesting to collect information on treatment tax when there are dumping into the sewage system.

As for industrial establishments expenditure when they dump wastewater into places different from sewage, fluvial channels or the sea (septic tanks, decanting areas, etc.), it is advisable to collect the amounts paid to waste managers in charge of the collection of mud or silt produced along the production process, or any other type of solid waste. Regarding those establishments that treat their own wastewater, information on the treatments used should be collected. On a separate issue, and with purposes similar to those for water supply, a rubric for the collection of information on the uses of re-used / recycled water should be included.

Finally regarding the polluting burden created by industrial establishments, it would be necessary to know its features, as well as, if necessary, the type of treatment before its dumping into the sewage system or into a natural environment.

Therefore, the aim of a specific survey on water use in industry would not be just the estimation of the magnitudes of the aforementioned variables, but also the

establishment of the water flows that make up the production process and their corresponding volumetric balances. With a supplementary but quite relevant nature regarding the above mentioned survey, there could be the use of the magnitudes of water use as an indicator of manufacturing industrial sector activity.

14. Annex

Table 56
Economic activity paragraphs (NACE-93 Rev.1)
(Subsections)

	Economic activity
DA	Food, beverage and tobacco industry
DB	Textile and manufacture of garments industry
DC	Leather and footwear industry
DD	Wood and products of wood and cork industry
DE	Paper, graphic arts and reproduction industry
DF	Petroleum refining and nuclear fuel treatment
DG	Chemical industry
DH	Rubber and plastic materials transformation industry
DI	Other non-metallic ores industry
DJ	Metallurgy and manufacture of metallic products
DK	Manufacture of machinery and mechanic equipment industry
DL	Electric, electronic and optical material and equipment industry
DM	Manufacture of transport equipment
DN	Other manufacturing industries

Table 57
Economic activity paragraphs (NACE-2009)
(Divisions)

Division	NACE-2009 title
10	Food industry
11	Manufacture of beverages
12	Tobacco industry
13	Textile industry
14	Manufacture of garments
15	Leather and footwear industry
16	Manufacture of wood and of of products of wood and cork, except furniture; basketmaking and wickerwork
17	Manufacture of paper and paper-products
18	Graphic arts and reproduction of recorded media
19	Manufacture of coke and refined-petroleum products
20	Chemical industry
21	Manufacture of pharmaceutical products
22	Rubber and plastic material transformation industry
23	Manufacture of other non-metallic ore products
24	Metallurgy; manufacture of iron, steel and ferro-alloy products
25	Manufacture of metal products, except machinery and equipment
26	Manufacture of computers, electronic and optical products
27	Manufacture of electrical material and equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing industries
33	Repair and installation of machinery and equipment

Table 58
Approximate correspondence between NACE-93 and NACE-2009

NACE-93 subsection	NACE-2009 division
DA	10, 11 and 12
DB	13 and 14
DC	15
DD	16
DE	17 and 18
DF	19
DG	20 and 21
DH	22
DI	23
DJ	24 and 25
DK	28
DL	26 and 27
DM	29 and 30
DN	31, 32 and 33

Note: in NACE-2009 there does not exist the classification of economic activities by subsections

Questionnaire from the water use module in Waste Production in Industry Survey (2007)

4. Suministro de agua

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
4.1. A través de una red pública:		
1 Volumen total de agua suministrada (**m^3/año**)		
2 Importe de las tasas por el suministro de agua (**Euros**)		
3 Importe de las tasas de saneamiento (**Euros**)		

4.2. ¿Su establecimiento realiza captación propia de agua?

☐ Si ☐ No

Si no realiza captación propia pase directamente al epígrafe 4.4 de este apartado.

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
4.3. Captación directa de agua por el propio establecimiento de:		
1 Aguas superficiales (**m^3/año**)		
2 Aguas subterráneas (**m^3/año**)		
3 Agua de mar: para desalación (**m^3/año**)		
4 Agua de mar: no desalada (**m^3/año**)		
5 Otros tipos de recursos hídricos (especificar en **m^3/año**)		
6 Importe del canon de captación de agua (**Euros**)		

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
4.4 Agua residual regenerada suministrada por terceros (m^3/año**)**		
1 Importe del suministro del agua residual regenerada (**Euros**)		

Importe de las tasas por el suministro de agua: importe pagado a la empresa o Ayuntamiento que corresponda por el volumen de agua procedente del suministro público. No se incluirá el importe referente a las tasas de saneamiento (alcantarillado y depuración de aguas residuales).

Importe de las tasas de saneamiento:importe pagado a la empresa o Ayuntamiento que corresponda en concepto de alcantarillado y depuración de aguas residuales (se incluye el canon de saneamiento). Se refiere a las aguas residuales vertidas una red pública de alcantarillado.

Importe de canon de captación de agua: importe pagado por el volumen de agua captado directamente por la empresa al Organismo que corresponda (Confederación Hidrográfica, Comunidad Autónoma) en concepto de canon de utilización del agua, de canon de regulación, canon de producción o canon de ocupación.

5. Aguas residuales

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
5.1 Volumen total anual de agua vertida (m^3/día)		
1 A una red pública de alcantarillado		
2 Al mar		
3 A un cauce fluvial		
4 A una fosa séptica		
5 A otros medios receptores (especificar): _____		

5.2 Número de días al año de vertido efectivo (o días anuales trabajados) _____

5.3 Importe del canon de vertido (euros) _____

5.4 ¿El establecimiento depura las aguas residuales generadas en el proceso productivo?

☐ Si ☐ No

Si su respuesta es afirmativa pase a responder los restantes epígrafes del apartado 5.5 Si el establecimiento no realiza depuración pase a cumplimentar el apartado 5.6 del cuestionario (Cantidad total de residuos generados).

5.5 Tipo de tratamiento utilizado (marcar lo que corresponda):

☐ Tecnologías blandas (lagunaje, lechos de turba, biodiscos ...)

☐ Primario (Tratamiento físico-químico)

☐ Primario + Secundario (Tratamiento físico-químico y biológico)

☐ Primario + Secundario + Terciario (Tratamiento físico-químico, biológico y refino)

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
5.5.1 Volumen total de aguas depuradas (m^3/día)		
5.5.2 Volumen total de aguas no depuradas (m^3/día)		

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
5.6 Volumen de agua reutilizada proveniente de las aguas residuales generadas por el propio establecimiento (m^3/año)		

	ANTES DEL TRATAMIENTO	DESPUÉS DEL TRATAMIENTO
5.7 Características de las aguas residuales generadas (Unidad: mg/litro)		
1 Demanda química de oxígeno (DQO)		
2 Demanda bioquímica de oxígeno (DBO_5)		
3 Sólidos en suspensión (SS)		
4 Nitrógeno total		
5 Fósforo total		
6 Metales pesados (As, Hg, Pb, ...)		

5.8 Total de lodos generados en el tratamiento de aguas residuales (Unidad: kilogramos) _____

5.9 Total de biogás producido (Unidad: (m^3/día) _____

Importe del canon de vertido: importe abonado a la Confederación Hidrográfica (canon de control de vertidos) o a la Comunidad Autónoma (canon de vertido o canon de vertidos al mar). Se refiere a las aguas residuales vertidas directamente al Dominio Público Hidraúlico o al Dominio Público Marítimo-Terrestre.

Questionnaire from the water use module in Waste Production in Industry Survey (2008)

4. Suministro de agua

	TOTAL (INCLUYENDO REFRIGERACION)	PARTE DESTINADA A REFRIGERACIÓN
4.1 A través de una red pública:		
1 Volumen total de agua suministrada **(m^3/año)**		
2 Importe abonado por el suministro de agua **(euros)**		
3 Importe por el servicio de saneamiento **(euros)**		

4.2 ¿Su establecimiento realiza captación propia de agua?

☐ SI ☐ No

Si no realiza captación propia pase directamente al epígrafe 4.4 de este apartado

	TOTAL (INCLUYENDO REFRIGERACION)	PARTE DESTINADA A REFRIGERACIÓN
4.3 Volumen total de agua captada por el propio establecimiento		
1 Aguas superficiales **(m^3/año)**		
2 Aguas subterráneas **(m^3/año)**		
3 Agua de mar: para desalación **(m^3/año)**		
4 . Agua de mar: no desalada **(m^3/año)**		
5 Otros tipos de recursos hídricos **(m^3/año)** (especificar): _____		
6 Importe del canon de captación de agua **(euros)**		
4.4 Volumen de agua residual regenerada suministrada por terceros (m^3/año)		
1 Importe del suministro del agua residual regenerada **(euros)**		

Importe abonado por el suministro de agua: importe pagado a la empresa o Ayuntamiento que corresponda por el volumen de agua procedente del suministro público. No se incluirá el importe referente a las tasas de saneamiento (alcantarillado y depuración de aguas residuales).

Importe por el servicio de saneamiento: importe pagado a la empresa o Ayuntamiento que corresponda en concepto de alcantarillado y depuración de aguas residuales (se incluye el canon de saneamiento). Se refiere a las aguas residuales vertidas a una red pública de alcantarillado.

Importe del canon de captación de agua: importe pagado por el volumen de agua captado directamente por la empresa al Organismo que corresponda (Confederación Hidrográfica, Comunidad Autónoma) en concepto de canon de utilización del agua, de canon de regulación, canon de producción o canon de ocupación.

5. Aguas residuales

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
5.1 Volumen total de agua vertida (m^3/día)		
1 A una red pública de alcantarillado		
2 Al mar		
3 A un cauce fluvial (ríos, torrentes, rieras ...)		
4 A una fosa séptica		
5 A otros medios receptores (especificar):		

5.2 Número de días al año de vertido efectivo (o días anuales trabajados) _____

5.3 Importe del canon de vertido (euros) _____

5.4 ¿El establecimiento depura las aguas residuales generadas en el proceso productivo?

☐ Si ☐ No

Si su respuesta es afirmativa pase a responder los restantes epígrafes del apartado 5.5. Si el establecimiento no realiza depuración pase a cumplimentar el apartado 5.6 del cuestionario

5.5 Tipo de tratamiento utilizado (marcar lo que corresponda):

☐ Tecnologías blandas (lagunaje, lechos de turba, biodiscos ...)
☐ Primario (Tratamiento físico-químico)
☐ Primario+Secundario (Tratamiento físico-químico y biológico)
☐ Primario+Secundario+Terciario (Tratamiento físico-químico, biológico y refino)

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
5.5.1 Volumen total de aguas depuradas (m^3/día)		
5.5.2 Volumen total de aguas no depuradas (m^3/día)		

	TOTAL (INCLUYENDO REFRIGERACIÓN)	PARTE PROCEDENTE DE REFRIGERACIÓN
5.6 Volumen de agua reutilizada proveniente de las aguas residuales generadas por el propio establecimiento (m^3/año)		

	ANTES DEL TRATAMIENTO	DESPUÉS DEL TRATAMIENTO
5.7 Características de las aguas residuales generadas (Unidad: mg/litro)		
1 Demanda química de oxígeno (DQO)		
2 Demanda bioquímica de oxígeno (DBO_5)		
3 Sólidos en suspensión (SS)		
4 Nitrógeno total		
5 Fósforo total		
6 Metales pesados (As, Hg, Pb, ...)		

5.8 Total de lodos generados en el tratamiento de aguas residuales (Unidad: kilogramos) _____

5.9 Total de biogás producido (Unidad: m^3/día) _____

Importe del canon de vertido: importe abonado a la Confederación Hidrográfica (canon de control de vertidos) o a la Comunidad Autónoma (canon de vertido o canon de vertidos al mar). Se refiere a las aguas residuales vertidas directamente al Dominio Público Hidraúlico o al Dominio Público Marítimo-Terrestre. No incluir los importes abonados en concepto de limpieza de fosa séptica o gasto por recogida de las aguas residuales.

Questionnaire from the water use module in Environment in Industry Survey (2010)

D. Suministro de agua

D.1 A través de una red pública de abastecimiento	Total (incluyendo refrigeración)	Parte destinada a refrigeración
1. Volumen total de agua suministrada (m^3/año)		
2. Importe abonado por el suministro de agua (Euros)		

D.2 ¿Su establecimiento realiza captación propia de agua?

☐ SÍ ☐ NO

En caso afirmativo indique su origen

D.3 Volumen total de agua captada	Total (incluyendo refrigeración)	Parte destinada a refrigeración
1. Aguas superficiales (m^3/año)		
2. Aguas subterráneas (m^3/año)		
3. Agua de mar: para desalación (m^3/año)		
4. Agua de mar: no desalada (m^3/año)		
5. Otros tipos de recursos hídricos (especificar):		
6. Importe del canon de captación de agua (Euros)		

Importe abonado por el suministro de agua: importe pagado a la empresa o Ayuntamiento que corresponda por el volumen de agua procedente del suministro público. No se incluirá el importe referente a las tasas de saneamiento (alcantarillado y depuración de aguas residuales) ni el canon autonómico de saneamiento.

Importe del canon de captación de agua: importe pagado por el volumen de agua captado directamente por la empresa al Organismo que corresponda (Confederación Hidrográfica, Comunidad Autónoma) en concepto de canon de utilización del agua, de canon de regulación, canon de producción o canon de ocupación.