Natural Gas Technologies Centre

DEVELOPMENT OF A COST-EFFECTIVE PROCESS FOR SWITCHING FROM ELECTRIC TO GAS-FIRED DRYERS IN MULTI-HOUSING LAUNDRIES

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DEVELOPMENT OF A COST-EFFECTIVE PROCESS FOR SWITCHING FROM ELECTRIC TO GAS-FIRED DRYERS IN MULTI-HOUSING LAUNDRIES

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10. Abstract

Information was obtained on a cost-effective method for switching from electric to natural gas-fired dryers through the design of a proper evacuation system. The data were collected from information in the open literature, laboratory test performances, and monitoring of laundries located in the greater Toronto area. Site monitoring of three multi-residential building laundries revealed that no dryers are in operation for at least 70% of the time, and that all dryers of a laundry room are in simultaneous operation less than 2% of the time. This utilization profile has a great influence on the potential annual building heating/cooling energy savings. It was demonstrated that by switching from electric to natural gas-fired dryers and properly redesigning the evacuation system, an 8-dryer laundry could save more than $6,000 annually on its energy bills.

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SUMMARY

Information was obtained on a cost-effective method for switching from electric to natural gas-fired dryers through the design of a proper evacuation system. The data were collected from information in the open literature, laboratory test performances, and monitoring of laundries located in the greater Toronto area.

The main objective of the laboratory work was to characterize the effect of various operating parameters on the drying time and energy consumption of a gas-fired dryer in a well-controlled environment. Tests were conducted on one dryer to study the effect of load size and initial moisture content, back pressure, limited make-up air, and induced air draft on the dryer's operation. The effect of using a variable-speed drive common exhaust fan, as opposed to a single-speed drive fan, was also studied by conducting tests on a bank of six gas-fired dryers. Key laboratory results indicated:

- Ending the drying cycle as soon as clothing is dry, instead of waiting for the complete cycle duration, could lead to energy savings of up to 25%;
- Drying fewer heavier loads is more cost-effective than drying multiple lighter loads. Drying time could be reduced by 22%, accompanied by an 18% decrease in energy consumption;
- Reducing initial moisture content from 70% to 55% by replacing older washing machines with newer ones, could represent energy savings of up to 20%;
- Failing to properly clean the dryer exhaust, and thereby significantly increasing back pressure, could raise drying time by up to 80% and contribute to a 10% increase in energy consumption;
- Inducing an excessive vacuum at the dryer outlet, as is the case when the exhaust fan is not properly sized, could contribute to increasing a dryer's energy consumption by 2% to 8%;
- Using an MVDS control system has little impact on drying time but could contribute to a decrease in dryers' energy consumption by 3%, while preventing up to 10 times more conditioned air than necessary from exhausting to the outside.

The main objective of the on-site monitoring was to characterize the operation of multi-residential building laundry rooms and document changes associated with the conversion of electric clothes dryers to natural gas-fired dryers, taking into account the redesign of the dryers' exhaust system. Three multi-residential laundries located in the greater Toronto area were monitored for at least one month. Following that, electric dryers were replaced by natural gas-fired dryers, which were also monitored for a period greater than one month.

The on-site monitoring was made possible through the collaboration of Sparkle Solutions, a company providing on-premises laundry services. Sparkle Solutions collaborated with NGTC in facilitating the installation of monitoring equipment, converting the laundry from electric to natural gas-fired dryers, and coordinating all activities requiring the support of electricians or plumbers. Key results, based on more than 35,000 hours of monitoring, are summarized below.

Dryer utilization profile

- Dryers located in the laundry rooms of multi-housing buildings operate on average 1,300 minutes per week;
- Approximately 16 hours per day (70% of the time), none of the monitored dryers were used by building tenants;
- All dryers operated simultaneously on average only 22 minutes per day.

Dryer energy consumption

- Switching from electric to gas dryers decreased electric consumption by 71 kWh/week and increased gas consumption to 8.7 m^3/week (based on 1,300 minutes of operation per week);
- The reduction of the coincident electric consumption peak is estimated to be around 4.0 kW per dryer installed;
- For most of the utility rate scenarios, natural gas dryers are cheaper to operate than electric dryers;
- Natural gas dryers are always cheaper to operate when the electricity cost is higher than \$0.08/kWh and the natural gas cost lower than \$0.60/m^3.

Exhaust strategy and loss of conditioned air

- When dryers are commonly exhausted to the outside using an exhaust fan designed to remove 5.7 m^3/min (200 cfm) per dryer at all times, the loss of conditioned air to the outside is estimated to be around 8,200 m^3/day/dryer;
- By using a variable-speed drive fan, which controls its speed depending on the number of dryers in operation, the loss of conditioned air is reduced to 1,200 m^3/day/dryer;
- Providing that duct runs of less than 4.2 meters (14 feet) are necessary, the most efficient way of dealing with drying air is to individually exhaust dryers to the outside. The loss of conditioned air per dryer is only 1 100 m^3/day/dryer.

Exhaust strategy and annual savings

- A rule of thumb was developed (presented in section 5.4.3) to estimate heating and cooling costs associated with the use of a single-speed exhaust fan;
- When a common exhaust strategy is retained, additional electricity savings could be achieved through exhaust fan modulation capacity. As was demonstrated for Site B, electricity savings could reach 8,800 kWh/year.
- Additional electricity savings are expected when switching from single-speed drive fans to variable-speed drive fans as most of the time the former ones have a belt-drive as opposed to a direct drive. Exhausto's estimates their fan is at least 5-10% more efficient than other fans, regardless of their control system.

Combining results of the laboratory testing and site monitoring, it was demonstrated that by switching from electric to natural gas-fired dryers and properly redesigning the evacuation system, an 8-dryer laundry could save more than $6,000 annually on its energy bills.

Note.

Savings reported were obtained using the Exhausto's MVDS fan and PID control system. Results may differ from other variable-speed drive fan systems.

SOMMAIRE

L'information nécessaire afin de déterminer la manière la plus économique et efficace d'optimiser le système d'évacuation de buanderies, lors du remplacement de sécheuses électriques pour des sécheuses au gaz naturel, a été obtenu en réalisant des tests en laboratoire et en recueillant les données d'opération de buanderies situées dans la grande région de Toronto.

L'objectif principal des expériences en laboratoire était de caractériser, dans un environnement contrôlé, l'effet de divers paramètres d'opération sur le temps de séchage et la consommation énergétique de sécheuses alimentées au gaz naturel. Des tests ont été effectués sur une sécheuse afin d'étudier l'effet sur l'opération de la sécheuse du poids et du contenu en humidité du linge, de la pression à la sortie de la sécheuse, de l'alimentation en air frais, et du tirage. Les avantages liés à l'utilisation d'un ventilateur à vitesse variable, lorsque comparés à un ventilateur à vitesse unique, ont été étudiés grâce à la réalisation d'essais en laboratoire sur une série six sécheuses au gaz naturel. Les principaux résultats des tests en laboratoire sont :

- Terminer le cycle de séchage aussitôt que les vêtements sont secs plutôt que d'attendre la durée complète du cycle préprogrammé permettrait d'économiser jusqu'à 25 % en énergie;
- sécher un lot plus imposant, plutôt que de sécher de multiples petits lots de linge, est plus économique. En effet, le temps de séchage pourrait ainsi être réduit de 22 %, et la consommation énergétique de 18 %;
- réduire le contenu en humidité initial des vêtements de 70 % à 55 % en remplaçant une vieille machine à laver par une nouvelle plus efficace permettrait d'économiser jusqu'à 20%;
- ne pas nettoyer adéquatement l'évacuation des sécheuses, ce qui a pour effet d'augmenter la pression statique à la sortie des sécheuses, peut engendrer une augmentation du temps de séchage jusqu'à 80 % et contribuer à une augmentation de 10 % de la facture énergétique;
- induire une dépressurisation excessive à la sortie de la sécheuse, comme lorsqu'un ventilateur d'évacuation est mal dimensionné, pourrait contribuer à augmenter la consommation énergétique de 2 % à 8 %;

- utiliser un système de ventilation modulant, lorsque comparé à un ventilateur à vitesse constante, a peu d'impact sur le temps de séchage, mais peut permettre de réduire la consommation énergétique des sécheuses par 3 %, tout en permettant d'évacuer jusqu'à 10 fois moins d'air conditionné vers l'extérieur.

L'objectif principal de la cueillette d'information sur site était de déterminer le profil moyen d'utilisation de buanderies et de documenter les changements associés à la conversion de sécheuses électriques pour des sécheuses au gaz naturel, en prenant en considération la reconfiguration du système d'évacuation. Pour ce faire, trois buanderies situées dans des édifices à logements situés dans la grande région de Toronto ont été surveillées pendant une période d'un mois. Ensuite, les sécheuses électriques ont été remplacées par des sécheuses au gaz naturel et surveillées de nouveau pendant une période supérieure à un mois.

La cueillette d'information sur site a été possible grâce à la collaboration de Sparkle Solutions, une compagnie offrant des services de buanderie sur les lieux. Sparkle Solutions a collaboré avec le CTGN afin de faciliter l'installation des équipements de mesure, compléter le remplacement des sécheuses électriques pour des sécheuses au gaz naturel, et coordonner toutes les activités nécessitant l'appui des divers corps de métiers. Les principaux résultats, basés sur plus de 35 000 heures de surveillance, sont résumés ci-dessous.

Profil d'utilisation des sécheuses

- Les sécheuses de buanderies d'édifices à logements opèrent en moyenne 1 300 minutes par semaine;
- durant environ 16 heures (70 % du temps), aucune sécheuse n'est utilisée par les occupants;
- toutes les sécheuses étaient simultanément en marche que 22 minutes par jour.

Consommation énergétique des sécheuses

- le remplacement de sécheuses électriques par des sécheuses au gaz a permis de réduire la consommation électrique de 71 kWh/semaine et a porté la consommation en gaz naturel à 8,7 m^3/semaine (basé sur 1 300 minutes d'opération par semaine);
- la réduction de la charge électrique appelée maximale a été réduite d'environs 4,0 kW par sécheuse installée;
- pour la plupart des scénarios de coût d'énergie, les sécheuses au gaz naturel sont toujours plus économiques que celles électriques;
- les sécheuses alimentées au gaz naturel sont toujours plus économiques lorsque les coûts d'électricité sont plus élevés que 0,08$/kWh et que le coût du gaz naturel est plus bas que 0,60$/$m^3$.

Stratégie d'évacuation et pertes d`air conditionnée

- Lorsque le ventilateur d'extraction est dimensionné de manière à évacuer 5,7 m^3/min d'air (200 pi^3/min) par sécheuse en tout temps, la perte d'air conditionnée vers l'extérieur est d'environ 8 200 m^3/jour/sécheuse;
- en installant un ventilateur qui module la vitesse d'extraction en fonction du nombre de sécheuses en service, la perte d'air conditionnée vers l'extérieur est réduite à 1 200 m^3/jour/sécheuse;
- en considérant que la conduite d'évacuation soit inférieure à 4.2 mètres (14 pieds), la manière la plus efficace de gérer l'évacuation des sécheuses est des évacuées individuellement vers l'extérieur. La perte d'air conditionnée vers l'extérieur n'est alors que de 1 100 m^3/jour/sécheuse;

Stratégie d’évacuation et économies annuelles

- Une règle du pouce a été développée (présenté à la section 5.4.3) afin d’estimer les coûts de chauffage et de climatisation associés à l’utilisation d’un ventilateur à vitesse unique;
- lorsque les sécheuses doivent être évacuées de façon commune, des économies supplémentaires d’électricité peuvent être réalisées grâce l’utilisation d’un ventilateur à vitesse variable. Comme démontré lors de l’analyse du site B, ces économies peuvent atteindre jusqu’à 8 800 kWh/année.

En combinant les résultats des tests en laboratoire et de la cueillette d’information sur site, il a été démontré que de remplacer des sécheuses électriques par des sécheuses au gaz naturel tout en reconfigurant de façon optimale le système d’évacuation permettrait d’économiser jusqu’à 6 000 $ annuellement pour une buanderie comprenant 8 sécheuses.

Note.

Les économies ont été obtenues à l’aide du ventilateur et du contrôleur PID de Exhausto. Les résultats peuvent différer des autres types de ventilateur d’extraction.

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DEFINITIONS, ABBREVIATIONS, AND SYMBOLS

Bone-dry	Condition of a load of test clothes which has been dried in a dryer at maximum temperature for a minimum of 10 minutes, removed and weighed before cool down, and then dried again for 10-minute periods until the final weight change of the load is 1 percent or less
CGA	Canadian Gas Association
CV	Coefficient of variance (standard deviation divided by average value)
$DD_{cooling}/DD_{heating}$	Degree-days per year of cooling (above 18^{o}C) and heating (below 18^{o}C)
$\varepsilon_{cooling}/\ \varepsilon_{heating}$	Annual efficiency of the cooling and heating system
Hygroscopic	The ability of a substance to attract water molecules from the surrounding environment through either absorption or adsorption
Drying hysteresis	The drying hysteresis is the phenomenon behind the fact that the same piece of material will dry at different rates, even when exposed to the same drying conditions, depending on its drying history (the number of times it has been washed and dried)
IPVL	Integrated Part-Load Value is a weighted average of efficiency measurements at various part-load conditions, as described in ARI Standard 550/590-98.
Moisture content	Ratio of the weight of water contained by the test load to the bone-dry weight of the test load, expressed as a percent
MDVS	Mechanical Dryer Venting System
TCH	Toronto Community Housing

UNIT, AND UNIT CONVERSIONS

ft^3	Cubic feet (1 ft^3 = 0.02832 m^3)
hPa	Hecto Pascal (1 hPa = 100 Pa)
in. w.c.	Inches of water column (1 in. w.c. = 249 Pa)
mBar	Milli-bar (1 mBar = 1 hPa = 100 Pa)
^oC	Degree Celcius
scfm	Standard cubic feet per minute (20^oC, 101.3 kPa)
V	Volts
Wh	Watt-hour
%R.H.	Relative humidity expresses in percentage

1.0 CONTEXT

In Ontario, residential clothes dryers represent an annual energy consumption of 12.6 PJ[1] (275 GWh). Therefore, any energy conservation program leading to even the smallest percentage in savings could considerably decrease provincial energy consumption and greenhouse gas emissions.

Electric dryers are considered 100% efficient. However, in Ontario a considerable amount of the electricity is currently being produced by coal and natural gas power plants, which are not 100% efficient. Moreover, once generated, electricity has to be transmitted to the end user through the grid, which results in additional losses. Consequently, natural gas-dryers can be considered more efficient than electric dryers.

Each electric residential clothes dryer consumes approximately 912 kWh/year[2]. As such, an electric dryer in Ontario contributes the equivalent of 250 kg CO_2 annually to greenhouse gas emissions (276 gCO_2/kWh[3]). Switching from an electric to a natural gas-fired dryer could then save approximately 850 kWh/year (some electricity is needed to drive the dryer's drum and blower even in natural gas-fired dryers), while reducing greenhouse gas emissions by approximately 40 kg CO_2/year. Converting 100,000 electric dryers to natural gas-fired dryers in Ontario could, in turn, contribute to reducing greenhouse gas emissions by 4,000 tons CO_2/year. Therefore, implementing a program to help convert electric dryers to natural gas-fired dryers could foster important electricity savings and contribute to meeting Kyoto Act targets.

In that context, Enbridge Gas Distribution has asked the Natural Gas Technologies Centre (NGTC) to develop the most efficient and cost-effective process for switching from electric to gas-fired dryers in multi-housing laundries. Efforts were focused on the evacuation system and its effect on installation cost and operating cost (dryers' performance), because important

[1] NRCan. Comprehensive Energy Use Database. 2004 Data.
http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/comprehensive_tables/index.cfm?attr=0

[2] Office of Energy Efficiency. http://oee.nrcan.gc.ca/equipment/english/page18.cfm

[3] Environment Canada. 2004 Emissions Data
http://www.ec.gc.ca/pdb/ghg/inventory_report/2004_report/ann9_e.cfm

additional savings could be achieved by reducing the heating/cooling cost associated with the evacuation of conditioned air through the drying process.

2.0 OBJECTIVES

The objective was to develop the most efficient and cost-effective process for switching from electric to gas-fired dryers in multi-housing laundries. The findings of this project will make it possible to choose the best solution from among various solutions for each individual site 's configuration. Efforts were focused on the evacuation system and its effect on installation and operating costs (dryers' performance).

3.0 APPROACH

Information was obtained on a cost-effective method for switching from electric to natural gas-fired dryers through the design of a proper evacuation system. The data were collected from information in the open literature, laboratory test performances, and monitoring of laundries located in the greater Toronto area.

The main objective of the laboratory work was to characterize the effect of various operating parameters on the drying time and energy consumption of a gas-fired dryer in a well-controlled environment. More specifically, the following parameters were studied:

- Load size and initial moisture ratio;
- Back pressure and induced air draft;
- Make-up air limitation;
- Use of variable-speed drive blower vs. single-speed drive blower.

The main objective of the on-site monitoring was to characterize the operation of multi-residential building laundry rooms and document changes associated with the conversion of electric clothes dryers to natural gas-fired dryers, taking into account the redesign of the dryers' exhaust system. To this end, three multi-residential laundries located in the greater Toronto area were selected and studied for more than 35,000 hours. More specifically, the following tasks were completed:

- Monitoring of electric dryers for at least one month;
- Conversion of electric dryers to natural gas-fired dryers;
- Monitoring of gas-fired dryers for at least one month;
- Modification of the exhaust system (one site only);
- Monitoring of gas-fired dryers and modified exhaust system (one site only);
- Optimization of the exhaust system (one site only);
- Monitoring of gas-fired dryers and optimized exhaust system (one site only).

The on-site monitoring was made possible through the collaboration of Sparkle Solutions, a company providing on-premises laundry services. Sparkle Solutions collaborated with NGTC in facilitating the installation of monitoring equipment, converting the laundry from electric to natural gas-fired dryers, and coordinating all activities requiring the support of electricians or plumbers.

4.0 LABORATORY TESTING

The main objective of the laboratory work was to characterize the effect of various operating parameters on the drying time and energy consumption of a gas-fired dryer in a well-controlled environment.

Tests were conducted on one dryer to study the effect of load size and initial moisture content, back pressure, limited make-up air, and induced air draft on the dryer's operation.

The effect of using a variable-speed drive common exhaust fan, as opposed to a single-speed drive fan, was also studied by conducting tests on a bank of six gas-fired dryers. Electricity savings reported when switching from a single-speed to a variable-speed drive fan are most likely underestimated since a high-efficiency fan was used in all tests.

The following sections describe the testing protocol (section 4.1), and results obtained when testing one dryer (section 4.2) and a bank of dryers (section 4.3). Finally, key findings and their possible impacts on a real-life installation are summarized (section 4.4).

4.1 LABORATORY TESTING PROTOCOL

The laboratory testing protocol is based on the "*Testing Method for Measuring Per-Cycle Energy Consumption and Energy Factor of Domestic Gas Clothes Dryers*" published by the Canadian Gas Association (CGA P.5-M97, R2004).

The standard was not followed rigorously, but instead was adapted to better reflect the experiment objective, as well as the true operation of gas-fired dryers in multi-housing laundries.

The following sections describe the reference test load (section 4.1.1), the laboratory testing protocol (section 4.1.2), and the monitoring protocol (section 4.1.3) used during the course of this study. Refer to Appendix A for more details on laboratory procedures.

4.1.1 Reference Test Load

Even when exposed to the same drying environment, different clothes will dry at different rates because phenomena involved during the drying process depend not only on the air temperature and humidity, but also on material properties. To ensure comparability of tests, it was of paramount importance to employ standardized loads. Consequently, as per CGA P.5-M97 method instructions, a 50 percent cotton/50 percent polyester blend, pure finished bleached cloth was used.

Most fabrics tend to wear while being washed and dried, especially during the first few wash/dry cycles. This causes the fabric to lose weight, because lint accumulates in the dryer filter or is exhausted with the humid air as the fabric is being worn out. The resultant weight loss can impact the drying rate calculation, since it is derived from wet and dry test load weights. Moreover, most fabrics exhibit some drying hysteresis that needs to be eliminated prior to the commencement of any test series. The test load preconditioning protocol (Appendix A) was followed rigorously to ensure that the fabric would behave the same from one test to another.

When testing a clothes dryer, the CGA P.5-M97 method specifies operating the clothes dryer until the moisture content of the test load is between 2.5 and 5.0 percent of the bone-dry weight. This requires having the dryer on a scale that is precise enough to measure the clothes weight change while the dryer is functioning. To simplify and expedite laboratory testing, the reference drying cycle was set to 30 minutes, rather than targeting a specific final moisture content.

For a standard size domestic dryer with a drum capacity of 0.12 m^3 (4.4 ft^3) or greater, the CGA testing method suggests using a test load of 3.18 kg (7.00 lbs). The dryer used in this study is a commercial dryer with a drum capacity of 0.22 m^3 (7.7 ft^3). Instead of using the standard test load recommended by CGA, the test load bone-dry weight was targeted so that a test load with an initial moisture content of approximately 70% (as specified by CGA P.5-M97) is dry after 30 minutes. Consequently, the test load bone-dry weight was set to 5.0 kg (11.0 lbs).

In summary, the reference test load consists of:

- Fabric: 50% cotton/ 50% polyester blend (pieces of 22 x 34 in.);
- Bone-dry weight: 5.0 kg;
- Initial moisture content: 70 %.

4.1.2 Test Protocol

As shown in section 4.2.1, very reliable and repetitive results were obtained through rigorous execution of the following sequence, for each and every test (all procedures are detailed further in Appendix A):

- Wash the test load (refer to "Wash test load" procedure);
- While washing the test load:
  - Clean the clothes dryer lint trap thoroughly;
  - Precondition the dryer (refer to "Clothes dryer preconditioning" procedure).
- Weigh the wet test load;
- Load the clothes dryer (refer to "Load dryer" procedure);
- Dry the test load for 30 minutes (refer to "Dry test load" procedure);
- Weigh the dry test load;

Each specific test was repeated three times to guarantee that the results would be statistically significant. Moreover, the tests were randomly performed in order to eliminate any possibilities of experimental artefacts that could have been induced by using a particular test sequence.

4.1.3 Clothes Dryer Monitoring

As seen in Figure 1, six operating parameters were monitored in order to quantify the dryer's performance during the various tests conducted in laboratory.

The average value of each measurement was computed and recorded every 10 seconds.

Inlet conditions

A Air temperature and relative humidity

Outlet conditions

B Air temperature

C Air humidity

D Static pressure

E Pitot tube (to calculate air flow)

F Electric consumption

G Gas consumption

Figure 1: Clothes dryer monitoring equipment

4.2 SINGLE-OPERATING DRYER: RESULTS AND ANALYSIS

More than 85 tests were carried out in NGTC's laboratory to study the effect of various parameters on the drying time and energy consumption of a stand-alone dryer. Refer to section 4.3 for results concerning a bank of dryers.

4.2.1 Reference Drying Test

The reference drying test was performed using the reference test load (section 4.1.1) and protocol (section 4.1.2). It was conducted a total of 12 times throughout the study to evaluate the repeatability of the testing procedure.

All test results presented in the sections immediately below are compared to those of the reference test.

Table 1: Reference drying test results

	Range	CV
Bone-dry weight (kg)	5.02 – 5.04	0.1 %
Moisture content (%)	69.8 – 71.0	0.5 %
Drying time (min)	30.0 – 30.3	0.3 %
Average outlet air condition		
Static pressure (in. w.c.)	0.18 – 0.20	3.8 %
Flow (scfm)	98 - 109	2.7 %
Temperature (^oC)	43 - 44	0.6 %
Relative humidity (%)	73.9 – 78.3	2.1 %
Final clothes moisture content (%)	3.1 – 4.4	12.1 %
Total energy consumption (wh)		
Natural gas	3,398 – 3,456	0.6 %
Electricity	148 - 156	1.6 %
Total	3,548 – 3,612	0.6 %

As shown in Table 1, the repeatability of the procedure was excellent since the coefficient of variance falls under 4% for all parameters except for the final clothes moisture content.

The final clothes moisture content ranged from 3.1 to 4.4%. This represents a difference of only 65 grams in water weight per 5-kg test load. Moreover, the CGA P.5-M97 method stipulates that clothes can be considered dry when the final moisture content is lower than 5%. Consequently, even though the CV of the final moisture content is 12.1%, this measurement is considered precise enough to have no real impact on test result quality.

It should be noted that operating parameters presented in the next following sections will not be explicitly reported when they fall within the range of the reference test results presented in Table 1.

4.2.2 Drying Time and Energy Consumption

By varying drying time from 10 to 45 minutes, a study was undertaken about the effect of drying time on final moisture content of clothes, and on energy consumption. The next table summarizes these key results.

Table 2: Effect of drying time on operating parameters

Drying time (min)	Clothes final moisture content (%)	Average outlet air temperature (°C)	Average outlet air relative humidity (%)
10	49.6%	40.1	84.1
20	24.6%	42.4	82.2
30	3.6%	44.1	77.6
45	0.1%	51.2	55.8

As explained earlier, the test load size was chosen so that clothes would dry after a 30-minute period. Thus, as expected, the moisture content was 3.6% after 30 minutes and 0.1% (almost bone-dry) after 45 minutes. Remember that the CGA P.5-M97 method considers clothes dry if moisture content is less than 5%.

Hardly any evaporation occurs at the end of the drying cycle, when the clothes are almost completely dry. Since there is no more air cooling effect due to water evaporation, the exhaust air is warm and dry at the end of a drying cycle. This explains why the exhaust air was on average warmer and drier during the 45-minute test than during any other tests.

Table 3 illustrates the final moisture content of clothes, as well as energy consumption (gas and electricity), for different drying times.

Table 3: Effect of drying time on operating parameters

Drying time (min)	Clothes final moisture content (%)	Energy consumption (Wh)		
		Natural gas	Electricity	Total
10	49.6%	1,142	54	1,197
20	24.6%	2,299	105	2,404
30	3.6%	3,437	153	3,590
45	0.1%	4,335	227	4,562

As specified by the CGA P.5-M97 method, clothes can be considered dry when the moisture content is under 5%; any further drying is a waste of time and energy. For instance, a total of 4,562 Wh was consumed to dry the clothes for 45 minutes. However, Table 3 clearly indicates that the clothes were already dry after 30 minutes, and that only 3,590 Wh was consumed in both natural gas and electricity. Consequently, for these specific conditions, ending the cycle as soon as the clothes were dry (30 minutes) instead of waiting for the total cycle duration (45 minutes) could have led to energy savings of up to 27% (972 Wh).

Assuming that a typical multi-housing laundry dryer operates at 2,000 cycles/year, ending the drying cycle as soon as the clothes are dry could represent energy savings of up to 1,944 kWh/dryer/year. Therefore, it may be worthwhile investing in a dryer equipped with a moisture sensor that stops the drying cycle automatically when clothes are dry.

4.2.3 Drying Curve Calculation

To understand how clothing moisture content varies as clothes are being dried, a mass balance was performed around the drying air using the exhaust air flow paired with inlet and outlet air relative humidity.

The difference between the inlet and outlet air absolute humidity is the water being evaporated from the clothes plus some humidity inherent to the natural gas combustion. When subtracting the humidity generated by the combustion, the clothes moisture removal rate can be calculated; it can then be used to determine clothing moisture content as drying time progresses.

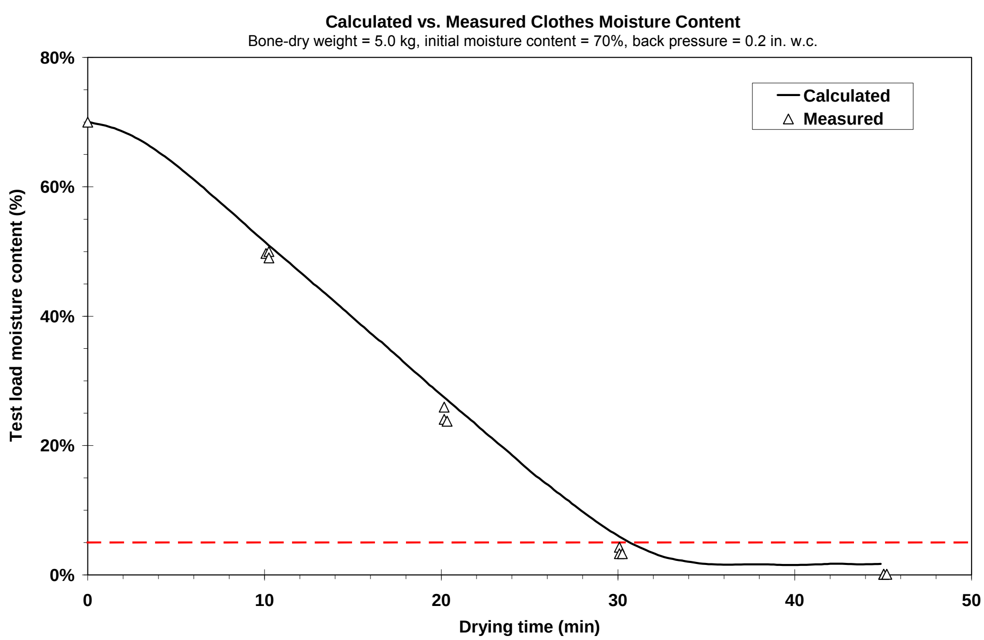


Figure 2: Calculated vs. measured clothes moisture content variation in time

Figure 2 shows the calculated drying curve as well as the moisture content measured after 10, 20, 30, and 45 minutes. The drying curve was generated using the average drying rate of the three 45-minute tests performed. The red dotted line represents the moisture content at which clothes can be considered dry, i.e. under 5% according to the CGA P.5-M97 method.

As seen in Figure 2, there is a good correlation between the calculated and the measured clothes moisture content. This method will later be used to determine the time after which the clothes are considered dry, instead of relying on the final moisture content only.

4.2.4 Load Size (Bone-Dry Weight)

The effect of load size on drying time and energy consumption was studied by performing tests with 2.0, 3.5, 5.0, and 6.5-kg test loads. The initial moisture content was 70%, as was the case for the reference test.

As Table 4 illustrates, the bigger the load, the greater the clothes moisture content after completion of the 30-minute drying cycles. However, clothes can be considered dry in all tests with the exception of the 6.5-kg load test.

Table 4: Effect of test load size on operating parameters (30-minute cycle)

Bone-dry test load weight (kg)	Clothes final moisture content (%)	Average outlet air temperature (^oC)	Average outlet air relative humidity (%)
2.0	0.0	59.5	22.0
3.5	0.0	51.3	49.3
5.0	3.3	43.7	74.6
6.5	15.7	42.6	84.5

As seen earlier, when the clothes are dry prior to the completion of the drying cycle, the average air temperature increases and average air relative humidity decreases. This was the case for the 2.0-kg and 3.5-kg test loads. In contrast, because the 6.5-kg test load had not completely dried after 30 minutes, its average air temperature was the lowest, while average relative humidity the highest, of all loads.

Figure 3 shows the effect of test load size on drying time and energy consumption. There are two sets of data. The first one represents the results as obtained during the various laboratory tests. The second set was calculated using the mass balance method explained earlier (section

4.2.2) and shows what would have been the results (drying time and energy consumption) if the dryer was to be equipped with a moisture sensor that ends the drying cycle immediately once clothes moisture content reaches 5.0%.

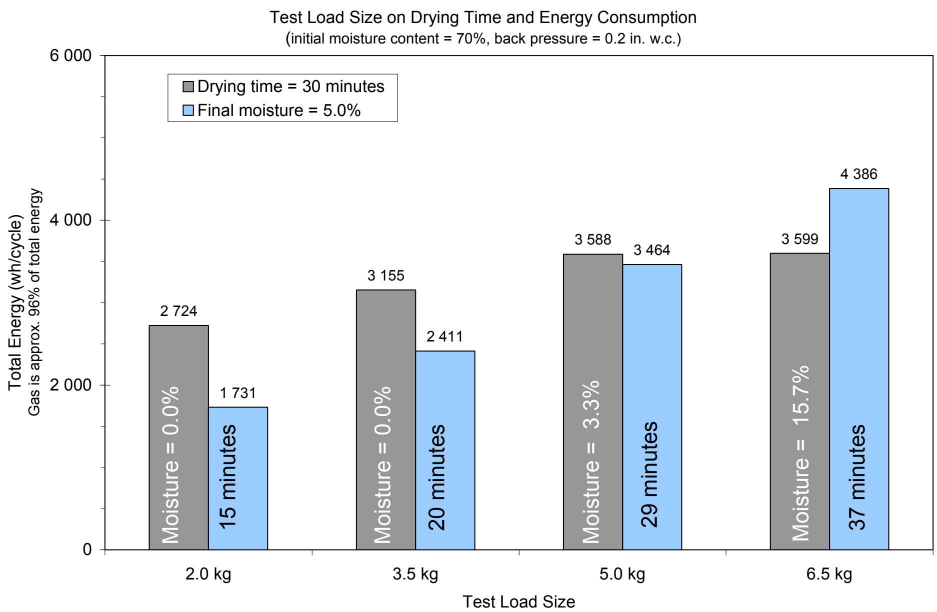


Figure 3: Test load size vs. drying time and energy consumption

As demonstrated in the figure above, the smallest load (2.0 kg) was dry after 15 minutes. Stopping the dryer after 15 minutes, instead of 30 minutes, could have resulted in energy savings of up to 36% (993 Wh/cycle). Similarly, if the 3.5-kg test load had dried for 20 minutes instead of 30 minutes, the savings could have reached as much as 24% (744 Wh/cycle). These results confirm the findings of section 4.1.2.

Drying fewer heavier loads is more cost-effective than drying multiple lighter loads. This is clearly demonstrated in Figure 3. Drying loads of 6.5 kg took on average 37 minutes and required approximately 4,400 Wh/cycle. Drying consecutively three batches of 2.0 kg is 22% more time-consuming (45 minutes), and requires 18% more energy (5,200 Wh/cycle) even though 8% less clothing (6.0 kg) is being dried.

4.2.5 Test Load Moisture Content

Annual energy consumption does not vary significantly from one clothes dryer model to another (EnerGuide Appliance Directory, 2006). Therefore, the best way to save energy when drying clothes is to either buy a clothes dryer equipped with a humidity sensor, or invest in a new washing machine. Newer washing machines use less water and are able to extract mechanically more water from the clothes by speeding up basket rotation.

The effect of initial load moisture content on drying time and energy consumption was studied by performing tests using loads with initial moisture contents of 55%, 70%, 85%, and 100%.

Table 5: Effect of load initial moisture content on operating parameters (30-minute drying cycle)

Initial moisture content (%)	Clothes final moisture content (%)	Average outlet air temperature (°C)	Average outlet air relative humidity (%)
55	0.0%	48.2	61.7
70	3.2%	43.7	76.4
85	15.4%	42.7	81.2
100	29.5%	42.6	82.6

As the table above shows, when the initial moisture content is low, drying time becomes shorter, average air temperature higher, and average relative humidity lower than reference test numbers. These results are in line with the explanation given previously on the relationship between drying time and average outlet air temperature and relative humidity.

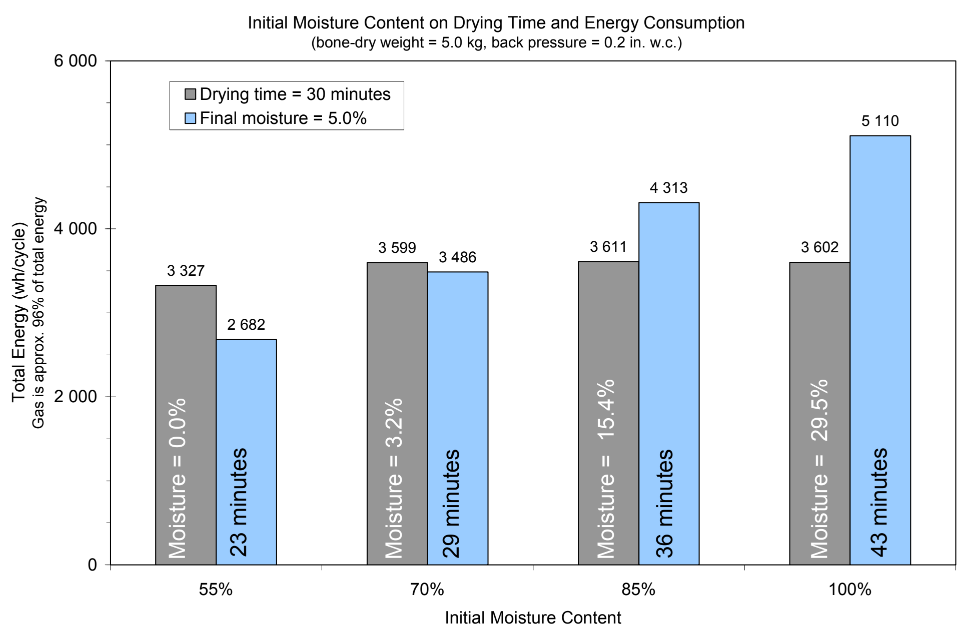


Figure 4: Test load initial moisture content vs. drying time and energy consumption

Figure 4 shows the effect of load initial moisture content on drying time and energy consumption. As explained earlier, there are two sets of data: measured (after a 30-minute cycle) and calculated (when clothes moisture content reaches 5%).

The results clearly show that decreasing the initial moisture content prior to drying the clothes has a positive impact on drying time and energy consumption.

With reference to Figure 4, decreasing initial moisture content from 70% to 55% reduces drying time by 20% (6 minutes) and energy consumption by 23% (800 Wh/cycle).

In a former study published by NGTC, it was demonstrated that the moisture content following the washing cycle can vary from 40% to 70% for top-load washing machines, and from 40% to 45% for front-load washing machines (NGTC, 2004). This means that reducing the initial moisture content from 70% to 55%, by replacing an older washing machine with a newer one, could represent savings of up to 1,600 kWh/year (based on 2,000 cycles/year).

4.2.6 Restricted Dryer Exhaust

A study was carried out focussing on the effect of dryer exhaust restriction on drying time and energy consumption. In a real-life situation, the dryer exhaust can be restricted if the evacuation duct is not cleaned on a regular basis (accumulation of lint), or if it is kinked, tortuous or too long.

The Whirlpool Service Manual (Exhausting Whirlpool Dryers) specifies that dryer back pressure should range between 0 and 0.6 inches of water column at the dryer’s connection. This was obtained in laboratory by modifying the cross-section area of the 4-in exhaust duct tip. Table 6 shows the effect of dryer backpressure on a number of operating parameters.

Table 6: Effect of backpressure on operating parameters (30-minute drying cycle)

Back pressure (in. w.c.)	Clothes final moisture content (%)	Average flow (scfm)	Average outlet air temperature (^oC)	Average outlet air relative humidity (%)
0.03	2.9	119	43.2	72.6
0.19	3.8	101	43.5	76.1
0.44	4.7	76	46.2	81.6
0.68	20.8	46	46.7	90.1

Even though the Whirlpool Service Manual specifies that their dryers can operate within a back-pressure range of 0 to 0.6 in.w.c., the results clearly show that this has an impact on the dryer's performance.

Reducing air flow through the dryer causes the air residence time inside the drum to be longer. Thus, the air has to carry more water and, in some extreme cases, even approach the saturation point. The more humid the air, the more difficult it is to evaporate water from clothes. During laboratory testing, the clothes were dry even when the air average relative humidity was 82%.

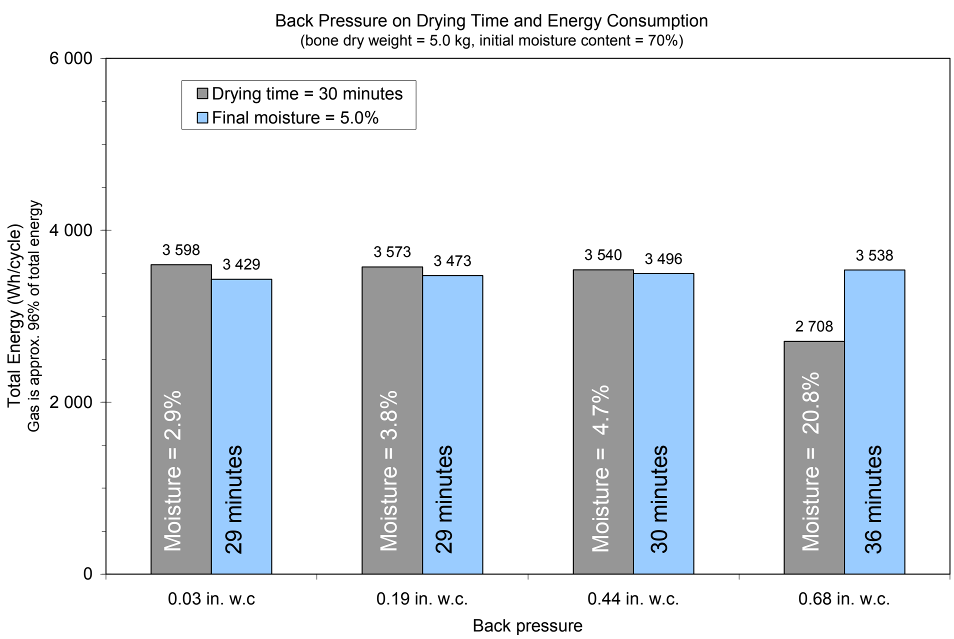


Figure 5: Back pressure vs. drying time and energy consumption (5.0-kg test load)

According to Figure 5, as long as dryer operation was maintained within the manufacturer-specified range, increases in dryer back pressure had no significant impact on dryer performance. Indeed, energy consumption and drying time were similar for back pressures respecting the manufacturer's specifications (0 to 0.6 in.w.c.).

However, failing to follow manufacturer specifications can cause operation issues. When the back pressure reached 0.7 in.w.c., clothing final moisture content reached 20%. As illustrated in Figure 5, this signifies that 36 minutes would have been required to completely dry the 5.0-kg test load.

Similar tests were performed using lighter test loads (2.0 and 3.5 kg). Back pressure varied from 0.2 in.w.c. to 0.7 in.w.c., with results listed in Figure 6.

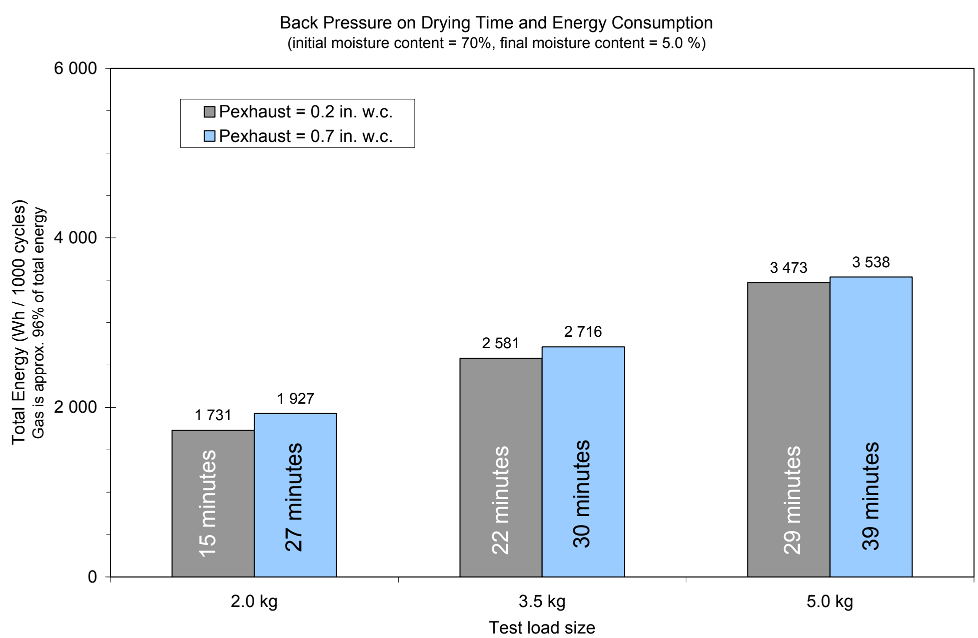


Figure 6: Effect of back pressure on drying time and energy consumption (2.0, 3.5, and 5.0 kg)

As indicated in the figure above, the results for lighter loads (2.0 and 3.5 kg) differ slightly from previously shown results (5.0 kg). Indeed, drying time increased by 80% for the 2.0-kg test load and by 36% for the 3.0-kg test load. Similarly, energy consumption increased by 11% for the 2.0-kg test load and by 5% for the 3.5-kg test load.

It should be noted that increasing dryer back pressure has much more impact on dryers' drying time than on energy consumption. At higher back pressure the air flow is reduced so that the drying is slowed down, but less energy is required since less hot drying air is flowing through the dryer.

In summary, a clogged dryer exhaust can significantly impact on drying time and energy consumption, especially when the manufacturer's specifications are not respected, or when small loads are dried.

4.2.7 Restricted Air Inlet

Also studied was the effect of a hypothetical laundry room depressurization, due to an insufficient supply of fresh air, on drying time, energy consumption and dryer operation. This was accomplished by surrounding the clothes dryer by an air-tight metal casing (Figure 7). The vacuum level was varied from 0.2 to 0.6 in.w.c by reducing the cross-section area of the casing air intake.

The impacts on drying rate and drying time were similar to those observed during the exhaust system backpressure experiments. In both cases, outlet static pressure was higher than inlet static pressure. Similar results were obtained for the same pressure differential between the air inlet and outlet, no matter whether the outlet was pressurized or the inlet depressurized.

Figure 7: Dryer air-tight metal casing

That being the case, the results are not presented here, since no additional findings arose from this test series.

It should be noted that no operating issues such as burner ignition problems were observed, even when depressurization inside the casing was at its maximum (0.60 in. w.c. of vacuum). The impact of high vacuum on safety hasn't been studied.

4.2.8 Fan-Assisted Evacuation

In some situations, such as when the dryers of a multi-residential laundry room are located far from an outside wall, it may be necessary to connect the common evacuation duct to a fan-assisted evacuation system that will ensure air is exhausted to the outside.

The exhaust fan is generally sized in such a way that it handles the air flow generated by all dryers when they operate simultaneously. This signifies that, when only a few of the dryers are operating, the fan is over-designed and can cause significant depressurization at the dryer outlet.

One area studied was the effect of such a system on the dryer's performance. The vacuum at the clothes dryer outlet was varied by changing the fan drive speed. Note that similar tests were performed on a system comprising a bank of six dryers (section 4.3).

Figure 8: Set-up to study the effect of fan-assisted evacuation on dryer performance

As seen in Table 7, increasing the vacuum at the dryer outlet from 0 to 2.1 in. w.c. caused the drying air flow to almost double. As expected, doubling the air flow had an impact on the average outlet temperature and relative humidity: the air was cooler and drier. However, this had nearly no impact on clothes final moisture content. It seems that the adverse effect of the colder air on the drying rates was offset by the positive effect of using drier air.

Table 7: Effect of induced air draft on operating parameters (30-minute drying cycle)

Back pressure (in. w.c.)	Clothes final moisture content (%)	Air flow (scfm)	Average outlet air temperature (^oC)	Average outlet air relative humidity (%)
0.05	3.4%	117	43.2	74.6
-0.64	3.4%	157	40.9	68.4
-1.45	4.2%	195	38.7	65.9
-2.07	4.2%	218	37.8	64.0

As shown in Figure 9, inducing a relatively high vacuum at the dryer outlet had little impact on drying time and energy consumption of the dryers.

However, it is worth noting that doubling the airflow through the dryers could have a significant impact on the heating and cooling costs of a building, because it is conditioned air that is evacuated to the outside. Furthermore, the air draft developed by the mechanical exhaust may be such that air is exhausted through non-operating dryers to the outside.

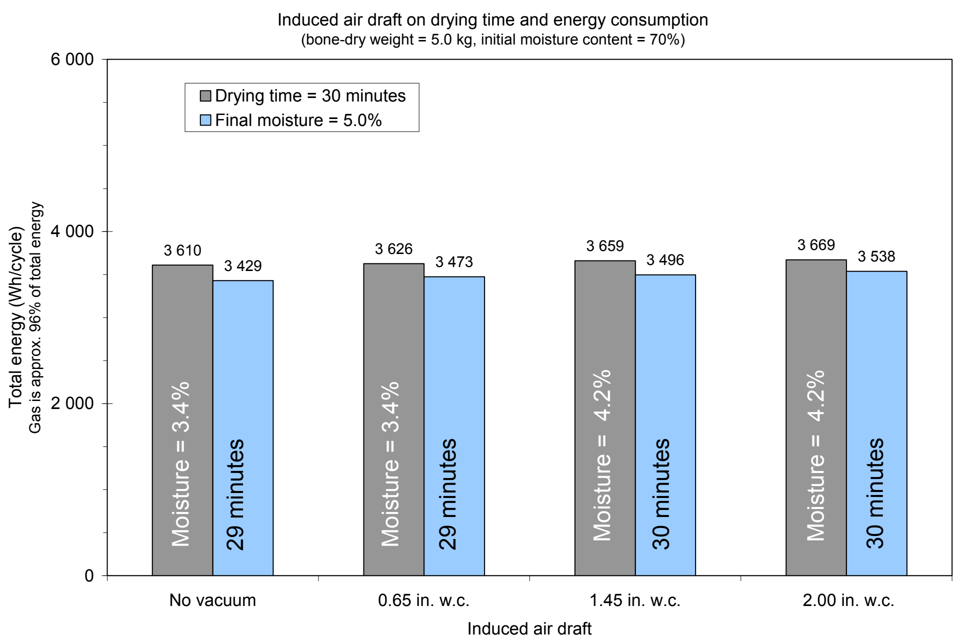


Figure 9: Induced air draft vs. drying time and energy consumption (5.0 kg)

Similar tests were performed for lighter loads (2.0 and 3.5 kg). Results are compared to those obtained using the manufacturer's recommended back pressure of 0.2 in.wc. in Figure 10.

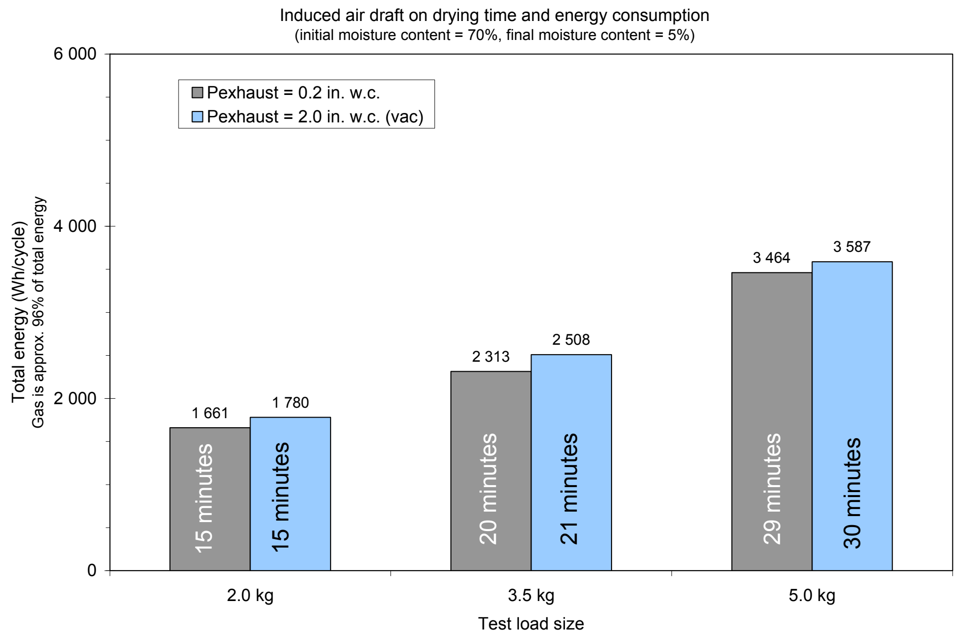


Figure 10: Induced air draft vs. drying time and energy consumption (2.0, 3.5 and 5.0 kg)

As was the case for the 5.0-kg test load, inducing a vacuum at the exit of the dryer had no impact on drying time. However, it did have a slight impact on energy consumption. Indeed, energy consumption increased by 7% for the 2.0-kg test load, 8% for the 3.0-kg test load, and 3.6% for the 5.0-kg test load.

The impact of high vacuum on safety hasn't been studied. Some references mention that an excessive vacuum at the dryer outlet may pull the flame towards lint build-up and create a lint fire.

4.3 MULTIPLE-DRYER INSTALLATION / APPLICATION

More than 18 tests were performed in NGTC's laboratory to study the effect of a common exhaust system control strategy on drying time and energy consumption of a bank of six dryers.

The main objective was to compare the use of a variable-speed drive fan, which modulates its speed depending on the number of dryers in operation, to that of a constant-speed exhaust fan running continuously at its nominal capacity.

Instead of trying to replicate operating conditions, regardless of whether a constant-speed or variable-speed exhaust fan was used, each test series was designed to represent what would have been a state-of-the-art installation in a laundry room. For instance, the end of the collector was left open when the constant-speed exhaust fan was in use, while it was sealed during tests using the variable-speed exhaust fan. Therefore, comparing the two tests has less of a scientific value than a practical one.

The test bench, test load, and monitoring protocol are described in sections 4.3.1 and 4.3.2. The influence of the exhaust control strategy on drying time and dryer energy consumption is presented in section 4.3.3. Section 4.3.4 details the impact of the exhaust control strategy on the static pressure profile along the main collector and on total air flow evacuated to the outside.

4.3.1 Test Bench Description and Test Load

The operation of a multi-residential laundry was simulated in NGTC's laboratory. Six dryers were connected to a 12-inch diameter collector whose evacuation was ensured by a 12-inch exhaust fan manufactured by Exhausto (model MDVS315). The Exhausto fan is a direct-drive high-efficiency fan which impeller has been designed for optimal efficiency. Results presented below may differ if another variable-speed drive fan system was to be used instead.

Figure 11 illustrates the dryers numbered from 1 to 6, the first of which being the farthest from the exhaust fan.

Figure 11: Multiple dryer test bench in NGTC's laboratory

To ensure accurate measurements of the dryers' exhaust static pressure and air flow, all dryer outlets were attached to 24-inch long, 4-inch diameter rigid metal vents. These rigid vents were then connected to the main collector using 4-inch diameter flexible metal vents fixed on 30-degree elbows.

The test load used for this test series was different from the reference test load described in section 4.1.1. Since the exhaust system seems to have more impact on drying time and energy consumption when the load is smaller (section 4.2.6 and 4.2.8), the test load bone-dry weight was set to 3.2 kg (7.0 lb) instead of 5.0 kg (11.0 lb). Note that the standard residential load according to the CGA P.5-M97 method is 7.0 lb.

Moreover, instead of targeting an initial moisture content of 70%, test loads were removed from the washing machine after completion of, rather than during, the spin cycle, in order to resemble more real life situations.

In summary, the standard test load consisted of:

- Fabric: 50% cotton/ 50% polyester blend (units of 22 x 34 in.);
- Test load bone-dry weight: 3.2 kg;
- Test load initial moisture content: 62.5 %.

4.3.2 Monitoring and Testing Protocol

All dryers were monitored for outlet static pressure and air temperature. In addition, dryer #4 was monitored for inlet and outlet air relative humidity, inlet air temperature, and outlet air flow. Total electric and natural gas consumptions were also measured.

Air flow, temperature, and relative humidity at the exit of the main collector were all monitored, as was collector tip static pressure (see Figure 11). Exhaust fan electric consumption was also monitored.

The same evacuation fan was used to study the effect of two different exhaust strategies on drying time and energy consumption; the Exhausto MDVS control system was first turned on to take full advantage of the modulating flow control system and was then turned off to simulate a single-speed exhaust fan.

With the MDVS control system on, the airflow in the collector was controlled by modulating the exhaust fan speed in order to maintain 0.03 in. w.c. of vacuum at the end of the collector. Note that, as in Figure 11, the collector ending was sealed, as specified by the exhaust fan's manufacturer.

For the second test series, the MDVS control system was turned off and the exhaust fan speed manually set in order to remove 1,200 cfm of air (200 cfm of air per dryer), as per dryer manufacturer specifications. Note that in this case the end of the main collector was left open, as it should be done in a real installation, to prevent pulling too much air from the non-operating dryers, and help in equalizing static pressure across the collector.

As mentioned previously, the two test series were not designed to replicate operating conditions, but rather to represent a state-of-the-art installation as recommended by either the dryer manufacturer or exhaust fan supplier.

4.3.3 Drying Time and Energy Consumption

The effect of the evacuation control strategy on drying time and dryers' energy consumption, was studied by carrying out tests with 1, 3, and 6 dryers in operation. Each test was carried out three times to ensure results would be statistically significant.

All test loads were completely dried after a 30-minute period, regardless of control strategy used. Therefore, drying time was estimated using the mass balance method described in section 4.2.3. Drying time evaluation was limited to dryer #4, since it was the only dryer that had all the variables required for the calculation monitored.

Table 8: Effect of evacuation control strategy on average drying time (dryer #4)

Dryers in operation	Control system on (variable flow)	Control system off (1,200 cfm)
Dryer #4	17.5 minutes	17.7 minutes
Dryers #2, 4, and 6	17.8 minutes	18.0 minutes
All dryers	18.3 minutes	18.3 minutes

As Table 8 indicates, modulating air flow through the use of the Exhausto MVDS system had little impact on drying time. At best, drying was completed on average 10 seconds faster when the control system was turned on - a value considered negligible.

The impact of the evacuation system control strategy on dryers' energy consumption has also been evaluated. Results previously illustrated in section 4.2.6 have shown that energy savings of approximately 3% could be expected if a dryer's exhaust was properly controlled.

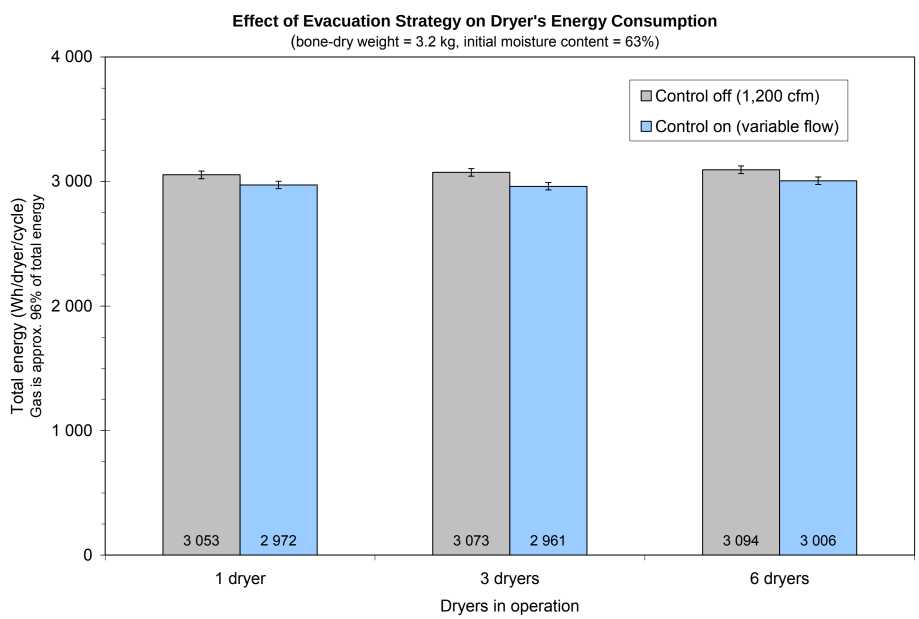


Figure 12: Effect of evacuation control strategy on dryer's energy consumption

Results of section 4.2.6 were confirmed by the test series involving a bank of six dryers. As seen in Figure 12, when the MDVS control system was turned on, savings of 2.7%, 3.6%, and 2.8% were respectively obtained when 1, 3, and 6 dryers were in operation.

4.3.4 Static Pressure and Total Flow Evacuated to the Outside

The parameters most influenced by the control strategy are the pressure profile along the main collector, and total air flow evacuated to the outside. The latter could have a significant impact on a building's heating and cooling costs, as will be described in section 5.4.3.

Figure 13 shows that when the evacuation fan speed was modulating to account for the number of dryers in operation, the pressure profile along the main collector was much more uniform than when the fan speed was kept constant.

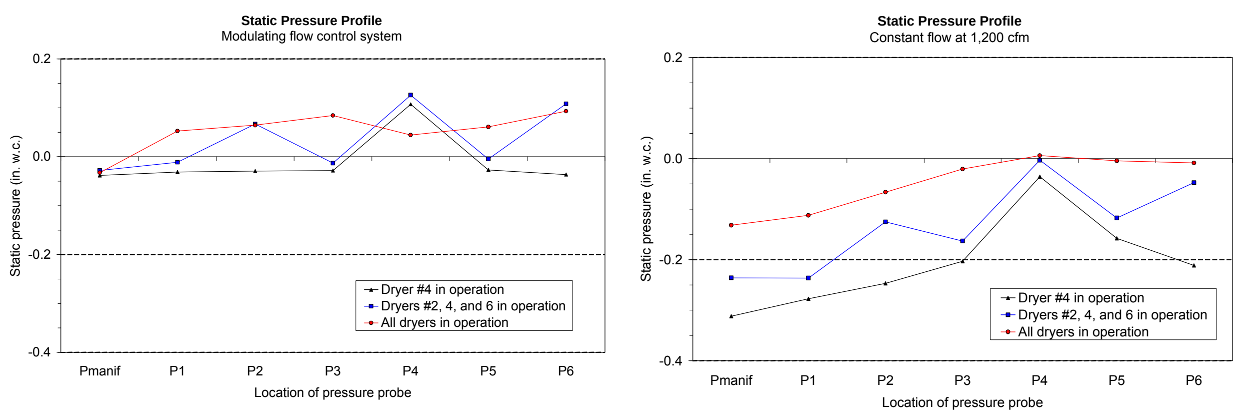


Figure 13: Effect of evacuation control strategy on static pressure profile along manifold

Indeed, the maximal pressure differential between two dryers, when the control system was turned on, was 0.15 in. w.c.; with the control system turned off, the result was 0.25 in. w.c. . This means that when only a few of the dryers were working, a significant vacuum was induced in the non-operating dryers. For instance, when only dryer #4 was in operation, a vacuum of up to 0.3 in. w.c. was induced in dryer #1, and up to 0.2 in.w.c. in all other non-operating dryers. The induced vacuum caused air to be pulled from the environment through the dryers. This in turn caused extra air to flow through the dryers to the outside, resulting in a waste of conditioned air and, consequently, a waste of energy. Note that if the collector end had been sealed, it is possible that the amount of air pulled through the dryers would have been less significant. However, such installations are not recommended.

This is clearly illustrated in Table 9, which shows the air flow evacuated to the outside when 1, 3, and 6 dryers are in operation.

Table 9: Effect of evacuation control strategy on total flow evacuated

Dryers in operation	Control system on (variable flow)	Control system off (1,200 cfm)
Dryer #4	197 cfm	1,215 cfm
Dryers #2, 4, and 6	337 cfm	1,237 cfm
All dryers	704 cfm	1,221 cfm

As seen in the table above, it is evident that the MVDS control system worked perfectly and ensured that only drying air emanating from the dryers in operation was exhausted to the outside. In contrast, when the fan was manually set to evacuate 1,200 cfm, a significant amount of conditioned air was lost to the outside, especially when only a few of the dryers were in operation. Indeed, approximately 1,000 cfm was unnecessarily evacuated when only one dryer was in operation; similarly, 900 cfm were lost when three dryers were in operation, as were 500 cfm when all dryers were functioning.

It should be noted that when designing the exhaust system, the dryer manufacturer recommends ensuring that the system is able to handle a total of 200 cfm per dryer. However, as numerous laboratory results have shown in section 4.2 and in Table 9, rarely more than 120 cfm per dryer were required. This contributed to an additional 80 cfm of air per dryer being evacuated needlessly to the outside.

4.4 LABORATORY TEST RESULTS SUMMARY

The key results presented in sections 4.2 and 4.3 are summarized below. It should be noted that these results refer to experiments performed in NGTC's laboratory, and they may differ from one installation to another.

- Ending the drying cycle as soon as clothing is dry, instead of waiting for the complete cycle duration, could lead to energy savings of up to 25%;
- Drying fewer heavier loads is more cost-effective than drying multiple lighter loads. Drying time could be reduced by 22%, accompanied by an 18% decrease in energy consumption;
- Reducing initial moisture content from 70% to 55% by replacing older washing machines by newer ones, could represent energy savings of up to 20%;
- Failing to properly clean the dryer exhaust, and thereby significantly increasing back pressure, could raise drying time by up to 80% and contribute to a 10% increase in energy consumption;
- Inducing an excessive vacuum at the dryer outlet, as is the case when the exhaust fan is not properly sized, could contribute to increasing a dryer's energy consumption by 2% to 8%;
- Using an MVDS control system has little impact on drying time but could contribute to a decrease in dryers' energy consumption by 3%, while preventing up to 10 times more conditioned air than necessary from exhausting to the outside;
- Additional electricity savings are expected when switching from single-speed drive fans to variable-speed drive fasn as most of the time the former ones have a belt-drive as opposed to a direct drive. Exhausto's estimates their fan is at least 5-10% more efficient than other fans, regardless of their control system.

5.0 ON-SITE MONITORING

Whereas section 4.0 dealt with results obtained in laboratory, this section presents on-site monitoring results of laundry gas-dryers located in the greater Toronto area.

The objective was to monitored a few laundry rooms equipped with electric dryers for at least one month. Then, electric dryers were replaced by natural gas-fired dryers, and also monitored for a period greater than one month.

The on-site monitoring was made possible through the collaboration of Sparkle Solutions, a company providing on-premises laundry services. Sparkle Solutions collaborated with NGTC in easing the installation of monitoring equipment, converting the laundry from electric to natural gas-fired dryers, and coordinating all activities requiring the support of electricians or plumbers.

The following sections aim at portraying the three laundries under investigation (section 5.1); detailing monitoring protocol (section 5.2); outlining key results (section 5.3); studying the effect of exhaust strategies on clothes dryer operation (section 5.4); and, finally, summarizing key findings (section 5.5).

5.1 SITE DESCRIPTION

The present study was carried out in multi-residential buildings owned by the Toronto Community Housing (TCH). TCH is the largest social housing provider in Canada and the second largest in North America.

NGTC's site selection criteria were such that laundry rooms had to be as representative of typical multi-residential laundries as possible. NGTC also requested that the three main dryer exhaust system types (individual, common non-fan-assisted, and common fan-assisted exhaust) be represented.

Sparkle Solutions selected three (3) laundries from among TCH buildings, based on NGTC's criteria. Sparkle Solutions specializes in providing on-premises laundry services and is TCH's route operator. The three different sites selected are described in Table 10.

It should be noted that Sparkle Solutions was not aware of any laundry whose dryers were commonly evacuated to the outside without being assisted by an exhaust fan. It seems that such an exhaust strategy is not typical of laundry installations, at least in the greater Toronto area. For this reason, the three main exhaust system types originally desired were not represented.

Table 10: On-site monitoring - site description

Site A

- Laundry room located in basement;
- Nine (9) dryers and nine (9) washing machines;
- Six dryers located near the outside wall, with three dryers located 6 feet from outside wall;
- Dryers individually vented to the outside (one foot from ground level).

Site B

- Laundry room located in basement;
- 30 dryers and 33 washing machines;
- One duct running throughout laundry room to evacuate dryers' exhaust to the outside;
- Site originally housed a constant-speed exhaust fan connected to the main duct. In the course of the project, two (2) variable-speed Exhausto-manufactured exhaust fans replaced constant-speed exhaust fan.

Site C

- Laundry room located on ground floor;
- 17 dryers and 15 washing machines (ground floor);
- Dryers individually vented to the outside;
- Drying air taken from an enclosed area located between dryers and outside wall.

The monitored dryers were all Whirlpool Advantech® models, except for Site B gas-fired dryers. The Whirlpool Advantech® dryer is the model typically installed by Sparkle Solutions. Dryer specifications are shown in the next table.

Table 11: Electric and gas-fired dryer specifications

	Electric dryers (all sites)	Gas-fired dryers (Sites A and C)	Gas-fired dryers (Site B)
Brand (model)	Whirlpool (CEP2760KQ2)	Whirlpool (CGE 2761kQ2)	Huebsch (hdfx09wf11102)
Drum volume (ft^3)	7.4	7.4	7.0
Heater/burner rating	5,600 W	22,000 Btu/h	25,000 Btu/h
Motor rating	500 W	500 W	600 W

5.2 ON-SITE MONITORING PROTOCOL

Four dryers per site were monitored and their locations within the laundry rooms chosen in such a way that they represented, as much as possible, other dryers located in the laundry area. Whenever possible, monitored dryers were located away from each other, and were uniformly distributed within the room. Note that it was decided to locate all Site B monitored dryers in the same section of the laundry room because it was not feasible to safely wire the monitoring devices across the room. Refer to Appendix B for laundry room layout, location of monitored dryers, and exhaust system configuration.

Table 12: On-site monitoring variables

	Electric dryers	Gas-fired dryers
One measurement per dryer		
Inlet air temperature (^oC)	x	x
Outlet air temperature, exhaust duct (^oC)	x	x
Outlet static pressure, exhaust duct (in. w.c.)	x	x
Electric consumption, heater only (Wh)	x	
Electric consumption, motor and controls only (Wh)		x
Natural gas consumption (ft^3)		x
One measurement per site		
Ambient air temperature (^oC)	x	x
Ambient air relative humidity (% R.H.)	x	x
Barometric pressure (hPa)	x	x
Site B only, with Exhausto system installed		
Exhausto fan electric consumption (Wh)		x
Exhausto fan drive signal (0 – 10V)		x
Static pressure probe (Pa)		x

Table 12 shows variables that were monitored at every site. Each site was equipped with a Squirrel 2040 data logger from Grant Instruments. The Squirrel 2040 data logger has 32 universal inputs and 4 digital inputs (used for electrical consumption measurements). All variables were computed by the Squirrel 2040 data logger at every second and recorded every minute. Micro data loggers were used in combination with the Squirrel 2040 to monitor gas consumption. Table 13 describes the different monitoring devices that were installed on-site to gather information on the operation of the electric and gas-fired dryers.

Table 13: On-site monitoring devices

Temperature	"T" type thermocouples
Relative humidity	Vaisala HMP235 humidity and temperature probes
Pressure	Modus t30-010 (0 – 1 in. w.c.) and Setra 264 (0 – 2.5 in.w.c.) pressure transmitters
Barometric pressure	Setra 276 (800 – 1,100 mbar) transmitters
Electricity	Wattnode WNA-3Y-208-P
Gas	Canadian Meter AL225 volumetric diaphragm meters
Data acquisition 1	Grant Instruments. Squirrel 2040, 24 bits. 32 universal inputs data logger
Data acquisition 2	Architectural Energy. Micro Data Logger Model 202. 4 inputs used for pulse collection

5.3 ON-SITE MONITORING RESULTS

Each dryer was monitored for at least 35 consecutive days, though monitoring periods often lasted more than 50 days, exceeding even 100 days in the monitoring of Site B electric dryers. Consequently, results presented hereinafter are based on more than 35,000 hours of monitoring.

The following sections present the dryers' weekly operating time (section 5.3.1), laundries' daily utilization profiles (section 5.3.2), and average energy consumptions of electric and natural gas-fired dryers (section 5.3.3).

5.3.1 Dryer weekly operating time

The average weekly operating time per dryer was estimated using two different methods: one based on electricity consumption (as measured by the monitoring equipment), and the other one based on financial revenues generated by each dryer (provided by Sparkle Solutions). Refer to Appendix C for more details on the two methods.

Both methods of estimating weekly operating time need to be accurate enough so that results obtained using one method resemble results obtained using the other method.

The monitoring equipment calculations of dryer operating time should be more accurate for natural gas-fired dryers than for electric dryers, as explained in Appendix C. It is therefore expected that differences between the two calculation methods (monitoring equipment and revenues generated) would be greater for electric dryers than for natural gas-fired dryers.

Moreover, dryer users may be paying for more minutes than what they really use (they might remove dry clothes from a dryer even though the drying cycle is not completed such as during the cool down cycle). Thus, one should expect, in all cases, the average weekly operating time calculated by revenue to be slightly higher than that calculated according to electricity consumption.

Table 14 shows the average weekly operating time per dryer depending on the calculation method used. Refer to Appendix C for more details on the two methods.

Table 14: Average weekly operating time per calculation method used (min/week)

	Site A			Site C		
	Electric consumption	Revenues	Difference	Electric consumption	Revenues	Difference
Electric dryers						
Dryer #1	1,856	968	-48%	876	1,032	+18%
Dryer #2	1,672	1,075	-36%	931	1,102	+18%
Dryer #3	1,438	375	-74%	1,477	795	-86%
Dryer #4	1,681	489	-71%	888	1,027	+16%
Gas-fired dryers						
Dryer #1	1,767	1,660	-6%	880	963	+9%
Dryer #2	1,297	193	-85%	1,033	1,071	+4%
Dryer #3	1,660	1,573	-5%	1,658	1,523	-8%
Dryer #4	1,205	1,110	-8%	871	914	+5%

It is worth noting that daily revenues generated by Site B dryers were not available since no card payment system has been installed in that particular laundry.

Overall, the average weekly operating times calculated using the two different methods were similar, with the exception of a number of measurements, highlighted in grey in Table 14. For all Site A electric dryers, Site C dryer #3, and Site A dryer #2, operating time calculated according to revenues was 35 to 90% lower than the operating time derived from electric consumption No explanation could be found, other than the possibility that dryers may have been operating even though no payment was made. This information was fed back to Sparkle Solutions, to enable them to verify whether the card payment system was functioning properly.

Site C electric dryers' operating time, calculated using revenues, was on average 18% greater than the operating time calculated according to electric consumption. This is not surprising, since dryers may have been functioning while the heater element was off (such as during the cool-down cycle). In addition, as mentioned earlier, it is also possible that dryer users stopped the drying machine prior to completion of the cycle even though they had paid for further minutes.

For all other results, in terms of average weekly operating time calculated, those based on either electric consumption or revenues generated were within 10% of each other. This indicates that results are reliable and could be used to characterize the average dryer utilization rate.

From the results presented in Table 14, it is fair to assume that the average weekly operating time of electric dryers was 18% longer than the average weekly true operating time calculated using the monitoring equipment. Similarly, the operating time of natural gas-fired dryers was 5% greater than the calculations yielded by the monitoring equipment. In line with this, Table 15 summarizes the monitoring period and average operating time per site, based on the corrections mentioned above.

Table 15: On-site monitoring period and dryer average operating time per week

	Site A	Site B	Site C
Electric dryers			
Period	Sept 17, 2006 – Nov 11, 2006	Sept 17, 2006 – Jan 6, 2007	Oct 1, 2006 – Nov 11, 2006
Duration (days)	56	112	42
Average operating time (min/week)	1,960	1,210	1,230
Gas-fired dryers			
Period	Dec 24, 2006 – Jan 27, 2007	March 10, 2007 – September 22*,**	Nov 19, 2006 – Jan 13, 2007
Duration (days)	35	96	54*
Average operating time (min/week)	1,556	757	1,166

* Data missing on Dec 1 and Dec 7, 2006

** Dryers were not monitored continuously during this period. Instead, they were monitored between March 10 and April 19, July 19 and August 8, and August 12 and September 22, 2007

Based on results presented in Table 15, it is fair to assume that dryers located in the laundry room of multi-housing buildings operate on average 1,300 minutes per week. This result will be used at a later time to estimate the potential annual savings of different laundry exhaust system configurations.

5.3.2 Laundry utilization profile

In multi-residential laundry rooms, there should be enough washing machines and clothes dryers to accommodate tenants during rush hours, typically at nights or during weekends. Outside of rush hours, there are usually too many appliances for what is actually needed, so that building occupants use only a small fraction of the available machines.

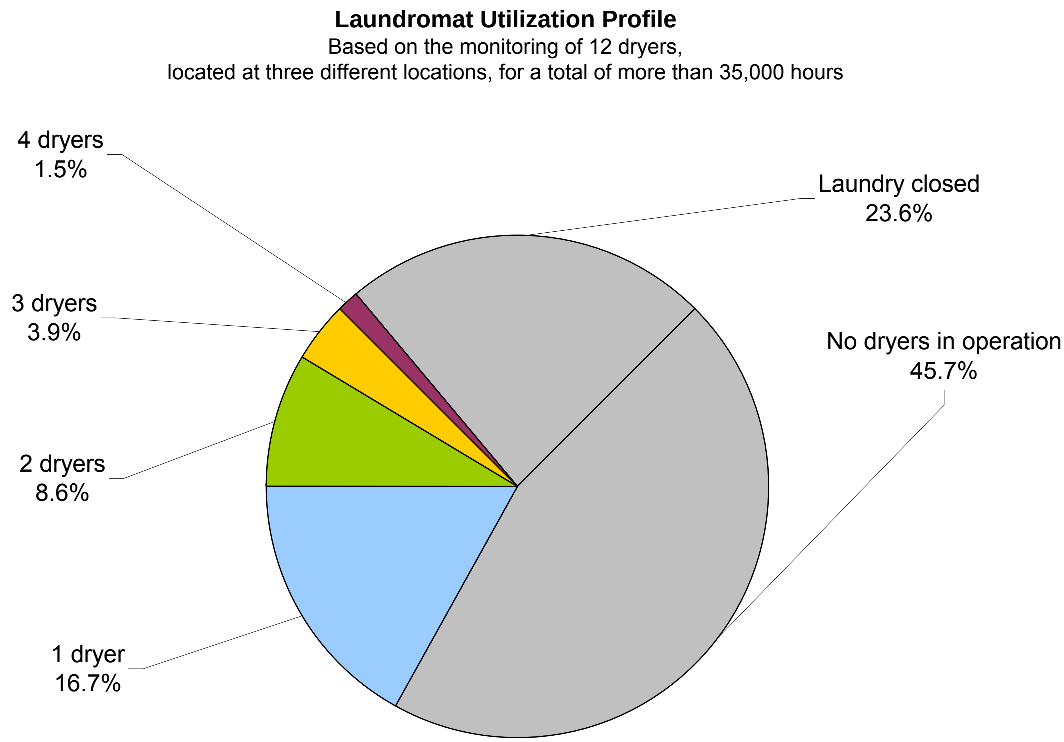


Figure 14: Laundry utilization profile

Recall that electric and natural gas dryers were monitored for a total of more than 35,000 hours. Statistics were derived from these measurements in order to quantify the average laundry utilization profile. As demonstrated in Appendix D, results from one site to another were very similar (standard deviation = 3.0%). The average utilization profile, shown in Figure 14, can therefore be considered representative of a typical multi-residential social housing laundry.

It is surprising to note that for approximately 16 hours per day (70% of the time), none of the monitored dryers were used by building tenants. Even more unforeseen is that all dryers were operating simultaneously on average only 22 minutes per day. The fact that most of the time no dryers are in operation represents a good opportunity to save energy through the installation of an appropriate exhaust system, as described in section 5.4.

5.3.3 Dryer energy consumption

When it comes to deciding whether to install electric or natural gas-fired clothes dryers, the key aspect is operating cost. Natural gas-fired dryers are often said to be cheaper to operate than electric dryers. Indeed, the Office of Energy Efficiency stipulates on its website that "*Natural gas offers an economical alternative to an electric dryer. In areas where the cost of natural gas is significantly lower than electricity, you'll save even more money*"[4]. However, to our knowledge, no specific information exists in the open literature regarding which utility rates will favor one dryer type versus another. This section addresses that issue, based on the on-site monitoring results.

Another popular belief is that natural gas-fired dryers dry clothes faster than electric dryers. This was not specifically investigated in this study. However, no clear trend was observed when investigating the average operating time per week of electric and natural gas fired-dryers. A previous study performed by NGTC showed that drying times of electric and natural gas-fired dryers are similar (NGTC, 2001). Therefore it is fair to stipulate that the duration of a drying cycle is similar for the two dryer types.

Table 16: Dryers' energy consumption

	Site A	Site B	Site C
Electric dryers			
Specific electric consumption (Wh/min)*	54.4	58.3	62.0
Coincident electric consumption peak (kW) **,***	3.2	4.3	4.1
Natural gas-fired dryers			
Specific electric consumption (Wh/min)	3.1	4.7	2.9
Coincident electric consumption peak (kW) **	0.2	0.3	0.2
Average specific gas consumption (10^{-3} m^3/min)	7.2	6.0	6.9

* includes 3.0 Wh/min for dryer motor and controls as per gas dryer monitoring

** weekdays between 6 am and 6 pm

*** include 0.2 kW for dryer motor and controls as per gas dryer monitoring

As seen from Table 16, the use of natural gas clothes dryers can significantly decrease the electric bill to the detriment of the natural gas bill, which would imply an increase. On average, we have observed that switching from electric to gas dryers decreases electric consumption by 71 kWh/week and increases gas consumption to 8.7 m^3/week, based on 1,300 minutes of operation per week.

[4] http://oee.nrcan.gc.ca/publications/infosource/pub/home/Buying_and_Using_EE_Appliances_Section06.cfm?text=N&printview=N

In addition, the reduction of the coincident electric consumption peak is estimated to be around 4.0 kW per dryer installed. This could significantly reduce the electrical circuit installation cost for new buildings, as well as the cost associated with peak electricity demand for large laundries.

Whether or not it is cheaper to operate gas dryers than electric ones depends on utility rates. The cost structures of natural gas and electric utilities are different and make a cost analysis rather complicated. For instance, fixed monthly fees differ, and rates may depend on monthly consumption, among other factors. Instead of considering the cost structure of each utility, an average cost per unit of energy delivered was used to derive a figure showing the annual savings associated with the use of natural gas-fired dryers (Figure 15).

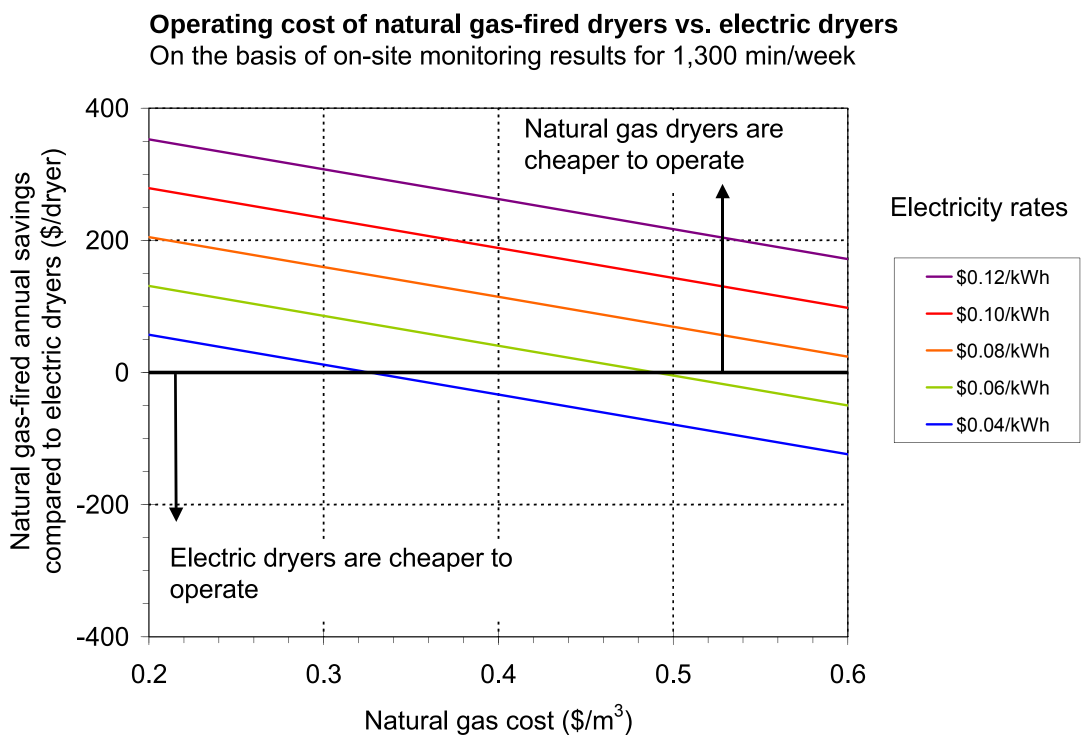


Figure 15: Operating cost of natural gas-fired vs. electric dryers

As illustrated in Figure 15, for most utility rate scenarios, natural gas dryers are cheaper to operate than electric dryers. In fact, natural gas dryers are always cheaper to operate when the electricity cost is higher than \$0.08/kWh and the natural gas cost lower than \$0.60/m^3. When natural gas costs \$0.40/m^3 and electricity \$0.10/kWh, the savings associated with the operation of natural gas-fired dryers could reach as much as $200/year, representing approximately 70% of the annual operating cost of electric dryers.

5.4 EXHAUST STRATEGY

A dryer's exhaust strategy is said to have an influence on drying time, as well as on the appliance's energy consumption. As shown in section 4.0, the exhaust system can indeed have a slight influence on dryer operation in some conditions. The effect of the exhaust system in real-life situations was explored through the analysis of on-site monitoring results.

Sections 5.4.1 and 5.4.2 describe the operation of clothes dryers when they are respectively individually and collectively vented to the outside; section 5.4.3 explores the potential annual savings associated with the installation of a variable-speed drive exhaust fan.

5.4.1 Dryers individually vented to the outside

As specified in most dryer installation manuals and best practices guides, it is always recommended to evacuate dryers individually to the outside via the shortest possible route. Not only are such installations cheaper to install than a common exhaust system, but doing so ensures air is only evacuated to the outside when necessary.

Table 17: Average operation conditions of dryers individually vented to the outside

	Site A			Site C		
	T_{in} (°C)	T_{out} (°C)	P_{out} (in. w.c.)	T_{in} (°C)	T_{out} (°C)	P_{out} (in. w.c.)
Electric dryers	**26.8**	**52.1**	**0.38**	**18.4**	**36.6**	**0.00**
Dryer #1	24.9	54.0	0.30	12.6	42.5	0.00
Dryer #2	25.0	52.8	0.15	20.7	48.2	0.00
Dryer #3	28.2	49.1	0.58	17.4	23.1	0.00
Dryer #4	29.1	52.5	0.48	23.0	32.5	0.02
Natural gas dryers	**26.8**	**51.7**	**0.40**	**13.3**	**33.8**	**0.02**
Dryer #1	25.2	55.0	0.22	7.8	50.0	0.00
Dryer #2	25.3	51.5	0.20	14.0	39.5	0.00
Dryer #3	28.3	51.4	0.62	10.8	16.7	0.00
Dryer #4	28.4	48.9	0.53	20.6	28.8	0.07

Two of the three monitored laundries in Toronto had dryers individually exhausted to the outside (Site A and Site C). The average operating conditions, per dryer, are presented in Table 17.

As seen in the table above, there are no significant differences between the operation of electric and natural gas-fired dryers. The outlet air temperature is similar, as is the exhaust duct back pressure.

Recall that Site A dryers were located in the basement but were individually vented to the outside one level above. Dryers #1 and #2 were directly beside the outside wall, while dryers #3 and #4 were a couple of feet from it, as indicated in Appendix B. The fact that dryers #3 and #4 were farther away from the outside wall explains the higher back pressure at their outlets. However, this had no impact on the operation of the dryer nor on its energy consumption.

The inlet temperature readings of Site A dryers are misleading; they do not signify that ambient air temperature in the laundry room was around 27^{o}C. A dryer's air intake is generally located on the back of the machine, so the temperature probe was taped to the wall behind the dryers. Dryers emit energy when they are functioning, resulting in an air temperature increase slightly above the ambient temperature in the gap between the wall and the dryers.

Operating conditions of Site C dryers differed slightly from the operation of Site A dryers. As explained earlier, the air intake of Site C dryers was located in an enclosed space open to the outside air. This is the reason why the air inlet temperature was lower than the inlet air temperature of Site A dryers. It also explains why the air inlet temperature was lower when natural gas dryers were monitored (November – January) than when electric dryers were monitored (October – November). The lower temperature apparently had no clear impact on the dryers' energy consumption.

Contrary to Site A dryers, the dryers at Site C were located on the ground level, all very close to the outside wall. Pressure gauges inserted in the exhaust ducts indicate that the ducts were at atmospheric pressure even when dryers were in operation. This could explain the fact that air outlet temperatures were lower than they should have been; there was probably some mixing with the outside air in the exhaust duct.

Site A and Site C dryers were individually exhausted to the outside. Where possible, this is the most efficient way of dealing with drying air. It minimizes issues related to the accumulation of lint, evacuates to the outside only what is necessary, and prevents cost associated to exhaust fans. Considering that dryers operate an average of 1,300 minutes per week, and 120 cfm per dryer are evacuated to the outside during operation, the loss of conditioned air per dryer is 630 m^3/day/dryer (22,300 ft^3/day).

5.4.2 Dryers collectively vented to the outside

One of the three monitored laundries in Toronto (Site B) had dryers commonly exhausted to the outside via a common duct running throughout the laundry room (Appendix B). Each dryer was connected to the main duct using 4-inch diameter flexible metal vents. The laundry room was located in the basement, beside the indoor garage. An exhaust fan, placed in the mechanical room beside the laundry room, ensured air was evacuated to the outside, one level above.

The system also comprised a pressure limit switch, installed a couple of feet from the exhaust fan and hooked on to the main natural gas valve. This had the function of turning off the supply of natural gas in case of an exhaust fan failure. It was not possible to determine the pressure at which the pressure limit switch was set.

Throughout the study, the exhaust system was optimized to minimize the amount of conditioned air evacuated to the outside, and reduce the operating cost associated with this exhaust system. The following table summarizes the five different exhaust strategies that were deployed and investigated all through the study.

Table 18: Site B modifications to exhaust system throughout the study

	Monitoring Period	Dryer Type	Exhaust System
A	Sept 17, 2006 – Jan 6, 2007	Electric	Large single-speed drive fan
B	March 10 – April 19, 2007	Natural gas	Exhausto fan (MDVS500), continuously at 100% capacity
C	July 19 – August 8, 2007	Natural gas	Two Exhausto fans (MDVS500), set at 0.16 in.w.c. vacuum
D	August 12 – Sept 22, 2007	Natural gas	Two Exhausto fans (MDVS500), set at 0.09 in.w.c. vacuum

<u>Monitoring period A</u>

At the beginning of the project, all Site B dryers were electric and a large exhaust fan running continuously at full speed ensured the evacuation of drying air to the outside.

The dryers' average air inlet temperature was around 40°C at the beginning of the monitoring period, decreasing to 15°C at the end of the monitoring period, in January. The decrease in air inlet temperature was due to the fact that the laundry room, adjacent to the indoor garage, was not heated, so that the ambient air temperature fell as it became colder outside. The reduction in air inlet temperature had no clear impact on dryers' energy consumption.

The air temperature at the outlet of the dryers was on average between 50 and 60°C.

When installing the static pressure monitoring probe, a decision had to be made whether to mount the probe so that it measured a positive or a negative static pressure at the dryers' outlet. At the time the pressure probes were put in, a vacuum of 1.2 in.w.c. was measured at the outlet of the dryers

The problem was resolved in November 2006 by modifying the monitoring strategy. The dryer #3 pressure probe was relocated to the outlet of dryer #2, so that a reading would be possible whether the dryer outlet pressure was positive or negative.

Consequently, we were able to determine that, generally, the static pressure at the outlet of each dryer was between 0.1 and 1.0 in.w.c. (vacuum) when the machines were in operation, and between 0.2 and 1.0 in.w.c. (vacuum) when they were not in operation.

<u>Monitoring period B</u>

All electric dryers were replaced by natural gas-fired dryers. At the same time, an Exhausto MDVS500 fan replaced the large exhaust fan. The fan was not connected to any control system and was therefore running continuously at full speed.

The Exhausto fan was delivered directly to Sparkle Solutions, who took charge of its installation. It is important to point out that it is usually Exhausto personnel themselves, or staff from an associated company, that take care of the installation.

Standard Exhausto installations require the gas pressure limit switch to be connected to the Exhausto control system in order to ensure its adequate operation. As the installation was not performed by personnel from either Exhausto or Wesmech (Exhausto's service company in Toronto), the gas pressure limit switch was initially not hooked up to the Exhausto control system.

The Exhausto system tends to limit the amount of air evacuated to the outside, whereas the original fan was evacuating a significant air volume. As a result, the static pressure at the location of the pressure limit switch was lower after installation of the Exhausto fan. It was not possible to verify at what pressure the limit switch had been set, nor was it possible to modify its setting. Consequently, since the vacuum generated by the Exhausto fan proved insufficient, the exhaust fan operation was frequently not "seen" by the pressure limit switch which, in turn shut off the natural gas supply for safety reasons. This had the effect of reducing considerably the dryers' running time and generating some complaints from tenants. This probably would have never happened if trained staff had completed the installation.

In April 2007, a meeting took place between Wesmech, Sparkle Solutions, Enbridge Gas Distribution, and NGTC. Wesmech personnel realized that the initial laundry room dimensions they had for the system design were inaccurate and clearly underestimated. Wesmech personnel took all measurements required for the design, and concluded that a second fan would be needed. The second fan was installed in June 2007.

Prior to the installation of the second Exhausto fan, the air inlet temperature increased from 12^{o}C at the beginning of the monitoring period to 24^{o}C as the weather got warmer outside. The dryer air outlet temperature varied from 50 to 65^{o}C.

Although the installation of the Exhausto fan had not been executed properly, the operation of the exhaust system was very smooth and stable. The static pressure readings at the dryers' outlet during operation ranged between 0.20 and 0.45 in. w.c. (vacuum), and between 0.45 and 0.50 in. w.c. (vacuum) when not operating.

The electric consumption of the Exhausto fan was approximately 210 kWh/week (1,300 W x 24 hours x 7 days).

Monitoring period C

In June 2007, the second Exhausto fan was installed. NGTC, Wesmech and Sparkle Solutions were present at the time of the installation. The pressure limit switch was not connected to the Exhausto control system because the electrician who installed the VFD (variable frequency drive) and other monitoring components had no time to complete the installaton.

To prevent the pressure limit switch from shutting off the natural gas supply, the Exhausto system was set so that 0.16 in w.c. (vacuum) would be maintained in the main exhaust duct.

As was the case during the monitoring period B, the exhaust system operation went smoothly and proved reliable.

The dryers' inlet temperature varied between 25 and 30°C, and dryer outlet temperature between 50 and 65°C.

Average back pressure of dryers ranged between 0.17 and 0.24 in.w.c. when dryers were operating, and between 0.02 and 0.07 in.w.c. (vacuum) when they were not in operation.

The Exhausto system maintained 0.16 in.w.c. (vacuum) in the main exhaust duct as it was supposed to. Exhaust fan electric consumption varied between 150 W and 600 W, but consumed on average 225 W, i.e. 38 kWh/week.

Monitoring period D

The pressure limit switch was finally hooked up to the Exhausto control system in September 2007 so that final adjustments could be made to the system. According to Wesmech personnel recommendations, this was set to 0.09 in .w.c. (vaccum)

The dryers' inlet temperature varied between 25 and 30°C, with their outlet temperature between 50 and 65°C.

The average back pressure of the dryers ranged between 0.2 and 0.3 in.w.c. when dryers were in operation, and between 0.02 and 0.07 in.w.c. (vacuum) when they were not operating.

The Exhausto system maintained between 0.07 and 0.09 in.w.c. (vacuum) in the main exhaust duct. Exhaust fan electric consumption varied between 190 W and 480 W, but consumed on average 150 W, i.e. 25kWh/week.

Summary

The following table summarizes the average dryer operating conditions for each exhaust strategy presented in Table 18.

Table 19: Average operating conditions of dryers commonly vented to the outside

	Air temperature		Static pressure at dryer outlet		Dryer Energy Consumption		Exhausto System	
	T_{in} (^oC)	T_{out} (^oC)	When operating (in. w.c.)	When not operating (in. w.c.)	Electric (wh/min)	Gas (10^{-3} m^3/min)	P_{avg} (in.w.c.)	Electric consumpt. (W)
A	24	50	0.1 – 0.8 (vacuum)	0.1 – 1.2 (vacuum)	58.3	n/a	n/a	n/a
B	17	61	0.3 – 0.5 (vacuum)	0.4 – 0.5 (vacuum)	4.8	7.8	n/a	1300
C	30	62	0.2	0.11 (vacuum)	4.8	7.9	0.17 (vacuum)	225
D	27	60	0.2 – 0.3	0.05 – 0.1 (vacuum)	4.8	7.0	0.09 (vacuum)	150

5.4.3 Savings associated with the installation of a variable-speed drive exhaust fan

Exhaust fans are usually sized so they can handle the airflow when all dryers are in operation. Because all dryers rarely operate simultaneously, a single-speed exhaust fan is, most of the time, oversized. Compared to a variable-speed exhaust fan, which adjusts its speed depending on the number of dryers in operation, a single-speed exhaust fan is, therefore, more expensive to operate.

As shown in Figure 14, all dryers in a laundry room operate simultaneously less than 1.5% of the time (22 minutes per day). This implies that for 98.5% of the day, air is being unnecessarily exhausted to the outside when a single-speed drive fan is used. Because air is usually conditioned in laundry rooms, this adversely affects the space heating and cooling cost of the building.

One could apply the following rules of thumb to estimate heating and cooling costs associated with the use of a single-speed exhaust fan. Refer to Appendix E for more details on these two equations.

$$Lost_{heating}\left(\frac{m^3_{gas}}{year}\right) = \frac{DD_{heating} \cdot Nb_{dryers}}{\varepsilon_{heating}} \times 0.23$$

$$Lost_{cooling}\left(\frac{kWh}{year}\right) = \frac{DD_{cooling} \cdot Nb_{dryers}}{\varepsilon_{cooling}} \times 2.3$$

For instance, for a 10-dryer laundry room located in Toronto, assuming the average annual efficiency of the heating system is 80% and that of the cooling system is 700%[5], then the cost associated with the loss of conditioned air is approximately:

$$Lost_{heating} = \frac{4{,}066 \cdot 10}{80\%} \times 0.23 = 11{,}700 \frac{m^3_{gaz}}{year}$$

$$Lost_{cooling} = \frac{252 \cdot 10}{700\%} \times 2.3 = 800 \frac{kWh}{year}$$

The above rule of thumb is valid only when:

- The laundry utilization profile resembles the one presented in section 5.3.2;
- The single-speed exhaust fan being replaced is designed to evacuate 200 cfm per dryer, 24 hours per day;
- The laundry room is conditioned to 18°C year-round.

In addition to savings associated with the evacuation of exhaust air to the outside, significant electricity savings could be achieved due to the exhaust fan modulation capacity. Indeed, when running at full speed, Site B's Exhausto system consumed 1,300 W continuously, while the average consumption when properly designed was 150 W. This corresponds to annual savings of 8,800 kWh.

Note.

Savings reported were obtained using the Exhausto's MVDS fan and PID control system. Results may differ if another variable-speed drive fan system was to be used instead. Additional electricity savings are expected when switching from single-speed drive fans to variable-speed drive fans as most of the time the former ones have a belt-drive as opposed to a direct drive. Exhausto's estimates their fan is at least 5-10% more efficient than other fans, regardless of their control system.

[5] Recommended IPVL for water-cooled electric chillers = 0.5 kW/ton, COP = $(0.5\ kW/ton)^{-1}$ = 2.0 ton/kW = 2 ton/kW *3.517 kW/ton = 7.0
Reference: DOE, « How to Buy an Energy-Efficient Water-Cooled Electric Chiller », http://www1.eere.energy.gov/femp/pdfs/wc_chillers.pdf

5.5 ON-SITE MONITORING SUMMARY

The key results presented in sections 5.3 and 5.4 are summarized below.

Dryer utilization profile

- Results presented hereinafter are based on more than 35,000 hours of monitoring;
- Dryers located in the laundry rooms of multi-housing buildings operate on average 1,300 minutes per week;
- Approximately 16 hours per day (70% of the time), none of the monitored dryers were used by building tenants;
- All dryers operated simultaneously on average only 22 minutes per day.

Dryer energy consumption

- Switching from electric to gas dryers will decrease electric consumption by 71 kWh/week and increase gas consumption to 8.7 m^3/week (based on 1,300 minutes of operation per week);
- The reduction of the coincident electric consumption peak is estimated to be around 4.0 kW per dryer installed;
- For most of the utility rate scenarios, natural gas dryers are cheaper to operate than electric dryers;
- Natural gas dryers are always cheaper to operate when the electricity cost is higher than \$0.08/kWh and the natural gas cost lower than \$0.60/m^3

Exhaust strategy and loss of conditioned air

- When dryers are commonly exhausted to the outside using an exhaust fan designed to remove 5.7 m^3/min (200 cfm) per dryer at all time, the loss of conditioned air to the outside is estimated to be around 8,200 m^3/day/dryer;
- By using a variable-speed drive fan, which controls its speed depending on the number of dryers in operation, the loss of conditioned air is reduced to 1,200 m^3/day/dryer;
- Providing that duct runs of less than 4.2 meters (14 feet) are necessary, the most efficient way of dealing with drying air is to individually exhaust dryers to the outside. The loss of conditioned air per dryer is only 1 100 m^3/day/dryer.

Exhaust strategy and annual savings

- One could apply the rules of thumb presented in section 5.4.3 to estimate heating and cooling costs associated with the use of a single-speed exhaust fan;
- When a common exhaust strategy if retained, additional electricity savings could be achieved through exhaust fan modulation capacity. As was demonstrated for Site B, electricity savings could reach 8,800 kWh/year;
- Additional electricity savings are expected when switching from single-speed drive fans to variable-speed drive fans as most of the time the former ones have a belt-drive as opposed to a direct drive. Exhausto's estimates their fan is at least 5-10% more efficient than other fans, regardless of their control system.

Note.

Savings reported were obtained using the Exhausto's MVDS fan and PID control system. Results may differ if another variable-speed drive fan system was to be used instead.

6.0 GUIDELINES: SWITCHING FROM ELECTRIC TO GAS-FIRED DRYERS

In multi-housing laundries, switching from electric to gas-fired dryers can foster important electricity savings. For that reason, every laundry manager should at least consider the installation of natural gas-fired dryers and estimate savings associated to his particular installation. If indeed they proceed with the conversion of electric dryers to natural gas-fired dryers, laundry managers should also take advantage of the fact that work will be done in the laundry room to revisit the exhaust system. Minimizing the loss of conditioned air to the outside could foster important energy savings.

The information contained in the next few sections can be used to draw a user guideline aimed at enlightening laundry managers on the cost benefits of using natural gas-fired dryers and revisiting the exhaust system (section 6.1), highlighting installation and service requirements (section 6.2), and guiding what exhaust strategy applies best to one installation (section 6.3).

Most of the information relevant to the process of switching from electric to gas-fired dryers is contained in the next following sections, therefore is possible that some of the material contained in sections 4.0 and 5.0 would be repeated.

IMPORTANT. The information hereinafter is for information purposes only; all installations must comply with governing codes and ordinances. In addition, when designing an exhaust system comprising an auxiliary blower, it is recommended to seek the assistance of a contractor or an engineer specialized in heating/cooling applications.

6.1 ENERGY SAVINGS ASSOCIATED TO DRYER TYPE AND EXHAUST SYSTEM

To maximize energy savings associated to the conversion of a multi-housing laundry from electric dryers to natural gas-fired dryers, one should take advantage of the fact that work will be done in the laundry room to also re-examine the dryers' exhaust strategy. By doing so, annual energy savings could be threefold:

- Savings due to the installation of natural gas-fired dryers;
- Savings due to the minimizing of conditioned air loss to the outside;
- Savings due to the installation of a variable-speed drive exhaust fan;

The following table shows the annual energy cost of various dryer's exhaust strategy whether electric dryers or natural gas-fired dryers are installed. It should be noted that because the installation and maintenance cost may vary significantly from one particular location to another, the focus was put on the annual energy cost.

Table 20: Annual energy cost associated to dryer type and exhaust system

	Single dryer venting	Multiple dryer venting		
		w/o blower	w/ single-speed drive blower	w/ variable-speed drive blower
Electric dryers				
Dryers (electricity and natural gas)	$ 3 055	$ 3 055	$ 3 055	$ 3 055
Loss of conditioned air	$ 614	$ 614	$ 4 764	$ 675
Auxiliary blower (if applicable)	$ -	$ -	$ 1 105	$ 127
TOTAL	**$ 3 669**	**$ 3 669**	**$ 8 924**	**$ 3 858**
Natural gas-fired dryers				
Dryers (electricity and natural gas)	$ 1 745	$ 1 745	$ 1 745	$ 1 745
Loss of conditioned air	$ 614	$ 614	$ 4 764	$ 675
Auxiliary blower (if applicable)	$ -	$ -	$ 1 105	$ 127
TOTAL	**$ 2 360**	**$ 2 360**	**$ 7 614**	**$ 2 548**

Based on an 8-dryer laundry located in the greater Toronto area (heating degree-days = 4066, and cooling degree-days = 252). It is assumed that each dryer operates 1,300 minutes per week and that the laundry room temperature is maintained at 18°C all year-round. The cost of electricity is assumed to be $0.097/kWh and the one of natural gas $0.43/m^3. Energy consumption and cost associated to the loss of conditioned air were estimated using information released previously in the present report.

As seen in section 5.3.3, switching from electric to gas-fired dryers could decrease the weekly electric consumption by 71 kWh while increasing the natural gas consumption to 8.7 m^3 (based on 1,300 minutes of operation per week). This corresponds to annual energy savings of approximately $1,300 for an 8-dryer laundry as seen in Table 20.

Concerning the evacuation system, the most cost-effective are to individually vent dryers to the outside or to evacuate dryers through a common duct, but not assisted by a blower. There is no electricity consumption inherent to the use of an auxiliary fan and the amount of conditioned air evacuated to the outside is minimal. However, as seen in section 6.3.2, the latter option is not recommended.

When dryers are too far from an outside wall, an auxiliary blower shall be used. In that case, it is recommended to always use a variable-speed drive blower as electricity savings associated to the variable-frequency drive could represent up to $1,000/year for an 8-dryer laundry. In addition, savings associated to minimizing the amount of conditioned air evacuated to the outside could reach $4,000.

Therefore, converting an 8-dryer laundry room from electric to natural gas-fired dryers while retrofitting a single-speed drive blower to a variable-speed drive blower could foster energy savings of up to $7,000/year.

6.2 INSTALLATION REQUIREMENTS (ELECTRIC VS. NATURAL GAS DRYERS)

Despite the popular belief, exhausting natural-gas fired dryer is no different than exhausting electric dryers. In fact for a 22,000 Btu/hr capacity dryers, the combustion air represents less than 2% (3 cfm) of the total air passed through the drum to dry clothes. Therefore, provision for outside air should be taken so that 200 cfm per dryer is available at all time, but not extra care should be taken when installing natural gas-fired dryers.

The installation of electric and natural gas dryers must comply with local codes and ordinances, and should be performed according to installation manuals. Special care should be taken to the:

- Exhaust tip location;
- Clearance with combustible material;
- Provision for outside air;
- Electric and natural gas (when applicable) service requirements.

The following table doesn't provide a exhaustive list of requirements, but instead give some insights on what differ when connecting natural gas-fired dryer instead of electric dryers. A more complete list is given in Appendix F, but the reader is invited to refer to local codes and ordinances for more information.

Table 21: Overview of service requirements for electric and natural gas-fired dryers

	Electric dryers	Natural gas dryers
Electric service requirements		
Codes	The dryer must be electrically grounded in accordance with local codes, or in the absence of local codes, with the Canadian Electrical Code, CSA C22.1.	
Connecting services	A four-wire or three-wire, single-phase, 120/240-volt, 60-hz, AC-only electrical supply. A four-wire or three-wire, 120/208-volt may be required on a separate, 30-amp circuit, fused on both sides of the line if specified on the model/serial rating plate. A time-delay or fuse or circuit breaker is recommended.	120-volt, 60-hz, AC-only, 15- or 20-amp, fused electrical circuit is required. A time-delay fuse or circuit breaker is also recommended.
Natural gas service requirements		
Codes	N/a	The gas installation must conform with local codes, or in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1/NFPA 54 or the Canadian Natural Gas and Propane Installation Code, CSA B149.1.
Installation requirements		
Clearances	It should be noted that although the electric dryers clearances are not included in any Codes or ordinances, most installation manual recommend to comply with the same requirements as natural gas-fired dryers	In addition of the manufacturer's specified clearances, the Natural Gas and Propane Installation Code - CAN/CSA-B149.1-05 (including January & February 2007 updates), specified gas dryer clearances from combustible material.
Exhaust		A certified flexible foil non-combustible-type duct may be used as a transition connection between the dryer exhaust and a rigid moisture duct A moisture-exhaust duct shall have a clearance of at least 6 in (150 mm) to combustible material but may be installed with a reduced clearance, provided that the combustible material is protected

6.3 DRYERS' EXHAUST STRATEGY

Exhausting dryers to the outside is necessary to avoid the warm, dirty, and humid air to accumulate inside the building. However, because it involves evacuating conditioned air to the outside, the exhaust system design can grandly influence the annual energy bill. Therefore, when selecting the design of a multi-residential housing laundry exhaust system, specific characteristics of the laundry room (location, size, etc.) and the annual energy cost should be taken into account.

Whenever dryers are close enough from an outside wall, it is recommended to individually evacuate dryers to the outside (section 6.3.1) because it is the simplest installation and also the less costly to operate.

When the laundry room is located far from an outside wall, such as in the building basement, dryers must be vented with the assistance of an auxiliary blower. In such cases, it is recommended to install a variable-speed drive blower (section 6.3.3) instead of a single-speed drive blower (section 6.3.2) because it is much cheaper to operate and can contribute to reducing considerably the building heating/cooling bill. When dryers are close enough from an outside wall so they can be commonly evacuated using no blower (section 6.3.2), it is better to individually vent them to the outside. Therefore, both the common exhaust system using no auxiliary blower and the one using a single-speed drive exhaust fan should be avoided.

6.3.1 Single dryer venting

Individually venting dryers to the outside is the most efficient and cost-effective way of managing both electric and natural gas-fired dryers exhaust. This configuration should be favoured whenever possible, i.e. when the distance between the dryers and an outside wall is shorter than the maximal vent system length as specified by dryer's manufacturers. The maximal allowable length ranges between 4 and 20 meters and depends upon vent material, number of elbows, and exhaust hood type.

Each manufacturer has their maximal vent length specifications. As an indication, the ones of Whirlpool Advantech® dryers (dryers used in the course of this study) are shown in Figure 16.

Maximum Vent Length

4" (10.2 cm) Diameter Exhaust Hoods

Rigid Metal Vent

No. of 90° turns	Box Hood and Louvered Style	Angled Hood Style
0	64 ft. (19.5 m)	58 ft. (17.7 m)
1	54 ft. (16.5 m)	48 ft. (14.6 m)
2	44 ft. (13.4 m)	38 ft. (11.6 m)
3	35 ft. (10.7 m)	29 ft. (8.8 m)
4	27 ft. (8.2 m)	21 ft. (6.4 m)

Flexible Metal Vent

No. of 90° turns	Box Hood and Louvered Style	Angled Hood Style
0	36 ft. (11.0 m)	28 ft. (8.5 m)
1	31 ft. (9.4 m)	23 ft. (7.0 m)
2	27 ft. (8.2 m)	19 ft. (5.8 m)
3	25 ft. (7.6 m)	17 ft. (5.2 m)
4	23 ft. (7.0 m)	15 ft. (4.6 m)

Figure 16: Maximum vent length of Whirlpool Advantech® dryers (Whirlpool Corporation)

Generally speaking, most manufacturers agree that plastic or metal foil vent shall not be used. They recommend using 4-inch diameter heavy metal vent or flexible metal vent. The latter one should be fully extended and supported when dryers are in their final position to avoid hogging and kinking that may result in reduced airflow and poor performance. As seen in section 4.2.6, not only a kinked vent represents a risk for fire, but it can also increase the dryer's energy consumption by up to 10%.

As shown in Figure 16, it is better to plan an installation in order to use the fewest number of elbows and turns. Indeed, the maximal vent length can be decreased by up to 60% when four elbow turns are used instead of none.

An exhaust hood should cap the vent to prevent rodents, birds, and insects from entering the premise. Most local jurisdictions state that exhaust hood must be at least 12" from the ground or any other object that may be in the path of the exhaust. One should be careful when selecting the exhaust hood type as the maximal vent system length may be decreased by up to 2.5 meters depending on its design.

6.3.2 Multiple dryer venting without auxiliary blower

It is possible to exhaust a bank of dryers to the outside through a common duct. The installation is complex, it requires a tapered duct, and not ideal because lint could easily accumulate in the common duct due to an insufficient air velocity in the common duct. Therefore, it is recommended to avoid this configuration when possible.

The number of dryers that could be connected to a common exhaust duct is limited; for instance the Service Manual for Exhausting Dryers (Whirlpool Corporation) stipulates that a bank of up to eight dryers may be installed on a central duct. No auxiliary blower is required in such installation. However, if eight dryers are connected, the central duct should be tapered from 4 inches in diameter to up to 12 inches (Figure 17).

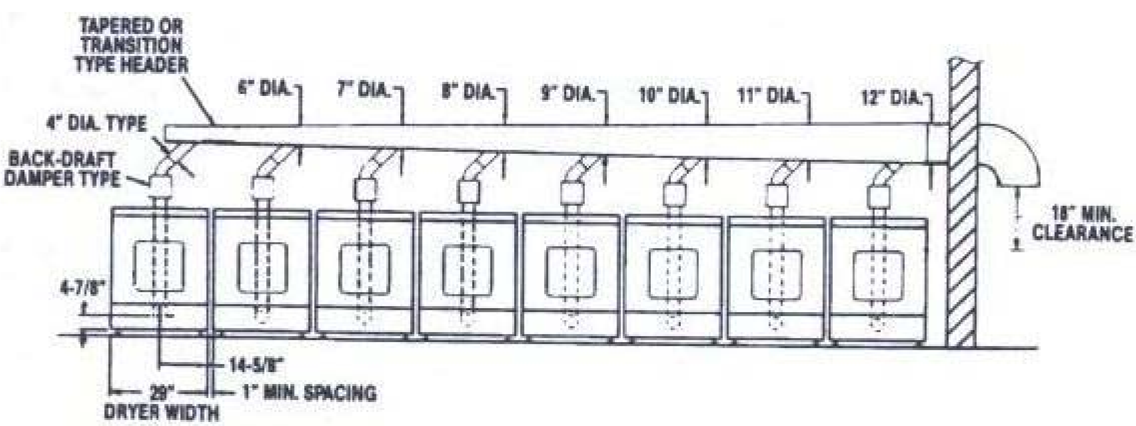


Figure 17: Multiple dryer venting without auxiliary blower (Whirlpool Corporation)

To connect each dryer to the central use 4-inch diameter aluminum making sure that the angle at which the 4-inch pipe enters the central duct doesn't exceed 45 degrees. In addition, a back draft damper should be installed between the dryer and the central duct.

The central duct should be tapered because it is recommended to maintain the air velocity in the duct above 365 m/min (1,200 ft/min) at all time (Alliance Laundry System) to prevent accumulation of lint. However, it is easy to figure that if only the dryer at the very end of the central duct is operating, the air velocity when the central duct is 12 inches in diameter will be well below the recommended velocity (200 cfm / 0.79 ft^3 = 425 ft/min). Therefore, the duct must be well maintained and clean frequently, if not, could represent a risk for fire.

6.3.3 Multiple dryer venting using auxiliary blower

Multi-housing laundries are sometimes located in the building basement or far from an outside wall (as it was the case for Site B laundry). In such case, dryers can't individually be vented to the outside nor evacuated through a central duct if no auxiliary blower is installed.

It is recommended that a contractor design such system or engineer specialized in heating/cooling applications. Nevertheless, the following guidelines (based on the Service Manual for Exhausting Dryers, Whirlpool Corporation) could be considered in the design of the central exhaust system. As the manual from Whirlpool Corporation didn't include any remarks on the use of a variable-speed drive fan as the one manufactured by Exhausto, alternative ways of controlling the air pressure in the exhaust system was added to their guidelines.

The central duct system must be designed in order to handle the maximum anticipated number of dryers operated at one time (provisions should be made to evacuate 200 cfm per dryer).

Using an exhaust blower in combination with an automatic damper in the central duct or a variable-speed drive fan, provide from 0 to 0.1 inches of water column vacuum in the central exhaust duct and from 0 to 0.6 inches of water column pressure at the connection of each dryer exhaust.

7.0 CONCLUSION AND RECOMMENDATIONS

Information was obtained on a cost-effective method for switching from electric to natural gas-fired dryers through the design of a proper evacuation system. It was demonstrated that when switching from electric to natural gas-fired dryers and properly redesigning the evacuation system, an 8-dryer laundry could save more than $6,000 annually on its energy bills.

A series of energy-saving measures were also quantified in laboratory. Among the most interesting ones:

- ending the drying cycle as soon as clothing is dry could lead to savings of up to 25%;
- reducing initial moisture content from 70% to 55% by replacing older washing machines with newer ones, could represent energy savings of up to 20%.

Some unique and interesting information was gathered through the on-site monitoring of three multi-housing laundries:

- approximately 16 hours per day, none of the dryers were in use by building tenants;
- all dryers operated simultaneously on average only 22 minutes per day.

Larger laundry rooms, which require the assistance of an auxiliary blower to evacuate dryer exhaust to the outside, are designed to remove 200 cfm per dryer at all times. On the contrary, it was actually demonstrated that all dryers of a laundry operate simultaneously only 22 minutes per day. Installing a variable-speed drive fan that controls its speed according to the number of dryers in operation could, therefore, contribute to decreasing the cooling/heating bills associated with the laundry by a factor of 5 to 10.

In the light of the results presented, it is recommended that:

- commercial laundry owners be informed of the potential savings associated with a switch from electric to natural gas-fired dryers;
- proper evacuation system design be a fundamental requirement;
- priority be given to installation of clothes dryers equipped with humidity sensor to automatically stop the drying cycle once clothes are dry;
- the installation of high-efficiency washing machines should be favoured.

8.0 REFERENCES

1. Canadian Gas Association, "*Testing Method for Measuring Per-Cycle Energy Consumption and Energy Factor of Domestic Gas Clothes Dryers*", CGA P.5-M97. 2004

2. Natural Resources Canada's Office of Energy Efficiency, "*Energy Consumption Ratings of Major Household Appliances*", EnerGuide Appliance Directory, Chapter 7, 2006.

3. Whirpool Corporation, "*Service Manual for Exhausting Whirpool Dryers",* Part No. LIT603197.

4. Natural Gas Technologies Centre (NGTC), "*Top vs. Front Loading Washers Testing*", Report #122304-5, 2004.

5. Natural Gas Technologies Centre (NGTC), "*Comparative assessment of gas and electric clothes dryers »*, Report #214000, 2001

6. *Alliance Laundry System. http://www.comlaundry.com/.* Accessed in October 2007.

9.0 APPENDICES

Appendix A: Detailed Laboratory Procedures

TEST CLOTH PRECONDITIONING

The clothes' moisture content at equilibrium depends on the ambient air temperature and relative humidity. However, this relationship varies depending on whether the material is absorbing or desorbing humidity. This means that the material can exhibit different values of moisture content at equilibrium for the same ambient condition (temperature and relative humidity) depending on whether the clothes are humidified or dried; this is referred to as drying hysteresis.

Subjecting the material to consecutive cycles of moisture absorption and desorption can eliminate drying hysteresis. After the execution of this preconditioning procedure, the relationship between material moisture content at equilibrium and ambient air (temperature and relative humidity) will be unique. This is required to ensure that the clothes will behave the same throughout the study. The following procedure (adapted from the CGA P.5-M97 method) was undertaken only once per test load:

1. Bone-dry test load (see "Bone-dry test load" procedure). Note weight (w_A);
2. Place test cloth load in a standard clothes washer set a the maximum water fill level;
3. Wash the load for 10 minutes (wash, rinse and extract cycles);
4. Control water temperature to 37.7 ± 2.7 °C;
5. Bone-dry test load (see "Bone-dry test load" procedure). Note weight (w_B);
6. Repeat steps 1 to 5 until $(w_B - w_A)/w_A \leq 1.0\%$.

BONE-DRY TEST LOAD

To determine the test load bone-dry weight, i.e. when the material is free of any residual moisture, the following procedure was followed (adapted from CGA P.5-M97):

1. Dry test load (maximum temperature) for at least 10 minutes;
2. Remove before the load cools down. Note weight (w_A);
3. Dry test load again (maximum temperature) for at least 10 minutes;
4. Remove before the load cools down. Note weight (w_B);
5. Repeat steps 1 to 4 until $(w_B - w_A)/w_A \leq 1.0\%$.

WASH TEST LOAD

A General Electric GE Evolution washing machine (model GNSR2140D5WW) was used. The following procedure was employed whenever wet test loads were required (adapted from CGA P.5-M97):

1. Load washing machine with test load;
2. Start washing machine, choosing the following options:
    a. Load/charge: LARGE;
    b. Temperature: COLD(but fed by an outside water tank maintained at 37.7^{o}C);
    c. Options: OFF (2nd rinse);
    d. Cycle: DELICATE
3. Control water temperature to 37.7 ± 2.7 ^{o}C;
4. Stop washing machine 30 seconds after the spinning cycle has started;
5. Remove test load from washing machine and weigh (w_w);
6. The moisture content, (w_w- w_{bd})/ w_{bd}, should be 70.0 ± 3.5 %;
    a. If moisture content < 66.5%: pour water on the test load;
    b. If moisture content > 73.5%: wait a few minutes for some of the water to evaporate.

CLOTHES DRYER PRECONDITIONING

When monitoring clothes dryer energy consumption, one should ensure that the dryer's initial condition is similar from one test to another. During the drying cycle, the dryer warms up so that part of the energy is consumed in raising the temperature of its structure (drum, casing, etc.). If two tests were to be conducted consecutively, the former one would consume more energy even if test conditions were similar. Therefore, it is necessary to precondition the dryers before each test so as to obtain reliable results (adapted from CGA P.5-M97):

1. Start the empty clothes dryer in the non-heat mode;
2. Turn off the clothes dryer at one of the following points (according to the more time-consuming of the two):
    a. when discharge temperature is varying less than 0.5 ^{o}C (for more than 10 minutes);
    b. when total drying cycle exceeds 15 minutes.

TEST LOAD LOADING

Load the test load by grasping each piece of clothing by its centre, allowing it to hang loosely, and dropping it in the dryer section.

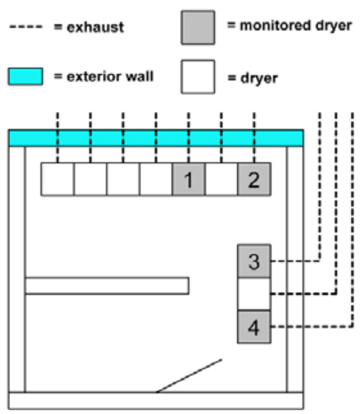
DRY TEST LOAD

The dryer used for this study was the Whirpool ADVANTECH gas-fired clothes dryer (model CGE2761KQ).

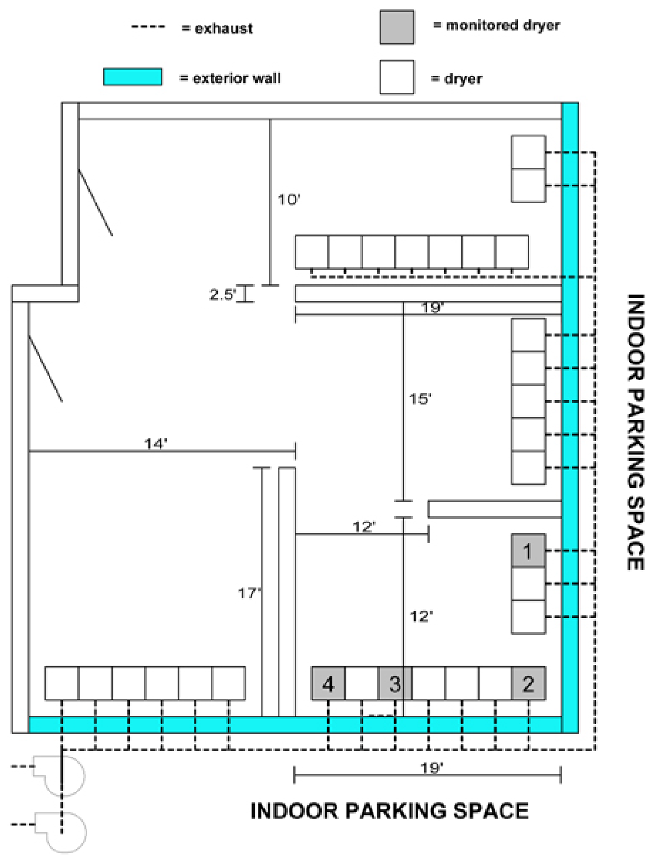
1. Load the drying machine with a test load;
2. Start drying machine choosing the following options:
    a. Dry temperature selector: HIGH (regular/heavy)
    b. Extra care cool down: OFF
3. Stop the dryer after 30 minutes (unless otherwise specified).

Appendix B: Laundry rooms' layout

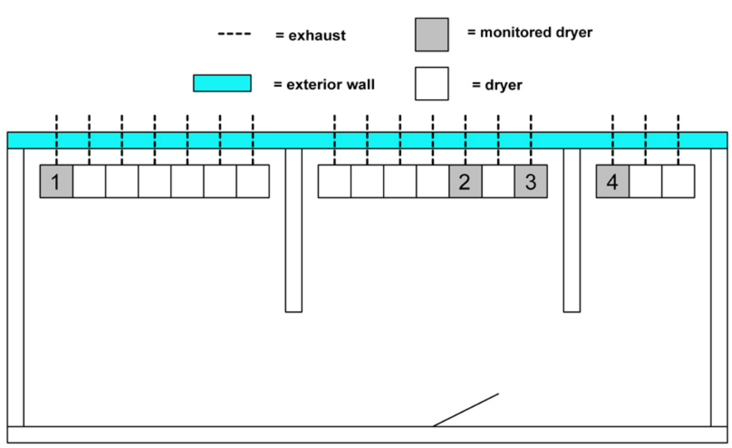
SITE A



SITE B



SITE C



Appendix C: Dryers' average operating time

The dryers' average weekly operating time was calculated according to the two different methods described below.

TECHNIQUE BASED ON ELECTRICITY CONSUMPTION

For electric dryers, whenever the heater element was consuming electricity within a 1-minute period, one minute was added to the daily dryer operating time. This method underestimates the operating time since the dryer may have been functioning while the heater element was off (such as during the cooling cycle).

Table 22: Dryer's average weekly operating time based on electricity consumption

	Site A	Site B	Site C
Electric dryers			
Period	Sept 17, 2006 – Nov 11, 2006	Sept 17, 2006 – Jan 6, 2007	Oct 1, 2006 – Nov 11, 2006
Duration (days)	56	112	42
Average operating time (min/week)	1,661	1,025	1,043
Dryer #1	*1,856*	*1,427*	*876*
Dryer #2	*1,672*	*682*	*931*
Dryer #3	*1,438*	*935*	*1,477*
Dryer #4	*1,681*	*1,055*	*888*
Gas-fired dryers			
Period	Dec 24, 2006 – Jan 27, 2007	March 10, 2007 – September 22**	Nov 19, 2006 – Jan 13, 2007
Duration (days)	35	96**	54*
Average operating time (min/week)	1,482	721	1,110
Dryer #1	*1,767*	*582*	*880*
Dryer #2	*1,297*	*373*	*1,033*
Dryer #3	*1,660*	*866*	*1,658*
Dryer #4	*1,205*	*1,063*	*871*

*** Data missing on Dec 1 and Dec 7, 2006**

**** Dryers were not monitored continuously during this period. Instead, they were monitored between March 10 and April 19, July 19 and August 8, and August 12 and September 22, 2007**

For gas dryers, the same method was used except that one minute was added to the daily operating time whenever the dryer motor and controls were consuming electricity. This method is more accurate than the latter one since the motor that drives the dryer drum and fan is always on thorough the drying cycle.

TECHNIQUE BASED ON REVENUES GENERATED

For two of the three laundries, Site A and C, dryers were equipped with a card payment system that allows determining the revenues per dryer per day. Sparkle Solutions provide NGTC with the revenues generated by the dryers for a specific time period and NGTC derived the average dryer operating time per week based on the fact that each $0.25 corresponds to 10 minutes of operation.

Table 23 shows the average weekly operating time of all dryers in the laundry room, and differentiates the operating time of the monitored dryers to that of the non-monitored dryers.

Table 23: Dryer's average weekly operating time based on revenues generated

	Site A	Site C
Electric dryers		
Period	Sept 17, 2006 – Nov 11, 2006	Oct 1, 2006 – Nov 11, 2006
Duration (days)	56	42
Average operating time, all dryers (min/week)	959	985
Monitored dryers (min/week)	727	989
Non-monitored dryers (min/week)	1,145	984
Gas-fired dryers		
Period	Dec 24, 2006 – Jan 15, 2007	Nov 19, 2006 – Jan 13, 2007
Duration (days)	23	56
Average operating time, all dryers (min/week)	1,194	1,437
Monitored dryers (min/week)	1,134	1,118
Non-monitored dryers (min/week)	1,243	1,553

Appendix D: Laundry Utilization Profile

The following tables detailed the dryer utilization profile, based on four monitored dryers per site. It should be noted that results are very similar from one site to another. The average utilization profile can therefore be considered representative of a typical multi-residential social housing laundry.

Table 24: Total dryer monitoring time (hours)

	Site A	Site B	Site C	Total
Electric dryers	1,344	2,688	1,008	**5,040**
Natural gas dryers	840	2,279	1,296	**4,415**
Total	**2,184**	**4,967**	**2,304**	**9,455**

Table 25: Electric dryers' utilization profile

	Site A	Site B	Site C	Average	Standard Deviation
Laundry closed	25.0%	25.0%	25.0%	**25.0%**	**0.0%**
No dryer in operation	43.0%	48.6%	48.4%	**46.7%**	**3.2%**
One (1) dryer in operation	11.4%	16.4%	15.8%	**14.5%**	**2.7%**
Two (2) dryers in operation	10.7%	6.6%	7.3%	**8.2%**	**2.2%**
Three (3) dryers in operation	6.5%	2.6%	2.8%	**4.0%**	**2.2%**
Four (4) dryers in operation	3.4%	0.8%	0.6%	**1.6%**	**1.6%**
Total	**100%**	**100%**	**100%**	**100%**	**N/a**

Table 26: Natural gas dryers' utilization profile

	Site A	Site B	Site C	Average	Standard Deviation
Laundry closed	25.0%	25.0%	25.0%	**25.0%**	**0.0%**
No dryer in operation	44.8%	53.5%	52.2%	**50.2%**	**4.7%**
One (1) dryer in operation	12.5%	15.2%	15.5%	**14.4%**	**1.6%**
Two (2) dryers in operation	9.3%	4.7%	6.1%	**6.7%**	**2.3%**
Three (3) dryers in operation	5.8%	1.3%	1.1%	**2.8%**	**2.7%**
Four (4) dryers in operation	2.6%	0.2%	0.0%	**0.9%**	**1.4%**
Total	**100%**	**100%**	**100%**	**100%**	**N/a**

Appendix E: Laundry space heating and cooling cost associated to exhaust fans

One could use the following rules of thumb to calculate the heating and cooling cost associated to the superfluous evacuation of air to the outside when using a single-speed operating exhaust fan:

$$Lost_{heating}\left(\frac{m^3_{gas}}{year}\right) = \frac{DD_{heating} \cdot Nb_{dryers}}{\varepsilon_{heating}} \times 0.23$$

$$Lost_{cooling}\left(\frac{kWh}{year}\right) = \frac{DD_{cooling} \cdot Nb_{dryers}}{\varepsilon_{cooling}} \times 2.3$$

The above rule of thumb is valid only when:

- The laundry utilization profile resembles the one presented in section 5.3.2;
- The single-speed exhaust fan being replaced is designed to evacuate 200 cfm per dryer, 24 hours per day;
- The air that is evacuated to the outside is conditioned to 18°C all year round.

HEATING AND COOLING FACTOR

Based on the average utilization profile presented in section 5.3.1, it is estimated that 7,000 m^3 (247,000 ft^3) of air per dryer per day is unnecessary evacuated to the outside when using a single-speed exhaust fan instead of a variable-speed drive fan. The following table describes the calculation assuming single-speed exhaust fans are designed to constantly evacuate 3 m^3/min (200 cfm) per dryer, even when no dryers are operating.

Table 27: Conditioned air savings

Laundry Utilization Profile			Conditioned Air Loss to the Outside (m^3/day/dryer)		
% Dryers in Operation	Laundry profile (%/day)	Laundry profile (min/day)	MVDS	No MVDS	Savings
100	1.5	22	75	82	7
75	3.9	56	143	245	102
50	8.6	124	211	612	401
25	16.7	240	299 (203+96)	1,223	924
0	69.3	998	399	5,994	5,595
TOTAL	**100**	**1,440**	**1,127**	**8,155**	**7,029**

It should be noted that even when no dryers are operating, the Exhausto system also evacuates some conditioned air to the outside through the dryers. In fact, it was observed during the laboratory testing that when only one dryer was operating, 2.2 m^3/min (77 cfm) was evacuated through the non-operating dryers (Table 28). Therefore, in the calculation presented in Table

27, it was considered that when less more 25% of the dryers are not operating, an additional 0.4 m^3-air/min (13 ft^3/min) per installed dryer are evacuated to the outside.

Table 28: Loss of conditioned air vs. number of dryers in operation (based on laboratory results)

# Dryers in operation (6 dryers in total)	Exhausto control ON			Exhausto control OFF		
	Air flow (ft^3/min)			Air flow (ft^3/min)		
	Dryers in operation	Total in main exhaust	Loss of air	Dryers in operation	Total in main exhaust	Loss of air
1	120	197	77	131	1,215	1,084
3	118	337	0	127	1,237	856
6	115	624	0	117	1,221	519

The heating and cooling factors (0.23 and 2.3) were derived from these two equations, based on the fact that approximately 7,000 m^3 of conditioned air per day could be saved when installing a variable-speed drive fan that adjusts its operation depending on the number of dryers operating:

$$Factor_{heating} = \frac{Lost_{air} \times Density_{air} \times Cp_{air}}{HHV_{gaz}} \cong \frac{7{,}000\frac{m^3_{air}}{day} \times 1.2\frac{kg}{m^3} \times 1.0\frac{kJ}{kg^oC}}{36{,}500\frac{kJ}{m^3_{gaz}}} = 0.23\frac{m^3_{gaz}}{^oC \cdot day}$$

$$Factor_{cooling} = \frac{Lost_{air} \times Density_{air} \times Cp_{air}}{Factor_{conversion}} \cong \frac{7{,}000\frac{m^3_{air}}{day} \times 1.2\frac{kg}{m^3} \times 1.0\frac{kJ}{kg^oC}}{3{,}600\frac{kJ}{kWh}} = 2.3\frac{kWh}{^oC \cdot day}$$

Appendix F: Service requirements

The following text is a summary of relevant standards, codes, ordinances, and installation manuals related to the installation of electric and natural gas-fired dryers. By no means the followings intend to be an exhaustive list of requirements and it is recommended to refer directly to local codes and dryer installation manuals when performing a real installation.

Applicable Standards or Codes

Electric and natural gas-fired dryers

- Local Codes;
- 2006 Building Code Compendium (Ontario Building Code);
- Canadian Electrical Codes Parts 1 & 2 (CSA C22.1-latest version).

Natural gas-fired dryers only

- Natural Gas and Propane Installation Code (CAN/CSA-B149.1-latest version).

Required Services

Electrical service specifications (electric and natural gas-fired dryers)

- The electrical installation must comply with local codes, or in the absence of local codes, with the latest version of the Canadian Electrical Codes Parts 1 & 2 (CSA C22.1);
- All electrical connections must be done by a certified electrical contractor (or technician);
- The required electrical supply is specified on the equipment serial plate, on a data label affixed on the equipment or in the specification sheet or the installation manual of the equipment;
- The followings requirements may differ for electric and gas-fired dryers:
  - Electrical supply;
  - Service/ground location on the equipment;
  - Recommended wire and connector sizes;
  - Fuse and breaker ratings for electric model;

Natural gas service specifications (natural gas-fired dryers only)

- The gas installation must comply with local codes, or in the absence of local codes, with the latest version of the Natural Gas and Propane Installation Code (CAN/CSA-B149.1);
- All gas installations must be done by a certified gas contractor (or technician);
- The information regarding natural gas requirements (pressure, burner rating, gas piping) is specified on the equipment serial plate, on a data label affixed on the equipment, or in the specification sheet or the installation manual of the equipment;
- A readily accessible manual shut-off valve for each gas dryer shall be provided (Natural Gas and Propane Installation Code: CAN/CSA-B149.1-latest version);
- Before performing the installation of a gas dryer, ensure that the type of gas specified on the equipment serial plate agreed with the type of gas available;
- The natural gas line pressure must be maintained at the specified pressure with all gas appliances running;
- As a recommendation, the gas installation should be inspected by the personal of the gas utility prior to the gas equipment start-up.

Installation Guidelines

Fresh Air Supply Requirements (electric and natural gas-fired dryers)

- “Make-up Air: In ventilating systems that exhaust air to the outdoors, provision shall be made for the admission of a supply of make-up air in sufficient quantity so that the operation of the exhaust system and other exhaust equipment or combustion equipment is not adversely affected.” ref. 1 (6.2.4.12)
- Opening size and/or fresh air supply requirements are defined in the manufacturer’s installation manual. ref. 3, 6 & 7

Clothes Dryer Location (electric and natural gas-fired dryers)

- According to manufacturer’s installation manual (for example: installed on a sound level floor, carpeting must be removed, not exposed to water and / or weather…) ref. 3, 6 & 7
- For common laundry room: “…, a laundry room in a floor area that is not within a dwelling unit shall be separated from the remainder of the building by a fire separation having a fire-resistance rating not less than 1 h.” ref. 1 (3.3.1.21). For exceptions, see the Ontario Building Code – section 3.3.1.21 (2) & (3).

Dryer Clearances (electric and natural gas-fired dryers)

- Minimum and recommended clearances (above, back, sides and front of the dryer) for ease of installation, operation, servicing, and maintenance are specified in the manufacturer’s installation manual. ref. 3, 6 & 7

Dryer Clearances (natural gas-fired dryers only)

- In addition of the manufacturer’s specified clearances, the Natural Gas and Propane Installation Code - CAN/CSA-B149.1-05 (including January & February 2007 updates), specified gas dryer clearances from combustible material:

    - Domestic-type clothes dryers: “Except where permitted by Clause 4.13.2, a dryer shall have the following minimum clearances from combustible material:
        - above – 6 in (150 mm);
        - front – 24 in (600 mm);
        - back and sides – 6 in (150 mm).” ref. 2 (7.5.4)
    - Commercial-type clothes dryers: “Except where permitted by Clause 4.13.2, a dryer shall have the following minimum clearances from combustible material:
        - above – 18 in (450 mm);
        - front – 18 in (450 mm);
        - back and sides – 18 in (450 mm).” ref. 2 (7.4.2)

Dryer Exhaust (electric and natural gas-fired dryers)

- “Exhaust ducts connected to laundry drying equipment shall be:
    - independent of other exhaust ducts,
    - designed and installed so that the entire duct can be cleaned,
    - constructed of smooth corrosion-resistant material.” ref. 1 (6.2.3.8)
- Exhaust duct material requirements may be more stringent in manufacturer’s installation manuals than in the 2006 Building Code Compendium or the National Gas and Propane Installation Code. If so, comply with the manufacturer’s instructions.

- "Exhaust ducts directly connected to laundry drying equipment shall be independent of other exhaust ducts" ref. 1 (6.2.4.11)
- The dryer exhaust duct shall not be connected into any vent, vent connector, chimney, wall, ceiling or concealed space building. ref. 2 (7.4.5 & 7.5.3); ref. 3; ref. 7
- "Where an exhaust duct passes through or is adjacent to unheated space, the duct shall be insulated to prevent moisture or condensation in the duct" ref. 1 (6.2.4.11)
- "Exhaust outlets shall be designed to prevent back draft under wind conditions." ref. 1 (6.2.4.11)
- "Exhaust systems shall discharge directly to the outdoors." ref. 1 (6.2.4.11)
- Exhaust duct must not be secured with screws (see manufacturer's installation manual for example of what should be used: clamps, pop-rivets) ref. 2 (7.4.5 & 7.5.3); ref. 3 & 6
- Exhaust diameter, maximum permissible length, and configuration, as per manufacturer's instructions. ref. 3, 6 & 7
- The static back pressure in the exhaust duct, while the dryer is in operation, shall be within the manufacturer's specified range (example: between 0.0 inch w.c. and 0.9 inch w.c.). ref. 3, 6 & 7

Dryer Exhaust (natural gas-fired dryers only)

- Domestic-type clothes dryers: "A dryer shall be equipped with a moisture-exhaust duct that terminates outsides the building, and the duct shall be constructed of a material that is:
  - non-combustible; or
  - certified as meeting the requirements for Class 1 air ducts contained in CAN/ULC-S110." ref. 2 (7.5.1)
- Commercial-type clothes dryers: "A dryer shall be connected to a metal moisture-exhaust duct that terminates outdoors…." ref. 2 (7.4.4)
- Commercial-type clothes dryers: "A certified flexible foil non-combustible-type duct may be used as a transition connection between the dryer exhaust and a rigid moisture duct" ref. 2 (7.4.3)
- Commercial-type clothes dryers: "A dryer shall be connected to a metal moisture-exhaust duct that terminates outdoors not less than 3 ft (1 m) from any pressure regulator vent termination and not less than 10 ft (3 m) from a fresh-air intake." ref. 2 (7.4.4)
- Domestic-type clothes dryers: " A moisture-exhaust duct shall not terminate within 3 ft (1 m) in any direction of any pressure regulator vent termination or fresh-air intake." ref. 2 (7.5.2)
- Commercial-type clothes dryers: " A moisture-exhaust duct shall have a clearance of at least 6 in (150 mm) to combustible material but may be installed with a reduced clearance, provided that the combustible material is protected as specified in Table 4.1" ref. 2 (7.4.7)

Dryer Exhaust, Manufacturer's recommendations (electric and natural gas-fired dryers)

- For better dryer performance, it is recommended to exhaust dryer(s) individually to the outdoors. ref. 6 & 7
- Use the fewest number of elbows and turns. Elbows should be sweep types. ref. 3, 6 & 7
- The dryer exhaust duct length should be minimized. ref. 6 & 7

- Some manufacturers recommended that exhaust or booster fans not be used in the exhaust ductwork system. ref. 7
- Multiple dryer venting specifications are defined in manufacturer's installation manual. Some companies, such as Exhausto, are specialized in the installation of multiple dryer venting system.

Definitions

***"Commercial** and **industrial-type appliance** or **equipment**: an appliance or equipment other than a residential or recreational type."* ref. 2

"***Residential appliance**: an appliance commonly used in, but not restricted to use in, a dwelling unit."* ref. 2

"***Type 1 clothes dryer**: Preliminary used in family living environment. May or may not be coin-operated for public use."* ref. 10

"***Type 2 clothes dryer**: Used in business with direct intercourse of the function with the public. May or may not be operated by public or hired attendant. May or may not be coin-operated."* ref. 10

References

1. 2006 Building Code Compendium (including April 2, 2007 update), Ministry of Municipal Affairs and Housing Building and Development Branch, Ontario.

2. Natural Gas and Propane Installation Code CAN/CSA-B149.1-05 (including January & February 2007 updates), Canadian Standards Association.

3. INSTALLATION INSTRUCTIONS COMMERCIAL DRYER – Gas or Electric, Whirlpool, 2005.

4. ADVANTECH COMMERCIAL DRYER SPECIFICATIONS, Single Dryer Specifications Model: CGE2761KQ, Whirlpool.

5. Service Manual for Whirlpool corporation Exhausting Dryers, Whirlpool Corporation, August 1987.

6. Installation Manual – Drying Tumblers 25 pound capacity, 30 pound capacity, 35 pound capacity (Starting Serial No. 0602xxxxx), Alliance Laundry Systems, February 2006.

7. AD-24 (Gas DSI & Electric) Installation Manual, American Dryer Corp.

8. Exhausting of Multiple Clothes Dryers, Technical Report #TRR3990501, EXHAUSTO Inc., March 2005.

9. MDVS System Guide, Better Drying with Better Venting, Clothes Dryer Exhaust, EXHAUSTO Venting Design Solutions.

10. National Fuel Gas Code 2006, Online edition (www.nfpa.org).

Appendix G: On-site monitoring results

Site A, Toronto, Ontario
Electric Dryers

			DRYER #1			
	Time	**kWh**	**Tin**	**Tout**	**P**	**Wh/min**
AVERAGE	265	13,2	24,9	54,0	0,30	49,7
DEVIATION	112	5,6	1,7	2,3	0,02	2,6
MIN	46	2,2	21,3	50,0	0,25	41,0
MAX	498	25,5	28,7	58,7	0,34	54,5
TOTAL	14 845	737	na	na	na	na
17-sept-06	**367**	**16,9**	**27,6**	**58,1**	**0,25**	**46,0**
18-sept-06	95	4,5	27,2	58,1	0,27	47,0
19-sept-06	174	9,4	24,4	51,7	0,27	54,1
20-sept-06	215	10,7	23,0	56,2	0,26	49,8
21-sept-06	376	18,1	23,0	55,6	0,28	48,2
22-sept-06	46	2,2	22,1	55,1	0,31	48,6
23-sept-06	**270**	**14,2**	**26,0**	**53,2**	**0,26**	**52,7**
24-sept-06	**495**	**24,5**	**26,6**	**54,6**	**0,26**	**49,5**
25-sept-06	161	7,8	22,6	56,6	0,29	48,7
26-sept-06	365	18,9	23,5	50,3	0,28	51,8
27-sept-06	275	13,3	24,8	55,5	0,29	48,4
28-sept-06	275	13,1	21,9	54,8	0,29	47,5
29-sept-06	250	12,6	21,7	52,9	0,30	50,2
30-sept-06	**408**	**20,5**	**22,9**	**55,4**	**0,30**	**50,2**
1-oct-06	**367**	**17,5**	**23,3**	**56,8**	**0,29**	**47,8**
2-oct-06	206	9,9	21,3	55,9	0,30	48,0
3-oct-06	167	8,2	24,4	53,9	0,30	49,3
4-oct-06	172	8,8	23,5	52,5	0,29	51,0
5-oct-06	155	7,8	22,5	52,7	0,32	50,0
6-oct-06	365	16,3	25,0	56,4	0,31	44,6
7-oct-06	**224**	**10,7**	**24,4**	**54,1**	**0,29**	**47,8**
8-oct-06	**367**	**18,4**	**24,7**	**53,6**	**0,30**	**50,1**
9-oct-06	422	20,8	27,6	54,9	0,30	49,3
10-oct-06	232	12,0	26,8	52,9	0,30	51,6
11-oct-06	163	8,4	25,7	50,0	0,29	51,5
12-oct-06	372	18,5	26,2	54,7	0,30	49,8
13-oct-06	250	12,6	25,0	57,1	0,30	50,3
14-oct-06	**197**	**10,1**	**24,9**	**51,1**	**0,30**	**51,3**
15-oct-06	**431**	**22,0**	**26,9**	**53,1**	**0,29**	**51,0**
16-oct-06	55	3,0	24,3	50,4	0,32	54,3
17-oct-06	295	14,8	24,9	52,0	0,31	50,1
18-oct-06	304	15,4	25,1	50,7	0,28	50,5
19-oct-06	341	17,1	24,4	52,7	0,30	50,1
20-oct-06	113	5,9	23,7	51,0	0,30	51,8
21-oct-06	**446**	**23,1**	**26,8**	**53,6**	**0,31**	**51,9**
22-oct-06	**498**	**24,6**	**28,7**	**53,6**	**0,30**	**49,5**
23-oct-06	192	9,7	25,7	54,6	0,27	50,4
24-oct-06	111	6,0	25,2	50,7	0,29	54,5
25-oct-06	212	10,0	24,6	56,1	0,30	47,0
26-oct-06	256	13,2	23,8	50,4	0,31	51,5
27-oct-06	154	7,6	23,5	53,4	0,33	49,5
28-oct-06	**199**	**10,2**	**24,8**	**55,8**	**0,30**	**51,4**
29-oct-06	**486**	**25,5**	**27,4**	**50,2**	**0,28**	**52,4**
30-oct-06	302	14,6	26,0	53,5	0,29	48,3
31-oct-06	169	9,2	26,6	51,1	0,28	54,4
1-nov-06	176	7,2	25,4	58,7	0,29	41,0
2-nov-06	330	15,8	24,8	53,7	0,29	47,9
3-nov-06	170	7,9	25,2	54,8	0,31	46,4
4-nov-06	**364**	**19,0**	**24,6**	**52,1**	**0,31**	**52,1**
5-nov-06	**387**	**17,3**	**26,7**	**56,4**	**0,32**	**44,7**
6-nov-06	216	9,9	23,3	57,2	0,31	45,8
7-nov-06	293	14,8	27,8	54,3	0,32	50,4
8-nov-06	251	12,7	25,6	52,1	0,32	50,7
9-nov-06	200	10,3	26,3	56,4	0,31	51,3
10-nov-06	141	6,5	25,2	56,7	0,31	46,4
11-nov-06	**322**	**16,8**	**26,8**	**51,9**	**0,34**	**52,1**

Site A, Toronto, Ontario
Electric Dryers

	DRYER #2					
	Time	**kWh**	**Tin**	**Tout**	**P**	**Wh/min**
AVERAGE	239	13,4	25,0	52,8	0,15	55,5
DEVIATION	132	7,1	1,4	3,5	0,02	3,3
MIN	0	1,4	20,6	42,6	0,09	46,3
MAX	586	32,8	28,0	59,1	0,20	61,2
TOTAL	13 372	739	na	na	na	na
17-sept-06	**371**	**20,1**	**26,8**	**52,4**	**0,17**	**54,1**
18-sept-06	112	6,4	26,6	52,0	0,16	57,5
19-sept-06	173	9,6	26,1	56,2	0,20	55,4
20-sept-06	159	9,0	23,3	51,7	0,11	56,4
21-sept-06	220	10,3	24,6	57,1	0,11	46,8
22-sept-06	291	14,6	23,2	57,0	0,12	50,2
23-sept-06	**102**	**5,7**	**25,0**	**54,0**	**0,09**	**55,9**
24-sept-06	**586**	**32,8**	**26,4**	**53,5**	**0,10**	**56,0**
25-sept-06	281	15,1	23,9	55,9	0,14	53,7
26-sept-06	274	13,6	24,8	58,1	0,15	49,8
27-sept-06	225	13,5	25,2	50,0	0,13	60,0
28-sept-06	272	15,2	22,2	50,1	0,13	55,8
29-sept-06	103	5,9	21,3	53,8	0,15	57,4
30-sept-06	**518**	**27,6**	**22,9**	**55,6**	**0,16**	**53,4**
1-oct-06	**353**	**19,2**	**23,9**	**55,8**	**0,15**	**54,4**
2-oct-06	134	8,1	23,3	50,4	0,15	60,4
3-oct-06	181	10,4	25,1	48,7	0,14	57,7
4-oct-06	0	-	-	-	-	-
5-oct-06	59	3,6	23,3	42,6	0,19	61,2
6-oct-06	231	11,9	25,1	56,8	0,17	51,3
7-oct-06	**170**	**9,6**	**24,6**	**51,3**	**0,17**	**56,7**
8-oct-06	**233**	**12,0**	**25,6**	**55,3**	**0,17**	**51,4**
9-oct-06	426	23,7	26,6	55,2	0,17	55,7
10-oct-06	338	18,8	25,9	52,3	0,17	55,6
11-oct-06	159	9,0	26,1	53,7	0,16	56,9
12-oct-06	300	16,3	26,2	50,8	0,15	54,3
13-oct-06	258	15,2	24,5	50,9	0,17	59,1
14-oct-06	**123**	**7,5**	**24,9**	**45,2**	**0,17**	**60,8**
15-oct-06	**510**	**26,7**	**26,2**	**54,5**	**0,17**	**52,4**
16-oct-06	25	1,4	20,6	58,1	0,15	57,9
17-oct-06	216	11,9	25,5	52,1	0,18	55,2
18-oct-06	194	10,7	26,1	52,0	0,14	55,1
19-oct-06	171	9,9	25,7	48,5	0,15	57,9
20-oct-06	166	9,3	23,7	51,9	0,14	56,2
21-oct-06	**534**	**30,7**	**26,5**	**51,7**	**0,15**	**57,4**
22-oct-06	**482**	**26,6**	**28,0**	**53,7**	**0,16**	**55,2**
23-oct-06	194	11,3	26,1	49,9	0,13	58,2
24-oct-06	56	2,6	24,6	59,1	0,13	46,3
25-oct-06	222	11,7	24,2	55,6	0,13	52,9
26-oct-06	207	11,1	24,0	52,2	0,15	53,8
27-oct-06	149	8,4	24,0	49,3	0,19	56,6
28-oct-06	**164**	**9,7**	**25,3**	**47,5**	**0,13**	**59,2**
29-oct-06	**510**	**28,8**	**26,4**	**51,8**	**0,12**	**56,4**
30-oct-06	234	14,0	26,2	49,2	0,17	59,9
31-oct-06	219	12,6	25,8	51,0	0,14	57,7
1-nov-06	299	15,2	25,7	56,5	0,16	50,8
2-nov-06	215	10,9	25,7	54,0	0,15	50,5
3-nov-06	169	8,8	23,8	55,4	0,15	52,1
4-nov-06	**331**	**18,6**	**25,0**	**55,8**	**0,16**	**56,0**
5-nov-06	**293**	**17,8**	**26,1**	**46,2**	**0,16**	**60,7**
6-nov-06	115	6,5	24,3	52,6	0,16	56,5
7-nov-06	271	15,5	26,8	53,5	0,16	57,1
8-nov-06	149	7,9	26,3	56,2	0,14	52,8
9-nov-06	114	6,4	27,0	57,8	0,14	55,8
10-nov-06	162	9,6	24,7	47,5	0,16	59,2
11-nov-06	**349**	**19,9**	**25,7**	**51,9**	**0,17**	**57,1**

Site A, Toronto, Ontario
Electric Dryers

	DRYER #3					
	Time	**kWh**	**Tin**	**Tout**	**P**	**Wh/min**
AVERAGE	205	11,3	28,2	49,1	0,58	50,3
DEVIATION	136	6,7	2,1	6,5	0,12	9,6
MIN	0	0,0	19,8	17,2	0,01	3,0
MAX	516	27,5	32,2	54,8	0,65	59,8
TOTAL	11 501	597	na	na	na	na
17-sept-06	**424**	**22,1**	**31,3**	**51,3**	**0,60**	**52,2**
18-sept-06	42	2,2	31,7	53,3	0,61	51,5
19-sept-06	120	6,0	27,3	54,7	0,61	50,1
20-sept-06	142	7,4	27,6	51,2	0,60	52,0
21-sept-06	267	14,9	28,6	50,6	0,58	55,9
22-sept-06	117	7,0	27,6	44,6	0,61	59,8
23-sept-06	**96**	**4,9**	**30,1**	**53,1**	**0,57**	**51,0**
24-sept-06	**465**	**25,9**	**32,2**	**52,1**	**0,57**	**55,6**
25-sept-06	47	2,5	29,2	54,8	0,60	53,1
26-sept-06	261	14,5	27,9	50,4	0,60	55,5
27-sept-06	158	8,7	28,7	49,5	0,58	55,0
28-sept-06	151	8,3	25,9	48,1	0,60	54,9
29-sept-06	296	15,6	25,7	51,0	0,60	52,9
30-sept-06	**445**	**22,2**	**28,7**	**54,1**	**0,61**	**49,9**
1-oct-06	**404**	**21,7**	**28,5**	**51,7**	**0,59**	**53,7**
2-oct-06	83	4,4	26,3	52,3	0,60	53,1
3-oct-06	151	8,4	28,9	53,0	0,59	55,9
4-oct-06	134	7,6	28,1	48,5	0,56	-
5-oct-06	0,0	-	-	-	-	-
6-oct-06	0,0	-	-	-	-	-
7-oct-06	0,0	-	-	-	-	-
8-oct-06	1,0	0,0	21,1	20,8	0,0	**3,0**
9-oct-06	1,0	0,0	19,8	17,2	0,0	6,0
10-oct-06	107	5,7	29,6	49,2	0,60	53,4
11-oct-06	188	9,7	29,5	52,5	0,58	51,6
12-oct-06	227	11,8	29,3	50,0	0,58	52,2
13-oct-06	112	5,7	27,3	52,5	0,58	50,6
14-oct-06	**121**	**6,6**	**27,8**	**49,0**	**0,58**	**54,5**
15-oct-06	**516**	**27,5**	**29,8**	**50,2**	**0,59**	**53,2**
16-oct-06	53	2,8	27,4	50,3	0,60	51,9
17-oct-06	222	11,5	28,3	50,6	0,60	52,0
18-oct-06	128	6,8	28,0	45,9	0,61	53,2
19-oct-06	201	10,4	27,5	48,8	0,59	51,8
20-oct-06	55	3,1	27,8	45,7	0,61	56,1
21-oct-06	**386**	**19,0**	**29,8**	**52,6**	**0,60**	**49,3**
22-oct-06	**478**	**23,5**	**31,9**	**51,9**	**0,61**	**49,2**
23-oct-06	215	10,2	29,4	51,2	0,60	47,3
24-oct-06	125	5,6	27,7	52,1	0,58	45,2
25-oct-06	276	14,7	27,7	51,7	0,62	53,4
26-oct-06	164	9,2	26,3	46,7	0,61	56,3
27-oct-06	245	12,7	26,5	50,7	0,62	51,7
28-oct-06	**148**	**7,3**	**27,8**	**49,6**	**0,60**	**49,5**
29-oct-06	**471**	**24,2**	**30,1**	**47,8**	**0,61**	**51,4**
30-oct-06	264	13,2	28,8	49,7	0,65	50,1
31-oct-06	304	15,5	28,1	47,7	0,64	51,1
1-nov-06	277	13,4	28,7	51,0	0,63	48,4
2-nov-06	352	17,5	29,0	49,4	0,64	49,7
3-nov-06	167	8,7	27,1	48,9	0,63	51,9
4-nov-06	**273**	**13,6**	**28,7**	**52,0**	**0,64**	**49,7**
5-nov-06	**291**	**15,0**	**30,6**	**49,8**	**0,63**	**51,6**
6-nov-06	233	12,2	27,3	47,8	0,64	52,6
7-nov-06	320	15,5	30,4	53,2	0,62	48,3
8-nov-06	162	8,4	28,4	45,9	0,60	52,1
9-nov-06	190	10,0	28,4	47,9	0,62	52,5
10-nov-06	94	4,7	28,0	49,4	0,63	50,4
11-nov-06	**331**	**16,7**	**29,1**	**49,2**	**0,62**	**50,4**

Site A, Toronto, Ontario
Electric Dryers

	DRYER #4					
	Time	**kWh**	**Tin**	**Tout**	**P**	**Wh/min**
AVERAGE	240	4,0	29,1	52,5	0,48	15,7
DEVIATION	142	2,2	2,7	9,1	0,12	2,3
MIN	0	0,0	17,5	13,4	0,01	3,0
MAX	544	8,8	32,7	58,6	0,55	16,6
TOTAL	13 445	217	na	na	na	na
17-sept-06	**498**	**8,1**	**31,9**	**57,6**	**0,54**	**16,2**
18-sept-06	122	2,0	31,2	55,0	0,51	16,3
19-sept-06	132	2,1	30,5	57,6	0,55	16,2
20-sept-06	344	5,6	27,8	52,3	0,52	16,2
21-sept-06	431	6,9	28,4	54,5	0,50	16,0
22-sept-06	299	4,7	28,4	55,7	0,51	15,8
23-sept-06	**246**	**4,1**	**30,0**	**52,7**	**0,50**	**16,5**
24-sept-06	**544**	**8,8**	**31,9**	**53,7**	**0,49**	**16,1**
25-sept-06	306	5,0	27,6	49,9	0,47	16,3
26-sept-06	209	3,3	28,6	53,5	0,51	15,7
27-sept-06	281	4,4	30,1	54,4	0,49	15,8
28-sept-06	240	3,7	27,8	54,0	0,49	15,4
29-sept-06	449	7,3	26,9	57,4	0,51	16,3
30-sept-06	**396**	**6,5**	**29,2**	**56,5**	**0,52**	**16,3**
1-oct-06	**432**	**7,0**	**29,1**	**53,8**	**0,51**	**16,3**
2-oct-06	195	3,1	27,0	52,6	0,52	16,1
3-oct-06	297	4,8	30,0	55,3	0,52	16,1
4-oct-06	243	4,0	29,0	56,7	0,49	-
5-oct-06	1	0,0	17,5	13,4	0,01	-
6-oct-06	0	-	-	-	-	-
7-oct-06	0	-	-	-	-	-
8-oct-06	1	0,0	21,1	19,8	0,01	**3,0**
9-oct-06	1	0,0	19,8	15,6	0,01	6,0
10-oct-06	259	4,1	30,6	57,0	0,51	15,7
11-oct-06	190	3,0	29,4	53,8	0,49	16,1
12-oct-06	301	4,8	30,1	50,8	0,51	16,0
13-oct-06	50	0,8	28,8	58,6	0,52	15,8
14-oct-06	**121**	**2,0**	**28,6**	**54,5**	**0,51**	**16,2**
15-oct-06	**468**	**7,5**	**31,2**	**51,8**	**0,51**	**16,1**
16-oct-06	61	1,0	28,5	58,0	0,53	16,4
17-oct-06	173	2,7	29,7	52,5	0,49	15,5
18-oct-06	228	3,7	29,6	52,6	0,51	16,2
19-oct-06	175	2,8	30,4	56,7	0,52	16,0
20-oct-06	61	1,0	27,3	51,9	0,50	16,3
21-oct-06	**342**	**5,7**	**31,2**	**53,8**	**0,49**	**16,5**
22-oct-06	**404**	**6,5**	**32,7**	**51,4**	**0,51**	**16,2**
23-oct-06	181	2,8	30,5	55,7	0,49	15,6
24-oct-06	104	1,6	29,1	56,5	0,49	15,7
25-oct-06	196	3,2	29,1	54,3	0,52	16,4
26-oct-06	61	1,0	28,6	50,5	0,53	16,6
27-oct-06	188	3,0	28,7	53,9	0,54	16,1
28-oct-06	**293**	**4,9**	**27,9**	**53,1**	**0,49**	**16,6**
29-oct-06	**411**	**6,7**	**31,4**	**54,3**	**0,49**	**16,3**
30-oct-06	297	4,7	30,7	55,6	0,52	15,9
31-oct-06	133	2,2	31,3	56,4	0,52	16,3
1-nov-06	346	5,4	31,1	56,5	0,52	15,6
2-nov-06	335	5,4	30,2	55,0	0,52	16,1
3-nov-06	140	2,3	28,7	52,2	0,51	16,3
4-nov-06	**271**	**4,4**	**30,8**	**56,2**	**0,53**	**16,1**
5-nov-06	**447**	**7,4**	**31,1**	**54,0**	**0,53**	**16,5**
6-nov-06	183	3,0	29,7	54,6	0,54	16,2
7-nov-06	433	6,9	32,1	57,0	0,52	15,9
8-nov-06	327	5,3	29,1	57,4	0,52	16,3
9-nov-06	79	1,3	30,1	54,1	0,50	16,4
10-nov-06	218	3,6	29,0	56,6	0,50	16,3
11-nov-06	**302**	**5,0**	**30,8**	**53,7**	**0,53**	**16,4**

Site A, Toronto, Ontario
Electric Dryers

Specific Concident Peak Demand (kW for a 15-minute period)
(Peak demand / # dryers)

Day Period	6h - 9h	9h - 12h	12h - 15h	15h - 18h	18h - 21h	21h - 24h
WEEK MAX	**3,01**	**2,93**	**2,98**	**2,96**	**3,00**	**2,99**
WEEKEND MAX	**3,00**	**2,97**	**2,95**	**3,00**	**2,92**	**2,70**
MAX	**3,01**	**2,97**	**2,98**	**3,00**	**3,00**	**2,99**
17-sept-06	**1,63**	**2,90**	**2,41**	**2,24**	**1,95**	**1,94**
18-sept-06	0,00	0,00	0,00	0,00	2,59	1,42
19-sept-06	0,00	0,00	0,00	1,76	2,59	2,80
20-sept-06	1,16	2,49	0,00	2,00	2,99	2,99
21-sept-06	2,06	0,86	2,42	2,76	1,71	0,00
22-sept-06	0,07	2,13	0,95	1,19	1,18	0,51
23-sept-06	**0,14**	**2,75**	**1,04**	**1,13**	**1,67**	**1,49**
24-sept-06	**3,00**	**2,94**	**2,78**	**2,35**	**2,77**	**2,18**
25-sept-06	1,79	2,04	2,11	1,23	1,80	0,26
26-sept-06	0,00	2,37	2,37	2,03	2,08	0,00
27-sept-06	0,29	1,78	0,25	2,96	2,82	0,23
28-sept-06	2,71	0,58	1,81	0,96	2,73	1,34
29-sept-06	0,01	2,72	2,07	1,72	3,00	0,17
30-sept-06	**2,88**	**2,76**	**1,76**	**3,00**	**2,83**	**2,70**
1-oct-06	**2,76**	**2,77**	**2,24**	**2,83**	**2,92**	**0,00**
2-oct-06	0,85	0,85	2,98	0,00	1,84	1,58
3-oct-06	0,93	2,02	2,98	2,04	1,66	0,00
4-oct-06	1,17	2,09	1,80	0,26	0,67	0,00
5-oct-06	0,00	0,87	1,76	0,58	0,87	0,00
6-oct-06	0,63	0,85	1,80	0,97	1,67	0,88
7-oct-06	**1,80**	**1,80**	**1,65**	**1,58**	**0,00**	**0,00**
8-oct-06	**0,87**	**1,81**	**0,00**	**1,59**	**1,80**	**0,86**
9-oct-06	0,68	1,79	1,80	1,84	1,83	0,07
10-oct-06	0,95	1,80	1,79	2,15	2,97	0,00
11-oct-06	1,11	2,81	1,19	1,80	2,90	0,64
12-oct-06	2,77	2,70	2,86	1,79	2,03	1,19
13-oct-06	1,83	0,95	0,95	2,41	2,00	0,00
14-oct-06	**0,00**	**0,00**	**1,12**	**2,71**	**2,79**	**1,91**
15-oct-06	**2,76**	**2,62**	**1,87**	**2,25**	**2,19**	**2,04**
16-oct-06	0,94	0,00	0,00	1,17	0,00	0,01
17-oct-06	0,58	2,62	2,78	0,07	2,94	1,09
18-oct-06	3,01	2,58	2,03	0,86	2,95	2,05
19-oct-06	2,04	1,73	2,76	0,07	2,97	0,00
20-oct-06	1,81	0,26	0,97	2,72	2,15	0,00
21-oct-06	**2,92**	**2,84**	**2,46**	**2,81**	**2,69**	**0,00**
22-oct-06	**2,93**	**2,19**	**2,44**	**2,72**	**2,73**	**0,00**
23-oct-06	2,15	2,07	1,57	2,48	1,89	0,00
24-oct-06	0,00	0,92	2,10	1,62	1,14	0,00
25-oct-06	0,94	1,09	2,38	2,89	2,74	0,00
26-oct-06	1,78	1,81	2,46	1,72	2,06	1,79
27-oct-06	1,78	1,98	1,99	0,79	0,19	0,00
28-oct-06	**0,01**	**0,86**	**2,59**	**2,08**	**1,82**	**0,00**
29-oct-06	**2,59**	**2,89**	**1,76**	**2,77**	**2,80**	**1,76**
30-oct-06	1,15	2,11	0,00	1,74	2,84	1,03
31-oct-06	0,76	2,93	2,54	2,72	1,79	1,39
1-nov-06	0,00	2,54	2,64	2,22	1,79	1,05
2-nov-06	2,65	2,17	2,72	1,20	2,75	0,00
3-nov-06	0,00	2,70	2,64	0,67	1,14	0,93
4-nov-06	**0,01**	**2,97**	**2,73**	**1,92**	**1,95**	**1,84**
5-nov-06	**0,27**	**2,52**	**2,66**	**1,51**	**2,69**	**0,47**
6-nov-06	0,00	0,85	1,20	1,96	2,74	2,01
7-nov-06	0,87	0,39	2,96	2,79	2,55	0,87
8-nov-06	0,69	0,85	2,01	2,30	1,81	1,69
9-nov-06	1,73	1,27	2,72	1,68	1,15	0,00
10-nov-06	0,26	1,82	1,65	2,71	1,57	0,00
11-nov-06	**0,87**	**1,57**	**2,95**	**2,75**	**1,82**	**0,00**

Site A, Toronto, Ontario
Gas Dryers

	DRYER #1								
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**	**P**
AVERAGE	252	0,60	2,37	1,74	73,0	75,3	25,15	55,0	0,22
DEVIATION	113	0,27	0,08	0,76	7,1	7,1	1,53	1,9	0,02
MIN	41	0,10	2,21	0,27	60,3	62,7	22,30	49,5	0,18
MAX	574	1,37	2,59	3,93	89,7	92,1	28,49	58,0	0,27
TOTAL	8 834	20,99	na	61,0	na	na	na	na	7,73
24-déc-06	**281**	**0,68**	**2,44**	**2,34**	**87,0**	**89,4**	**28,5**	**55,95**	**0,21**
25-déc-06	180	0,40	2,25	1,14	66,0	68,2	24,4	57,68	0,23
26-déc-06	174	0,40	2,27	1,33	79,5	81,7	27,4	53,74	0,19
27-déc-06	219	0,49	2,24	1,71	81,5	83,8	26,8	54,52	0,23
28-déc-06	243	0,58	2,37	1,72	73,6	76,0	25,8	53,83	0,25
29-déc-06	369	0,86	2,32	2,45	69,4	71,7	25,3	54,84	0,26
30-déc-06	**288**	**0,66**	**2,29**	**2,07**	**74,9**	**77,1**	**25,18**	**53,36**	**0,21**
31-déc-06	**234**	**0,53**	**2,28**	**1,49**	**66,5**	**68,8**	**22,4**	**56,9**	**0,27**
1-janv-07	250	0,62	2,46	1,89	78,9	81,4	24,7	53,1	0,19
2-janv-07	142	0,34	2,40	0,88	65,0	67,4	24,5	54,4	0,20
3-janv-07	153	0,36	2,35	1,12	76,3	78,6	24,5	54,4	0,19
4-janv-07	223	0,56	2,51	1,44	67,2	69,7	25,9	54,4	0,21
5-janv-07	59	0,13	2,21	0,46	81,7	83,9	22,7	54,1	0,24
6-janv-07	**328**	**0,80**	**2,43**	**2,13**	**67,8**	**70,2**	**27,5**	**57,6**	**0,22**
7-janv-07	**375**	**0,90**	**2,41**	**2,76**	**76,7**	**79,1**	**26,9**	**55,6**	**0,21**
8-janv-07	243	0,58	2,38	1,54	65,9	68,3	25,9	57,7	0,20
9-janv-07	289	0,70	2,42	1,67	60,3	62,7	27,38	57,96	0,18
10-janv-07	110	0,25	2,30	0,87	82,6	84,9	23,5	55,8	0,20
11-janv-07	152	0,37	2,43	1,04	71,2	73,7	24,1	54,0	0,21
12-janv-07	229	0,54	2,34	1,57	71,7	74,1	25,8	54,5	0,21
13-janv-07	**421**	**1,02**	**2,42**	**3,24**	**80,4**	**82,8**	**27,1**	**56,1**	**0,23**
14-janv-07	**380**	**0,92**	**2,41**	**2,41**	**66,2**	**68,6**	**26,0**	**55,7**	**0,24**
15-janv-07	275	0,64	2,34	1,92	72,7	75,0	24,5	55,2	0,24
16-janv-07	123	0,30	2,41	1,06	89,7	92,1	24,8	49,9	0,20
17-janv-07	41	0,10	2,48	0,27	69,5	72,0	24,0	57,1	0,22
18-janv-07	224	0,52	2,33	1,42	66,2	68,5	24,7	56,0	0,21
19-janv-07	332	0,77	2,33	2,17	68,1	70,4	25,4	55,9	0,21
20-janv-07	**248**	**0,60**	**2,41**	**1,73**	**72,7**	**75,1**	**25,9**	**55,0**	**0,24**
21-janv-07	**574**	**1,37**	**2,39**	**3,93**	**71,4**	**73,8**	**26,6**	**54,9**	**0,24**
22-janv-07	236	0,55	2,33	1,68	74,1	76,5	23,53	54,51	0,23
23-janv-07	244	0,57	2,36	1,66	70,8	73,1	24,7	54,1	0,21
24-janv-07	105	0,27	2,59	0,85	84,3	86,9	23,0	49,5	0,25
25-janv-07	284	0,66	2,34	1,80	66,1	68,4	22,3	53,1	0,24
26-janv-07	354	0,84	2,36	2,55	75,2	77,6	24,0	54,5	0,24
27-janv-07	**452**	**1,11**	**2,46**	**2,73**	**63,1**	**65,6**	**24,4**	**57,9**	**0,25**

Site A, Toronto, Ontario
Gas Dryers

	DRYER #2								
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**	**P**
AVERAGE	185	0,75	3,62	1,61	80,3	83,9	25,30	51,5	0,20
DEVIATION	131	0,42	0,20	0,93	8,8	8,7	1,27	5,3	0,03
MIN	0	0,12	3,04	0,18	62,8	66,7	22,66	33,9	0,16
MAX	493	1,65	3,91	4,13	101,6	105,5	27,69	58,6	0,27
TOTAL	6 485	23,37	na	49,8	na	na	na	na	6,25
24-déc-06	**308**	**1,03**	**3,35**	**2,44**	**82,7**	**86,1**	**27,0**	**42,57**	**0,19**
25-déc-06	0	-	-	-	-	-	-	-	-
26-déc-06	218	0,78	3,56	1,66	79,5	83,0	27,1	52,47	0,19
27-déc-06	60	0,18	3,04	0,51	88,6	91,7	26,2	33,89	0,22
28-déc-06	181	0,63	3,48	1,53	88,1	91,6	25,8	47,52	0,22
29-déc-06	292	0,99	3,39	2,37	84,6	88,0	25,3	43,34	0,24
30-déc-06	**330**	**1,15**	**3,47**	**2,60**	**82,1**	**85,6**	**25,14**	**51,61**	**0,19**
31-déc-06	**140**	**0,50**	**3,60**	**1,12**	**83,5**	**87,1**	**24,6**	**54,1**	**0,27**
1-janv-07	196	0,70	3,57	1,72	91,7	95,3	26,1	51,8	0,17
2-janv-07	45	0,16	3,48	0,37	86,0	89,4	24,9	52,4	0,17
3-janv-07	116	0,40	3,47	0,99	89,1	92,6	24,9	46,7	0,18
4-janv-07	30	0,12	3,89	0,18	63,8	67,7	25,1	57,3	0,21
5-janv-07	30	0,12	3,91	0,21	73,1	77,0	22,7	52,9	0,18
6-janv-07	**364**	**1,32**	**3,64**	**2,66**	**76,4**	**80,0**	**27,5**	**53,7**	**0,17**
7-janv-07	**141**	**0,54**	**3,85**	**0,85**	**62,8**	**66,7**	**27,7**	**57,1**	**0,22**
8-janv-07	137	0,51	3,75	0,99	75,5	79,3	25,8	53,7	0,17
9-janv-07	0	-	-	-	-	-	-	-	-
10-janv-07	0	-	-	-	-	-	-	-	-
11-janv-07	0	-	-	-	-	-	-	-	-
12-janv-07	121	0,47	3,85	0,82	70,9	74,8	25,7	56,0	0,19
13-janv-07	**493**	**1,65**	**3,36**	**4,13**	**87,4**	**90,7**	**26,4**	**44,5**	**0,20**
14-janv-07	**346**	**1,23**	**3,56**	**2,80**	**84,3**	**87,9**	**26,0**	**47,8**	**0,20**
15-janv-07	154	0,58	3,78	1,34	90,6	94,4	23,7	50,1	0,22
16-janv-07	100	0,38	3,77	0,80	83,3	87,1	24,6	54,5	0,17
17-janv-07	182	0,70	3,83	1,41	80,9	84,8	23,2	56,4	0,19
18-janv-07	266	0,99	3,73	1,86	73,0	76,7	24,7	55,5	0,21
19-janv-07	153	0,54	3,54	1,11	75,8	79,4	25,3	49,8	0,19
20-janv-07	**341**	**1,25**	**3,67**	**2,42**	**73,9**	**77,6**	**25,3**	**56,6**	**0,21**
21-janv-07	**423**	**1,57**	**3,71**	**3,16**	**78,0**	**81,7**	**26,5**	**54,8**	**0,23**
22-janv-07	280	1,06	3,80	2,21	82,4	86,2	24,10	51,79	0,21
23-janv-07	205	0,76	3,70	1,38	70,0	73,7	25,9	57,0	0,20
24-janv-07	106	0,41	3,89	1,03	101,6	105,5	23,1	47,9	0,23
25-janv-07	140	0,48	3,41	1,06	79,2	82,7	23,9	53,7	0,16
26-janv-07	229	0,83	3,62	1,87	85,3	89,0	24,2	51,5	0,23
27-janv-07	**358**	**1,33**	**3,71**	**2,21**	**64,3**	**68,0**	**26,0**	**58,6**	**0,22**

Site A, Toronto, Ontario
Gas Dryers

	DRYER #3								
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout	P
AVERAGE	237	0,53	2,23	2,26	99,3	101,6	28,34	51,4	0,62
DEVIATION	98	0,22	0,18	0,96	15,8	15,9	1,63	3,6	0,02
MIN	40	0,10	1,96	0,35	61,1	63,1	24,89	40,6	0,58
MAX	422	0,99	2,90	4,05	130,7	132,8	32,46	58,6	0,67
TOTAL	8 298	18,51	na	79,0	na	na	na	na	21,67
24-déc-06	**361**	**0,88**	**2,43**	**3,66**	**105,8**	**108,3**	**29,9**	**50,14**	**0,61**
25-déc-06	40	0,10	2,42	0,35	91,8	94,3	27,5	42,70	0,59
26-déc-06	225	0,46	2,05	2,82	130,7	132,8	32,5	56,13	0,59
27-déc-06	262	0,54	2,06	2,57	102,4	104,5	29,4	54,36	0,62
28-déc-06	285	0,56	1,96	2,56	93,6	95,6	29,8	57,58	0,64
29-déc-06	361	0,77	2,13	3,80	109,7	111,8	29,0	52,08	0,65
30-déc-06	**314**	**0,67**	**2,13**	**3,13**	**103,9**	**106,1**	**27,38**	**53,30**	**0,62**
31-déc-06	**212**	**0,48**	**2,24**	**1,94**	**95,5**	**97,8**	**25,4**	**48,7**	**0,67**
1-janv-07	102	0,24	2,32	0,98	100,3	102,6	29,2	54,0	0,60
2-janv-07	130	0,29	2,20	1,33	106,4	108,6	27,6	50,6	0,63
3-janv-07	111	0,23	2,03	0,86	81,2	83,3	27,4	58,6	0,62
4-janv-07	304	0,70	2,31	3,11	106,8	109,1	27,9	49,2	0,60
5-janv-07	152	0,37	2,46	1,67	114,4	116,8	28,4	50,6	0,58
6-janv-07	**197**	**0,48**	**2,42**	**1,82**	**96,4**	**98,8**	**31,1**	**51,9**	**0,58**
7-janv-07	**233**	**0,51**	**2,20**	**2,13**	**95,5**	**97,7**	**30,4**	**53,5**	**0,62**
8-janv-07	228	0,50	2,18	2,18	99,6	101,7	29,4	52,5	0,62
9-janv-07	269	0,62	2,29	2,88	111,6	113,9	29,27	49,43	0,59
10-janv-07	272	0,58	2,12	2,60	99,5	101,7	28,5	53,1	0,59
11-janv-07	140	0,31	2,25	1,62	120,7	123,0	27,1	48,4	0,64
12-janv-07	112	0,23	2,07	1,19	111,0	113,1	29,0	52,5	0,62
13-janv-07	**359**	**0,82**	**2,28**	**2,94**	**85,5**	**87,8**	**30,3**	**51,1**	**0,62**
14-janv-07	**369**	**0,85**	**2,31**	**2,73**	**77,0**	**79,4**	**29,8**	**52,9**	**0,62**
15-janv-07	131	0,28	2,11	0,92	72,9	75,0	26,9	47,6	0,63
16-janv-07	122	0,25	2,05	0,71	61,1	63,1	28,1	51,6	0,62
17-janv-07	328	0,75	2,28	2,15	68,3	70,6	26,1	50,1	0,63
18-janv-07	284	0,58	2,04	2,06	75,7	77,7	28,4	53,7	0,62
19-janv-07	301	0,61	2,02	2,77	96,0	98,1	27,2	53,4	0,61
20-janv-07	**312**	**0,66**	**2,12**	**3,07**	**102,7**	**104,8**	**28,9**	**53,9**	**0,64**
21-janv-07	**376**	**0,91**	**2,43**	**3,81**	**105,8**	**108,2**	**29,5**	**49,5**	**0,65**
22-janv-07	200	0,49	2,47	1,92	99,9	102,4	26,67	46,66	0,62
23-janv-07	267	0,57	2,15	2,74	106,9	109,0	27,9	53,4	0,63
24-janv-07	101	0,21	2,11	0,95	97,9	100,0	24,9	54,1	0,64
25-janv-07	153	0,44	2,90	1,84	125,6	128,5	25,8	40,6	0,62
26-janv-07	263	0,58	2,19	3,14	124,7	126,9	27,1	49,8	0,63
27-janv-07	**422**	**0,99**	**2,35**	**4,05**	**100,0**	**102,4**	**28,1**	**52,4**	**0,62**

Site A, Toronto, Ontario
Gas Dryers

	DRYER #4								
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**	**P**
AVERAGE	172	0,81	4,31	0,94	50,0	54,3	28,39	48,9	0,53
DEVIATION	108	0,41	0,14	0,61	8,5	8,5	1,60	3,6	0,02
MIN	0	0,14	4,00	0,11	37,9	42,4	25,62	40,3	0,49
MAX	430	1,81	4,56	2,58	85,1	89,4	32,36	55,7	0,60
TOTAL	6 027	25,88	na	30,0	na	na	na	na	17,06
24-déc-06	**210**	**0,86**	**4,09**	**1,01**	**50,1**	**54,2**	**26,2**	**47,38**	**0,54**
25-déc-06	31	0,14	4,45	0,11	37,9	42,4	30,7	53,72	0,55
26-déc-06	213	0,91	4,27	1,02	49,9	54,2	27,8	50,84	0,52
27-déc-06	133	0,60	4,51	0,51	39,8	44,3	30,3	55,75	0,54
28-déc-06	192	0,82	4,27	0,86	46,6	50,9	28,8	49,28	0,55
29-déc-06	257	1,09	4,22	1,08	44,0	48,2	28,4	48,22	0,57
30-déc-06	**178**	**0,76**	**4,25**	**0,83**	**48,8**	**53,0**	**27,33**	**47,22**	**0,54**
31-déc-06	**170**	**0,70**	**4,14**	**0,71**	**43,4**	**47,6**	**25,6**	**40,8**	**0,60**
1-janv-07	0	-	-	-	-	-	-	-	-
2-janv-07	102	0,42	4,14	0,51	52,5	56,6	27,3	44,8	0,53
3-janv-07	101	0,46	4,55	0,45	46,8	51,4	29,8	51,0	0,50
4-janv-07	103	0,45	4,35	0,44	44,2	48,6	27,4	43,8	0,50
5-janv-07	0	-	-	-	-	-	-	-	-
6-janv-07	**171**	**0,74**	**4,31**	**0,85**	**52,1**	**56,4**	**32,4**	**52,3**	**0,51**
7-janv-07	**291**	**1,24**	**4,25**	**1,44**	**51,8**	**56,0**	**30,5**	**49,3**	**0,52**
8-janv-07	193	0,86	4,47	0,88	47,4	51,9	29,3	53,1	0,50
9-janv-07	297	1,23	4,15	1,53	53,7	57,9	29,81	47,27	0,49
10-janv-07	131	0,58	4,45	0,51	40,9	45,4	29,0	51,2	0,49
11-janv-07	70	0,31	4,37	0,33	48,6	53,0	28,3	49,0	0,52
12-janv-07	119	0,53	4,44	0,57	49,7	54,2	29,6	51,5	0,54
13-janv-07	**316**	**1,36**	**4,29**	**1,59**	**52,4**	**56,7**	**29,1**	**47,4**	**0,53**
14-janv-07	**430**	**1,81**	**4,22**	**2,00**	**48,5**	**52,7**	**28,5**	**49,2**	**0,53**
15-janv-07	83	0,33	4,00	0,38	47,8	51,8	25,7	40,3	0,55
16-janv-07	110	0,50	4,56	0,56	52,8	57,4	27,9	52,6	0,54
17-janv-07	154	0,68	4,43	0,75	50,8	55,2	28,1	49,0	0,54
18-janv-07	77	0,32	4,20	0,41	55,6	59,9	28,4	45,2	0,55
19-janv-07	122	0,55	4,53	0,52	44,5	49,0	29,9	55,5	0,51
20-janv-07	**309**	**1,35**	**4,38**	**1,53**	**51,6**	**55,9**	**29,9**	**50,4**	**0,53**
21-janv-07	**303**	**1,29**	**4,26**	**2,47**	**85,1**	**89,4**	**27,6**	**47,3**	**0,55**
22-janv-07	311	1,31	4,20	1,49	50,1	54,3	27,01	46,51	0,53
23-janv-07	120	0,52	4,32	0,56	48,8	53,2	26,1	46,2	0,52
24-janv-07	0	-	-	-	-	-	-	-	-
25-janv-07	151	0,66	4,40	0,65	45,0	49,4	26,5	48,8	0,55
26-janv-07	192	0,82	4,28	0,87	47,4	51,7	26,7	48,8	0,57
27-janv-07	**387**	**1,68**	**4,34**	**2,58**	**69,6**	**73,9**	**28,4**	**50,6**	**0,54**

Site A, Toronto, Ontario
Gas Dryers

Specific Concident Peak Demand (kW for a 15-minute period)
(Peak demand / # dryers)

Day Period	6h - 9h	9h - 12h	12h - 15h	15h - 18h	18h - 21h	21h - 24h
WEEK MAX	**0,18**	**0,19**	**0,19**	**0,20**	**0,21**	**0,18**
WEEKEND MAX	**0,19**	**0,20**	**0,20**	**0,20**	**0,20**	**0,19**
MAX	**0,19**	**0,20**	**0,20**	**0,20**	**0,21**	**0,19**
24-déc-06	**0,04**	**0,09**	**0,19**	**0,20**	**0,16**	**0,00**
25-déc-06	0,00	0,00	0,14	0,04	0,04	0,00
26-déc-06	0,00	0,19	0,17	0,19	0,10	0,04
27-déc-06	0,00	0,14	0,12	0,06	0,11	0,11
28-déc-06	0,12	0,04	0,19	0,18	0,09	0,00
29-déc-06	0,13	0,17	0,15	0,07	0,14	0,13
30-déc-06	**0,19**	**0,13**	**0,09**	**0,19**	**0,15**	**0,09**
31-déc-06	**0,04**	**0,10**	**0,13**	**0,07**	**0,20**	**0,04**
1-janv-07	0,00	0,00	0,13	0,13	0,04	0,00
2-janv-07	0,00	0,00	0,18	0,11	0,14	0,00
3-janv-07	0,00	0,11	0,16	0,10	0,09	0,00
4-janv-07	0,12	0,11	0,14	0,10	0,08	0,04
5-janv-07	0,04	0,06	0,06	0,03	0,00	0,00
6-janv-07	**0,11**	**0,17**	**0,20**	**0,19**	**0,08**	**0,09**
7-janv-07	**0,04**	**0,12**	**0,20**	**0,11**	**0,15**	**0,17**
8-janv-07	0,11	0,10	0,10	0,08	0,20	0,12
9-janv-07	0,00	0,14	0,04	0,14	0,15	0,08
10-janv-07	0,00	0,04	0,14	0,04	0,14	0,00
11-janv-07	0,07	0,00	0,11	0,05	0,05	0,02
12-janv-07	0,00	0,14	0,13	0,20	0,00	0,00
13-janv-07	**0,00**	**0,19**	**0,20**	**0,19**	**0,20**	**0,13**
14-janv-07	**0,16**	**0,20**	**0,19**	**0,19**	**0,14**	**0,10**
15-janv-07	0,18	0,17	0,06	0,06	0,10	0,14
16-janv-07	0,00	0,18	0,10	0,11	0,05	0,00
17-janv-07	0,03	0,13	0,11	0,11	0,16	0,10
18-janv-07	0,13	0,14	0,12	0,15	0,16	0,00
19-janv-07	0,07	0,14	0,13	0,00	0,13	0,10
20-janv-07	**0,13**	**0,12**	**0,19**	**0,10**	**0,17**	**0,19**
21-janv-07	**0,13**	**0,17**	**0,18**	**0,14**	**0,20**	**0,04**
22-janv-07	0,10	0,10	0,19	0,20	0,10	0,10
23-janv-07	0,10	0,10	0,07	0,12	0,18	0,00
24-janv-07	0,00	0,14	0,10	0,09	0,11	0,00
25-janv-07	0,14	0,04	0,04	0,16	0,21	0,00
26-janv-07	0,00	0,08	0,13	0,20	0,19	0,18
27-janv-07	**0,16**	**0,16**	**0,18**	**0,19**	**0,17**	**0,10**

Site B, Toronto, Ontario
Electric Dryers

	DRYER #1				
	Time	kWh	Tin	Tout	Wh/min
AVERAGE	204	12,5	30,0	50,3	58,9
DEVIATION	98	5,4	4,1	3,7	2,9
MIN	0	1,8	19,0	41,6	49,9
MAX	510	28,8	39,3	59,6	64,0
TOTAL	22 827	1 345	na	na	na
17-sept-06	**259**	**15,6**	**27,2**	**48,9**	**60,4**
18-sept-06	114	6,3	28,8	57,9	55,2
19-sept-06	250	15,6	26,5	48,9	62,5
20-sept-06	143	8,3	24,8	54,5	57,9
21-sept-06	29	1,8	24,3	44,8	60,9
22-sept-06	29	1,9	21,7	41,6	64,0
23-sept-06	**250**	**15,0**	**30,0**	**52,2**	**60,2**
24-sept-06	**308**	**18,5**	**33,3**	**50,8**	**60,0**
25-sept-06	214	11,7	29,5	56,4	54,8
26-sept-06	176	11,2	26,1	44,1	63,9
27-sept-06	201	12,7	28,4	48,4	63,3
28-sept-06	222	14,2	26,6	45,4	63,8
29-sept-06	233	14,5	28,0	47,1	62,1
30-sept-06	**334**	**19,8**	**31,1**	**51,4**	**59,3**
1-oct-06	**510**	**28,8**	**39,0**	**53,9**	**56,4**
2-oct-06	176	9,9	38,0	55,4	56,1
3-oct-06	225	12,2	38,5	56,4	54,4
4-oct-06	216	12,6	37,1	55,4	58,4
5-oct-06	114	6,7	35,0	51,3	58,6
6-oct-06	217	12,2	34,4	57,3	56,0
7-oct-06	**218**	**12,0**	**31,8**	**53,9**	**55,2**
8-oct-06	**214**	**12,7**	**29,9**	**49,9**	**59,4**
9-oct-06	235	13,4	35,5	53,4	57,0
10-oct-06	138	7,9	31,8	53,7	57,5
11-oct-06	114	5,9	35,8	59,6	51,9
12-oct-06	194	10,8	35,1	56,5	55,5
13-oct-06	266	15,8	31,1	48,9	59,4
14-oct-06	**81**	**4,0**	**28,9**	**59,6**	**49,9**
15-oct-06	**430**	**23,8**	**35,1**	**53,7**	**55,3**
16-oct-06	255	15,1	29,0	50,9	59,3
17-oct-06	273	16,7	32,5	52,0	61,2
18-oct-06	83	4,8	33,0	58,3	57,4
19-oct-06	241	14,6	38,5	51,4	60,4
20-oct-06	277	17,6	28,2	49,0	63,5
21-oct-06	**146**	**9,2**	**33,5**	**46,9**	**63,0**
22-oct-06	**249**	**14,4**	**32,9**	**52,7**	**57,7**
23-oct-06	216	13,2	30,3	49,2	61,2
24-oct-06	172	10,5	32,1	50,4	61,0
25-oct-06	232	14,6	29,7	45,1	62,9
26-oct-06	313	19,6	26,5	45,4	62,5
27-oct-06	88	5,4	25,1	48,7	61,9
28-oct-06	**335**	**19,5**	**29,2**	**54,2**	**58,2**
29-oct-06	**287**	**16,9**	**31,2**	**51,5**	**58,7**
30-oct-06	347	20,6	29,6	50,6	59,3
31-oct-06	131	7,7	35,4	53,5	58,9
1-nov-06	136	8,4	28,6	45,0	61,8
2-nov-06	115	6,7	32,3	49,4	58,0
3-nov-06	71	4,5	27,5	46,4	62,7
4-nov-06	**289**	**16,9**	**28,5**	**47,8**	**58,5**
5-nov-06	**233**	**13,4**	**28,8**	**50,8**	**57,7**
6-nov-06	307	17,5	29,5	52,5	56,9
7-nov-06	223	13,0	31,6	49,5	58,2
8-nov-06	257	16,1	29,4	45,8	62,6
9-nov-06	113	7,1	35,1	49,9	62,9
10-nov-06	0	-	-	-	-
11-nov-06	**370**	**22,5**	**30,5**	**49,3**	**60,9**
12-nov-06	**289**	**17,0**	**32,1**	**50,2**	**59,0**
13-nov-06	163	9,6	28,7	47,0	58,7

Site B, Toronto, Ontario
Electric Dryers

	DRYER #2				
	Time	kWh	Tin	Tout	Wh/min
AVERAGE	97	6,1	21,1	48,9	53,3
DEVIATION	77	3,8	3,1	5,8	6,0
MIN	0	0,0	13,7	21,4	1,5
MAX	312	17,0	28,4	60,6	60,4
TOTAL	10 911	588	na	na	na
17-sept-06	**225**	**12,3**	**24,4**	**51,3**	**54,5**
18-sept-06	86	4,6	26,7	54,4	53,4
19-sept-06	25	1,4	21,8	50,7	57,9
20-sept-06	58	3,3	21,1	41,0	56,7
21-sept-06	142	7,7	20,5	49,8	54,0
22-sept-06	1	0,0	20,5	21,4	1,5
23-sept-06	**79**	**4,2**	**24,4**	**53,9**	**53,2**
24-sept-06	**212**	**11,1**	**24,3**	**55,2**	**52,5**
25-sept-06	169	9,7	22,3	50,5	57,4
26-sept-06	82	4,3	21,5	55,4	52,1
27-sept-06	0	-	-	-	-
28-sept-06	169	9,5	20,2	49,8	56,1
29-sept-06	202	11,2	18,7	40,0	55,6
30-sept-06	**137**	**7,3**	**24,3**	**50,6**	**53,3**
1-oct-06	**312**	**16,4**	**27,4**	**50,8**	**52,4**
2-oct-06	29	1,6	25,3	45,1	56,3
3-oct-06	56	3,0	28,4	50,9	53,8
4-oct-06	0	-	-	-	-
5-oct-06	0	-	-	-	-
6-oct-06	161	8,1	23,1	53,0	50,3
7-oct-06	**81**	**4,6**	**25,4**	**49,4**	**56,4**
8-oct-06	**82**	**4,2**	**26,8**	**52,8**	**51,6**
9-oct-06	164	8,9	26,9	53,2	54,0
10-oct-06	28	1,7	19,6	44,0	60,4
11-oct-06	109	5,9	27,2	51,1	54,5
12-oct-06	0	-	-	-	-
13-oct-06	138	7,8	22,1	47,1	56,4
14-oct-06	**54**	**3,0**	**23,7**	**50,0**	**54,8**
15-oct-06	**307**	**15,3**	**24,6**	**53,2**	**49,8**
16-oct-06	106	5,4	22,0	54,6	51,0
17-oct-06	103	5,0	23,0	55,6	48,8
18-oct-06	84	4,9	25,0	45,5	57,9
19-oct-06	140	7,7	24,8	49,7	55,4
20-oct-06	57	3,1	21,5	46,6	53,8
21-oct-06	**54**	**3,0**	**23,4**	**49,9**	**54,7**
22-oct-06	**163**	**8,0**	**23,4**	**55,3**	**49,4**
23-oct-06	83	4,2	23,3	54,5	50,6
24-oct-06	59	3,4	20,3	37,9	57,7
25-oct-06	0	-	-	-	-
26-oct-06	145	7,7	21,0	48,4	52,8
27-oct-06	26	1,5	18,9	45,5	56,3
28-oct-06	**207**	**10,8**	**21,1**	**50,9**	**52,4**
29-oct-06	**198**	**10,6**	**22,2**	**49,8**	**53,3**
30-oct-06	175	9,6	21,6	47,6	55,0
31-oct-06	83	4,6	24,3	49,1	55,2
1-nov-06	28	1,5	21,1	60,6	55,0
2-nov-06	189	10,7	20,2	44,4	56,6
3-nov-06	0	-	-	-	-
4-nov-06	**112**	**6,1**	**19,9**	**49,9**	**54,7**
5-nov-06	**197**	**10,2**	**21,5**	**53,7**	**51,7**
6-nov-06	112	6,2	22,1	49,6	54,9
7-nov-06	29	1,4	22,8	55,2	48,2
8-nov-06	85	4,7	23,1	49,0	55,2
9-nov-06	87	5,1	23,5	45,8	58,2
10-nov-06	0	-	-	-	-
11-nov-06	**165**	**8,9**	**21,0**	**47,3**	**54,0**
12-nov-06	**114**	**6,3**	**20,1**	**47,7**	**55,3**
13-nov-06	26	1,4	19,9	50,9	54,1

14-nov-06	110	6,9	29,0	48,5	62,3
15-nov-06	137	7,9	31,6	51,3	57,8
16-nov-06	388	21,6	34,7	55,1	55,6
17-nov-06	0	-	-	-	-
18-nov-06	**333**	**20,0**	**32,0**	**47,9**	**60,1**
19-nov-06	**202**	**12,1**	**31,0**	**46,5**	**60,1**
20-nov-06	374	22,0	28,1	48,0	58,7
21-nov-06	202	11,6	30,9	51,1	57,3
22-nov-06	168	9,9	29,6	51,4	58,7
23-nov-06	115	6,7	28,1	49,0	58,3
24-nov-06	309	16,6	29,4	55,2	53,6
25-nov-06	**173**	**10,3**	**30,4**	**48,1**	**59,3**
26-nov-06	**337**	**20,7**	**34,4**	**48,5**	**61,4**
27-nov-06	85	4,9	37,6	55,0	58,1
28-nov-06	168	9,3	34,3	52,3	55,3
29-nov-06	106	6,3	32,4	51,0	59,1
30-nov-06	239	13,7	39,3	54,3	57,5
1-déc-06	256	14,1	27,1	51,6	55,0
2-déc-06	**290**	**17,5**	**30,7**	**46,3**	**60,3**
3-déc-06	**246**	**15,1**	**23,4**	**44,4**	**61,4**
4-déc-06	201	12,6	23,6	45,3	62,8
5-déc-06	189	10,0	28,4	54,0	53,1
6-déc-06	0	-	-	-	-
7-déc-06	341	18,9	21,8	50,2	55,5
8-déc-06	201	11,9	24,1	52,5	59,3
9-déc-06	**0**	**-**	**-**	**-**	**-**
10-déc-06	**280**	**17,0**	**29,4**	**47,2**	**60,7**
11-déc-06	167	9,9	33,3	51,4	59,3
12-déc-06	52	3,0	36,0	53,4	57,2
13-déc-06	200	11,7	28,5	49,1	58,7
14-déc-06	248	13,9	30,0	51,5	56,1
15-déc-06	55	3,3	33,3	49,6	60,7
16-déc-06	**290**	**17,9**	**25,6**	**45,1**	**61,7**
17-déc-06	**281**	**15,7**	**29,2**	**52,2**	**55,9**
18-déc-06	280	16,2	30,1	51,6	58,0
19-déc-06	176	11,2	30,2	45,5	63,5
20-déc-06	193	11,5	24,2	49,6	59,7
21-déc-06	138	8,2	27,3	48,3	59,5
22-déc-06	102	5,9	25,4	49,4	58,0
23-déc-06	**115**	**6,9**	**23,9**	**46,6**	**60,3**
24-déc-06	**173**	**10,3**	**24,4**	**45,9**	**59,5**
25-déc-06	143	8,1	26,3	49,5	56,6
26-déc-06	82	4,6	27,7	53,0	56,0
27-déc-06	199	12,3	19,0	45,0	61,6
28-déc-06	84	5,3	32,0	47,6	63,1
29-déc-06	308	18,1	24,2	48,2	58,7
30-déc-06	**231**	**14,6**	**24,3**	**43,3**	**63,3**
31-déc-06	**86**	**5,0**	**21,9**	**46,5**	**58,0**
1-janv-07	74	3,9	29,6	56,6	52,2
2-janv-07	222	13,2	27,3	47,8	59,5
3-janv-07	223	12,4	28,1	50,7	55,7
4-janv-07	362	21,3	29,5	50,0	58,8
5-janv-07	248	14,3	30,5	50,5	57,8
6-janv-07	**324**	**19,6**	**30,5**	**47,4**	**60,4**

14-nov-06	138	6,8	21,1	57,3	49,2
15-nov-06	86	4,7	22,0	51,8	54,4
16-nov-06	272	13,9	24,1	51,9	51,2
17-nov-06	0	-	-	-	-
18-nov-06	**119**	**6,5**	**21,8**	**42,4**	**54,7**
19-nov-06	**57**	**3,1**	**19,4**	**42,0**	**55,0**
20-nov-06	0	-	-	-	-
21-nov-06	0	-	-	-	-
22-nov-06	86	4,5	18,6	49,8	52,3
23-nov-06	0	-	-	-	-
24-nov-06	53	2,8	20,2	51,0	53,1
25-nov-06	**112**	**6,0**	**20,1**	**47,6**	**53,6**
26-nov-06	**136**	**7,3**	**22,7**	**47,9**	**53,4**
27-nov-06	29	1,5	24,1	56,6	51,4
28-nov-06	83	4,6	20,3	43,3	55,6
29-nov-06	56	2,8	25,0	56,9	50,5
30-nov-06	29	1,6	22,6	46,7	56,3
1-déc-06	88	4,7	21,1	51,8	53,4
2-déc-06	**229**	**12,7**	**19,7**	**43,7**	**55,5**
3-déc-06	**232**	**12,6**	**18,6**	**47,3**	**54,1**
4-déc-06	86	4,8	16,1	45,2	55,7
5-déc-06	177	9,7	17,4	44,9	55,1
6-déc-06	28	1,6	17,3	34,4	56,7
7-déc-06	28	1,5	15,6	42,4	54,2
8-déc-06	56	2,9	14,5	56,4	51,6
9-déc-06	**81**	**4,1**	**16,2**	**56,9**	**50,1**
10-déc-06	**166**	**9,0**	**18,5**	**47,4**	**54,1**
11-déc-06	55	3,0	17,8	47,7	53,9
12-déc-06	57	3,1	18,5	52,3	54,2
13-déc-06	57	2,8	21,0	57,8	48,9
14-déc-06	220	11,8	20,9	46,3	53,6
15-déc-06	110	5,9	21,3	51,3	53,4
16-déc-06	**87**	**4,8**	**20,1**	**46,6**	**54,8**
17-déc-06	**85**	**4,8**	**22,6**	**50,0**	**56,9**
18-déc-06	73	3,4	20,0	57,3	46,5
19-déc-06	0	-	-	-	-
20-déc-06	29	1,5	14,9	54,1	51,6
21-déc-06	0	-	-	-	-
22-déc-06	29	1,6	16,4	37,3	56,6
23-déc-06	**50**	**2,5**	**18,5**	**54,4**	**49,6**
24-déc-06	**84**	**4,5**	**20,3**	**47,7**	**53,9**
25-déc-06	167	9,3	18,3	43,8	55,9
26-déc-06	229	13,1	17,0	44,2	57,2
27-déc-06	162	8,9	17,6	48,5	55,2
28-déc-06	29	1,6	19,1	48,2	56,2
29-déc-06	214	12,1	13,7	45,4	-
30-déc-06	**114**	**6,7**	**14,3**	**40,6**	**59,0**
31-déc-06	**0**	**-**	**-**	**-**	**-**
1-janv-07	0	-	-	-	-
2-janv-07	59	3,4	16,6	38,2	57,0
3-janv-07	137	6,8	17,5	49,9	49,7
4-janv-07	163	9,3	18,6	41,6	57,0
5-janv-07	28	1,2	21,1	57,4	43,8
6-janv-07	**311**	**17,0**	**20,1**	**46,1**	**54,5**

Site B, Toronto, Ontario
Electric Dryers

DRYER #3

	Time	kWh	Tin	Tout	Wh/min
AVERAGE	134	8,8	23,1	49,1	61,5
DEVIATION	89	5,2	3,1	5,3	4,6
MIN	0	0,4	15,8	33,3	46,5
MAX	397	24,4	29,9	60,6	73,0
TOTAL	14 962	918	na	na	na
17-sept-06	**61**	**3,5**	**26,9**	**59,9**	**57,2**
18-sept-06	86	4,2	29,9	58,4	48,5
19-sept-06	91	6,1	26,1	49,3	66,6
20-sept-06	56	3,5	23,4	45,6	61,9
21-sept-06	61	4,2	24,7	42,2	68,7
22-sept-06	0	-	-	-	-
23-sept-06	**89**	**5,8**	**26,9**	**49,3**	**65,3**
24-sept-06	**172**	**9,4**	**28,8**	**54,9**	**54,5**
25-sept-06	31	2,0	23,9	53,7	63,7
26-sept-06	123	8,1	23,1	48,5	65,6
27-sept-06	61	4,1	25,1	44,4	68,0
28-sept-06	142	9,2	22,9	47,7	65,0
29-sept-06	121	8,1	19,7	44,3	66,7
30-sept-06	**207**	**12,9**	**25,9**	**48,8**	**62,5**
1-oct-06	**336**	**21,1**	**27,7**	**46,8**	**62,7**
2-oct-06	49	3,1	26,6	51,1	64,3
3-oct-06	0	-	-	-	-
4-oct-06	150	7,8	29,2	59,9	51,7
5-oct-06	82	5,5	24,9	44,2	67,1
6-oct-06	92	5,6	25,4	52,3	61,0
7-oct-06	**172**	**10,9**	**28,4**	**49,9**	**63,2**
8-oct-06	**91**	**5,6**	**28,3**	**47,1**	**61,3**
9-oct-06	78	4,7	29,8	53,8	60,1
10-oct-06	122	7,8	23,5	54,2	63,5
11-oct-06	121	8,1	28,9	46,8	67,0
12-oct-06	59	4,0	26,3	46,2	68,1
13-oct-06	91	5,4	24,7	52,6	59,5
14-oct-06	**61**	**4,1**	**27,3**	**48,2**	**67,8**
15-oct-06	**243**	**15,1**	**26,8**	**48,1**	**62,2**
16-oct-06	175	11,9	26,1	45,1	67,7
17-oct-06	31	2,0	24,0	41,5	65,6
18-oct-06	134	7,6	27,2	53,1	56,6
19-oct-06	122	6,5	28,4	56,0	53,2
20-oct-06	92	5,7	24,9	48,1	62,4
21-oct-06	**197**	**11,1**	**25,9**	**53,4**	**56,6**
22-oct-06	**243**	**14,8**	**25,9**	**50,0**	**61,0**
23-oct-06	172	9,4	26,3	54,2	54,5
24-oct-06	174	11,1	22,5	51,5	63,6
25-oct-06	99	5,8	22,7	58,8	58,2
26-oct-06	62	4,0	21,0	49,5	63,8
27-oct-06	60	3,8	20,1	49,3	63,1
28-oct-06	**397**	**24,4**	**23,0**	**49,0**	**61,4**
29-oct-06	**327**	**20,7**	**23,5**	**48,2**	**63,4**
30-oct-06	79	4,9	22,3	42,7	62,6
31-oct-06	184	11,4	24,8	52,8	62,1
1-nov-06	262	17,7	22,6	44,2	67,6
2-nov-06	152	9,4	20,6	46,8	62,1
3-nov-06	31	2,0	19,4	33,9	63,8
4-nov-06	**211**	**13,6**	**20,9**	**43,5**	**64,3**
5-nov-06	**391**	**23,5**	**22,0**	**50,1**	**60,2**
6-nov-06	290	16,9	22,9	53,9	58,1
7-nov-06	151	9,3	22,8	53,3	61,4
8-nov-06	30	1,6	24,0	60,6	52,7
9-nov-06	92	5,7	24,9	50,7	62,5
10-nov-06	90	5,9	21,8	46,6	-
11-nov-06	**121**	**8,0**	**21,4**	**48,0**	**66,1**
12-nov-06	**215**	**13,3**	**20,0**	**48,2**	**62,0**
13-nov-06	91	5,5	21,3	49,3	60,2

Site B, Toronto, Ontario
Electric Dryers

DRYER #4

	Time	kWh	Tin	Tout	Wh/min
AVERAGE	151	7,5	22,7	42,8	48,8
DEVIATION	98	4,4	3,0	8,0	12,8
MIN	0	0,1	12,8	13,2	1,5
MAX	521	21,5	30,0	59,3	70,9
TOTAL	16 883	790	na	na	na
17-sept-06	**266**	**16,5**	**27,5**	**49,3**	**62,0**
18-sept-06	171	9,6	30,0	52,1	56,2
19-sept-06	31	2,0	26,3	46,9	64,0
20-sept-06	153	8,3	26,5	53,4	54,0
21-sept-06	213	14,6	25,3	42,8	68,5
22-sept-06	521	4,2	19,3	18,2	8,1
23-sept-06	**179**	**10,6**	**26,9**	**51,3**	**59,1**
24-sept-06	**303**	**17,9**	**27,2**	**50,0**	**59,2**
25-sept-06	123	7,4	23,5	47,4	60,0
26-sept-06	152	10,0	22,5	50,7	65,8
27-sept-06	146	9,4	24,0	55,8	64,3
28-sept-06	142	8,7	21,4	47,8	61,6
29-sept-06	4	0,1	17,3	21,8	34,1
30-sept-06	**181**	**11,0**	**24,5**	**50,1**	**60,8**
1-oct-06	**350**	**21,5**	**27,8**	**52,1**	**61,4**
2-oct-06	128	8,7	25,6	42,8	68,2
3-oct-06	92	5,8	27,9	50,0	63,0
4-oct-06	170	10,3	26,8	51,1	60,9
5-oct-06	61	3,9	24,2	53,9	63,6
6-oct-06	0	-	-	-	-
7-oct-06	**154**	**9,1**	**27,1**	**49,7**	**59,2**
8-oct-06	**31**	**2,0**	**23,1**	**45,4**	**65,5**
9-oct-06	120	6,0	27,2	54,4	49,9
10-oct-06	31	1,8	21,9	39,9	57,0
11-oct-06	60	2,5	27,8	59,3	41,8
12-oct-06	150	7,5	24,6	50,1	50,0
13-oct-06	91	4,7	24,0	48,2	51,7
14-oct-06	**182**	**9,3**	**24,9**	**54,8**	**51,1**
15-oct-06	**61**	**3,9**	**26,5**	**44,1**	**64,2**
16-oct-06	31	2,0	24,0	46,4	64,0
17-oct-06	166	8,8	23,9	50,1	53,1
18-oct-06	170	9,9	26,5	49,2	57,9
19-oct-06	123	7,0	26,3	43,7	56,6
20-oct-06	116	6,3	24,0	48,0	54,7
21-oct-06	**183**	**9,1**	**24,8**	**51,2**	**49,9**
22-oct-06	**212**	**11,4**	**24,4**	**46,6**	**53,7**
23-oct-06	281	15,9	24,4	44,5	56,6
24-oct-06	124	7,7	20,0	43,2	61,8
25-oct-06	88	5,3	21,2	49,9	60,2
26-oct-06	145	9,6	21,2	45,7	65,9
27-oct-06	60	4,3	19,6	39,7	70,9
28-oct-06	**327**	**20,7**	**22,1**	**46,5**	**63,3**
29-oct-06	**273**	**16,6**	**23,0**	**50,1**	**60,8**
30-oct-06	32	1,9	22,4	44,1	59,2
31-oct-06	111	6,0	25,1	54,8	54,3
1-nov-06	61	4,1	23,2	43,2	66,9
2-nov-06	209	12,7	21,6	48,6	60,9
3-nov-06	91	6,1	20,6	45,8	66,6
4-nov-06	**275**	**15,3**	**21,8**	**42,6**	**55,6**
5-nov-06	**131**	**6,8**	**22,6**	**43,8**	**51,6**
6-nov-06	116	5,6	22,6	45,8	48,0
7-nov-06	151	8,0	23,6	42,0	53,2
8-nov-06	92	4,2	24,7	45,5	45,5
9-nov-06	123	6,1	25,2	44,8	49,4
10-nov-06	0	-	-	-	-
11-nov-06	**366**	**17,2**	**23,1**	**46,4**	**47,0**
12-nov-06	**182**	**8,5**	**22,3**	**48,1**	**46,5**
13-nov-06	202	9,1	22,1	52,1	44,9

14-nov-06	91	5,3	23,3	52,7	58,2
15-nov-06	77	4,6	23,5	52,7	59,9
16-nov-06	306	19,6	26,7	48,9	64,0
17-nov-06	0	-	-	-	-
18-nov-06	**294**	**17,7**	**23,7**	**51,0**	**60,1**
19-nov-06	**185**	**11,3**	**20,9**	**49,6**	**61,2**
20-nov-06	122	7,1	20,9	50,6	58,5
21-nov-06	0	-	-	-	-
22-nov-06	0	-	-	-	-
23-nov-06	59	3,7	21,9	49,0	62,6
24-nov-06	122	7,2	21,6	51,7	59,1
25-nov-06	**61**	**4,0**	**19,6**	**45,0**	**65,0**
26-nov-06	**9**	**0,4**	**23,6**	**35,7**	**46,5**
27-nov-06	183	10,9	23,9	51,1	59,7
28-nov-06	230	13,2	21,8	52,2	-
29-nov-06	119	6,7	26,1	55,6	56,5
30-nov-06	122	7,8	22,3	49,1	64,0
1-déc-06	226	14,5	23,6	47,4	64,0
2-déc-06	**121**	**8,3**	**21,4**	**36,4**	**68,4**
3-déc-06	**301**	**17,8**	**20,9**	**47,6**	**59,1**
4-déc-06	90	5,9	18,0	42,9	65,7
5-déc-06	151	9,3	19,5	47,6	61,3
6-déc-06	159	9,4	18,7	49,5	59,3
7-déc-06	153	10,2	15,8	42,1	66,5
8-déc-06	92	5,7	17,2	45,4	61,8
9-déc-06	**54**	**3,9**	**17,8**	**36,9**	**73,0**
10-déc-06	**183**	**10,4**	**21,3**	**53,7**	**56,6**
11-déc-06	0	-	-	-	-
12-déc-06	0	-	-	-	-
13-déc-06	90	5,9	22,3	48,5	66,0
14-déc-06	205	11,2	22,0	52,9	54,5
15-déc-06	28	1,7	20,2	33,3	62,2
16-déc-06	**180**	**10,7**	**22,5**	**49,8**	**59,2**
17-déc-06	**151**	**9,3**	**24,5**	**52,2**	**61,7**
18-déc-06	93	5,0	21,3	52,7	53,5
19-déc-06	92	6,2	18,2	40,8	67,0
20-déc-06	0	-	-	-	-
21-déc-06	151	9,3	21,4	46,2	61,6
22-déc-06	153	10,1	19,5	43,2	66,0
23-déc-06	**85**	**4,7**	**22,0**	**55,1**	**55,1**
24-déc-06	**241**	**13,9**	**23,4**	**53,4**	**57,5**
25-déc-06	273	17,1	20,4	48,2	62,8
26-déc-06	181	11,2	20,1	49,5	61,8
27-déc-06	182	12,0	20,3	42,1	66,1
28-déc-06	175	10,6	19,7	46,2	60,8
29-déc-06	214	13,3	17,3	49,6	62,1
30-déc-06	**153**	**8,9**	**17,5**	**51,9**	**58,0**
31-déc-06	**373**	**22,8**	**19,1**	**51,2**	**61,0**
1-janv-07	31	1,7	21,1	50,4	55,0
2-janv-07	56	2,9	23,5	60,1	52,7
3-janv-07	153	9,1	22,5	50,4	59,5
4-janv-07	76	4,7	21,9	54,8	62,3
5-janv-07	181	11,3	21,5	50,9	62,3
6-janv-07	**212**	**12,4**	**24,4**	**50,9**	**58,4**

14-nov-06	31	1,4	22,5	45,0	46,7
15-nov-06	91	4,3	22,5	41,3	47,4
16-nov-06	274	12,4	25,2	42,3	45,3
17-nov-06	0	-	-	-	-
18-nov-06	**92**	**4,3**	**22,6**	**41,7**	**46,7**
19-nov-06	**121**	**5,9**	**21,0**	**39,7**	**49,1**
20-nov-06	151	7,2	20,7	42,5	47,5
21-nov-06	154	7,4	21,3	40,3	48,2
22-nov-06	31	1,5	20,4	39,2	49,8
23-nov-06	122	6,2	22,0	39,0	50,9
24-nov-06	61	3,1	21,3	39,3	50,2
25-nov-06	**67**	**3,2**	**20,6**	**38,3**	**47,8**
26-nov-06	**123**	**5,1**	**24,1**	**40,2**	**41,3**
27-nov-06	31	1,3	24,2	42,4	42,2
28-nov-06	122	5,3	21,7	42,5	43,4
29-nov-06	75	2,9	25,2	47,2	38,9
30-nov-06	30	1,4	23,4	39,7	45,1
1-déc-06	273	11,3	23,3	41,9	41,5
2-déc-06	**212**	**9,4**	**22,1**	**40,6**	**44,3**
3-déc-06	**331**	**14,6**	**21,2**	**39,6**	**44,1**
4-déc-06	190	7,9	20,3	39,7	41,8
5-déc-06	234	8,6	19,4	37,9	36,7
6-déc-06	183	7,9	21,4	41,5	43,0
7-déc-06	399	12,5	16,9	36,3	31,2
8-déc-06	227	0,3	12,8	13,2	1,5
9-déc-06	**83**	**0,1**	**14,1**	**14,0**	**1,5**
10-déc-06	**0**	**-**	**-**	**-**	**-**
11-déc-06	92	3,9	22,2	39,3	42,5
12-déc-06	118	5,0	21,4	41,6	42,0
13-déc-06	199	8,4	23,5	38,2	42,3
14-déc-06	184	7,1	25,1	42,7	38,5
15-déc-06	30	1,3	21,7	38,8	42,1
16-déc-06	**183**	**7,2**	**21,8**	**41,6**	**39,5**
17-déc-06	**244**	**9,8**	**23,9**	**39,6**	**40,2**
18-déc-06	123	4,8	21,3	44,6	39,0
19-déc-06	186	7,6	18,6	35,7	40,9
20-déc-06	140	3,6	16,8	29,4	26,0
21-déc-06	0	-	-	-	-
22-déc-06	123	5,0	21,0	35,9	40,9
23-déc-06	**212**	**8,0**	**22,7**	**43,2**	**37,8**
24-déc-06	**304**	**12,4**	**23,5**	**37,8**	**40,7**
25-déc-06	215	8,8	21,6	36,5	40,7
26-déc-06	208	8,2	21,0	39,6	39,5
27-déc-06	56	2,4	21,9	36,9	42,3
28-déc-06	121	5,1	21,9	37,6	41,9
29-déc-06	273	7,6	15,0	25,1	27,8
30-déc-06	**340**	**11,0**	**16,4**	**28,1**	**32,2**
31-déc-06	**205**	**5,4**	**17,7**	**26,2**	**26,5**
1-janv-07	62	2,6	20,8	40,5	42,0
2-janv-07	239	10,2	21,5	39,1	42,7
3-janv-07	215	9,1	21,1	38,8	42,1
4-janv-07	90	4,1	21,0	37,7	45,2
5-janv-07	0	-	-	-	-
6-janv-07	**306**	**12,9**	**24,1**	**38,3**	**42,3**

Site B, Toronto, Ontario
Electric Dryers

Site B, Toronto, Ontario
Electric Dryers

Note: when the pressure was positive it was included in the average.

PRESSURE (OPERATION)

VAC	P1	P2	P3	P4
AVERAGE	-0,3	-0,2	-0,3	-0,4
DEVIATION	0,4	0,3	0,3	0,4
MIN	-1,1	-0,8	-0,7	-1,1
MAX	0,0	0,1	0,0	0,1
TOTAL	na	na	na	na
17-sept-06	**-1,0**	**-0,7**	**-0,6**	**-1,1**
18-sept-06	0,0	0,1	0,0	-0,1
19-sept-06	0,0	0,1	0,0	-0,1
20-sept-06	0,0	0,1	0,0	-0,1
21-sept-06	0,0	0,1	0,0	-0,1
22-sept-06	0,0	0,0	-	0,0
23-sept-06	**0,0**	**0,1**	**0,0**	**-0,1**
24-sept-06	**0,0**	**0,1**	**0,0**	**0,0**
25-sept-06	-0,4	-0,2	-0,6	-0,6
26-sept-06	-1,0	-0,8	-0,7	-1,0
27-sept-06	-1,1	-	-0,7	-1,1
28-sept-06	-1,0	-0,8	-0,7	-1,0
29-sept-06	-0,9	-0,7	-0,7	-0,9
30-sept-06	**-0,9**	**-0,6**	**-0,7**	**-0,9**
1-oct-06	**-0,8**	**-0,5**	**-0,6**	**-0,8**
2-oct-06	-0,9	-0,6	-0,6	-0,9
3-oct-06	-0,8	-0,6	-	-0,9
4-oct-06	-0,8	-	-0,6	-0,8
5-oct-06	-0,8	-	-0,6	-0,7
6-oct-06	0,0	0,1	0,0	-
7-oct-06	**0,0**	**0,1**	**0,0**	**0,0**
8-oct-06	**0,0**	**0,1**	**0,0**	**-0,1**
9-oct-06	0,0	0,1	0,0	0,0
10-oct-06	0,0	0,1	0,0	0,0
11-oct-06	0,0	0,1	0,0	0,0
12-oct-06	0,0	-	0,0	0,0
13-oct-06	0,0	0,1	0,0	0,0
14-oct-06	**0,0**	**0,1**	**0,0**	**0,0**
15-oct-06	**0,0**	**0,1**	**0,0**	**0,1**
16-oct-06	0,0	0,1	0,0	0,0
17-oct-06	0,0	0,1	0,0	0,0
18-oct-06	0,0	0,1	0,0	0,0
19-oct-06	0,0	0,1	0,0	0,0
20-oct-06	0,0	0,1	0,0	0,0
21-oct-06	**0,0**	**0,1**	**0,0**	**0,0**
22-oct-06	**0,0**	**0,1**	**0,0**	**0,1**
23-oct-06	0,0	0,1	0,0	0,0
24-oct-06	-0,6	-0,6	-0,6	-0,6
25-oct-06	-0,8	-	-0,6	-0,8
26-oct-06	-0,8	-0,6	-0,7	-0,7
27-oct-06	-0,8	-0,6	-0,6	-0,8
28-oct-06	**-0,6**	**-0,5**	**-0,5**	**-0,6**
29-oct-06	**-0,6**	**-0,4**	**-0,4**	**-0,6**
30-oct-06	-0,6	-0,5	-0,5	-0,6
31-oct-06	-0,6	-0,4	-0,5	-0,6
1-nov-06	-0,6	-0,4	-0,5	-0,5
2-nov-06	-0,5	-0,4	-0,4	-0,5
3-nov-06	-0,5	-	-0,4	-0,5
4-nov-06	**-0,3**	**-0,3**	**-0,2**	**-0,3**
5-nov-06	**-0,3**	**-0,2**	**-0,2**	**-0,2**
6-nov-06	-0,3	-0,2	-0,2	-0,3
7-nov-06	-0,3	-0,1	-0,2	-0,3
8-nov-06	-0,3	-0,2	-0,2	-0,3
9-nov-06	-0,3	-0,2	-0,2	-0,3
10-nov-06	-	-	-0,2	-
11-nov-06	**-0,2**	**-0,1**	**-0,2**	**-0,2**

PRESSURE (NOT IN OPERATION)

VAC	P1	P2	P3	P4
AVERAGE	-0,4	-0,3	-0,3	-0,4
DEVIATION	0,4	0,3	0,3	0,4
MIN	-1,2	-0,9	-0,9	-1,2
MAX	0,0	0,0	0,0	0,0
TOTAL	na	na	na	na
17-sept-06	**-1,2**	**-0,9**	**-0,8**	**-1,2**
18-sept-06	-0,3	-0,3	-0,2	-0,3
19-sept-06	0,0	0,0	0,0	0,0
20-sept-06	0,0	0,0	0,0	0,0
21-sept-06	0,0	0,0	0,0	0,0
22-sept-06	0,0	0,0	-	0,0
23-sept-06	**0,0**	**0,0**	**0,0**	**0,0**
24-sept-06	**0,0**	**0,0**	**0,0**	**0,0**
25-sept-06	-0,7	-0,6	-0,5	-0,6
26-sept-06	-1,1	-0,9	-0,8	-1,0
27-sept-06	-1,2	-	-0,9	-1,1
28-sept-06	-1,1	-0,9	-0,8	-1,0
29-sept-06	-1,0	-0,8	-0,8	-0,9
30-sept-06	**-1,0**	**-0,8**	**-0,8**	**-1,0**
1-oct-06	**-0,9**	**-0,8**	**-0,7**	**-0,9**
2-oct-06	-0,9	-0,8	-0,7	-0,9
3-oct-06	-0,9	-0,8	-	-0,9
4-oct-06	-0,9	-	-0,7	-0,8
5-oct-06	-0,8	-	-0,7	-0,8
6-oct-06	0,0	0,0	0,0	-
7-oct-06	**0,0**	**0,0**	**0,0**	**0,0**
8-oct-06	**0,0**	**0,0**	**0,0**	**0,0**
9-oct-06	0,0	0,0	0,0	0,0
10-oct-06	0,0	0,0	0,0	0,0
11-oct-06	0,0	0,0	0,0	0,0
12-oct-06	0,0	-	0,0	0,0
13-oct-06	0,0	0,0	0,0	0,0
14-oct-06	**0,0**	**0,0**	**0,0**	**0,0**
15-oct-06	**0,0**	**0,0**	**0,0**	**0,0**
16-oct-06	0,0	0,0	0,0	0,0
17-oct-06	0,0	0,0	0,0	0,0
18-oct-06	0,0	0,0	0,0	0,0
19-oct-06	0,0	0,0	0,0	0,0
20-oct-06	0,0	0,0	0,0	0,0
21-oct-06	**0,0**	**0,0**	**0,0**	**0,0**
22-oct-06	**0,0**	**0,0**	**0,0**	**0,0**
23-oct-06	0,0	0,0	0,0	0,0
24-oct-06	-0,6	-0,5	-0,5	-0,6
25-oct-06	-0,9	-	-0,7	-0,8
26-oct-06	-0,9	-0,7	-0,7	-0,8
27-oct-06	-0,9	-0,7	-0,7	-0,8
28-oct-06	**-0,8**	**-0,6**	**-0,6**	**-0,7**
29-oct-06	**-0,8**	**-0,6**	**-0,6**	**-0,7**
30-oct-06	-0,8	-0,6	-0,6	-0,7
31-oct-06	-0,8	-0,6	-0,6	-0,7
1-nov-06	-0,7	-0,6	-0,6	-0,6
2-nov-06	-0,6	-0,5	-0,5	-0,6
3-nov-06	-0,6	-	-0,5	-0,5
4-nov-06	**-0,5**	**-0,4**	**-0,4**	**-0,4**
5-nov-06	**-0,4**	**-0,3**	**-0,4**	**-0,4**
6-nov-06	-0,4	-0,3	-0,4	-0,4
7-nov-06	-0,4	-0,3	-0,4	-0,4
8-nov-06	-0,4	-0,3	-0,4	-0,4
9-nov-06	-0,4	-0,3	-0,3	-0,3
10-nov-06	-	-	-0,3	-
11-nov-06	**-0,3**	**-0,3**	**-0,3**	**-0,3**

Site B, Toronto, Ontario
Electric Dryers

Note: "na" when the day-average value is positive (vac) or negative (pos). But individual value are included in the daily average calculation.

	When dryers are in operation			
	BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	-0,07	-0,03	0,05	-0,08
DEVIATION	0,04	0,03	0,03	0,04
MIN	-0,16	-0,06	0,00	-0,16
MAX	0,00	0,00	0,15	0,00
TOTAL	na	na	na	na
12-nov-06	**-0,20**	**-0,05**	**0,11**	**-0,17**
13-nov-06	-0,21	-0,10	0,13	-0,21
14-nov-06	-0,18	-0,12	0,20	-0,13
15-nov-06	-0,14	-0,04	0,09	-0,14
16-nov-06	-0,12	0,00	0,05	-0,06
17-nov-06	-	-	-	-
18-nov-06	**-0,09**	**na**	**0,01**	**-0,09**
19-nov-06	**-0,08**	**na**	**0,03**	**-0,08**
20-nov-06	-0,10	-	-	-0,08
21-nov-06	-0,16	-	-	-0,13
22-nov-06	-0,14	-0,06	na	-0,16
23-nov-06	-0,10	-	-	-0,10
24-nov-06	-0,09	na	0,01	-0,05
25-nov-06	**-0,09**	**-0,06**	**na**	**-0,11**
26-nov-06	**-0,03**	**na**	**0,06**	**0,00**
27-nov-06	-0,04	na	0,04	-0,10
28-nov-06	-0,08	-0,01	0,00	-0,05
29-nov-06	-0,07	na	0,05	-0,06
30-nov-06	-0,05	na	0,04	-0,06
1-déc-06	-0,02	na	0,07	-0,05
2-déc-06	**-0,03**	**na**	**0,05**	**-0,05**
3-déc-06	**-0,04**	**na**	**0,05**	**-0,04**
4-déc-06	-0,08	-0,03	na	-0,08
5-déc-06	-0,06	na	0,04	-0,07
6-déc-06	-	na	0,00	-0,11
7-déc-06	-0,04	na	0,06	-0,09
8-déc-06	-0,03	na	0,06	-0,15
9-déc-06	**-**	**na**	**0,01**	**-0,15**
10-déc-06	**na**	**na**	**0,08**	**-**
11-déc-06	-0,02	0,00	0,00	-0,06
12-déc-06	0,00	na	0,06	-0,06
13-déc-06	-0,02	na	0,06	-0,06
14-déc-06	na	na	0,05	na
15-déc-06	na	na	0,03	-0,03
16-déc-06	**na**	**na**	**0,15**	**na**
17-déc-06	**na**	**na**	**0,09**	**na**
18-déc-06	na	na	0,06	-0,03
19-déc-06	na	-	-	na
20-déc-06	na	na	0,08	na
21-déc-06	na	-	-	-
22-déc-06	na	na	0,05	na
23-déc-06	**na**	**na**	**0,04**	**na**
24-déc-06	**na**	**na**	**0,08**	**na**
25-déc-06	na	na	0,05	na
26-déc-06	na	na	0,02	na
27-déc-06	na	na	0,06	na
28-déc-06	na	na	0,09	na
29-déc-06	na	na	0,04	na
30-déc-06	**na**	**na**	**0,03**	**na**
31-déc-06	**na**	**-**	**-**	**na**
1-janv-07	na	-	-	na
2-janv-07	na	na	0,03	na
3-janv-07	na	na	0,03	na
4-janv-07	na	na	0,02	na
5-janv-07	na	na	0,07	-
6-janv-07	**na**	**na**	**0,04**	**na**

Site B, Toronto, Ontario
Electric Dryers

	When dryers are not in operation			
	BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	-0,11	-0,09	0,08	-0,10
DEVIATION	0,09	0,07	#DIV/0!	0,07
MIN	-0,25	-0,20	0,08	-0,22
MAX	-0,01	0,00	0,08	0,00
TOTAL	na	na	na	na
12-nov-06	**-0,32**	**-0,25**	**0,25**	**-0,27**
13-nov-06	-0,35	-0,27	0,27	-0,30
14-nov-06	-0,30	-0,24	0,25	-0,26
15-nov-06	-0,30	-0,24	0,25	-0,26
16-nov-06	-0,25	-0,20	0,08	-0,21
17-nov-06	-	-	na	-
18-nov-06	**-0,24**	**-0,17**	**na**	**-0,18**
19-nov-06	**-0,20**	**-0,16**	**na**	**-0,17**
20-nov-06	-0,22	-	na	-0,19
21-nov-06	-0,25	-	na	-0,22
22-nov-06	-0,24	-0,19	na	-0,20
23-nov-06	-0,21	-	na	-0,19
24-nov-06	-0,20	-0,15	na	-0,17
25-nov-06	**-0,22**	**-0,17**	**na**	**-0,18**
26-nov-06	**-0,18**	**-0,13**	**na**	**-0,15**
27-nov-06	-0,20	-0,16	na	-0,17
28-nov-06	-0,20	-0,16	na	-0,18
29-nov-06	-0,20	-0,16	na	-0,17
30-nov-06	-0,17	-0,13	na	-0,14
1-déc-06	-0,15	-0,11	na	-0,12
2-déc-06	**-0,17**	**-0,13**	**na**	**-0,13**
3-déc-06	**-0,17**	**-0,13**	**na**	**-0,14**
4-déc-06	-0,19	-0,15	na	-0,17
5-déc-06	-0,19	-0,15	na	-0,16
6-déc-06	-	-0,14	na	-0,16
7-déc-06	-0,15	-0,11	na	-0,13
8-déc-06	-0,16	-0,12	na	-0,12
9-déc-06	**-**	**-0,11**	**na**	**-0,12**
10-déc-06	**-0,11**	**-0,08**	**na**	**-**
11-déc-06	-0,13	-0,10	na	-0,11
12-déc-06	-0,13	-0,10	na	-0,11
13-déc-06	-0,11	-0,08	na	-0,09
14-déc-06	-0,09	-0,06	na	-0,07
15-déc-06	-0,08	-0,06	na	-0,07
16-déc-06	**-0,08**	**-0,05**	**na**	**-0,06**
17-déc-06	**-0,07**	**-0,04**	**na**	**-0,05**
18-déc-06	-0,09	-0,06	na	-0,07
19-déc-06	-0,04	-	na	-0,02
20-déc-06	-0,01	0,00	na	-0,01
21-déc-06	-0,01	-	na	-
22-déc-06	-0,01	na	na	0,00
23-déc-06	**-0,02**	**0,00**	**na**	**-0,01**
24-déc-06	**-0,01**	**0,00**	**na**	**0,00**
25-déc-06	-0,01	0,00	na	0,00
26-déc-06	-0,02	0,00	na	-0,01
27-déc-06	-0,02	0,00	na	-0,01
28-déc-06	-0,01	0,00	na	-0,01
29-déc-06	-0,01	na	na	na
30-déc-06	**-0,01**	**0,00**	**na**	**-0,01**
31-déc-06	**-0,01**	**-**	**na**	**0,00**
1-janv-07	-0,02	-	na	-0,02
2-janv-07	-0,02	0,00	na	-0,01
3-janv-07	-0,02	0,00	na	-0,01
4-janv-07	-0,02	-0,01	na	-0,01
5-janv-07	-0,02	-0,01	na	-
6-janv-07	**-0,02**	**0,00**	**na**	**-0,01**

Site B, Toronto, Ontario
Gas Dryers, 1 Exhausto Fan @ 100%

	DRYER #1							
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout
AVERAGE	80	1,16	12,93	0,60	43,1	56,1	16,73	60,4
DEVIATION	76	0,99	10,22	0,63	37,0	27,1	3,37	1,9
MIN	0	0,13	4,03	0,00	0,0	22,5	11,92	57,3
MAX	276	3,90	25,76	1,99	85,3	89,5	23,18	64,2
TOTAL	2 642	26,67	na	13,8	na	na	na	na
10-mars-07	**276**	**1,16**	**4,22**	**1,99**	**75,3**	**79,5**	**14,5**	**60,4**
11-mars-07	133	0,55	4,11	1,06	83,0	87,1	15,6	58,1
12-mars-07	143	0,62	4,31	1,00	73,0	77,3	12,9	60,8
13-mars-07	141	0,60	4,27	1,10	81,6	85,8	16,3	59,9
14-mars-07	61	0,26	4,26	0,43	73,4	77,7	16,8	61,7
15-mars-07	140	0,60	4,28	1,07	79,7	84,0	14,0	58,3
16-mars-07	**233**	**0,97**	**4,17**	**1,72**	**77,0**	**81,1**	**11,92**	**57,3**
17-mars-07	**153**	**0,64**	**4,16**	**1,25**	**85,3**	**89,5**	**12,8**	**59,3**
18-mars-07	112	0,47	4,16	0,81	75,5	79,6	12,1	60,0
19-mars-07	100	0,40	4,03	0,59	61,8	65,8	13,7	63,0
20-mars-07	0	-	-	-	-	-	-	-
21-mars-07	31	0,13	4,22	0,18	59,5	63,7	12,5	58,6
22-mars-07	152	0,64	4,19	1,00	68,4	72,6	19,8	62,0
23-mars-07	**193**	**0,79**	**4,10**	**1,35**	**73,2**	**77,3**	**20,2**	**62,2**
1-avr-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
2-avr-07	157	3,80	24,18	0,17	11,6	35,8	22,0	59,6
3-avr-07	92	2,23	24,26	0,00	0,0	24,3	21,36	62,2
4-avr-07	0	-	-	-	-	-	-	-
5-avr-07	0	-	-	-	-	-	-	-
6-avr-07	158	3,90	24,68	0,00	0,0	24,7	17,7	58,3
7-avr-07	**31**	**0,80**	**25,65**	**0,00**	**0,0**	**25,6**	**15,9**	**62,9**
8-avr-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
9-avr-07	0	-	-	-	-	-	-	-
10-avr-07	51	1,29	25,38	0,00	0,0	25,4	17,7	58,5
11-avr-07	0	-	-	-	-	-	-	-
12-avr-07	31	0,70	22,55	0,00	0,0	22,5	16,9	58,3
13-avr-07	61	1,39	22,84	0,00	0,0	22,8	19,7	59,8
14-avr-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
15-avr-07	**61**	**1,44**	**23,61**	**0,00**	**0,0**	**23,6**	**16,9**	**62,2**
16-avr-07	62	1,49	24,10	0,00	0,0	24,1	20,04	60,69
17-avr-07	70	1,80	25,76	0,09	14,0	39,8	23,2	64,2
18-avr-07	0	-	-	-	-	-	-	-
19-avr-07	0	-	-	-	-	-	-	-

Site B, Toronto, Ontario
Gas Dryers, 1 Exhausto Fan @ 100%

	DRYER #2							
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout
AVERAGE	47	1,25	17,73	0,29	31,7	49,4	15,4	60,9
DEVIATION	52	1,09	11,15	0,45	39,5	28,5	3,1	2,1
MIN	0	0,14	4,26	0,00	0,0	24,5	10,8	54,9
MAX	163	4,28	28,06	1,29	88,8	93,1	21,5	64,1
TOTAL	1 539	24,92	na	5,8	na	na	na	na
10-mars-07	**155**	**0,71**	**4,58**	**1,29**	**86,9**	**91,5**	**12,1**	**60,9**
11-mars-07	110	0,47	4,31	0,94	88,8	93,1	13,1	61,6
12-mars-07	0	-	-	-		-	-	-
13-mars-07	31	0,14	4,45	0,22	72,4	76,8	13,1	60,6
14-mars-07	0	-	-	-		-	-	-
15-mars-07	0	-	-	-		-	-	-
16-mars-07	**161**	**0,74**	**4,57**	**1,29**	**83,3**	**87,9**	**11,6**	**62,1**
17-mars-07	**62**	**0,27**	**4,42**	**0,40**	**67,9**	**72,4**	**10,8**	**60,7**
18-mars-07	38	0,16	4,26	0,28	77,9	82,1	12,0	63,1
19-mars-07	0	-	-	-		-	-	-
20-mars-07	0	-	-	-		-	-	-
21-mars-07	0	-	-	-		-	-	-
22-mars-07	51	0,22	4,32	0,35	71,6	75,9	21,0	60,3
23-mars-07	**122**	**0,57**	**4,65**	**0,92**	**78,7**	**83,3**	**18,6**	**60,2**
1-avr-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
2-avr-07	31	0,76	24,48	0,00	0,0	24,5	21,5	54,9
3-avr-07	0	-	-	-		-	-	-
4-avr-07	94	2,59	27,54	0,00	0,0	27,5	18,6	58,4
5-avr-07	41	1,11	27,04	0,00	0,0	27,0	15,0	60,8
6-avr-07	163	4,28	26,24	0,09	6,0	32,3	15,2	63,4
7-avr-07	**31**	**0,80**	**25,65**	**0,00**	**0,0**	**25,6**	**13,1**	**58,4**
8-avr-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
9-avr-07	112	3,01	26,89	0,00	0,0	26,9	14,8	60,5
10-avr-07	51	1,43	28,06	0,00	0,0	28,1	15,3	62,7
11-avr-07	0	-	-	-		-	-	-
12-avr-07	61	1,68	27,49	0,00	0,0	27,5	18,2	60,7
13-avr-07	92	2,50	27,15	0,00	0,0	27,1	15,6	62,3
14-avr-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
15-avr-07	**41**	**1,06**	**25,87**	**0,00**	**0,0**	**25,9**	**14,1**	**62,8**
16-avr-07	31	0,81	26,13	0,00	0,0	26,1	15,40	59,38
17-avr-07	61	1,62	26,51	0,00	0,0	26,5	18,4	64,1
18-avr-07	0	-	-	-		-	-	-
19-avr-07	0	-	-	-		-	-	-

Site B, Toronto, Ontario
Gas Dryers, 1 Exhausto Fan @ 100%

	DRYER #3							
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout
AVERAGE	122	2,50	19,73	0,58	40,6	60,3	15,6	57,3
DEVIATION	90	2,29	13,53	0,82	42,8	31,7	2,7	9,0
MIN	0	0,01	1,50	0,00	0,0	1,5	11,1	12,4
MAX	356	7,56	33,77	2,90	116,3	121,7	20,4	65,9
TOTAL	4 018	77,45	na	18,0	na	na	na	na
10-mars-07	**111**	**0,59**	**5,27**	**0,86**	**81,0**	**86,3**	**11,8**	**58,8**
11-mars-07	286	1,51	5,28	2,32	84,6	89,9	13,0	57,3
12-mars-07	80	0,44	5,48	0,89	116,3	121,7	12,1	52,3
13-mars-07	200	1,11	5,56	1,63	84,9	90,4	14,3	52,7
14-mars-07	82	0,45	5,43	0,55	70,0	75,5	15,9	57,0
15-mars-07	91	0,48	5,30	0,68	77,6	82,9	11,9	57,3
16-mars-07	**305**	**1,62**	**5,31**	**2,76**	**94,4**	**99,7**	**11,5**	**59,7**
17-mars-07	**41**	**0,23**	**5,59**	**0,31**	**78,7**	**84,3**	**13,9**	**61,6**
18-mars-07	137	0,74	5,37	1,41	107,0	112,4	12,3	55,6
19-mars-07	0	-	-	-		-	-	-
20-mars-07	51	0,27	5,39	0,40	80,8	86,2	11,7	62,7
21-mars-07	60	0,31	5,23	0,49	85,0	90,3	16,4	61,1
22-mars-07	101	0,57	5,62	1,04	107,1	112,7	18,2	59,0
23-mars-07	**356**	**1,87**	**5,24**	**2,90**	**84,9**	**90,1**	**20,4**	**61,1**
1-avr-07	**32**	**0,93**	**29,11**	**0,00**	**0,0**	**29,1**	**17,6**	**51,5**
2-avr-07	0	-	-	-		-	-	-
3-avr-07	132	4,16	31,53	0,11	8,5	40,0	19,6	61,8
4-avr-07	193	6,18	32,00	0,49	26,7	58,7	20,3	56,2
5-avr-07	182	5,96	32,74	0,34	19,3	52,0	16,5	62,2
6-avr-07	190	5,99	31,55	0,13	7,4	38,9	15,7	62,2
7-avr-07	**109**	**3,36**	**30,87**	**0,00**	**0,0**	**30,9**	**16,5**	**52,6**
8-avr-07	**7**	**0,01**	**1,50**	**0,00**	**0,0**	**1,5**	**11,1**	**12,4**
9-avr-07	236	7,56	32,05	0,28	12,5	44,6	15,6	61,0
10-avr-07	54	1,61	29,86	0,00	0,0	29,9	15,2	55,6
11-avr-07	184	5,82	31,64	0,15	8,4	40,1	16,2	61,3
12-avr-07	41	1,31	31,83	0,00	0,0	31,8	16,6	61,1
13-avr-07	116	3,67	31,64	0,00	0,0	31,6	17,6	63,3
14-avr-07	**115**	**3,78**	**32,86**	**0,00**	**0,0**	**32,9**	**16,3**	**57,3**
15-avr-07	**230**	**7,17**	**31,15**	**0,16**	**7,3**	**38,5**	**16,5**	**58,6**
16-avr-07	103	3,48	33,77	0,00	0,0	33,8	16,23	57,91
17-avr-07	71	2,35	33,08	0,11	15,8	48,9	19,3	65,9
18-avr-07	61	1,95	31,97	0,00	0,0	32,0	18,5	57,5
19-avr-07	61	1,98	32,46	0,00	0,0	32,5	16,0	60,9

Site B, Toronto, Ontario
Gas Dryers, 1 Exhausto Fan @ 100%

	DRYER #4							
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**
AVERAGE	205	3,59	13,96	0,61	39,8	53,8	16,3	49,7
DEVIATION	146	3,17	8,73	0,58	37,3	30,8	3,5	11,8
MIN	0	0,23	5,46	0,00	0,0	12,5	10,4	30,9
MAX	508	11,54	33,16	2,02	99,8	105,4	24,2	62,7
TOTAL	6 779	107,80	na	18,2	na	na	na	na
10-mars-07	**128**	**0,75**	**5,88**	**1,06**	**86,7**	**92,5**	**13,8**	**59,8**
11-mars-07	265	1,51	5,69	1,97	77,4	83,1	14,0	60,4
12-mars-07	41	0,23	5,64	0,39	99,8	105,4	13,0	55,1
13-mars-07	0	-	-	-		-	-	-
14-mars-07	41	0,23	5,63	0,30	75,1	80,7	17,8	60,1
15-mars-07	61	0,36	5,83	0,43	73,9	79,7	13,3	62,3
16-mars-07	**233**	**1,36**	**5,84**	**2,02**	**90,3**	**96,1**	**10,8**	**58,6**
17-mars-07	**193**	**1,13**	**5,88**	**1,53**	**82,9**	**88,8**	**10,4**	**59,2**
18-mars-07	193	1,13	5,85	1,41	76,0	81,8	11,0	60,3
19-mars-07	100	0,58	5,76	0,84	87,1	92,9	11,9	58,5
20-mars-07	81	0,47	5,79	0,61	79,0	84,8	15,4	62,7
21-mars-07	83	0,45	5,46	0,67	83,7	89,1	17,5	62,0
22-mars-07	82	0,45	5,52	0,53	66,8	72,3	22,9	62,7
23-mars-07	**219**	**1,21**	**5,51**	**1,52**	**72,2**	**77,7**	**24,2**	**62,7**
1-avr-07	**244**	**8,03**	**32,93**	**0,19**	**8,1**	**41,0**	**20,4**	**60,9**
2-avr-07	0	-	-	-		-	-	-
3-avr-07	0	-	-	-		-	-	-
4-avr-07	203	6,73	33,16	0,33	17,2	50,3	21,8	61,2
5-avr-07	261	7,23	27,71	0,50	19,8	47,6	18,4	49,9
6-avr-07	300	5,15	17,17	0,20	7,0	24,2	16,9	36,9
7-avr-07	**407**	**6,31**	**15,51**	**0,25**	**6,5**	**22,0**	**16,6**	**34,6**
8-avr-07	**439**	**7,50**	**17,09**	**0,44**	**10,6**	**27,6**	**16,2**	**34,8**
9-avr-07	208	2,59	12,47	0,00	0,0	12,5	17,0	30,9
10-avr-07	205	4,62	22,54	0,08	4,1	26,7	18,4	44,9
11-avr-07	180	4,03	22,38	0,03	1,6	23,9	18,5	43,2
12-avr-07	103	2,36	22,94	0,00	0,0	22,9	21,0	46,5
13-avr-07	315	4,96	15,75	0,13	4,5	20,2	15,7	35,9
14-avr-07	**499**	**9,62**	**19,28**	**0,67**	**14,1**	**33,4**	**14,9**	**40,4**
15-avr-07	**438**	**6,26**	**14,28**	**0,28**	**6,7**	**21,0**	**14,8**	**33,1**
16-avr-07	508	11,54	22,72	1,20	24,7	47,4	15,27	44,68
17-avr-07	336	4,66	13,87	0,39	12,1	26,0	16,1	32,5
18-avr-07	327	4,53	13,84	0,23	7,3	21,2	15,9	33,2
19-avr-07	86	1,81	21,02	0,00	0,0	21,0	16,4	42,9

Site B, Toronto, Ontario
Gas Dryers, 1 Exhausto Fan @ 100%

Specific Concident Peak Demand (W for a 15-minute period)
(Peak demand / # dryers)

Day Period	6h - 9h	9h - 12h	12h - 15h	15h - 18h	18h - 21h	21h - 24h
WEEK MAX	**1497**	**1460**	**1919**	**1349**	**1356**	**542**
WEEKEND MAX	**564**	**671**	**1362**	**1097**	**1094**	**539**
MAX	**1497**	**1460**	**1919**	**1349**	**1356**	**542**
10-mars-07	**209**	**307**	**313**	**147**	**83**	**0**
11-mars-07	89	216	234	225	95	0
12-mars-07	0	0	155	117	0	0
13-mars-07	21	155	73	98	144	0
14-mars-07	0	0	96	90	90	0
15-mars-07	96	85	0	145	0	0
16-mars-07	**205**	**209**	**175**	**199**	**257**	**0**
17-mars-07	**0**	**172**	**308**	**165**	**92**	**0**
18-mars-07	0	235	69	98	178	42
19-mars-07	0	145	101	0	69	1
20-mars-07	0	0	82	88	94	0
21-mars-07	0	169	151	0	0	0
22-mars-07	56	92	71	97	174	68
23-mars-07	**0**	**172**	**193**	**194**	**225**	**75**
1-avr-07	**564**	**578**	**536**	**519**	**516**	**539**
2-avr-07	0	609	276	390	0	0
3-avr-07	395	498	65	453	512	0
4-avr-07	1032	969	561	0	974	3
5-avr-07	780	939	585	2	1062	8
6-avr-07	8	521	530	1337	1356	537
7-avr-07	**11**	**569**	**891**	**567**	**1094**	**11**
8-avr-07	**12**	**558**	**579**	**635**	**8**	**11**
9-avr-07	507	1460	513	911	540	9
10-avr-07	11	1020	555	0	579	6
11-avr-07	6	519	866	942	0	542
12-avr-07	5	3	824	386	519	222
13-avr-07	1497	1280	573	506	6	9
14-avr-07	**564**	**548**	**554**	**575**	**1079**	**11**
15-avr-07	**396**	**671**	**1362**	**1097**	**543**	**9**
16-avr-07	405	1002	1076	1349	1013	9
17-avr-07	9	1416	1919	6	6	8
18-avr-07	8	557	6	6	1085	6
19-avr-07	555	555	0	0	0	0

Site B, Toronto, Ontario
Gas Dryers, 1 Exhausto Fan @ 100%

	When dryers are in operation			
	BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	0,00	-0,16	0,01	-0,34
DEVIATION	0,00	0,08	0,01	0,09
MIN	-0,01	-0,27	0,00	-0,47
MAX	0,00	-0,01	0,03	-0,19
TOTAL	na	na	na	na
10-mars-07	**-0,01**	**-0,17**	**na**	**-0,20**
11-mars-07	0,00	-0,17	na	-0,19
12-mars-07	0,00	-	-	-0,35
13-mars-07	0,00	-0,26	na	-
14-mars-07	-0,01	-	-	-0,34
15-mars-07	0,00	-	-	-0,31
16-mars-07	**0,00**	**-0,19**	**na**	**-0,22**
17-mars-07	**0,00**	**-0,07**	**0,03**	**-0,25**
18-mars-07	0,00	-0,07	na	-0,24
19-mars-07	0,00	-	-	-0,28
20-mars-07	-	-	-	-0,37
21-mars-07	0,00	-	-	-0,27
22-mars-07	-0,01	-0,21	na	-0,24
23-mars-07	**-0,01**	**-0,20**	**na**	**-0,19**
1-avr-07	**-**	**-**	**-**	**-0,33**
2-avr-07	-0,01	-0,27	na	-
3-avr-07	-0,01	-	-	-
4-avr-07	-	-0,23	na	-0,30
5-avr-07	-	-0,19	na	-0,34
6-avr-07	-0,01	-0,15	na	-0,37
7-avr-07	**0,00**	**-0,14**	**na**	**-0,42**
8-avr-07	**-**	**-**	**-**	**-0,43**
9-avr-07	-	-0,18	na	-0,42
10-avr-07	0,00	-0,11	na	-0,44
11-avr-07	-	-	-	-0,40
12-avr-07	0,00	-0,22	na	-0,35
13-avr-07	-0,01	-0,04	0,00	-0,39
14-avr-07	**-**	**-**	**-**	**-0,42**
15-avr-07	**-0,01**	**-0,04**	**0,01**	**-0,41**
16-avr-07	0,00	-0,24	na	-0,43
17-avr-07	-0,01	-0,01	0,00	-0,43
18-avr-07	-	-	-	-0,47
19-avr-07	-	-	-	-0,46

Site B, Toronto, Ontario
Gas Dryers, 1 Exhausto Fan @ 100%

	When dryers are not in operation			
	BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	0,00	-0,47	#DIV/0!	-0,49
DEVIATION	0,00	0,02	#DIV/0!	0,02
MIN	-0,01	-0,51	0,00	-0,53
MAX	0,00	-0,43	0,00	-0,45
TOTAL	na	na	na	na
10-mars-07	**0,00**	**-0,48**	**na**	**-0,47**
11-mars-07	0,00	-0,46	na	-0,46
12-mars-07	0,00	-	na	-0,48
13-mars-07	0,00	-0,48	na	-
14-mars-07	0,00	-	na	-0,46
15-mars-07	0,00	-	na	-0,47
16-mars-07	**0,00**	**-0,46**	**na**	**-0,45**
17-mars-07	**0,00**	**-0,48**	**na**	**-0,47**
18-mars-07	0,00	-0,47	na	-0,47
19-mars-07	0,00	-	na	-0,50
20-mars-07	-	-	na	-0,49
21-mars-07	0,00	-	na	-0,50
22-mars-07	0,00	-0,48	na	-0,48
23-mars-07	**-0,01**	**-0,43**	**na**	**-0,47**
1-avr-07	**-**	**-**	**na**	**-0,48**
2-avr-07	-0,01	-0,51	na	-
3-avr-07	-0,01	-	na	-
4-avr-07	-	-0,49	na	-0,50
5-avr-07	-	-0,47	na	-0,49
6-avr-07	0,00	-0,45	na	-0,46
7-avr-07	**0,00**	**-0,46**	**na**	**-0,50**
8-avr-07	**-**	**-**	**na**	**-0,50**
9-avr-07	-	-0,49	na	-0,48
10-avr-07	0,00	-0,51	na	-0,50
11-avr-07	-	-	na	-0,49
12-avr-07	0,00	-0,48	na	-0,49
13-avr-07	0,00	-0,46	na	-0,48
14-avr-07	**-**	**-**	**na**	**-0,51**
15-avr-07	**0,00**	**-0,45**	**na**	**-0,47**
16-avr-07	0,00	-0,48	na	-0,52
17-avr-07	0,00	-0,50	na	-0,53
18-avr-07	-	-	na	-0,53
19-avr-07	-	-	na	-0,49

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	DRYER #1							
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**
AVERAGE	109	3,35	24,71	0,86	66,7	91,4	29,64	62,0
DEVIATION	96	2,23	1,11	0,68	20,6	20,5	2,23	1,8
MIN	0	0,70	22,60	0,12	42,3	67,7	25,05	57,8
MAX	380	9,39	27,06	2,79	131,5	156,7	33,73	64,2
TOTAL	2 280	57,01	na	14,7	na	na	na	na
19-juil-07	**93**	**2,39**	**25,66**	**0,47**	**52,6**	**78,3**	**27,3**	**64,1**
20-juil-07	30	0,76	25,45	0,12	42,3	67,7	25,1	64,2
21-juil-07	39	0,91	23,38	0,26	68,8	92,1	27,7	62,0
22-juil-07	41	0,94	22,83	0,35	89,5	112,3	27,8	57,8
23-juil-07	163	4,08	25,05	0,93	59,7	84,7	28,5	61,9
24-juil-07	380	9,39	24,71	2,04	56,0	80,7	28,8	63,3
25-juil-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
26-juil-07	**173**	**4,68**	**27,06**	**1,21**	**73,2**	**100,2**	**28,7**	**60,4**
27-juil-07	0	-	-	-	-	-	-	-
28-juil-07	131	3,34	25,49	0,90	71,8	97,3	30,1	59,9
29-juil-07	31	0,70	22,60	0,26	86,2	108,8	28,6	59,9
30-juil-07	139	3,45	24,84	0,77	57,7	82,5	30,9	63,7
31-juil-07	67	1,62	24,13	0,38	58,8	82,9	30,0	64,1
1-août-07	**92**	**2,25**	**24,44**	**0,54**	**61,1**	**85,5**	**32,9**	**62,2**
2-août-07	**174**	**4,34**	**24,96**	**0,90**	**54,1**	**79,0**	**32,4**	**62,7**
3-août-07	184	4,71	25,60	1,08	61,0	86,6	33,7	62,5
4-août-07	125	2,97	23,80	0,62	51,8	75,6	30,76	62,3
5-août-07	221	5,57	25,19	2,79	131,5	156,7	29,1	60,9
6-août-07	197	4,90	24,88	1,09	57,6	82,5	31,4	62,0
7-août-07	0	-	-	-	-	-	-	-
8-août-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	DRYER #2							
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**
AVERAGE	70	2,50	27,14	1,29	137,0	164,2	29,7	60,4
DEVIATION	63	1,57	1,53	1,41	96,6	96,6	2,0	6,0
MIN	0	0,69	23,90	0,22	52,8	80,5	26,6	45,5
MAX	203	5,44	30,19	4,27	337,7	364,9	33,2	67,8
TOTAL	1 466	40,03	na	20,6	na	na	na	na
19-juil-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
20-juil-07	40	1,21	30,19	0,35	91,3	121,5	26,6	54,7
21-juil-07	31	0,76	24,63	0,22	72,8	97,5	27,1	63,9
22-juil-07	0	-	-	-		-	-	-
23-juil-07	112	3,10	27,66	0,57	52,8	80,5	28,1	63,9
24-juil-07	170	4,56	26,81	0,88	53,8	80,6	28,2	66,5
25-juil-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
26-juil-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
27-juil-07	72	2,02	28,10	0,58	83,8	111,9	27,7	55,9
28-juil-07	0	-	-	-		-	-	-
29-juil-07	59	1,59	26,90	0,38	66,8	93,7	28,6	62,9
30-juil-07	91	2,48	27,23	0,59	68,0	95,2	30,4	63,2
31-juil-07	44	1,16	26,25	0,31	73,5	99,8	28,7	64,6
1-août-07	**29**	**0,69**	**23,90**	**0,31**	**111,5**	**135,4**	**32,1**	**60,0**
2-août-07	**121**	**3,29**	**27,17**	**3,92**	**337,7**	**364,9**	**33,2**	**59,6**
3-août-07	151	4,07	26,95	3,97	274,4	301,4	32,4	63,7
4-août-07	40	1,09	27,34	1,19	309,9	337,2	31,3	50,4
5-août-07	173	5,02	29,02	1,39	83,7	112,7	28,5	59,6
6-août-07	203	5,44	26,80	4,27	219,5	246,3	31,0	63,9
7-août-07	49	1,41	28,78	0,89	188,9	217,6	29,7	45,5
8-août-07	**81**	**2,14**	**26,44**	**0,81**	**103,8**	**130,3**	**31,6**	**67,8**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	DRYER #3							
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**
AVERAGE	139	5,40	31,56	1,42	84,5	116,1	28,3	61,7
DEVIATION	93	2,19	0,93	0,78	18,8	18,6	1,8	1,2
MIN	0	2,16	30,22	0,55	56,0	88,8	24,8	59,4
MAX	283	8,98	33,46	3,61	139,6	170,3	31,3	63,4
TOTAL	2 913	91,87	na	24,2	na	na	na	na
19-juil-07	**91**	**3,05**	**33,46**	**0,63**	**72,2**	**105,7**	**27,7**	**60,4**
20-juil-07	71	2,16	30,36	0,55	81,2	111,5	24,8	60,2
21-juil-07	102	3,27	32,01	0,96	98,2	130,2	26,2	61,4
22-juil-07	142	4,50	31,69	1,00	73,6	105,3	26,9	63,4
23-juil-07	77	2,42	31,40	0,69	93,3	124,7	26,8	62,8
24-juil-07	218	6,71	30,76	1,86	89,1	119,9	26,8	62,0
25-juil-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
26-juil-07	**189**	**6,18**	**32,71**	**1,91**	**105,6**	**138,3**	**28,1**	**62,1**
27-juil-07	183	6,02	32,89	0,98	56,0	88,8	27,0	61,6
28-juil-07	184	5,81	31,57	1,40	79,3	110,9	28,4	59,4
29-juil-07	283	8,98	31,74	2,25	83,0	114,7	28,0	61,9
30-juil-07	222	7,24	32,59	1,87	88,1	120,7	29,2	60,9
31-juil-07	179	5,61	31,37	1,39	80,9	112,3	29,9	62,4
1-août-07	**270**	**8,29**	**30,70**	**3,61**	**139,6**	**170,3**	**31,3**	**62,0**
2-août-07	**130**	**4,05**	**31,17**	**1,00**	**80,0**	**111,2**	**30,4**	**63,1**
3-août-07	0	-	-	-		-	-	-
4-août-07	0	-	-	-		-	-	-
5-août-07	0	-	-	-		-	-	-
6-août-07	98	3,01	30,73	0,58	61,5	92,2	30,2	62,9
7-août-07	282	8,78	31,14	1,94	71,6	102,7	28,8	62,7
8-août-07	**192**	**5,80**	**30,22**	**1,53**	**83,2**	**113,4**	**30,4**	**60,2**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	DRYER #4							
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**
AVERAGE	105	3,97	32,39	0,75	64,1	96,5	28,0	60,7
DEVIATION	79	2,34	0,96	0,43	13,0	12,8	1,9	3,0
MIN	0	1,41	30,58	0,22	47,5	78,7	25,0	50,5
MAX	273	9,00	34,28	1,62	102,7	134,8	31,2	63,8
TOTAL	2 203	71,43	na	13,4	na	na	na	na
19-juil-07	**134**	**4,32**	**32,24**	**0,80**	**62,6**	**94,9**	**25,5**	**63,2**
20-juil-07	41	1,41	34,28	0,22	54,8	89,1	25,0	59,4
21-juil-07	0	-	-	-		-	-	-
22-juil-07	0	-	-	-		-	-	-
23-juil-07	61	1,99	32,66	0,50	85,6	118,3	26,3	62,4
24-juil-07	70	2,14	30,58	0,50	74,4	105,0	26,2	57,6
25-juil-07	**94**	**2,96**	**31,44**	**0,57**	**63,0**	**94,4**	**25,7**	**61,1**
26-juil-07	**91**	**2,99**	**32,87**	**0,43**	**49,4**	**82,3**	**27,2**	**63,8**
27-juil-07	53	1,71	32,21	0,34	66,2	98,4	26,2	60,7
28-juil-07	123	3,94	32,06	1,21	102,7	134,8	28,2	61,5
29-juil-07	0	-	-	-		-	-	-
30-juil-07	116	3,72	32,06	0,66	59,4	91,5	28,9	61,5
31-juil-07	76	2,40	31,56	0,47	64,8	96,3	28,3	62,9
1-août-07	**273**	**9,00**	**32,97**	**1,43**	**54,6**	**87,6**	**30,4**	**62,6**
2-août-07	**51**	**1,73**	**34,00**	**0,30**	**60,6**	**94,6**	**31,2**	**60,1**
3-août-07	255	8,41	32,99	1,62	66,1	99,1	30,9	60,2
4-août-07	201	6,59	32,80	1,19	61,7	94,5	28,1	62,2
5-août-07	135	4,51	33,38	0,77	59,3	92,7	27,6	61,1
6-août-07	163	5,23	32,06	0,89	56,7	88,8	30,0	62,3
7-août-07	204	6,45	31,63	1,28	65,3	97,0	27,8	58,7
8-août-07	**62**	**1,93**	**31,19**	**0,28**	**47,5**	**78,7**	**29,8**	**50,5**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

Specific Concident Peak Demand (W for a 15-minute period)
(Peak demand / # dryers)

Day Period	6h - 9h	9h - 12h	12h - 15h	15h - 18h	18h - 21h	21h - 24h
WEEK MAX	**1443**	**1314**	**1427**	**1040**	**1799**	**1289**
WEEKEND MAX	**651**	**1043**	**1037**	**618**	**1328**	**1689**
MAX	**1443**	**1314**	**1427**	**1040**	**1799**	**1689**
19-juil-07	**0**	**345**	**1037**	**618**	**404**	**33**
20-juil-07	0	1017	0	221	494	411
21-juil-07	0	743	519	510	180	0
22-juil-07	0	207	506	0	527	375
23-juil-07	0	711	447	509	1317	0
24-juil-07	1313	414	1427	284	1281	1289
25-juil-07	**0**	**521**	**521**	**134**	**0**	**0**
26-juil-07	**0**	**0**	**444**	**525**	**1248**	**0**
27-juil-07	0	954	930	525	0	1067
28-juil-07	528	656	924	549	501	498
29-juil-07	0	858	939	476	513	497
30-juil-07	0	1314	525	1040	1799	155
31-juil-07	1443	0	510	512	1283	0
1-août-07	**0**	**1043**	**1028**	**464**	**1328**	**1689**
2-août-07	**651**	**650**	**0**	**449**	**884**	**825**
3-août-07	0	875	968	906	1344	1133
4-août-07	471	497	945	0	540	564
5-août-07	437	669	927	633	1023	0
6-août-07	0	1235	1374	138	920	504
7-août-07	1022	510	1413	482	0	522
8-août-07	**0**	**488**	**513**	**0**	**1320**	**732**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	When dryers are in operation			
	BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	#DIV/0!	#DIV/0!	0,19	-0,01
DEVIATION	#DIV/0!	#DIV/0!	0,02	0,01
MIN	0,00	0,00	0,17	-0,02
MAX	0,00	0,00	0,24	-0,01
TOTAL	na	na	na	na
19-juil-07	**na**	**-**	**-**	**-0,01**
20-juil-07	na	na	0,19	na
21-juil-07	na	na	0,17	-
22-juil-07	na	-	-	-
23-juil-07	na	na	0,18	-0,02
24-juil-07	na	na	0,18	na
25-juil-07	**-**	**-**	**-**	**na**
26-juil-07	**na**	**-**	**-**	**na**
27-juil-07	-	na	0,20	na
28-juil-07	na	-	-	na
29-juil-07	na	na	0,17	-
30-juil-07	na	na	0,19	na
31-juil-07	na	na	0,24	na
1-août-07	**na**	**na**	**0,19**	**na**
2-août-07	**na**	**na**	**0,17**	**na**
3-août-07	na	na	0,18	na
4-août-07	na	na	0,21	na
5-août-07	na	na	0,18	na
6-août-07	na	na	0,19	na
7-août-07	-	na	0,21	na
8-août-07	**-**	**na**	**0,20**	**na**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	When dryers are not in operation			
	BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	-0,03	-0,13	#DIV/0!	-0,11
DEVIATION	0,00	0,01	#DIV/0!	0,01
MIN	-0,03	-0,13	0,00	-0,13
MAX	-0,02	-0,11	0,00	-0,09
TOTAL	na	na	na	na
19-juil-07	**-0,03**	**-**	**na**	**-0,13**
20-juil-07	-0,02	-0,13	na	-0,13
21-juil-07	-0,02	-0,13	na	-
22-juil-07	-0,03	-	na	-
23-juil-07	-0,03	-0,13	na	-0,12
24-juil-07	-0,03	-0,13	na	-0,11
25-juil-07	**-**	**-**	**na**	**-0,12**
26-juil-07	**-0,03**	**-**	**na**	**-0,11**
27-juil-07	-	-0,13	na	-0,11
28-juil-07	-0,03	-	na	-0,11
29-juil-07	-0,03	-0,13	na	-
30-juil-07	-0,03	-0,13	na	-0,11
31-juil-07	-0,03	-0,13	na	-0,12
1-août-07	**-0,03**	**-0,13**	**na**	**-0,11**
2-août-07	**-0,03**	**-0,13**	**na**	**-0,11**
3-août-07	-0,03	-0,13	na	-0,12
4-août-07	-0,03	-0,12	na	-0,10
5-août-07	-0,03	-0,12	na	-0,10
6-août-07	-0,03	-0,11	na	-0,10
7-août-07	-	-0,11	na	-0,09
8-août-07	**-**	**-0,12**	**na**	**-0,10**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	EXHAUSTO		
	Whe	**in w.c.**	**Signal**
AVERAGE	4 348,07	0,17	2,83
DEVIATION	366,77	0,00	0,15
MIN	3 856,00	0,17	2,63
MAX	5 103,75	0,17	3,14
TOTAL	na	na	na
19-juil-07	**4 031**	**0,17**	**2,7**
20-juil-07	4 036	0,17	2,7
21-juil-07	4 207	0,17	2,7
22-juil-07	4 132	0,17	2,7
23-juil-07	4 217	0,17	2,8
24-juil-07	4 537	0,17	2,9
25-juil-07	**3 942**	**0,17**	**2,6**
26-juil-07	**3 930**	**0,17**	**2,7**
27-juil-07	3 856	0,17	2,6
28-juil-07	4 442	0,17	2,9
29-juil-07	4 342	0,17	2,8
30-juil-07	4 311	0,17	2,8
31-juil-07	4 549	0,17	2,9
1-août-07	**3 975**	**0,17**	**2,7**
2-août-07	**4 194**	**0,17**	**2,8**
3-août-07	4 159	0,17	2,8
4-août-07	4 805	0,17	3,0
5-août-07	4 803	0,17	3,0
6-août-07	5 104	0,17	3,1
7-août-07	4 804	0,17	3,0
8-août-07	**4 938**	**0,17**	**3,1**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Well-Adjusted

	DRYER #1							
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout
AVERAGE	67	2,18	24,72	0,54	65,5	90,2	28,57	60,7
DEVIATION	55	1,14	1,01	0,28	12,4	12,7	2,08	2,9
MIN	0	0,72	23,03	0,16	45,7	68,7	24,27	54,4
MAX	189	4,80	27,66	1,06	90,6	117,9	33,54	64,5
TOTAL	2 816	69,88	na	17,4	na	na	na	na
12-août-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
13-août-07	90	2,18	24,27	0,53	61,0	85,2	31,1	63,2
14-août-07	183	4,49	24,55	1,06	60,7	85,2	28,8	62,4
15-août-07	82	2,04	24,93	0,51	65,1	90,0	29,8	62,8
16-août-07	189	4,80	25,39	0,85	46,8	72,1	30,6	63,9
17-août-07	0	-	-	-	-	-	-	-
18-août-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
19-août-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
20-août-07	61	1,69	27,66	0,53	90,2	117,9	26,4	54,4
21-août-07	42	1,06	25,14	0,26	63,7	88,8	24,5	63,9
22-août-07	71	1,73	24,40	0,36	53,5	78,0	26,1	57,8
23-août-07	91	2,26	24,79	0,50	57,1	81,9	27,6	63,8
24-août-07	31	0,72	23,08	0,19	63,3	86,4	32,2	62,9
25-août-07	**31**	**0,72**	**23,27**	**0,23**	**76,8**	**100,1**	**30,0**	**57,0**
26-août-07	**40**	**0,97**	**24,30**	**0,18**	**45,8**	**70,1**	**30,3**	**62,8**
27-août-07	122	3,18	26,04	0,93	79,8	105,8	28,9	56,8
28-août-07	103	2,39	23,21	0,61	61,6	84,8	29,01	60,0
29-août-07	41	0,98	23,96	0,20	51,4	75,4	33,5	63,8
30-août-07	132	3,41	25,83	0,84	66,2	92,0	29,4	59,9
31-août-07	51	1,29	25,35	0,27	55,3	80,6	28,5	64,5
1-sept-07	**123**	**2,96**	**24,02**	**0,70**	**59,8**	**83,8**	**28,9**	**60,5**
2-sept-07	**102**	**2,35**	**23,03**	**0,45**	**45,7**	**68,7**	**27,7**	**61,3**
3-sept-07	41	1,01	24,59	0,32	82,3	106,9	30,1	56,3
4-sept-07	121	2,97	24,58	0,74	64,0	88,6	27,6	61,4
5-sept-07	0	-	-	-	-	-	-	-
6-sept-07	61	1,59	26,14	0,35	60,1	86,2	29,0	63,5
7-sept-07	31	0,72	23,32	0,26	86,2	109,5	31,4	54,4
8-sept-07	**51**	**1,23**	**24,15**	**0,39**	**80,1**	**104,2**	**29,4**	**58,7**
9-sept-07	**164**	**4,02**	**24,50**	**1,05**	**66,9**	**91,4**	**27,4**	**60,1**
10-sept-07	0	-	-	-	-	-	-	-
11-sept-07	31	0,77	24,92	0,16	54,1	79,0	27,6	63,8
12-sept-07	104	2,72	26,18	0,78	78,5	104,7	26,1	58,7
13-sept-07	82	2,04	24,90	0,43	55,1	80,0	26,3	63,0
14-sept-07	130	3,24	24,93	0,82	65,8	90,7	27,2	60,8
15-sept-07	**151**	**3,80**	**25,19**	**0,93**	**64,4**	**89,6**	**24,3**	**60,5**
16-sept-07	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
17-sept-07	0	-	-	-	-	-	-	-
18-sept-07	0	-	-	-	-	-	-	-
19-sept-07	61	1,54	25,23	0,43	73,9	99,1	28,0	60,1
20-sept-07	0	-	-	-	-	-	-	-
21-sept-07	101	2,47	24,46	0,88	90,6	115,0	29,8	57,5
22-sept-07	**102**	**2,52**	**24,74**	**0,69**	**70,2**	**94,9**	**26,8**	**61,3**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	DRYER #2							
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**
AVERAGE	53	1,94	26,95	0,48	71,0	98,0	27,6	59,4
DEVIATION	44	0,98	1,18	0,23	11,0	11,5	2,2	4,4
MIN	0	0,77	24,92	0,16	41,2	67,8	23,0	49,1
MAX	183	5,00	29,54	1,20	93,0	122,6	31,6	65,2
TOTAL	2 226	60,18	na	14,9	na	na	na	na
12-août-07	**31**	**0,78**	**25,02**	**0,20**	**68,1**	**93,1**	**30,9**	**63,1**
13-août-07	61	1,60	26,21	0,39	66,9	93,1	29,1	62,6
14-août-07	91	2,38	26,13	0,62	71,1	97,2	27,7	64,4
15-août-07	48	1,34	27,84	0,38	81,9	109,7	28,5	64,2
16-août-07	51	1,45	28,41	0,42	85,3	113,7	30,5	54,9
17-août-07	0	-	-	-		-	-	-
18-août-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
19-août-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
20-août-07	72	1,93	26,75	0,51	74,4	101,2	24,9	57,5
21-août-07	183	5,00	27,30	1,20	68,5	95,8	24,9	59,3
22-août-07	61	1,73	28,28	0,47	80,8	109,1	26,4	49,3
23-août-07	41	1,10	26,93	0,30	75,4	102,4	27,2	56,6
24-août-07	71	1,86	26,22	0,50	73,1	99,3	30,1	59,2
25-août-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
26-août-07	**40**	**1,00**	**25,05**	**0,18**	**45,8**	**70,8**	**28,3**	**59,3**
27-août-07	41	1,15	27,99	0,34	86,0	114,0	27,1	51,1
28-août-07	31	0,79	25,60	0,24	81,8	107,4	28,3	61,6
29-août-07	0	-	-	-		-	-	-
30-août-07	80	2,23	27,92	0,50	65,1	93,0	29,2	62,6
31-août-07	85	2,27	26,68	0,54	66,3	93,0	27,2	62,6
1-sept-07	**111**	**2,97**	**26,73**	**0,65**	**61,1**	**87,8**	**26,8**	**63,5**
2-sept-07	**92**	**2,44**	**26,51**	**0,65**	**73,6**	**100,1**	**27,9**	**60,8**
3-sept-07	95	2,64	27,82	0,65	71,0	98,8	29,8	63,5
4-sept-07	61	1,61	26,36	0,38	64,7	91,0	26,8	60,8
5-sept-07	0	-	-	-		-	-	-
6-sept-07	41	1,09	26,67	0,16	41,2	67,8	29,9	64,1
7-sept-07	90	2,35	26,15	0,63	73,3	99,5	31,6	59,9
8-sept-07	**56**	**1,65**	**29,54**	**0,50**	**93,0**	**122,6**	**30,9**	**53,6**
9-sept-07	**143**	**3,83**	**26,78**	**0,89**	**64,9**	**91,7**	**25,8**	**59,8**
10-sept-07	0	-	-	-		-	-	-
11-sept-07	31	0,77	24,92	0,23	76,7	101,6	25,3	57,6
12-sept-07	31	0,79	25,40	0,23	77,2	102,6	27,9	60,1
13-sept-07	40	1,13	28,20	0,23	60,0	88,2	23,0	65,2
14-sept-07	92	2,65	28,81	0,65	73,2	102,0	24,8	55,0
15-sept-07	**41**	**1,16**	**28,28**	**0,34**	**86,0**	**114,3**	**24,2**	**49,1**
16-sept-07	**101**	**2,69**	**26,58**	**0,65**	**67,2**	**93,8**	**25,5**	**55,4**
17-sept-07	0	-	-	-		-	-	-
18-sept-07	0	-	-	-		-	-	-
19-sept-07	0	-	-	-		-	-	-
20-sept-07	0	-	-	-		-	-	-
21-sept-07	112	2,95	26,36	0,69	64,1	90,5	26,8	61,3
22-sept-07	**102**	**2,87**	**28,09**	**0,63**	**64,7**	**92,8**	**27,6**	**62,5**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	DRYER #3							
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout
AVERAGE	130	4,18	31,26	1,16	91,3	122,6	26,2	59,6
DEVIATION	65	1,98	0,90	0,57	18,5	18,7	2,2	2,9
MIN	0	0,79	28,62	0,19	47,9	80,5	22,4	51,8
MAX	258	8,20	33,31	2,53	129,8	162,5	30,6	64,1
TOTAL	5 464	171,50	na	47,7	na	na	na	na
12-août-07	**102**	**3,16**	**31,00**	**1,07**	**109,0**	**140,0**	**29,5**	**58,6**
13-août-07	146	4,72	32,31	1,46	104,0	136,4	27,8	58,5
14-août-07	80	2,43	30,41	0,71	93,0	123,4	27,6	60,6
15-août-07	100	3,09	30,86	1,02	106,7	137,6	28,0	57,0
16-août-07	147	4,56	31,05	1,49	105,9	136,9	29,7	60,3
17-août-07	51	1,59	31,09	0,36	74,5	105,6	25,9	64,1
18-août-07	**0**	**-**	**-**	**-**		**-**	**-**	**-**
19-août-07	**107**	**3,36**	**31,36**	**0,97**	**94,9**	**126,2**	**26,0**	**62,3**
20-août-07	92	2,90	31,48	1,00	113,4	144,9	23,3	60,0
21-août-07	210	6,70	31,90	1,92	95,2	127,1	24,1	58,8
22-août-07	235	7,35	31,26	2,36	104,9	136,1	25,1	57,9
23-août-07	91	2,99	32,85	0,42	47,9	80,7	26,4	51,8
24-août-07	199	6,11	30,72	1,17	61,3	92,0	28,6	62,0
25-août-07	**204**	**6,53**	**32,01**	**1,37**	**70,0**	**102,0**	**27,8**	**60,1**
26-août-07	**38**	**1,09**	**28,62**	**0,19**	**51,9**	**80,5**	**27,7**	**58,7**
27-août-07	71	2,21	31,10	0,62	91,4	122,5	26,5	55,9
28-août-07	87	2,64	30,38	0,50	59,9	90,2	27,6	59,9
29-août-07	26	0,79	30,23	0,19	75,7	105,9	30,5	61,3
30-août-07	258	8,20	31,80	1,76	71,0	102,8	27,6	60,5
31-août-07	146	4,56	31,22	1,09	78,2	109,4	26,7	62,3
1-sept-07	**203**	**6,38**	**31,40**	**1,84**	**94,7**	**126,1**	**26,1**	**59,3**
2-sept-07	**143**	**4,38**	**30,66**	**1,08**	**78,9**	**109,6**	**26,7**	**62,1**
3-sept-07	92	2,91	31,66	1,09	123,7	155,4	28,7	59,8
4-sept-07	177	5,69	32,13	1,27	74,8	106,9	24,8	62,8
5-sept-07	51	1,67	32,71	0,63	129,8	162,5	26,3	56,6
6-sept-07	123	3,83	31,12	0,99	83,6	114,7	28,2	62,5
7-sept-07	212	6,74	31,80	1,84	90,8	122,6	30,6	62,3
8-sept-07	**153**	**4,68**	**30,59**	**1,42**	**96,6**	**127,2**	**28,3**	**61,7**
9-sept-07	**92**	**2,88**	**31,29**	**0,93**	**105,5**	**136,8**	**24,3**	**55,3**
10-sept-07	71	2,06	28,99	0,81	118,9	147,9	25,72	52,45
11-sept-07	92	2,89	31,45	0,94	106,3	137,8	25,4	58,3
12-sept-07	228	7,07	31,03	1,81	82,6	113,7	24,8	60,8
13-sept-07	225	6,99	31,07	1,97	91,5	122,6	23,9	60,8
14-sept-07	91	2,95	32,42	0,70	80,2	112,6	22,9	63,8
15-sept-07	**143**	**4,44**	**31,06**	**1,22**	**88,8**	**119,8**	**22,4**	**61,5**
16-sept-07	**235**	**7,25**	**30,86**	**2,53**	**112,5**	**143,4**	**23,3**	**57,8**
17-sept-07	213	7,10	33,31	2,13	104,3	137,6	23,0	53,2
18-sept-07	114	3,66	32,11	1,03	94,2	126,3	23,3	61,4
19-sept-07	102	3,25	31,88	0,96	98,2	130,1	23,7	61,3
20-sept-07	71	2,16	30,42	0,60	87,5	117,9	25,1	62,6
21-sept-07	133	4,19	31,49	1,19	93,1	124,6	26,3	58,5
22-sept-07	**110**	**3,36**	**30,56**	**1,05**	**99,7**	**130,3**	**26,0**	**58,7**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	DRYER #4							
	Time	**kWhe**	**Whe/min**	**m^3 gas**	**Whg/min**	**Wht/min**	**Tin**	**Tout**
AVERAGE	145	4,64	31,93	0,97	70,1	102,1	25,4	58,7
DEVIATION	63	2,07	0,91	0,45	7,7	7,4	2,1	2,2
MIN	31	0,94	30,00	0,18	55,9	88,6	21,5	53,9
MAX	289	9,41	34,61	2,24	87,6	118,1	29,1	63,1
TOTAL	6 070	194,92	na	40,9	na	na	na	na
12-août-07	**134**	**4,21**	**31,44**	**0,85**	**66,1**	**97,6**	**29,1**	**59,3**
13-août-07	31	0,94	30,39	0,18	59,0	89,3	28,4	61,0
14-août-07	194	6,31	32,53	1,21	65,1	97,7	27,4	56,2
15-août-07	61	1,95	31,89	0,35	59,9	91,8	28,6	61,8
16-août-07	168	5,42	32,25	1,17	72,6	104,9	28,5	58,8
17-août-07	79	2,51	31,73	0,47	62,2	93,9	26,9	60,0
18-août-07	**51**	**1,59**	**31,18**	**0,35**	**72,0**	**103,1**	**25,1**	**58,1**
19-août-07	**179**	**5,72**	**31,94**	**1,24**	**72,5**	**104,4**	**24,9**	**60,3**
20-août-07	164	5,20	31,71	1,23	78,2	110,0	22,4	56,8
21-août-07	223	7,44	33,36	1,21	56,8	90,2	22,6	61,7
22-août-07	213	6,70	31,44	1,35	66,1	97,5	24,3	59,1
23-août-07	135	4,32	32,01	1,04	80,1	112,1	26,1	56,9
24-août-07	90	2,92	32,47	0,48	56,1	88,6	28,8	63,1
25-août-07	**102**	**3,25**	**31,84**	**0,73**	**74,2**	**106,0**	**27,2**	**58,7**
26-août-07	**142**	**4,41**	**31,08**	**0,99**	**72,4**	**103,5**	**26,4**	**59,5**
27-août-07	82	2,51	30,64	0,62	79,1	109,8	26,2	58,5
28-août-07	40	1,28	32,03	0,31	81,0	113,1	27,5	57,0
29-août-07	125	3,75	30,00	0,80	66,4	96,4	27,9	55,3
30-août-07	140	4,67	33,39	0,81	60,3	93,7	26,4	62,7
31-août-07	137	4,35	31,77	0,85	64,8	96,6	25,6	60,9
1-sept-07	**216**	**6,85**	**31,71**	**1,41**	**68,1**	**99,8**	**24,9**	**57,3**
2-sept-07	**82**	**2,52**	**30,75**	**0,58**	**73,9**	**104,7**	**26,3**	**58,6**
3-sept-07	61	1,86	30,47	0,51	87,6	118,1	25,6	55,2
4-sept-07	110	3,54	32,14	0,73	69,2	101,3	24,4	59,2
5-sept-07	164	5,32	32,44	1,15	73,0	105,5	24,1	59,7
6-sept-07	155	5,01	32,34	0,96	64,5	96,9	27,7	53,9
7-sept-07	214	6,83	31,91	1,66	80,7	112,6	28,8	58,3
8-sept-07	**289**	**9,41**	**32,57**	**2,05**	**74,0**	**106,6**	**27,0**	**59,2**
9-sept-07	**92**	**2,83**	**30,78**	**0,58**	**65,8**	**96,5**	**23,4**	**54,7**
10-sept-07	142	4,54	31,99	0,90	66,4	98,4	24,38	58,78
11-sept-07	143	4,63	32,38	0,91	66,4	98,8	24,4	60,5
12-sept-07	214	7,09	33,14	1,15	55,9	89,0	23,8	61,1
13-sept-07	239	7,81	32,67	1,59	69,6	102,3	23,1	59,4
14-sept-07	103	3,30	32,04	0,74	74,9	106,9	23,4	58,2
15-sept-07	**157**	**5,28**	**33,66**	**0,99**	**65,6**	**99,3**	**21,5**	**61,4**
16-sept-07	**273**	**8,70**	**31,87**	**2,24**	**85,4**	**117,3**	**22,6**	**55,3**
17-sept-07	255	8,32	32,62	1,74	71,0	103,6	22,1	57,0
18-sept-07	157	5,43	34,61	1,03	68,4	103,0	22,1	59,2
19-sept-07	130	4,06	31,25	0,93	74,8	106,1	23,8	57,7
20-sept-07	162	5,11	31,55	1,19	76,7	108,2	23,9	59,5
21-sept-07	122	3,83	31,43	0,84	71,5	103,0	24,6	58,9
22-sept-07	**100**	**3,18**	**31,76**	**0,74**	**77,3**	**109,0**	**25,2**	**56,7**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

Specific Concident Peak Demand (W for a 15-minute period)
(Peak demand / # dryers)

Day Period	6h - 9h	9h - 12h	12h - 15h	15h - 18h	18h - 21h	21h - 24h
WEEK MAX	**1817**	**1713**	**1395**	**1550**	**1589**	**1448**
WEEKEND MAX	**873**	**1451**	**1380**	**1602**	**1682**	**698**
MAX	**1817**	**1713**	**1395**	**1602**	**1682**	**1448**
12-août-07	**0**	**873**	**960**	**1002**	**0**	**0**
13-août-07	545	497	798	981	392	0
14-août-07	836	396	605	836	590	527
15-août-07	188	1314	770	24	0	0
16-août-07	215	999	503	470	1430	531
17-août-07	0	0	0	542	534	501
18-août-07	**0**	**0**	**0**	**513**	**0**	**0**
19-août-07	**0**	**71**	**519**	**1035**	**671**	**504**
20-août-07	0	608	887	522	1440	1448
21-août-07	404	0	1377	1436	1524	0
22-août-07	0	516	1244	1007	978	987
23-août-07	0	1632	519	548	360	0
24-août-07	477	495	1034	0	1589	504
25-août-07	**0**	**840**	**554**	**1008**	**821**	**0**
26-août-07	**0**	**524**	**501**	**1602**	**1682**	**0**
27-août-07	0	500	462	896	923	0
28-août-07	401	365	783	476	507	0
29-août-07	485	0	0	0	392	948
30-août-07	0	1056	413	1550	897	897
31-août-07	1817	936	516	509	513	0
1-sept-07	**0**	**956**	**1380**	**1322**	**489**	**500**
2-sept-07	**0**	**368**	**872**	**740**	**450**	**504**
3-sept-07	507	0	1245	962	0	0
4-sept-07	516	1305	746	0	533	536
5-sept-07	0	503	527	540	1010	0
6-sept-07	0	878	521	93	920	519
7-sept-07	0	1713	1395	1379	515	501
8-sept-07	**522**	**510**	**1367**	**609**	**1028**	**0**
9-sept-07	**0**	**413**	**995**	**1320**	**819**	**0**
10-sept-07	0	510	947	270	557	0
11-sept-07	0	1259	531	1019	0	0
12-sept-07	501	498	1028	992	1052	0
13-sept-07	1340	1034	530	716	1059	0
14-sept-07	0	440	0	719	1263	480
15-sept-07	**0**	**893**	**762**	**1437**	**540**	**0**
16-sept-07	**461**	**1274**	**1364**	**539**	**506**	**698**
17-sept-07	0	515	981	701	702	1074
18-sept-07	0	516	531	1041	1070	0
19-sept-07	204	521	429	1008	519	179
20-sept-07	495	981	0	533	0	0
21-sept-07	0	1625	0	945	1014	0
22-sept-07	**873**	**1451**	**1215**	**722**	**497**	**0**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	When dryers are in operation BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	#DIV/0!	#DIV/0!	0,26	#DIV/0!
DEVIATION	#DIV/0!	#DIV/0!	0,03	#DIV/0!
MIN	0,00	0,00	0,21	0,00
MAX	0,00	0,00	0,32	0,00
TOTAL	na	na	na	na
12-août-07	**-**	**na**	**0,25**	**na**
13-août-07	na	na	0,22	na
14-août-07	na	na	0,26	na
15-août-07	na	na	0,25	na
16-août-07	na	na	0,28	na
17-août-07	-	-	-	na
18-août-07	**-**	**-**	**-**	**na**
19-août-07	**-**	**-**	**-**	**na**
20-août-07	na	na	0,25	na
21-août-07	na	na	0,28	na
22-août-07	na	na	0,27	na
23-août-07	na	na	0,25	na
24-août-07	na	na	0,29	na
25-août-07	**na**	**-**	**-**	**na**
26-août-07	**na**	**na**	**0,29**	**na**
27-août-07	na	na	0,24	na
28-août-07	na	na	0,25	na
29-août-07	na	-	-	na
30-août-07	na	na	0,30	na
31-août-07	na	na	0,32	na
1-sept-07	**na**	**na**	**0,29**	**na**
2-sept-07	**na**	**na**	**0,28**	**na**
3-sept-07	na	na	0,29	na
4-sept-07	na	na	0,28	na
5-sept-07	-	-	-	na
6-sept-07	na	na	0,29	na
7-sept-07	na	na	0,29	na
8-sept-07	**na**	**na**	**0,27**	**na**
9-sept-07	**na**	**na**	**0,21**	**na**
10-sept-07	-	-	-	na
11-sept-07	na	na	0,24	na
12-sept-07	na	na	0,22	na
13-sept-07	na	na	0,26	na
14-sept-07	na	na	0,22	na
15-sept-07	**na**	**na**	**0,26**	**na**
16-sept-07	**-**	**na**	**0,23**	**na**
17-sept-07	-	-	-	na
18-sept-07	-	-	-	na
19-sept-07	na	-	-	na
20-sept-07	-	-	-	na
21-sept-07	na	na	0,23	na
22-sept-07	**na**	**na**	**0,24**	**na**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	When dryers are not in operation BACK PRESSURE (in. w.c.)			
VAC	**D1**	**D2**	**D2**	**D4**
AVERAGE	-0,03	-0,06	#DIV/0!	-0,06
DEVIATION	0,00	0,00	#DIV/0!	0,00
MIN	-0,03	-0,07	0,00	-0,07
MAX	-0,02	-0,05	0,00	-0,04
TOTAL	na	na	na	na
12-août-07	**-**	**-0,06**	**na**	**-0,06**
13-août-07	-0,03	-0,07	na	-0,06
14-août-07	-0,03	-0,07	na	-0,06
15-août-07	-0,03	-0,07	na	-0,06
16-août-07	-0,03	-0,07	na	-0,05
17-août-07	-	-	na	-0,06
18-août-07	**-**	**-**	**na**	**-0,06**
19-août-07	**-**	**-**	**na**	**-0,06**
20-août-07	-0,03	-0,07	na	-0,07
21-août-07	-0,03	-0,07	na	-0,06
22-août-07	-0,03	-0,06	na	-0,05
23-août-07	-0,03	-0,07	na	-0,06
24-août-07	-0,03	-0,07	na	-0,06
25-août-07	**-0,03**	**-**	**na**	**-0,06**
26-août-07	**-0,03**	**-0,06**	**na**	**-0,06**
27-août-07	-0,03	-0,06	na	-0,06
28-août-07	-0,03	-0,06	na	-0,06
29-août-07	-0,02	-	na	-0,06
30-août-07	-0,02	-0,05	na	-0,05
31-août-07	-0,03	-0,06	na	-0,06
1-sept-07	**-0,03**	**-0,06**	**na**	**-0,05**
2-sept-07	**-0,03**	**-0,06**	**na**	**-0,06**
3-sept-07	-0,03	-0,07	na	-0,06
4-sept-07	-0,03	-0,06	na	-0,06
5-sept-07	-	-	na	-0,06
6-sept-07	-0,03	-0,06	na	-0,06
7-sept-07	-0,02	-0,06	na	-0,05
8-sept-07	**-0,02**	**-0,06**	**na**	**-0,05**
9-sept-07	**-0,03**	**-0,06**	**na**	**-0,06**
10-sept-07	-	-	na	-0,06
11-sept-07	-0,03	-0,06	na	-0,06
12-sept-07	-0,02	-0,05	na	-0,04
13-sept-07	-0,03	-0,06	na	-0,06
14-sept-07	-0,02	-0,06	na	-0,06
15-sept-07	**-0,03**	**-0,06**	**na**	**-0,05**
16-sept-07	**-**	**-0,06**	**na**	**-0,06**
17-sept-07	-	-	na	-0,06
18-sept-07	-	-	na	-0,06
19-sept-07	-0,03	-	na	-0,06
20-sept-07	-	-	na	-0,06
21-sept-07	-0,03	-0,06	na	-0,06
22-sept-07	**-0,03**	**-0,06**	**na**	**-0,06**

Site B, Toronto, Ontario
Gas Dryers, 2 Exhausto Fans, Not Well-Adjusted

	During opearating hours		
	EXHAUSTO		
	Whe	**in w.c.**	**Signal**
AVERAGE	2 834,03	0,09	2,02
DEVIATION	254,12	0,00	0,15
MIN	2 397,50	0,07	1,73
MAX	3 445,25	0,09	2,35
TOTAL	na	na	na
12-août-07	**3 050**	**0,09**	**2,2**
13-août-07	2 440	0,09	1,8
14-août-07	2 742	0,09	2,0
15-août-07	2 590	0,09	1,9
16-août-07	3 060	0,09	2,2
17-août-07	2 411	0,09	1,8
18-août-07	**2 518**	**0,09**	**1,8**
19-août-07	**2 921**	**0,09**	**2,1**
20-août-07	3 070	0,09	2,2
21-août-07	3 386	0,09	2,3
22-août-07	2 969	0,09	2,1
23-août-07	2 990	0,09	2,1
24-août-07	2 945	0,09	2,1
25-août-07	**2 696**	**0,09**	**2,0**
26-août-07	**2 558**	**0,09**	**1,9**
27-août-07	2 578	0,09	1,9
28-août-07	2 827	0,09	2,0
29-août-07	2 861	0,09	2,1
30-août-07	3 018	0,09	2,1
31-août-07	2 618	0,09	1,9
1-sept-07	**3 013**	**0,09**	**2,1**
2-sept-07	**2 759**	**0,09**	**2,0**
3-sept-07	2 853	0,09	2,1
4-sept-07	2 778	0,09	2,0
5-sept-07	2 784	0,09	2,0
6-sept-07	3 035	0,09	2,1
7-sept-07	3 445	0,09	2,4
8-sept-07	**2 687**	**0,09**	**1,9**
9-sept-07	**3 004**	**0,09**	**2,1**
10-sept-07	2 598	0,09	1,9
11-sept-07	2 573	0,09	1,9
12-sept-07	2 398	0,09	1,8
13-sept-07	3 321	0,09	2,2
14-sept-07	2 715	0,09	2,0
15-sept-07	**2 907**	**0,09**	**2,0**
16-sept-07	**3 149**	**0,09**	**2,2**
17-sept-07	2 946	0,09	2,1
18-sept-07	2 677	0,09	1,9
19-sept-07	2 718	0,09	2,0
20-sept-07	2 976	0,09	2,1
21-sept-07	2 958	0,09	2,1
22-sept-07	**2 491**	**0,07**	**1,7**

Site C, Toronto, Ontario
Electric Dryers

	DRYER #1					
	Time	**kWh**	**Tin**	**Tout**	**P**	**Wh/min**
AVERAGE	125	7,4	12,6	42,5	-0,01	54,7
DEVIATION	78	4,0	4,9	3,8	0,01	2,2
MIN	0	1,5	5,0	34,0	-0,02	46,8
MAX	340	18,6	24,9	51,1	0,01	58,3
TOTAL	5 255	288	na	na	na	na
1-oct-06	**143**	**7,9**	**24,8**	**44,9**	**0,01**	**55,0**
2-oct-06	153	8,7	24,9	45,7	0,01	57,2
3-oct-06	84	4,8	18,0	43,0	0,00	57,2
4-oct-06	200	11,0	19,1	43,7	0,00	54,9
5-oct-06	132	7,5	15,1	41,5	-0,01	56,6
6-oct-06	176	9,8	14,1	42,5	-0,01	55,6
7-oct-06	**0**	**-**	**-**	**-**	**-**	**-**
8-oct-06	**133**	**7,6**	**20,6**	**43,3**	**0,00**	**57,1**
9-oct-06	262	14,6	19,7	46,3	-0,01	55,8
10-oct-06	78	4,1	16,3	45,9	0,00	52,1
11-oct-06	124	7,0	18,9	43,6	0,00	56,2
12-oct-06	76	4,0	9,2	44,2	-0,01	53,1
13-oct-06	141	7,7	6,7	38,1	-0,01	54,9
14-oct-06	**160**	**8,7**	**9,0**	**36,9**	**-0,01**	**54,5**
15-oct-06	**166**	**8,9**	**10,6**	**42,1**	**-0,01**	**53,7**
16-oct-06	103	5,8	13,9	39,9	-0,02	56,7
17-oct-06	0	-	-	-	-	-
18-oct-06	71	4,1	14,4	39,8	-0,01	57,8
19-oct-06	133	7,3	15,2	46,4	-0,01	54,6
20-oct-06	57	3,0	9,8	49,3	-0,01	51,9
21-oct-06	**312**	**16,7**	**11,6**	**43,4**	**0,00**	**53,6**
22-oct-06	**340**	**18,6**	**12,9**	**41,3**	**-0,01**	**54,8**
23-oct-06	29	1,6	6,7	47,0	-0,01	54,1
24-oct-06	61	3,4	8,7	39,2	-0,01	56,1
25-oct-06	32	1,5	10,2	51,1	0,00	46,8
26-oct-06	39	2,2	10,1	37,3	-0,01	56,7
27-oct-06	108	5,7	9,6	42,9	-0,01	52,6
28-oct-06	**98**	**5,4**	**8,1**	**41,4**	**-0,01**	**55,0**
29-oct-06	**191**	**10,1**	**8,6**	**41,5**	**-0,01**	**52,8**
30-oct-06	0	-	-	-	-	-
31-oct-06	82	4,7	15,2	38,9	-0,01	56,9
1-nov-06	66	3,8	7,6	38,2	-0,01	58,3
2-nov-06	118	6,6	5,3	34,0	-0,01	55,9
3-nov-06	181	10,0	5,0	35,0	-0,01	55,5
4-nov-06	**217**	**11,4**	**7,3**	**40,7**	**-0,01**	**52,7**
5-nov-06	**251**	**13,6**	**10,7**	**43,5**	**-0,01**	**54,1**
6-nov-06	97	5,0	12,9	44,7	-0,01	51,0
7-nov-06	69	3,7	12,2	43,1	-0,01	53,4
8-nov-06	176	9,4	14,0	43,7	-0,01	53,6
9-nov-06	172	9,5	12,2	40,0	-0,01	55,3
10-nov-06	93	5,1	10,9	48,9	-0,02	54,3
11-nov-06	**131**	**7,1**	**9,6**	**45,2**	**-0,01**	**54,4**

Site C, Toronto, Ontario
Electric Dryers

DRYER #2	Time	kWh	Tin	Tout	P	Wh/min
AVERAGE	133	9,2	20,7	48,2	-0,01	60,3
DEVIATION	95	5,3	3,9	4,3	0,00	4,1
MIN	0	2,8	14,5	38,6	-0,02	48,5
MAX	428	25,3	28,1	57,0	-0,01	66,1
TOTAL	5 585	339	na	na	na	na
1-oct-06	**202**	**12,2**	**26,4**	**49,7**	**-0,01**	**60,6**
2-oct-06	170	9,0	27,6	56,5	-0,01	52,7
3-oct-06	87	5,7	21,9	38,6	-0,01	65,1
4-oct-06	112	7,3	22,4	42,2	-0,02	65,2
5-oct-06	60	3,5	21,0	45,6	-0,01	57,6
6-oct-06	179	11,7	24,7	44,1	-0,01	65,3
7-oct-06	**50**	**2,8**	**26,6**	**57,0**	**-0,01**	**55,4**
8-oct-06	**141**	**8,4**	**27,6**	**46,7**	**-0,01**	**59,6**
9-oct-06	164	9,6	28,1	51,9	-0,01	58,8
10-oct-06	69	4,3	25,3	46,0	-0,02	61,6
11-oct-06	54	3,5	27,3	51,8	-0,01	64,1
12-oct-06	84	4,6	16,4	50,8	-0,01	54,3
13-oct-06	162	9,2	14,5	51,4	-0,01	56,6
14-oct-06	**124**	**7,6**	**18,3**	**44,6**	**-0,01**	**61,1**
15-oct-06	**180**	**10,9**	**17,3**	**45,5**	**-0,01**	**60,4**
16-oct-06	122	7,5	21,6	49,4	-0,01	61,6
17-oct-06	0	-	-	-	-	-
18-oct-06	102	6,4	20,1	47,3	-0,01	62,9
19-oct-06	95	5,8	24,1	50,0	-0,01	61,3
20-oct-06	78	4,7	20,9	51,5	-0,01	60,4
21-oct-06	**245**	**15,5**	**21,9**	**47,6**	**-0,01**	**63,3**
22-oct-06	**428**	**25,3**	**21,6**	**50,9**	**-0,01**	**59,2**
23-oct-06	0	-	-	-	-	-
24-oct-06	0	-	-	-	-	-
25-oct-06	94	5,8	19,9	43,5	-0,01	62,1
26-oct-06	0	-	-	-	-	-
27-oct-06	82	5,4	16,2	42,5	-0,01	66,1
28-oct-06	**270**	**17,3**	**17,6**	**41,6**	**-0,01**	**64,2**
29-oct-06	**199**	**11,7**	**15,7**	**50,4**	**-0,01**	**58,7**
30-oct-06	102	6,6	19,8	44,5	-0,01	65,0
31-oct-06	86	4,6	20,0	54,4	-0,01	53,9
1-nov-06	70	3,4	18,4	55,7	-0,01	48,5
2-nov-06	332	20,8	14,6	45,0	-0,01	62,7
3-nov-06	194	10,4	14,8	53,6	-0,01	53,6
4-nov-06	**181**	**11,1**	**16,4**	**49,3**	**-0,01**	**61,5**
5-nov-06	**323**	**20,6**	**18,2**	**44,8**	**-0,01**	**63,8**
6-nov-06	92	5,8	19,5	44,8	-0,01	62,8
7-nov-06	197	12,2	20,3	47,5	-0,01	62,1
8-nov-06	199	12,5	21,0	46,7	-0,01	62,8
9-nov-06	187	10,9	19,5	48,0	-0,01	58,1
10-nov-06	0	-	-	-	-	-
11-nov-06	**69**	**4,0**	**18,0**	**51,2**	**-0,01**	**57,5**

Site C, Toronto, Ontario
Electric Dryers

	DRYER #3					
	Time	**kWh**	**Tin**	**Tout**	**P**	**Wh/min**
AVERAGE	211	12,6	17,4	23,1	-0,02	59,7
DEVIATION	103	6,3	5,6	8,7	0,00	3,5
MIN	40	2,7	6,9	8,1	-0,02	52,1
MAX	426	26,3	27,7	38,6	-0,02	66,6
TOTAL	8 860	527	na	na	na	na
1-oct-06	**253**	**13,3**	**24,7**	**31,0**	**-0,02**	**52,5**
2-oct-06	266	15,0	27,7	36,9	-0,02	56,2
3-oct-06	40	2,7	23,3	33,2	-0,02	66,6
4-oct-06	154	8,2	22,9	38,2	-0,02	53,1
5-oct-06	83	4,4	21,6	26,6	-0,02	53,0
6-oct-06	182	10,5	22,3	25,6	-0,02	57,5
7-oct-06	**172**	**10,4**	**23,7**	**32,5**	**-0,02**	**60,4**
8-oct-06	**322**	**18,6**	**24,0**	**28,3**	**-0,02**	**57,8**
9-oct-06	301	18,3	25,8	28,3	-0,02	60,9
10-oct-06	75	4,8	24,9	23,5	-0,02	64,6
11-oct-06	96	6,3	26,7	23,5	-0,02	65,3
12-oct-06	179	10,3	10,3	11,4	-0,02	57,8
13-oct-06	162	9,9	9,7	26,6	-0,02	61,4
14-oct-06	**244**	**14,5**	**11,7**	**23,5**	**-0,02**	**59,4**
15-oct-06	**198**	**12,0**	**14,2**	**18,1**	**-0,02**	**60,7**
16-oct-06	120	7,6	20,5	17,2	-0,02	63,4
17-oct-06	106	6,2	19,4	14,7	-0,02	58,8
18-oct-06	86	5,0	16,2	16,4	-0,02	57,8
19-oct-06	298	16,6	21,3	28,7	-0,02	55,7
20-oct-06	216	11,3	19,4	34,6	-0,02	52,1
21-oct-06	271	15,7	15,6	18,2	-0,02	**58,0**
22-oct-06	426	24,8	18,2	26,5	-0,02	**58,3**
23-oct-06	193	11,4	10,6	8,5	-0,02	58,9
24-oct-06	68	4,2	18,9	15,3	-0,02	62,4
25-oct-06	187	10,2	21,5	38,4	-0,02	54,6
26-oct-06	134	8,4	15,1	9,1	-0,02	62,9
27-oct-06	348	21,6	17,4	22,1	-0,02	61,9
28-oct-06	**370**	**23,3**	**10,7**	**13,9**	**-0,02**	**63,0**
29-oct-06	**389**	**23,1**	**10,1**	**20,8**	**-0,02**	**59,4**
30-oct-06	221	12,9	16,0	16,9	-0,02	58,4
31-oct-06	150	9,0	15,5	17,2	-0,02	59,7
1-nov-06	140	8,3	10,9	8,1	-0,02	59,1
2-nov-06	369	23,0	6,9	12,4	-0,02	62,3
3-nov-06	182	11,3	7,1	32,1	-0,02	62,1
4-nov-06	**423**	**26,3**	**8,6**	**12,0**	**-0,02**	**62,2**
5-nov-06	**312**	**20,0**	**14,1**	**26,2**	**-0,02**	**64,1**
6-nov-06	152	9,6	16,5	12,3	-0,02	63,0
7-nov-06	149	8,9	17,2	20,0	-0,02	59,7
8-nov-06	204	12,9	21,0	38,6	-0,02	63,4
9-nov-06	102	6,4	17,1	29,6	-0,02	62,5
10-nov-06	172	9,6	17,7	26,2	-0,02	55,8
11-nov-06	**345**	**20,5**	**14,1**	**25,2**	**-0,02**	**59,5**

Site C, Toronto, Ontario
Electric Dryers

	DRYER #4					
	Time	**kWh**	**Tin**	**Tout**	**P**	**Wh/min**
AVERAGE	127	8,5	23,0	32,5	0,02	60,7
DEVIATION	79	4,2	3,1	8,9	0,02	3,6
MIN	0	1,5	18,6	15,1	-0,02	52,8
MAX	326	18,6	30,9	46,1	0,06	67,0
TOTAL	5 327	322	na	na	na	na
1-oct-06	**132**	**7,9**	**26,4**	**44,2**	**0,01**	**59,5**
2-oct-06	249	15,1	27,3	33,1	0,01	60,5
3-oct-06	82	5,3	26,0	27,4	-0,01	64,8
4-oct-06	93	5,9	27,9	46,0	0,00	63,5
5-oct-06	122	7,7	21,5	31,4	-0,01	63,1
6-oct-06	146	9,3	25,1	30,5	-0,02	63,9
7-oct-06	**143**	**7,5**	**24,1**	**33,8**	**-0,01**	**52,8**
8-oct-06	**116**	**7,1**	**30,9**	**46,1**	**-0,02**	**60,8**
9-oct-06	183	10,7	27,0	29,6	-0,01	58,4
10-oct-06	46	3,0	29,2	35,5	0,00	66,0
11-oct-06	27	1,5	22,4	17,8	0,01	54,2
12-oct-06	158	9,9	19,2	17,8	0,00	62,9
13-oct-06	216	13,0	18,6	27,0	0,02	60,2
14-oct-06	**191**	**12,3**	**21,7**	**35,8**	**0,01**	**64,2**
15-oct-06	**165**	**10,7**	**20,3**	**24,6**	**0,02**	**64,9**
16-oct-06	26	1,7	20,8	16,0	0,00	64,7
17-oct-06	38	2,5	18,9	18,7	0,00	67,0
18-oct-06	58	3,8	20,3	18,4	0,01	65,4
19-oct-06	212	13,3	25,0	31,6	0,01	62,5
20-oct-06	191	12,4	22,9	41,9	0,00	64,7
21-oct-06	146	9,6	25,6	38,7	0,01	**65,7**
22-oct-06	222	14,1	24,6	34,9	0,02	**63,6**
23-oct-06	0	-	-	-	-	-
24-oct-06	0	-	-	-	-	-
25-oct-06	111	6,1	24,5	41,0	0,02	55,2
26-oct-06	0	-	-	-	-	-
27-oct-06	110	6,7	22,6	43,5	0,03	61,2
28-oct-06	**129**	**7,6**	**21,7**	**31,2**	**0,02**	**59,2**
29-oct-06	**203**	**12,5**	**20,8**	**40,1**	**0,04**	**61,8**
30-oct-06	29	1,7	23,7	44,9	0,05	60,3
31-oct-06	92	5,4	20,6	21,8	0,06	58,9
1-nov-06	0	-	-	-	-	-
2-nov-06	155	9,2	20,0	32,2	0,06	59,3
3-nov-06	180	10,2	21,0	36,2	0,04	56,6
4-nov-06	**154**	**9,3**	**19,1**	**36,3**	**0,03**	**60,1**
5-nov-06	**326**	**18,6**	**21,6**	**30,6**	**0,04**	**57,0**
6-nov-06	56	3,2	19,0	15,1	0,03	57,9
7-nov-06	71	4,1	20,4	33,6	0,03	57,8
8-nov-06	205	11,3	24,3	37,4	0,03	55,1
9-nov-06	187	10,9	23,9	30,9	0,03	58,1
10-nov-06	106	6,2	21,8	42,8	0,03	58,3
11-nov-06	**251**	**14,5**	**21,6**	**37,8**	**0,04**	**57,7**

Site C, Toronto, Ontario
Electric Dryers

Specific Concident Peak Demand (kW for a 15-minute period)
(Peak demand / # dryers)

Day Period	6h - 9h	9h - 12h	12h - 15h	15h - 18h	18h - 21h	21h - 24h
WEEK MAX	**2,05**	**3,65**	**3,87**	**3,70**	**3,45**	**2,32**
WEEKEND MAX	**2,96**	**3,56**	**3,91**	**3,64**	**3,91**	**2,05**
MAX	**2,96**	**3,65**	**3,91**	**3,70**	**3,91**	**2,32**
1-oct-06	**0,00**	**2,98**	**3,13**	**2,40**	**0,97**	**0,00**
2-oct-06	1,60	2,50	3,67	2,80	1,02	0,00
3-oct-06	0,00	0,89	0,00	1,08	2,48	1,46
4-oct-06	0,00	2,05	3,07	1,05	0,88	0,00
5-oct-06	0,00	1,17	0,38	0,91	1,92	0,96
6-oct-06	0,87	1,02	1,05	1,04	2,65	2,32
7-oct-06	**0,00**	**1,72**	**1,96**	**2,03**	**0,00**	**1,02**
8-oct-06	**1,01**	**3,00**	**3,65**	**2,84**	**1,07**	**1,03**
9-oct-06	1,85	1,92	3,49	2,87	2,78	0,00
10-oct-06	0,00	0,00	1,53	0,00	3,10	0,38
11-oct-06	0,00	1,05	0,63	1,87	1,11	0,89
12-oct-06	0,98	2,20	1,44	2,04	2,07	0,00
13-oct-06	0,00	1,69	1,62	3,07	2,49	2,06
14-oct-06	**1,01**	**2,86**	**1,50**	**2,02**	**2,89**	**0,39**
15-oct-06	**0,00**	**2,80**	**2,59**	**2,01**	**2,79**	**0,00**
16-oct-06	0,00	2,00	1,02	1,94	1,90	0,00
17-oct-06	0,00	1,04	1,04	0,00	1,04	0,00
18-oct-06	1,02	1,02	1,19	1,05	1,02	0,00
19-oct-06	0,01	1,91	2,66	1,88	2,83	0,00
20-oct-06	0,90	2,83	2,67	1,05	1,97	1,79
21-oct-06	**2,94**	**2,46**	**2,95**	**0,78**	**2,07**	**0,83**
22-oct-06	**2,73**	**3,56**	**3,91**	**2,87**	**2,81**	**0,20**
23-oct-06	0,00	1,05	1,03	0,34	1,03	0,87
24-oct-06	0,00	0,00	1,72	1,88	0,88	0,00
25-oct-06	0,00	2,70	3,49	0,00	0,00	0,00
26-oct-06	0,00	1,06	0,75	1,02	0,98	0,00
27-oct-06	0,12	2,05	3,81	3,51	1,95	1,02
28-oct-06	**1,02**	**1,47**	**3,01**	**2,82**	**1,30**	**2,05**
29-oct-06	**2,09**	**3,28**	**1,68**	**3,12**	**1,82**	**0,59**
30-oct-06	0,99	1,01	2,07	2,99	0,00	0,00
31-oct-06	0,00	1,83	1,97	1,03	0,00	0,00
1-nov-06	0,93	1,14	0,00	2,07	1,68	1,36
2-nov-06	2,05	3,65	1,04	3,70	2,05	0,00
3-nov-06	0,00	0,84	0,45	2,88	3,45	2,31
4-nov-06	**1,04**	**2,77**	**3,37**	**2,25**	**1,96**	**1,03**
5-nov-06	**2,96**	**2,41**	**3,19**	**3,64**	**3,91**	**1,46**
6-nov-06	0,84	2,90	0,93	2,01	1,02	0,00
7-nov-06	0,00	1,50	2,02	1,34	2,75	0,91
8-nov-06	0,87	1,01	3,87	1,88	1,28	1,03
9-nov-06	1,87	2,22	2,32	0,00	2,88	0,00
10-nov-06	0,00	1,45	1,19	0,15	1,96	1,77
11-nov-06	**1,01**	**2,86**	**2,83**	**1,86**	**1,55**	**2,00**

Site C, Toronto, Ontario
Gas Dryers

	DRYER #1								
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout	P
AVERAGE	132	0,21	1,56	1,03	78,1	79,6	7,76	50,0	0,00
DEVIATION	79	0,12	0,12	0,57	11,2	11,2	3,54	3,0	0,01
MIN	0	0,05	1,35	0,22	51,1	53,1	0,73	44,1	-0,01
MAX	401	0,62	1,93	2,97	108,2	109,7	15,20	56,6	0,02
TOTAL	7 412	11,56	na	55,5	na	na	na	na	0,08
19-nov-06	**250**	**0,37**	**1,48**	**1,86**	**77,4**	**78,9**	**6,0**	**51,21**	**0,00**
20-nov-06	41	0,06	1,47	0,32	80,4	81,8	4,8	51,24	-0,01
21-nov-06	61	0,10	1,62	0,51	86,6	88,2	10,0	53,69	-0,01
22-nov-06	141	0,24	1,70	1,14	84,5	86,2	7,2	46,55	-0,01
23-nov-06	125	0,20	1,58	1,09	91,2	92,7	9,8	48,65	0,00
24-nov-06	165	0,28	1,67	1,21	76,4	78,1	11,9	46,39	0,00
25-nov-06	**173**	**0,25**	**1,45**	**1,26**	**76,0**	**77,5**	**11,70**	**53,41**	**0,00**
26-nov-06	**204**	**0,35**	**1,71**	**1,74**	**88,8**	**90,5**	**14,7**	**56,0**	**-0,01**
27-nov-06	86	0,14	1,67	0,62	74,8	76,4	15,2	55,1	-0,01
28-nov-06	0	-	-	-	-	-	-	-	-
29-nov-06	139	0,23	1,66	1,09	81,5	83,1	14,4	53,7	-0,01
30-nov-06	71	0,12	1,75	0,45	66,8	68,5	10,1	55,1	0,02
1-déc-06	271	0,41	1,52	2,00	77,2	78,7	6,6	50,6	0,00
2-déc-06	**123**	**0,18**	**1,49**	**0,98**	**82,8**	**84,3**	**4,9**	**52,5**	**-0,01**
3-déc-06	**121**	**0,18**	**1,52**	**0,78**	**66,9**	**68,4**	**3,0**	**51,6**	**-0,01**
4-déc-06	72	0,10	1,41	0,53	76,6	78,0	1,2	49,7	0,00
5-déc-06	81	0,12	1,44	0,67	86,9	88,3	2,52	46,73	0,00
6-déc-06	125	0,20	1,61	1,26	105,3	106,9	10,4	50,1	-0,01
7-déc-06	51	0,08	1,60	0,26	52,6	54,2	1,0	47,6	0,00
8-déc-06	249	0,37	1,47	1,70	71,0	72,5	2,2	51,1	-0,01
9-déc-06	**121**	**0,19**	**1,59**	**0,96**	**82,6**	**84,2**	**7,6**	**49,9**	**-0,01**
10-déc-06	**270**	**0,44**	**1,61**	**1,86**	**72,0**	**73,6**	**9,3**	**54,5**	**-0,01**
11-déc-06	92	0,14	1,53	0,95	108,2	109,7	11,3	50,5	0,00
12-déc-06	50	0,10	1,93	0,25	51,1	53,1	9,1	56,6	0,00
13-déc-06	72	0,13	1,75	0,60	86,6	88,3	12,5	47,7	0,00
14-déc-06	112	0,18	1,57	0,69	64,5	66,1	11,1	54,7	0,00
15-déc-06	111	0,18	1,61	0,85	79,7	81,3	8,7	52,8	0,00
16-déc-06	**122**	**0,19**	**1,53**	**0,91**	**78,2**	**79,7**	**8,3**	**52,1**	**-0,01**
17-déc-06	**160**	**0,29**	**1,82**	**1,35**	**88,2**	**90,0**	**14,1**	**51,1**	**0,01**
18-déc-06	161	0,24	1,48	1,59	103,2	104,7	9,45	51,92	0,01
19-déc-06	96	0,14	1,46	0,78	84,4	85,9	7,1	49,9	0,00
20-déc-06	91	0,15	1,63	0,72	82,4	84,0	5,6	47,3	0,01
21-déc-06	115	0,19	1,62	0,89	81,0	82,6	7,6	51,5	0,00
22-déc-06	142	0,22	1,52	1,05	77,3	78,8	8,2	50,4	0,01
23-déc-06	**401**	**0,62**	**1,56**	**2,97**	**77,2**	**78,8**	**8,0**	**46,8**	**0,00**
24-déc-06	**325**	**0,50**	**1,54**	**2,42**	**77,6**	**79,1**	**8,0**	**47,5**	**0,01**
25-déc-06	221	0,35	1,60	1,27	60,2	61,8	8,6	51,1	0,01
26-déc-06	91	0,13	1,40	0,55	62,9	64,3	6,3	49,3	0,01
27-déc-06	101	0,16	1,57	0,72	74,9	76,4	4,7	47,6	0,00
28-déc-06	232	0,40	1,70	1,63	73,3	75,0	7,9	48,0	0,01
29-déc-06	140	0,19	1,35	1,11	82,4	83,8	1,3	46,6	0,02
30-déc-06	**31**	**0,05**	**1,56**	**0,22**	**73,1**	**74,7**	**5,5**	**50,8**	**0,00**
31-déc-06	**172**	**0,25**	**1,44**	**1,29**	**78,4**	**79,8**	**5,3**	**47,7**	**0,02**
1-janv-07	116	0,17	1,43	0,82	73,6	75,1	10,1	49,6	0,00
2-janv-07	48	0,07	1,53	0,36	78,1	79,6	6,8	51,5	0,00
3-janv-07	101	0,15	1,44	0,73	75,3	76,7	6,3	47,0	0,00
4-janv-07	80	0,13	1,66	0,53	68,5	70,1	10,7	45,4	0,01
5-janv-07	0	-	-	-	-	-	-	-	-
6-janv-07	**211**	**0,34**	**1,61**	**1,46**	**72,2**	**73,8**	**9,5**	**49,9**	**0,02**
7-janv-07	**113**	**0,18**	**1,60**	**0,60**	**55,4**	**57,0**	**9,5**	**52,1**	**0,02**
8-janv-07	61	0,09	1,41	0,41	69,7	71,1	5,5	45,9	0,01
9-janv-07	41	0,06	1,35	0,37	93,3	94,6	4,3	44,1	0,01
10-janv-07	201	0,28	1,40	1,54	80,0	81,4	0,7	45,0	0,00
11-janv-07	173	0,27	1,56	1,43	86,4	88,0	7,9	45,7	0,01
12-janv-07	82	0,12	1,50	0,66	83,6	85,1	10,0	48,9	0,01
13-janv-07	**207**	**0,32**	**1,56**	**1,54**	**77,7**	**79,2**	**4,0**	**50,4**	**0,02**

Site C, Toronto, Ontario
Gas Dryers

	DRYER #2								
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout	P
AVERAGE	212	0,65	3,17	1,10	55,4	58,5	14,02	39,5	0,00
DEVIATION	137	0,43	1,29	0,77	25,4	26,6	4,13	16,9	0,01
MIN	0	0,00	0,25	0,00	0,0	0,3	5,43	1,5	-0,01
MAX	568	1,90	4,34	3,15	86,6	90,4	21,93	57,7	0,02
TOTAL	11 860	35,92	na	60,6	na	na	na	na	-0,20
19-nov-06	**346**	**1,23**	**3,57**	**2,04**	**61,6**	**65,1**	**16,6**	**45,28**	**0,01**
20-nov-06	250	0,51	2,02	0,93	39,0	41,0	13,4	23,75	0,00
21-nov-06	102	0,18	1,81	0,26	26,7	28,5	12,5	24,13	0,00
22-nov-06	180	0,62	3,44	0,91	52,7	56,2	15,8	45,61	0,00
23-nov-06	10	0,00	0,25	0,00	0,0	0,3	11,7	5,62	-0,01
24-nov-06	102	0,43	4,21	0,75	76,5	80,8	19,6	54,53	0,01
25-nov-06	**183**	**0,75**	**4,07**	**1,40**	**80,0**	**84,1**	**19,09**	**49,62**	**0,01**
26-nov-06	**248**	**1,03**	**4,14**	**1,56**	**65,8**	**69,9**	**21,9**	**54,7**	**0,01**
27-nov-06	112	0,47	4,23	0,69	64,1	68,3	17,9	57,7	0,00
28-nov-06	0	-	-	-	-	-	-	-	-
29-nov-06	50	0,22	4,32	0,37	77,4	81,7	21,1	55,7	0,01
30-nov-06	204	0,87	4,25	1,41	71,9	76,2	19,1	53,6	0,02
1-déc-06	97	0,30	3,13	0,39	42,3	45,4	11,1	40,9	0,01
2-déc-06	**317**	**0,92**	**2,89**	**1,61**	**52,9**	**55,8**	**13,1**	**36,7**	**-0,01**
3-déc-06	**452**	**1,13**	**2,49**	**1,95**	**45,1**	**47,6**	**10,8**	**29,4**	**-0,01**
4-déc-06	382	0,43	1,12	0,47	12,9	14,0	8,9	12,1	-0,01
5-déc-06	346	0,09	0,25	0,00	0,0	0,3	6,85	1,46	-0,01
6-déc-06	112	0,32	2,83	0,51	47,5	50,4	10,0	36,6	0,00
7-déc-06	517	0,46	0,90	0,47	9,5	10,4	6,2	7,3	-0,01
8-déc-06	568	0,87	1,53	1,39	25,6	27,1	5,6	14,9	-0,01
9-déc-06	**311**	**0,52**	**1,68**	**0,79**	**26,4**	**28,1**	**5,4**	**18,5**	**-0,01**
10-déc-06	**383**	**1,52**	**3,97**	**2,65**	**72,2**	**76,2**	**13,0**	**50,8**	**0,00**
11-déc-06	262	1,08	4,11	1,89	75,4	79,5	17,5	53,1	0,00
12-déc-06	242	1,00	4,11	1,98	85,4	89,5	16,9	53,1	0,00
13-déc-06	40	0,17	4,23	0,24	63,0	67,2	14,8	56,5	-0,01
14-déc-06	203	0,84	4,15	1,59	81,5	85,6	15,5	50,9	0,01
15-déc-06	74	0,32	4,34	0,45	63,7	68,1	16,2	54,0	0,00
16-déc-06	**171**	**0,70**	**4,12**	**1,20**	**73,2**	**77,3**	**17,1**	**51,2**	**-0,01**
17-déc-06	**294**	**1,22**	**4,16**	**1,89**	**67,2**	**71,3**	**21,4**	**55,7**	**-0,01**
18-déc-06	70	0,29	4,21	0,46	68,4	72,6	18,33	51,61	0,01
19-déc-06	146	0,57	3,89	1,05	75,1	79,0	13,7	46,2	-0,01
20-déc-06	220	0,72	3,27	1,12	53,1	56,3	13,5	38,8	-0,01
21-déc-06	72	0,29	4,01	0,45	64,5	68,5	15,9	52,5	-0,01
22-déc-06	189	0,80	4,21	1,52	83,9	88,1	15,1	52,7	0,00
23-déc-06	**451**	**1,90**	**4,21**	**3,15**	**72,9**	**77,1**	**15,3**	**51,7**	**0,00**
24-déc-06	**365**	**1,49**	**4,07**	**2,63**	**75,3**	**79,4**	**16,2**	**47,4**	**-0,01**
25-déc-06	152	0,60	3,96	1,08	74,1	78,0	16,8	47,6	0,00
26-déc-06	10	0,00	0,25	0,00	0,0	0,3	11,1	3,7	-0,01
27-déc-06	117	0,20	1,67	0,27	24,1	25,7	9,5	20,9	-0,01
28-déc-06	299	1,24	4,16	2,33	81,4	85,6	15,6	49,3	-0,01
29-déc-06	340	0,75	2,21	1,22	37,5	39,7	9,9	24,2	-0,01
30-déc-06	**158**	**0,31**	**1,97**	**0,43**	**28,7**	**30,6**	**11,6**	**24,3**	**-0,01**
31-déc-06	**210**	**0,79**	**3,74**	**1,51**	**75,0**	**78,7**	**12,5**	**47,9**	**-0,01**
1-janv-07	71	0,29	4,13	0,52	76,7	80,9	14,7	51,5	-0,01
2-janv-07	45	0,17	3,81	0,37	86,6	90,4	14,5	42,2	-0,01
3-janv-07	177	0,72	4,07	1,38	81,6	85,7	15,3	49,0	-0,01
4-janv-07	160	0,68	4,22	1,01	65,7	69,9	16,5	54,0	-0,01
5-janv-07	71	0,30	4,20	0,44	64,1	68,3	17,6	56,5	-0,01
6-janv-07	**395**	**1,62**	**4,10**	**2,71**	**71,6**	**75,7**	**18,6**	**51,6**	**-0,01**
7-janv-07	**266**	**1,07**	**4,02**	**1,93**	**75,8**	**79,8**	**18,2**	**51,4**	**0,00**
8-janv-07	66	0,02	0,25	0,00	0,0	0,3	6,5	3,6	-0,01
9-janv-07	227	0,40	1,78	0,68	31,3	33,1	9,8	22,3	-0,01
10-janv-07	424	0,62	1,47	0,98	24,0	25,5	8,2	16,0	-0,01
11-janv-07	202	0,62	3,07	1,20	62,0	65,1	11,0	38,4	-0,01
12-janv-07	100	0,42	4,17	0,71	74,6	78,7	15,3	53,7	-0,01
13-janv-07	**299**	**0,86**	**2,89**	**1,64**	**57,3**	**60,2**	**10,9**	**32,6**	**-0,01**

Site C, Toronto, Ontario
Gas Dryers

	DRYER #3								
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout	P
AVERAGE	242	0,72	2,97	0,99	40,2	43,2	10,79	16,7	-0,02
DEVIATION	125	0,38	0,08	1,12	37,4	37,4	4,29	9,9	0,00
MIN	41	0,12	2,82	0,00	0,0	2,8	0,44	0,0	-0,02
MAX	558	1,73	3,20	3,34	86,9	90,0	19,71	51,4	-0,02
TOTAL	13 530	40,42	na	55,2	na	na	na	na	-0,90
19-nov-06	**386**	**1,10**	**2,86**	**2,83**	**76,4**	**79,3**	**11,1**	**23,63**	**-0,02**
20-nov-06	225	0,67	2,98	1,62	75,3	78,2	10,0	11,55	-0,02
21-nov-06	110	0,32	2,93	0,65	61,8	64,7	11,8	18,44	-0,02
22-nov-06	41	0,12	2,82	0,29	73,4	76,3	10,6	51,37	-0,02
23-nov-06	384	1,15	2,99	2,93	79,7	82,7	12,4	20,11	-0,02
24-nov-06	354	1,05	2,97	2,68	78,9	81,9	16,6	29,45	-0,02
25-nov-06	**222**	**0,65**	**2,91**	**1,53**	**72,1**	**75,0**	**12,55**	**14,43**	**-0,02**
26-nov-06	**254**	**0,74**	**2,90**	**1,85**	**76,0**	**78,9**	**17,0**	**29,2**	**-0,02**
27-nov-06	82	0,24	2,96	0,65	82,1	85,1	12,2	10,7	-0,02
28-nov-06	195	0,60	3,06	1,09	58,3	61,4	18,6	17,8	-0,02
29-nov-06	197	0,58	2,92	1,53	80,9	83,8	15,7	13,6	-0,02
30-nov-06	313	1,00	3,18	1,98	65,8	69,0	17,6	27,2	-0,02
1-déc-06	132	0,37	2,82	1,01	79,8	82,6	9,1	5,4	-0,02
2-déc-06	**462**	**1,48**	**3,20**	**3,34**	**75,5**	**78,7**	**8,1**	**14,2**	**-0,02**
3-déc-06	**414**	**1,21**	**2,92**	**2,99**	**75,3**	**78,2**	**3,0**	**13,5**	**-0,02**
4-déc-06	264	0,77	2,93	1,70	67,3	70,2	4,1	7,2	-0,02
5-déc-06	332	1,00	3,02	2,35	74,0	77,0	2,53	5,83	-0,02
6-déc-06	71	0,22	3,09	0,57	83,2	86,3	6,4	4,5	-0,02
7-déc-06	112	0,32	2,88	0,74	69,2	72,1	6,7	0,0	-0,02
8-déc-06	398	1,19	2,98	2,90	76,1	79,0	0,4	16,3	-0,02
9-déc-06	**308**	**0,95**	**3,07**	**2,08**	**70,3**	**73,4**	**3,0**	**6,0**	**-0,02**
10-déc-06	**390**	**1,16**	**2,97**	**2,58**	**69,0**	**72,0**	**8,7**	**27,5**	**-0,02**
11-déc-06	273	0,82	3,00	1,99	76,2	79,2	15,0	17,5	-0,02
12-déc-06	198	0,60	3,05	1,65	86,9	90,0	16,8	16,2	-0,02
13-déc-06	61	0,18	2,87	0,37	63,2	66,1	10,3	9,4	-0,02
14-déc-06	310	0,92	2,96	2,29	77,1	80,1	10,2	10,6	-0,02
15-déc-06	337	1,01	3,01	2,28	70,6	73,6	11,5	16,4	-0,02
16-déc-06	**399**	**1,20**	**3,00**	**3,00**	**78,5**	**81,5**	**15,9**	**13,5**	**-0,02**
17-déc-06	**354**	**1,08**	**3,04**	**2,38**	**70,0**	**73,0**	**16,3**	**12,9**	**-0,02**
18-déc-06	113	0,32	2,87	0,92	84,9	87,8	19,71	10,89	-0,02
19-déc-06	181	0,57	3,15	0,42	24,1	27,2	9,5	5,7	-0,02
20-déc-06	199	0,61	3,04	0,00	0,0	3,0	7,0	11,5	-0,02
21-déc-06	171	0,52	3,02	0,00	0,0	3,0	13,6	7,6	-0,02
22-déc-06	306	0,92	3,01	0,00	0,0	3,0	14,3	15,6	-0,02
23-déc-06	**558**	**1,73**	**3,09**	**0,00**	**0,0**	**3,1**	**9,8**	**37,9**	**-0,02**
24-déc-06	**462**	**1,35**	**2,93**	**0,00**	**0,0**	**2,9**	**9,5**	**29,4**	**-0,02**
25-déc-06	113	0,33	2,95	0,00	0,0	2,9	10,8	34,0	-0,02
26-déc-06	72	0,21	2,94	0,00	0,0	2,9	14,8	14,8	-0,02
27-déc-06	121	0,36	2,96	0,00	0,0	3,0	5,9	12,0	-0,02
28-déc-06	184	0,54	2,92	0,00	0,0	2,9	9,8	16,9	-0,02
29-déc-06	235	0,68	2,90	0,00	0,0	2,9	8,9	16,2	-0,02
30-déc-06	**91**	**0,28**	**3,02**	**0,00**	**0,0**	**3,0**	**9,1**	**3,2**	**-0,02**
31-déc-06	**184**	**0,53**	**2,89**	**0,00**	**0,0**	**2,9**	**15,0**	**8,3**	**-0,02**
1-janv-07	123	0,35	2,85	0,00	0,0	2,8	10,7	30,7	-0,02
2-janv-07	216	0,65	3,03	0,00	0,0	3,0	8,8	19,7	-0,02
3-janv-07	174	0,51	2,95	0,00	0,0	3,0	8,0	7,2	-0,02
4-janv-07	233	0,69	2,97	0,00	0,0	3,0	11,3	22,1	-0,02
5-janv-07	197	0,57	2,91	0,00	0,0	2,9	11,8	10,6	-0,02
6-janv-07	**324**	**0,96**	**2,96**	**0,00**	**0,0**	**3,0**	**15,0**	**21,3**	**-0,02**
7-janv-07	**346**	**1,03**	**2,97**	**0,00**	**0,0**	**3,0**	**17,1**	**34,3**	**-0,02**
8-janv-07	92	0,27	2,92	0,00	0,0	2,9	8,4	16,1	-0,02
9-janv-07	349	1,03	2,96	0,00	0,0	3,0	7,6	9,8	-0,02
10-janv-07	275	0,81	2,93	0,00	0,0	2,9	8,1	16,2	-0,02
11-janv-07	53	0,16	3,04	0,00	0,0	3,0	7,1	31,9	-0,02
12-janv-07	131	0,40	3,06	0,00	0,0	3,1	9,9	10,2	-0,02
13-janv-07	**449**	**1,36**	**3,04**	**0,00**	**0,0**	**3,0**	**8,8**	**14,4**	**-0,02**

Site C, Toronto, Ontario
Gas Dryers

	DRYER #4								
	Time	kWhe	Whe/min	m^3 gas	Whg/min	Wht/min	Tin	Tout	P
AVERAGE	126	0,52	3,77	0,50	41,9	45,6	20,61	28,8	0,07
DEVIATION	106	0,40	0,14	0,69	40,0	40,0	4,39	14,4	0,02
MIN	0	0,03	3,22	0,00	0,0	3,5	10,93	2,4	0,03
MAX	543	2,13	4,04	2,73	102,0	105,9	28,83	61,9	0,13
TOTAL	7 078	26,99	na	26,2	na	na	na	na	3,83
19-nov-06	**321**	**1,27**	**3,96**	**2,73**	**88,6**	**92,6**	**21,7**	**27,19**	**0,04**
20-nov-06	162	0,64	3,97	1,35	87,1	91,0	18,5	13,25	0,04
21-nov-06	48	0,19	3,88	0,36	78,7	82,6	20,5	33,61	0,04
22-nov-06	111	0,43	3,85	1,00	93,7	97,6	18,1	22,31	0,04
23-nov-06	222	0,87	3,92	1,71	80,4	84,4	23,8	33,67	0,04
24-nov-06	310	1,21	3,91	2,27	76,5	80,4	26,2	32,66	0,06
25-nov-06	**189**	**0,72**	**3,79**	**1,50**	**83,0**	**86,8**	**21,97**	**18,06**	**0,08**
26-nov-06	**230**	**0,87**	**3,78**	**1,59**	**72,2**	**76,0**	**26,3**	**31,4**	**0,08**
27-nov-06	41	0,16	3,86	0,40	102,0	105,9	20,0	15,2	0,08
28-nov-06	92	0,37	4,04	0,65	73,2	77,2	22,3	29,5	0,08
29-nov-06	0	-	-	-	-	-	-	-	-
30-nov-06	198	0,76	3,84	1,38	72,6	76,4	25,6	38,5	0,06
1-déc-06	98	0,37	3,82	0,76	80,8	84,6	17,1	7,1	0,06
2-déc-06	**97**	**0,37**	**3,80**	**0,67**	**72,5**	**76,3**	**24,1**	**55,7**	**0,07**
3-déc-06	**170**	**0,66**	**3,87**	**1,34**	**82,0**	**85,9**	**24,0**	**50,0**	**0,08**
4-déc-06	59	0,23	3,90	0,47	83,5	87,4	19,1	40,3	0,06
5-déc-06	91	0,35	3,80	0,59	67,4	71,2	13,49	18,44	0,06
6-déc-06	42	0,15	3,48	0,31	77,5	81,0	10,9	6,5	0,06
7-déc-06	0	-	-	-	-	-	-	-	-
8-déc-06	214	0,81	3,76	1,74	84,8	88,5	17,9	37,8	0,07
9-déc-06	**97**	**0,38**	**3,89**	**0,74**	**80,0**	**83,9**	**16,3**	**22,0**	**0,10**
10-déc-06	**234**	**0,87**	**3,72**	**1,78**	**79,2**	**83,0**	**22,8**	**45,9**	**0,05**
11-déc-06	80	0,30	3,74	0,65	84,9	88,6	26,3	47,3	0,03
12-déc-06	62	0,23	3,69	0,47	79,6	83,3	20,2	25,9	0,05
13-déc-06	18	0,06	3,22	0,10	57,6	60,8	13,8	12,5	0,07
14-déc-06	31	0,11	3,55	0,25	85,5	89,0	24,5	37,0	0,07
15-déc-06	110	0,42	3,85	0,55	52,2	56,0	23,6	39,0	0,07
16-déc-06	**72**	**0,28**	**3,94**	**0,39**	**55,9**	**59,8**	**25,0**	**37,3**	**0,07**
17-déc-06	**31**	**0,11**	**3,65**	**0,26**	**86,4**	**90,1**	**20,8**	**11,9**	**0,07**
18-déc-06	41	0,15	3,74	0,23	58,3	62,1	19,42	10,04	0,06
19-déc-06	0	-	-	-	-	-	-	-	-
20-déc-06	82	0,31	3,75	0,00	0,0	3,8	22,3	30,2	0,06
21-déc-06	0	-	-	-	-	-	-	-	-
22-déc-06	51	0,19	3,80	0,00	0,0	3,8	28,8	61,9	0,05
23-déc-06	**543**	**2,13**	**3,92**	**0,00**	**0,0**	**3,9**	**25,3**	**45,5**	**0,07**
24-déc-06	**335**	**1,25**	**3,73**	**0,00**	**0,0**	**3,7**	**26,1**	**44,7**	**0,13**
25-déc-06	111	0,41	3,68	0,00	0,0	3,7	24,9	38,7	0,12
26-déc-06	72	0,27	3,81	0,00	0,0	3,8	13,7	10,2	0,09
27-déc-06	49	0,18	3,70	0,00	0,0	3,7	18,0	32,0	0,11
28-déc-06	251	0,98	3,89	0,00	0,0	3,9	20,7	18,4	0,08
29-déc-06	132	0,49	3,72	0,00	0,0	3,7	20,2	34,7	0,07
30-déc-06	**72**	**0,27**	**3,70**	**0,00**	**0,0**	**3,7**	**11,8**	**2,4**	**0,07**
31-déc-06	**91**	**0,34**	**3,72**	**0,00**	**0,0**	**3,7**	**14,9**	**3,9**	**0,08**
1-janv-07	172	0,65	3,78	0,00	0,0	3,8	20,6	30,3	0,09
2-janv-07	254	1,00	3,94	0,00	0,0	3,9	19,3	23,7	0,08
3-janv-07	36	0,13	3,63	0,00	0,0	3,6	12,2	10,4	0,07
4-janv-07	90	0,33	3,69	0,00	0,0	3,7	26,7	51,0	0,08
5-janv-07	8	0,03	3,47	0,00	0,0	3,5	23,0	21,2	0,09
6-janv-07	**225**	**0,83**	**3,68**	**0,00**	**0,0**	**3,7**	**23,1**	**30,2**	**0,09**
7-janv-07	**264**	**0,98**	**3,71**	**0,00**	**0,0**	**3,7**	**26,1**	**44,7**	**0,08**
8-janv-07	111	0,41	3,72	0,00	0,0	3,7	12,7	12,1	0,09
9-janv-07	92	0,34	3,69	0,00	0,0	3,7	19,8	43,0	0,10
10-janv-07	161	0,61	3,77	0,00	0,0	3,8	18,9	36,9	0,09
11-janv-07	91	0,34	3,78	0,00	0,0	3,8	18,4	28,2	0,10
12-janv-07	61	0,23	3,84	0,00	0,0	3,8	19,9	12,8	0,10
13-janv-07	**253**	**0,95**	**3,77**	**0,00**	**0,0**	**3,8**	**20,3**	**27,9**	**0,06**

Site C, Toronto, Ontario
Gas Dryers

Specific Concident Peak Demand (kW for a 15-minute period)
(Peak demand / # dryers)

Day Period	6h - 9h	9h - 12h	12h - 15h	15h - 18h	18h - 21h	21h - 24h
WEEK MAX	**0,14**	**0,18**	**0,20**	**0,19**	**0,20**	**0,20**
WEEKEND MAX	**0,14**	**0,19**	**0,20**	**0,19**	**0,20**	**0,20**
MAX	**0,14**	**0,19**	**0,20**	**0,19**	**0,20**	**0,20**
19-nov-06	**0,11**	**0,12**	**0,10**	**0,13**	**0,19**	**0,13**
20-nov-06	0,00	0,11	0,09	0,11	0,12	0,06
21-nov-06	0,00	0,11	0,00	0,03	0,05	0,05
22-nov-06	0,08	0,08	0,07	0,00	0,07	0,18
23-nov-06	0,00	0,10	0,11	0,05	0,12	0,10
24-nov-06	0,00	0,05	0,19	0,17	0,11	0,10
25-nov-06	**0,04**	**0,05**	**0,16**	**0,14**	**0,11**	**0,08**
26-nov-06	**0,05**	**0,17**	**0,11**	**0,15**	**0,15**	**0,10**
27-nov-06	0,08	0,12	0,06	0,09	0,01	0,00
28-nov-06	0,00	0,05	0,11	0,09	0,05	0,05
29-nov-06	0,04	0,05	0,03	0,05	0,08	0,15
30-nov-06	0,00	0,06	0,18	0,11	0,18	0,18
1-déc-06	0,00	0,15	0,11	0,05	0,03	0,06
2-déc-06	**0,01**	**0,13**	**0,13**	**0,12**	**0,17**	**0,00**
3-déc-06	**0,04**	**0,19**	**0,20**	**0,10**	**0,11**	**0,05**
4-déc-06	0,05	0,05	0,10	0,11	0,13	0,13
5-déc-06	0,00	0,00	0,11	0,06	0,05	0,07
6-déc-06	0,14	0,00	0,00	0,00	0,03	0,12
7-déc-06	0,00	0,15	0,05	0,07	0,00	0,00
8-déc-06	0,00	0,14	0,14	0,19	0,13	0,18
9-déc-06	**0,14**	**0,16**	**0,07**	**0,08**	**0,06**	**0,15**
10-déc-06	**0,10**	**0,19**	**0,09**	**0,08**	**0,11**	**0,20**
11-déc-06	0,11	0,00	0,07	0,16	0,17	0,18
12-déc-06	0,00	0,11	0,10	0,06	0,17	0,11
13-déc-06	0,00	0,05	0,05	0,05	0,00	0,07
14-déc-06	0,12	0,11	0,14	0,13	0,05	0,04
15-déc-06	0,00	0,11	0,10	0,05	0,11	0,20
16-déc-06	**0,07**	**0,11**	**0,11**	**0,08**	**0,20**	**0,11**
17-déc-06	**0,05**	**0,11**	**0,12**	**0,14**	**0,12**	**0,07**
18-déc-06	0,00	0,14	0,15	0,12	0,07	0,04
19-déc-06	0,07	0,12	0,07	0,07	0,07	0,00
20-déc-06	0,05	0,12	0,17	0,00	0,00	0,06
21-déc-06	0,07	0,00	0,06	0,05	0,07	0,07
22-déc-06	0,05	0,05	0,11	0,13	0,20	0,00
23-déc-06	**0,09**	**0,18**	**0,20**	**0,19**	**0,19**	**0,15**
24-déc-06	**0,10**	**0,19**	**0,14**	**0,19**	**0,19**	**0,12**
25-déc-06	0,00	0,18	0,19	0,13	0,00	0,02
26-déc-06	0,00	0,10	0,00	0,08	0,07	0,00
27-déc-06	0,00	0,12	0,04	0,05	0,05	0,00
28-déc-06	0,07	0,06	0,16	0,16	0,19	0,07
29-déc-06	0,00	0,16	0,14	0,09	0,07	0,00
30-déc-06	**0,06**	**0,06**	**0,00**	**0,06**	**0,11**	**0,07**
31-déc-06	**0,06**	**0,06**	**0,15**	**0,13**	**0,05**	**0,00**
1-janv-07	0,00	0,15	0,16	0,17	0,06	0,06
2-janv-07	0,00	0,05	0,11	0,15	0,15	0,11
3-janv-07	0,02	0,06	0,13	0,12	0,04	0,05
4-janv-07	0,00	0,00	0,14	0,17	0,04	0,05
5-janv-07	0,05	0,05	0,00	0,00	0,00	0,11
6-janv-07	**0,07**	**0,10**	**0,14**	**0,18**	**0,17**	**0,09**
7-janv-07	**0,10**	**0,13**	**0,19**	**0,17**	**0,09**	**0,00**
8-janv-07	0,00	0,00	0,05	0,12	0,06	0,00
9-janv-07	0,04	0,07	0,06	0,05	0,16	0,10
10-janv-07	0,00	0,16	0,10	0,06	0,07	0,07
11-janv-07	0,03	0,00	0,20	0,14	0,07	0,00
12-janv-07	0,00	0,00	0,05	0,14	0,15	0,00
13-janv-07	**0,12**	**0,19**	**0,09**	**0,03**	**0,18**	**0,11**