

Appendix A

City of Yellowknife Fleet of Vehicles and Equipment

Table A1 City of Yellowknife's fleet of light vehicles

Year	Make/Model	Class	Fuel Type
1993	CHEV CAPRI	01-LIGHT VEHICLE	Gasoline
1987	CHEV 1/2 TON	01-LIGHT VEHICLE	Gasoline
1997	FORD CROWN VICTORIA	01-LIGHT VEHICLE	Gasoline
1989	FORD F-250 Welder	01-LIGHT VEHICLE	Gasoline
1996	CHEV. CAPRICE	01-LIGHT VEHICLE	Gasoline
1993	FORD LGT CONVTLN 'F' PICK U	01-LIGHT VEHICLE	Gasoline
1990	FORD 3/4 TON	01-LIGHT VEHICLE	Gasoline
1990	FORD 3/4 TON	01-LIGHT VEHICLE	Gasoline
1990	FORD 1/2 TON VAN	01-LIGHT VEHICLE	Gasoline
1989	FORD F-250	01-LIGHT VEHICLE	Gasoline
1993	FORD 1/2 TON	01-LIGHT VEHICLE	Gasoline
1990	FORD F250	01-LIGHT VEHICLE	Gasoline
1992	CHEV 1/2 TON	01-LIGHT VEHICLE	Gasoline
1987	GMC 1/2 TON	01-LIGHT VEHICLE	Gasoline
1981	CHEV 1/2 TON	01-LIGHT VEHICLE	Gasoline
1985	FORD 1/4 TON	01-LIGHT VEHICLE	Gasoline
1985	FORD 1/4 TON	01-LIGHT VEHICLE	Gasoline
1991	FORD F250 1/2 TON	01-LIGHT VEHICLE	Gasoline
1988	MITUBISHI FORKLIFT	01-LIGHT VEHICLE	Propane
1991	FORD RANGER	01-LIGHT VEHICLE	Gasoline
1989	FORD F250	01-LIGHT VEHICLE	Gasoline
1989	FORD RANGER	01-LIGHT VEHICLE	Gasoline
1989	Ford Ranger	01-LIGHT VEHICLE	Gasoline
1990	FORD F250	01-LIGHT VEHICLE	Gasoline
1994	FORD VAN	01-LIGHT VEHICLE	Gasoline
1994	FORD F150	01-LIGHT VEHICLE	Gasoline
1996	FORD F150	01-LIGHT VEHICLE	Gasoline
1996	FORD F150	01-LIGHT VEHICLE	Gasoline
1997	FORD 1/2 TON	01-LIGHT VEHICLE	Gasoline
1997	FORD F150	01-LIGHT VEHICLE	Gasoline
1997	FORD F150	01-LIGHT VEHICLE	Gasoline
1997	FORD F150	01-LIGHT VEHICLE	Gasoline
1997	FORD F 150	01-LIGHT VEHICLE	Gasoline
1997	FORD F 150	01-LIGHT VEHICLE	Gasoline
1990	FORD ECONOLINE VAN	01-LIGHT VEHICLE	Gasoline
2002	1/2 TON PICK UP	01-LIGHT VEHICLE	Gasoline
2000	CHEV IMPALA	01-LIGHT VEHICLE	Gasoline
1993	GM ASTRO VAN	01-LIGHT VEHICLE	Gasoline
1997	FORD 3/4 Ton	01-LIGHT VEHICLE	Gasoline
2004	Ford F-150 1/2 ton pick-up	01-LIGHT VEHICLE	Gasoline
1997	FORD F-150	01-LIGHT VEHICLE	Gasoline
2004	FORD F-150	01-LIGHT VEHICLE	Gasoline
2005	GMC SAFARI-XT VAN	01-LIGHT VEHICLE	Gasoline
2005	FORD F-150	01-LIGHT VEHICLE	Gasoline
2005	FORD F-150	01-LIGHT VEHICLE	Gasoline

2005	Ford F-150	01-LIGHT VEHICLE	Gasoline
2005	F250 W LIGHT SERVICE BODY	01-LIGHT VEHICLE	Unleaded
2005	F-250 FORD 3/4 TON	01-LIGHT VEHICLE	Gasoline

Table A2 City of Yellowknife's fleet of bylaw vehicles

Year	Make/Model	Class	Fuel Type
2003	Dodge Intrepid	02-BYLAW VEHICL	Gasoline
1999	Crown Victoria	02-BYLAW VEHICL	Gasoline
2002	Crown Victoria	02-BYLAW VEHICL	Gasoline

Table A3 City of Yellowknife's fleet of medium duty trucks

Year	Make/Model	Class	Fuel Type
1990	FORD F350 1 TON FLAT DECK	03-MED DTY TRUC	Gasoline
1995	FORD TOW TRUCK	03-MED DTY TRUC	Gasoline
1966	IHC BOILER	03-MED DTY TRUC	Gasoline
1989	Ford F350 1 Ton	03-MED DTY TRUC	Gasoline
1977	CHEV 2 TON	03-MED DTY TRUC	Gasoline
1981	GM 3 TON	03-MED DTY TRUC	Gasoline
1993	GM 1 TON	03-MED DTY TRUC	Gasoline
1996	GMC SIERRA C3500	03-MED DTY TRUC	Gasoline
1970	CHEV 5 TON WATER TRUCK	03-MED DTY TRUC	Gasoline
2004	F350 FORD 1-TON	03-MED DTY TRUC	Gasoline
2004	3/4 TON SERVICE VAN	03-MED DTY TRUC	Gasoline
2005	FORD F-150	03-MED DTY TRUC	Gasoline
2005	F350 w/hiostr and dump box	03-MED DTY TRUC	Unleaded
2005	F550 2 TON W/HIAB CRANE	03-MED DTY TRUC	Unleaded
2005	F550 CUB VAN	03-MED DTY TRUC	Unleaded

Table A4 City of Yellowknife's fleet of heavy duty trucks

Year	Make/Model	Class	Fuel Type
1996	MOBIL STREET SWEEPER	04-HVY DTY TRUC	Diesel
1988	ATHEY MOBIL SWEEPER	04-HVY DTY TRUC	Diesel
1993	GMC Top Kick Tractor	04-HVY DTY TRUC	Diesel
1991	FORD LT9000 SANDER W/PLOW	04-HVY DTY TRUC	Diesel
1986	IHC TANDEM	04-HVY DTY TRUC	Diesel
1996	FORD LN8000 c/w mounted vac	04-HVY DTY TRUC	Diesel
1995	AEROMAX L9000 FORD TANDEM W	04-HVY DTY TRUC	Diesel
2001	Street Sweeper	04-HVY DTY TRUC	Diesel
2004	STERLING TANDEM	04-HVY DTY TRUC	Diesel
2004	STERLING VAC TRUCK	04-HVY DTY TRUC	Diesel
2004	STERLING TANDEM	04-HVY DTY TRUC	Diesel

Table A5 City of Yellowknife's fleet of heavy equipment

Year	Make/Model	Class	Fuel Type
1991	CAT 214 BACKHOE	05-HVY EQUIPMEN	Diesel
1989	950E CAT LOADER	05-HVY EQUIPMEN	Diesel
1998	936G LOADER	05-HVY EQUIPMEN	Diesel
1990	CAT 140G MOTOR GRADER	05-HVY EQUIPMEN	Diesel
1997	938F LOADER	05-HVY EQUIPMEN	Diesel

1995	CAT 140 GRADER	05-HVY EQUIPMEN	Diesel
1993	Cat IT12 F LOADER	05-HVY EQUIPMEN	Diesel
2002	D5M-XL CATIPILER	05-HVY EQUIPMEN	Diesel
1990	LOADLINE END DUMP on #41	05-HVY EQUIPMEN	None
1965	45' HIGH BOY TRAILER	05-HVY EQUIPMEN	None
1980	45 TON LOW BOY	05-HVY EQUIPMEN	None
1972	COLUMBIA WATER TANKER	05-HVY EQUIPMEN	None
1998	29' LOAD LINE END DUMP GRAV	05-HVY EQUIPMEN	None
2005	EXCAVATOR	05-HVY EQUIPMEN	Diesel

Table A6 City of Yellowknife's fleet of other equipment

Year	Make/Model	Class	Fuel Type
1989	4 RUPP PUMP W/TRAILER"	06-OTHER EQUIPM	Diesel
1970	JAEGER WATER PUMP 4	06-OTHER EQUIPM	Gasoline
1986	PORTABLE GEN SET	06-OTHER EQUIPM	Gasoline
1992	JOHN DEERE 510 LAWN MOWER	06-OTHER EQUIPM	Gasoline
1995	VERMEER BRUSH CUTTER BC735	06-OTHER EQUIPM	Gasoline
2002	Aerator	06-OTHER EQUIPM	Gasoline
2003	Snowmobiles 2003 YAMAYA VMAX 6	06-OTHER EQUIPM	Gasoline
2003	Snowmobiles 2003 YAMAYA VMAX 6	06-OTHER EQUIPM	Gasoline
1983	ENERGIZER on trailer	06-OTHER EQUIPM	Diesel
1982	Compressor (Heavy Duty)	06-OTHER EQUIPM	Diesel
1988	VOLCANO	06-OTHER EQUIPM	Diesel
1970	PACKER ROSCOE	06-OTHER EQUIPM	Diesel
2004	DIESEL DRIVEN PUMP	06-OTHER EQUIPM	Diesel
2004	WATER PICK	06-OTHER EQUIPM	None
1985	ALPURPOSE PACKER TRAILER	06-OTHER EQUIPM	None
1991	UTILITY TRAILER	06-OTHER EQUIPM	None
1983	HOMEMADE TRAILER	06-OTHER EQUIPM	None
1997	TILT TRAILER	06-OTHER EQUIPM	None
1996	TREE SPADE W/TRAILER	06-OTHER EQUIPM	None
	STEAMER C/W 16HP	06-OTHER EQUIPM	Diesel
1987	HIAB PICKER/CRANE	06-OTHER EQUIPM	None
1989	HOBART 300 AMP WELDER	06-OTHER EQUIPM	Gasoline
	(5000 WATT)	06-OTHER EQUIPM	Gasoline
	JOHN-DEERE RIDING MOWER	06-OTHER EQUIPM	Gasoline
	JOHN-DEERE AERATOR	06-OTHER EQUIPM	Gasoline
	EXMARK MOWER	06-OTHER EQUIPM	Gasoline
	TENCO SANDER	06-OTHER EQUIPM	None
	INLAND ROAD SCRAPER	06-OTHER EQUIPM	None
2004	'GODWIN 4" WATER PUMP'	06-OTHER EQUIPM	Diesel
2004	Plate Tamper	06-OTHER EQUIPM	Gasoline
2005	'Godwin 4" water pump/trailer'	06-OTHER EQUIPM	Diesel
2005	EXMARK MOWER	06-OTHER EQUIPM	Gasoline
	TENCO SANDER	06-OTHER EQUIPM	None
2006	Baler Compactor	06-OTHER EQUIPM	Unleaded

Table A7 City of Yellowknife's fleet of mobile tractors

Year	Make/Model	Class	Fuel Type
1993	BOBCAT 742B	07-MOBILE TRACT	Gasoline

1984	FORD TRACTOR 2610	07-MOBILE TRACT	Diesel
1995	JOHN DEERE 455 LAWN TRACTOR	07-MOBILE TRACT	Diesel
1997	BOBCAT	07-MOBILE TRACT	Diesel
2001	2001 BOBCAT LOADER -INGERSOLL	07-MOBILE TRACT	Diesel
1990	ZAMBONI 1991 (YKCA)	07-MOBILE TRACT	Propane
1990	ZAMBONI 1990 (Multiplex)	07-MOBILE TRACT	Propane
2004	Zamboni Ice re-surfacer	07-MOBILE TRACT	Propane
2004	Zamboni Ice Re-surfacer	07-MOBILE TRACT	Propane
1990	2003 ZAMBONI (GMA)	07-MOBILE TRACT	Propane
	ZAMBONI MODEL: 440	07-MOBILE TRACT	Propane

Table A8 City of Yellowknife's fleet of emergency equipment

Year	Make/Model	Class	Fuel Type
1988	FORD E350 AMBULANCE	08-EMERGENCY EQ	Gasoline
1985	IHC C1950 PUMPER	08-EMERGENCY EQ	Diesel
1981	IHC C1950 PUMPER	08-EMERGENCY EQ	Diesel
1994	FORD CYCLONE AERIAL SUPERIO	08-EMERGENCY EQ	Diesel
2001	MODULAR AMBULANCE	08-EMERGENCY EQ	Diesel
1997	FORD E350 AMBULANCE	08-EMERGENCY EQ	Diesel
1991	FORD E350 AMBULANCE	08-EMERGENCY EQ	Diesel
1994	IHC 4900 HAZMAT/RESCUE	08-EMERGENCY EQ	Diesel
1990	IHC 2554 WATER TANKER	08-EMERGENCY EQ	Diesel
1998	FORD LT WATER TANKER	08-EMERGENCY EQ	Diesel
2004	SMEAL AERIAL SPARTAN CHASSIS	08-EMERGENCY EQ	Diesel
	FORD E-350 AMBULANCE	08-EMERGENCY EQ	Unleaded

Appendix B Calculations

For all calculations, the following current fuel prices and exchange rates were used for estimation purposes.

Diesel: \$0.7934/L
Gasoline: \$0.7887/L
\$CDN/\$USD: 0.857

1. Calculation of annual fuel consumption and GHG emissions

Fuel consumption from 3 sources were used to estimate annual fuel consumption for the City of Yellowknife's Fleet of equipment and vehicles. The 3 sources of data are as follows:

1. Detailed fuel consumption tracked from July 1, 2005 – Dec. 31, 2005. Each vehicle or piece of equipment that fueled up at the City's garage had its fuel consumption tracked for the 6 month period of time. A summary can be seen in Table B1.
2. Overall fuel consumption data from Jan. 1, 2006 – March 15, 2006. Fuel consumption was tracked by operator, and was not cross-referenced to vehicles/equipment. A summary can be seen in Table B3.
3. Overall fuel consumption data from July 2004 – June 2005 from the Municipal Enforcement Division (MED) Cardlock at Matonabee Petroleum. .

From these data sources, the following information was derived:

- July 1 – Dec. 31 fuel consumption
 - Diesel: 67,210 L
 - Gasoline: 45,084 L
 - 183 days total for the time frame
- Jan. 1 – March 15 fuel consumption
 - Diesel: 53,551 L
 - Gasoline: 18,041 L
 - 74 days total for the time frame
- Annual fuel consumption for MED Cardlock:
 - Gasoline: 18,622 L

From the winter fuel consumption data, it can be seen that diesel equipment and vehicles are used more frequently, as shown by the following (using ratios of days of the time frame).

Diesel: $67,210 \text{ L} * 74 \text{ days} / 183 \text{ days} = 27,178 \text{ L}$

The data shows that in the 74 day time frame, almost double the amount is used (53,551 L), because in the winter months diesel equipment is more frequently used for snow removal.

However, for Gasoline, the data shows that gasoline vehicles and equipment are not operated more or less frequently during the winter months, considering the following:

$$\text{Gasoline: } 45,084 \text{ L} * 74 \text{ days} / 183 \text{ days} = 18,231 \text{ L}$$

Compared to the volume obtained from Jan. 1/06 – Mar. 15/06 data (18,041 L), the estimation by ratio of days is off by only 1.04%.

To calculate the annual diesel consumption, it was assumed that fuel consumption for March 16-June 30 is proportional to the fuel consumption from July 1 – Dec. 31. Thus, for the 108 days of the year in which fuel consumption is unaccounted for, fuel consumption is extrapolated from Data Source 1. Thus:

$$\text{Diesel: } 67,210 \text{ L} + 53,551 \text{ L} + (67,210 \text{ L} * 108 \text{ days} / 183 \text{ days}) = 160,426 \text{ L}$$

For gasoline consumption, we have already seen that there is little difference if the figure from Data Source 1 is extrapolated, as it was off by only 1% from actual data from Data Source 2. Thus, for gasoline data, the data from Data Source 1 can be extrapolated for the whole year, and then fuel consumption from Data Source 3 (MED Cardlock) can be added to it to estimate a yearly consumption of gasoline.

$$\text{Gasoline: } 45,084 \text{ L} * 365 \text{ days} / 183 \text{ days} + 18,622 \text{ L} = 108,544 \text{ L}$$

To estimate the GHG emissions, the following emission factors were used:

$$\begin{aligned} \text{Diesel Emission Factor: } & 0.26 \text{ kg CO}_2\text{e/kWh} \\ \text{Gasoline Emission Factor: } & 0.255 \text{ kg CO}_2\text{e/kWh} \end{aligned}$$

To use the emission factors, the volume of diesel and gasoline were multiplied by their respective heating values. Using the Lower Heating Value (LHV) would give a possibly unrealistically low estimate of GHG emissions, therefore the Higher Heating Values (HHV) were used.

$$\begin{aligned} \text{HHV Diesel: } & 10.2 \text{ kWh/L} \\ \text{HHV Gasoline: } & 10.42 \text{ kWh/L} \end{aligned}$$

Thus:

$$\begin{aligned} \text{GHG Diesel: } & 160,426 \text{ L} * 10.2 \text{ kWh/L} * 0.26 \text{ kg CO}_2\text{e/kWh} = 425,449 \text{ kg CO}_2\text{e} \\ \text{GHG Gasoline: } & 108,544 \text{ L} * 10.42 \text{ kWh/L} * 0.255 \text{ kg CO}_2\text{e/kWh} = 288,321 \text{ kg CO}_2\text{e} \end{aligned}$$

Table B1 City of Yellowknife's fleet fuel consumption data (Jul. 1/05 – Dec. 31/05)

Unit #	Vehicle #		Fuel	Jul. 1/06 to Dec. 31/06 Quantity (L)
E2086-97	89	863 Bobcat	Diesel	716.90
JC-3	99	C/S Jerry-Can	Diesel	48.40
E2022-90	75	CAT 140G Grader	Diesel	4,253.30
E2034-95	78	CAT 140G Grader	Diesel	5,512.10
E2010-91	70	CAT 214 Backhoe	Diesel	4,362.10
E2024-97	76	CAT 938 Loader	Diesel	4,029.80
E2013-98	72	CAT 938G Loader	Diesel	4,914.30
E2013-89	71	CAT 950E Loader	Diesel	924.10
E2026-84	77	Ford 2610 Tractor	Diesel	124.70
E2096-95	90	Ford Aeromax L9000 Tandem	Diesel	1,477.30
E1154-05	64	Ford F-150	Diesel	232.30
E1051-90	20	Ford F-250	Diesel	1,773.90
E1102-04	54	Ford F-350	Diesel	25.10
E2085-96	88	Ford LN8000 (c/with Vac Unit)	Diesel	478.80
E2039-91	81	Ford LT9000	Diesel	4,076.10
E1067-91	28	Ford Ranger	Diesel	5.60
E2099-02	91	Freightliner Chassis Model - FC70 Sweeper	Diesel	3,092.10
E1084-96	43	GMC Sierra 3500	Diesel	481.20
E2131-04	95	Godwin 4' Water Pump	Diesel	26.20
E2040-86	82	IHC Tandem	Diesel	1,690.70
E1080-95	39	John-Deere Riding Mower	Diesel	28.40
JC-14/15	106	Mechanic's Shop Jerry Can 14/15	Diesel	36.30
E2019-96	73	Mobil Sweeper	Diesel	482.90
E2036-88	79	Mobil Sweeper	Diesel	181.10
JC-5	101	R/S Jerry-Can	Diesel	131.80
E2056-70	85	Rosco Packer	Diesel	7.10
E2101-03	92	Sterling Tandem	Diesel	1,783.60
E2104-04	93	Sterling Tandem	Diesel	2,218.30
E2126-04	94	Sterling Vac Truck	Diesel	8,845.50
JC-7	103	SWM Jerry-Can	Diesel	15,250.10
E1003-93	3	Bobcat Loader (742B)	Gasoline	461.90
JC-1	97	C/S Jerry-Can	Gasoline	40.20
JC-2	98	C/S Jerry-Can	Gasoline	168.00
JC-12/13	40	C/S Parks JC-12/JC-13	Gasoline	51.40
E1002-87	2	Chev 1/2 Ton Pick-up	Gasoline	634.30
E1033-87	14	Chev 1/2 Ton Pick-up	Gasoline	558.10
E1052-92	21	Chev 1/2 Ton Pick-up	Gasoline	236.80
E1016-77	10	Chev C-50	Gasoline	182.80
E1094-70	51	Chev C-65 Cheyenne (5-Ton Tanker)	Gasoline	231.80
E1001-93	1	Chev Caprice	Gasoline	128.40
E1098-00	53	Chev Impala	Gasoline	154.20
E1097-02	52	Chev Silverado C-1500	Gasoline	1,338.80
E1127-04	61	Exmark Mower	Gasoline	284.60
E1160-05	107	Exmark Mower	Gasoline	366.10
E1008-97	5	Ford Crown Victoria	Gasoline	307.00
E1077-94	36	Ford E-150 Cargo Van	Gasoline	1,692.70
E1045-90	17	Ford E-150 Van	Gasoline	962.90

E1103-04	55	Ford E-250	Gasoline	1,140.80
E1093-90	50	Ford E-250 Van	Gasoline	2,177.90
E1050-93	19	Ford F-150	Gasoline	1,443.30
E1073-97	33	Ford F-150	Gasoline	1,442.20
E1078-94	37	Ford F-150	Gasoline	1,495.90
E1082-96	41	Ford F-150	Gasoline	895.90
E1083-96	42	Ford F-150	Gasoline	466.10
E1087-97	44	Ford F-150	Gasoline	946.90
E1088-97	45	Ford F-150	Gasoline	1,133.50
E1089-97	46	Ford F-150	Gasoline	1,151.30
E1090-97	47	Ford F-150	Gasoline	1,374.20
E1091-97	48	Ford F-150	Gasoline	1,118.50
E1092-97	49	Ford F-150	Gasoline	1,078.10
E1124-04	59	Ford F-150	Gasoline	475.80
E1126-04	60	Ford F-150	Gasoline	1,782.90
E1154-05	64	Ford F-150	Gasoline	623.20
E1156-05	66	Ford F-150	Gasoline	720.60
E1157-05	67	Ford F-150	Gasoline	1,492.40
E1048-89	18	Ford F-250	Gasoline	344.30
E1051-90	20	Ford F-250	Gasoline	849.50
E1063-91	26	Ford F-250	Gasoline	768.40
E1068-89	29	Ford F-250	Gasoline	303.30
E1076-90	35	Ford F-250	Gasoline	230.10
E1129-05	62	Ford F-250	Gasoline	853.00
E1044-90	16	Ford F-250	Gasoline	278.20
E1017-89	11	Ford F-250 Welding Truck	Gasoline	250.70
E1009-90	6	Ford F-350	Gasoline	910.10
E1102-04	54	Ford F-350	Gasoline	2,868.20
E1015-89	108	Ford F-350	Gasoline	160.30
E1155-05	65	Ford F-350 1-Ton Flat Deck	Gasoline	475.70
E1030-93	13	Ford F-350 S/C	Gasoline	957.30
E1006-93	4	Ford F-350 Tow Truck	Gasoline	756.40
E1152-05	110	Ford F-350 W/Dump Box	Gasoline	1,371.00
E1158-05	68	Ford F550 Flat Deck/Picker Truck	Gasoline	627.10
E1062-85	25	Ford Ranger	Gasoline	641.00
E1067-91	28	Ford Ranger	Gasoline	139.10
E1070-89	30	Ford Ranger	Gasoline	651.40
E1054-87	22	GMC 1/2 Ton Pick-up	Gasoline	482.60
E1074-93	34	GMC 3500 Dually	Gasoline	623.20
E1116-93	57	GMC Astro Van	Gasoline	252.10
E1084-96	43	GMC Sierra 3500	Gasoline	797.60
E1012-66	7	International Load Star	Gasoline	32.00
E1105-01	56	John-Deere Aerator	Gasoline	12.60
E1080-95	39	John-Deere Riding Mower	Gasoline	1.90
E1079-02	38	John-Deere Riding Mower (510)	Gasoline	95.70
JC-14/15	106	Mechanic's Shop Jerry Can 14/15	Gasoline	94.80
JC-14/15	106	Mechanic's Shop Jerry Can 14/15	Gasoline	62.70
E1066-88	27	Mitsubishi Fork Lift	Gasoline	141.30
E2019-96	73	Mobil Sweeper	Gasoline	65.00
E1012-A	8	Steamer C/W 16 HP	Gasoline	34.40
JC-6	102	SWM Jerry-Can	Gasoline	182.90

JC-7	103	SWM Jerry-Can	Gasoline	10.90
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Table B2 City of Yellowknife's fleet fuel consumption data (Jan. 1/06 – Mar. 15/06)

Operator Product Usage

Friday March 17, 2006

(January 1, 2006 07:00 - March 15, 2006 06:59)

General Ledger

7100-1-7411

DIESEL	DATE	TRN #	FUEL
Total for	DIESEL		53,550.50
GASOLINE	DATE	TRN #	FUEL
Total for	GASOLINE		18,040.80

Table B3 MED Cardlock fuel consumption data 2004-2005

	MED	Fire Dept
	CARD LOCK	CARD LOCK
2004 - 2005	GAS	GAS
JULY	1,597	199
AUG	1,365	199
SEPT	1,688	187
OCT	1,491	235
NOV	1,635	376
DEC	1,831	655
JAN	1,816	334
FEB	1,546	345
MAR	1,308	546
APR	1,393	293
MAY	1,441	324
JUN	1,511	412
TOTAL	18,622	4,105
AVERAGE PRICE	\$13,337.86	\$2,940.17

2. Breakdown of fuel consumption per vehicle/equipment

Further analysis in the study required an estimation of fuel savings and GHG reduction, if certain energy efficiency measures, or technologies were implemented within the fleet. This required a breakdown of fuel consumption per vehicle or piece of equipment, therefore the following procedure was used:

- Use itemized fuel consumption data from Jul. 1/05 – Dec. 31/05, and calculate percent total diesel/gasoline consumption per vehicle/equipment
- Multiply individual percentages by total annual fuel consumption (calculated in Section 1 of this Appendix)
- Apply energy efficiency measures to each vehicle/equipment

Tables B4 and B5 show the breakdown of the estimated annual fuel consumption per vehicle/equipment. With a breakdown of estimated fuel consumption per vehicle, a number of energy efficiency measures were considered, and from the literature review, and communication with suppliers, estimates of fuel savings were applied. The fuel savings and applicability to vehicles/equipment within the City of Yellowknife's fleet are shown below.

Measure	Fuel savings	Applicability
Tire Maintenance	1%	Class 1, 2, 3, 4, 5
Preventative Maintenance		
-Tune up	4%	Class 1, 2, 3, 4, 5
-Air Filter Replacement	1%	Class 1, 2, 3, 4, 5
Energy Conserving Motor Oil	2.7%	Class 1, 2, 3, 4, 5
Driver Training	15%	Class 1, 2, 3

To estimate fuel savings, and GHG impact of implementing idle-reduction technologies such as direct-fired heaters and APU units, it was assumed that 10% of total fuel consumption is due to idling. A better estimate would require more detailed data than is currently available within the City of Yellowknife's records, thus this assumption was made.

For direct-fired heating units, and battery-powered units, the supplier of the *Blueheat* system noted that systems were available only for Ford F-series (F-150, 250, 350) vehicles. To calculate the fuel savings for installing the *BlueHeat* systems, annual fuel consumption for all F-series vehicles was summed, and multiplied by 10% (assumed idling fuel consumption). Pickup trucks consume approximately 1.6 L/h at idle, and the maximum setting on the *BlueHeat* unit consumes 0.6 L/h. Thus the following calculation was used to estimate fuel savings per vehicle.

$$\text{BlueHeat Fuel savings (L)} = \text{F-series vehicle fuel consumption} * (1.6 \text{ L/h} - 0.6 \text{ L/h}) / (1.6 \text{ L/h})$$

A similar procedure was used for estimating fuel savings using APU units, however typical values for tractor/heavy equipment fuel consumption at idle is 3.5 L/h, while the APU units consume 0.9 L/h. Thus:

$$\text{APU Fuel Savings (L)} = \text{Equipment fuel consumption} * (3.5 \text{ L/h} - 0.9 \text{ L/h}) / (3.5 \text{ L/h})$$

Table B4 Diesel fuel consumption for individual vehicles/equipment

Unit #	Class	Make/Model	Fuel	Jul. 1/05 – Dec. 31/05 Data Quantity (L)	% total	Estimated Annual Consumption Quantity (L)
E1051-90	01-LIGHT VEHICL	Ford F-250	Diesel	1,773.90	2.64%	4,234.17
E1067-91	01-LIGHT VEHICL	Ford Ranger	Diesel	5.60	0.01%	13.37
E1154-05	01-LIGHT VEHICL	Ford F-150	Diesel	232.30	0.35%	554.48
E1084-96	03-MED DTY TRUCK	GMC Sierra 3500	Diesel	481.20	0.72%	1,148.59
E1102-04	03-MED DTY TRUCK	Ford F-350	Diesel	25.10	0.04%	59.91
E2019-96	04-HVY DTY TRUC	Mobil Sweeper	Diesel	482.90	0.72%	1,152.65
E2036-88	04-HVY DTY TRUC	Mobil Sweeper	Diesel	181.10	0.27%	432.27
E2039-91	04-HVY DTY TRUC	Ford LT9000	Diesel	4,076.10	6.06%	9,729.35
E2040-86	04-HVY DTY TRUC	IHC Tandem	Diesel	1,690.70	2.52%	4,035.58
E2085-96	04-HVY DTY TRUC	Ford LN8000 (c/with Vac Unit)	Diesel	478.80	0.71%	1,142.86
E2096-95	04-HVY DTY TRUC	Ford Aeromax L9000 Tandem	Diesel	1,477.30	2.20%	3,526.21
E2099-02	04-HVY DTY TRUC	Freightliner Chassis Model - FC70 Sweeper	Diesel	3,092.10	4.60%	7,380.62

E2101-03	04-HVY DTY TRUC	Sterling Tandem	Diesel	1,783.60	2.65%	4,257.32
E2104-04	04-HVY DTY TRUC	Sterling Tandem	Diesel	2,218.30	3.30%	5,294.92
E2126-04	04-HVY DTY TRUC	Sterling Vac Truck	Diesel	8,845.50	13.16%	21,113.56
E2010-91	05-HVY EQUIPMEN	CAT 214 Backhoe	Diesel	4,362.10	6.49%	10,412.01
E2013-89	05-HVY EQUIPMEN	CAT 950E Loader	Diesel	924.10	1.37%	2,205.76
E2014-98	05-HVY EQUIPMEN	CAT 938G Loader	Diesel	4,914.30	7.31%	11,730.07
E2022-90	05-HVY EQUIPMEN	CAT 140G Grader	Diesel	4,253.30	6.33%	10,152.32
E2024-97	05-HVY EQUIPMEN	CAT 938 Loader	Diesel	4,029.80	6.00%	9,618.84
E2034-95	05-HVY EQUIPMEN	CAT 140G Grader	Diesel	5,512.10	8.20%	13,156.98
E1080-95	06-OTHER EQUIPMENT	John-Deere Riding Mower	Diesel	28.40	0.04%	67.79
E2056-70	06-OTHER EQUIPMENT	Rosco Packer	Diesel	7.10	0.01%	16.95
E2131-04	06-OTHER EQUIPMENT	Godwin 4" Water Pump	Diesel	26.20	0.04%	62.54
JC-14/15	06-OTHER EQUIPMENT	Mechanic's Shop Jerry Can 14/15	Diesel	36.30	0.05%	86.65
JC-3	06-OTHER EQUIPMENT	C/S Jerry-Can	Diesel	48.40	0.07%	115.53
JC-5	06-OTHER EQUIPMENT	R/S Jerry-Can	Diesel	131.80	0.20%	314.60
JC-7	06-OTHER EQUIPMENT	SWM Jerry-Can	Diesel	15,250.10	22.69%	36,400.87
E2026-84	07-MOBILE TRACT	Ford 2610 Tractor	Diesel	124.70	0.19%	297.65
E2086-97	07-MOBILE TRACT	863 Bobcat	Diesel	716.90	1.07%	1,711.19

Total

Table B5 Gasoline fuel consumption for individual vehicles/equipment

Unit #	Class	Make/Model	Fuel	Jul. 1/05 – Dec. 31/05 Data Quantity (L)	% total	Estimated Annual Consumption Quantity (L)
E1001-93	01-LIGHT VEHICL	Chev Caprice	Gasoline	128.40	0.24%	256.10
E1002-87	01-LIGHT VEHICL	Chev 1/2 Ton Pick-up	Gasoline	634.30	1.17%	1,265.13
E1008-97	01-LIGHT VEHICL	Ford Crown Victoria	Gasoline	307.00	0.56%	612.32
E1017-89	01-LIGHT VEHICL	Ford F-250 Welding Truck	Gasoline	250.70	0.46%	500.03
E1030-93	01-LIGHT VEHICL	Ford F-350 S/C	Gasoline	957.30	1.76%	1,909.37
E1033-87	01-LIGHT VEHICL	Chev 1/2 Ton Pick-up	Gasoline	558.10	1.03%	1,113.15
E1044-90	01-LIGHT VEHICL	Ford F-250	Gasoline	278.20	0.51%	554.88
E1045-90	01-LIGHT VEHICL	Ford E-150 Van	Gasoline	962.90	1.77%	1,920.54
E1048-89	01-LIGHT VEHICL	Ford F-250	Gasoline	344.30	0.63%	686.72
E1050-93	01-LIGHT VEHICL	Ford F-150	Gasoline	1,443.30	2.65%	2,878.71
E1051-90	01-LIGHT VEHICL	Ford F-250	Gasoline	849.50	1.56%	1,694.36
E1052-92	01-LIGHT VEHICL	Chev 1/2 Ton Pick-up	Gasoline	236.80	0.44%	472.31
E1054-87	01-LIGHT VEHICL	GMC 1/2 Ton Pick-up	Gasoline	482.60	0.89%	962.56
E1062-85	01-LIGHT VEHICL	Ford Ranger	Gasoline	641.00	1.18%	1,278.50
E1063-91	01-LIGHT VEHICL	Ford F-250	Gasoline	768.40	1.41%	1,532.60
E1066-88	01-LIGHT VEHICL	Mitsubishi Fork Lift	Gasoline	141.30	0.26%	281.83
E1067-91	01-LIGHT VEHICL	Ford Ranger	Gasoline	139.10	0.26%	277.44
E1068-89	01-LIGHT VEHICL	Ford F-250	Gasoline	303.30	0.56%	604.94
E1070-89	01-LIGHT VEHICL	Ford Ranger	Gasoline	651.40	1.20%	1,299.24

E1073-97	01-LIGHT VEHICL	Ford F-150	Gasoline	1,442.20	2.65%	2,876.52
E1076-90	01-LIGHT VEHICL	Ford F-250	Gasoline	230.10	0.42%	458.94
E1077-94	01-LIGHT VEHICL	Ford E-150 Cargo Van	Gasoline	1,692.70	3.11%	3,376.15
E1078-94	01-LIGHT VEHICL	Ford F-150	Gasoline	1,495.90	2.75%	2,983.63
E1082-96	01-LIGHT VEHICL	Ford F-150	Gasoline	895.90	1.65%	1,786.90
E1083-96	01-LIGHT VEHICL	Ford F-150	Gasoline	466.10	0.86%	929.65
E1087-97	01-LIGHT VEHICL	Ford F-150	Gasoline	946.90	1.74%	1,888.63
E1088-97	01-LIGHT VEHICL	Ford F-150	Gasoline	1,133.50	2.08%	2,260.81
E1089-97	01-LIGHT VEHICL	Ford F-150	Gasoline	1,151.30	2.12%	2,296.31
E1090-97	01-LIGHT VEHICL	Ford F-150	Gasoline	1,374.20	2.53%	2,740.89
E1091-97	01-LIGHT VEHICL	Ford F-150	Gasoline	1,118.50	2.06%	2,230.89
E1092-97	01-LIGHT VEHICL	Ford F-150	Gasoline	1,078.10	1.98%	2,150.31
E1093-90	01-LIGHT VEHICL	Ford E-250 Van	Gasoline	2,177.90	4.00%	4,343.90
E1097-02	01-LIGHT VEHICL	Chev Silverado C-1500	Gasoline	1,338.80	2.46%	2,670.28
E1098-00	01-LIGHT VEHICL	Chev Impala	Gasoline	154.20	0.28%	307.56
E1116-93	01-LIGHT VEHICL	GMC Astro Van	Gasoline	252.10	0.46%	502.82
E1124-04	01-LIGHT VEHICL	Ford F-150	Gasoline	475.80	0.87%	949.00
E1126-04	01-LIGHT VEHICL	Ford F-150	Gasoline	1,782.90	3.28%	3,556.06
E1129-05	01-LIGHT VEHICL	Ford F-250	Gasoline	853.00	1.57%	1,701.34
E1154-05	01-LIGHT VEHICL	Ford F-150	Gasoline	623.20	1.15%	1,242.99
E1156-05	01-LIGHT VEHICL	Ford F-150	Gasoline	720.60	1.32%	1,437.26
E1157-05	01-LIGHT VEHICL	Ford F-150	Gasoline	1,492.40	2.74%	2,976.64
E1049-03	02-BYLAW VEHICL	2003 Dodge Intrepid	Gasoline	3,112.17*	5.72%	6,207.33
E1053-99	02-BYLAW VEHICL	1999 Crown Victoria	Gasoline	3,112.17*	5.72%	6,207.33
E1095-02	02-BYLAW VEHICL	2002 Crown Victoria	Gasoline	3,112.17*	5.72%	6,207.33
E1006-93	03-MED DTY TRUCK	Ford F-350 Tow Truck	Gasoline	756.40	1.39%	1,508.67
E1009-90	03-MED DTY TRUCK	Ford F-350	Gasoline	910.10	1.67%	1,815.23
E1012-66	03-MED DTY TRUCK	International Load Star	Gasoline	32.00	0.06%	63.83
E1015-89	03-MED DTY TRUCK	Ford F-350	Gasoline	160.30	0.29%	319.72
E1016-77	03-MED DTY TRUCK	Chev C-50	Gasoline	182.80	0.34%	364.60
E1074-93	03-MED DTY TRUCK	GMC 3500 Dually	Gasoline	623.20	1.15%	1,242.99
E1084-96	03-MED DTY TRUCK	GMC Sierra 3500	Gasoline	797.60	1.47%	1,590.84
E1094-70	03-MED DTY TRUCK	Chev C-65 Cheyenne (5-Ton Tanker)	Gasoline	231.80	0.43%	462.33
E1102-04	03-MED DTY TRUCK	Ford F-350	Gasoline	2,868.20	5.27%	5,720.73
E1103-04	03-MED DTY TRUCK	Ford E-250	Gasoline	1,140.80	2.10%	2,275.37
E1152-05	03-MED DTY TRUCK	Ford F-350 W/Dump Box	Gasoline	1,371.00	2.52%	2,734.51
E1155-05	03-MED DTY TRUCK	Ford F-350 1-Ton Flat Deck	Gasoline	475.70	0.87%	948.80
E1158-05	03-MED DTY TRUCK	Ford F550 Flat Deck/Picker Truck	Gasoline	627.10	1.15%	1,250.77
E2019-96	04-HVY DTY TRUC	Mobil Sweeper	Gasoline	65.00	0.12%	129.64
E1012-A	06-OTHER EQUIPMENT	Steamer C/W 16 HP	Gasoline	34.40	0.06%	68.61

E1079-02	06-OTHER EQUIPMENT	John-Deere Riding Mower (510)	Gasoline	95.70	0.18%	190.88
E1080-95	06-OTHER EQUIPMENT	John-Deere Riding Mower	Gasoline	1.90	0.00%	3.79
E1105-01	06-OTHER EQUIPMENT	John-Deere Aerator	Gasoline	12.60	0.02%	25.13
E1127-04	06-OTHER EQUIPMENT	Exmark Mower	Gasoline	284.60	0.52%	567.64
E1160-05	06-OTHER EQUIPMENT	Exmark Mower	Gasoline	366.10	0.67%	730.20
JC-1	06-OTHER EQUIPMENT	C/S Jerry-Can	Gasoline	40.20	0.07%	80.18
JC-12/13	06-OTHER EQUIPMENT	C/S Parks JC-12/JC-13	Gasoline	51.40	0.09%	102.52
JC-14/15	06-OTHER EQUIPMENT	Mechanic's Shop Jerry Can 14/15	Gasoline	94.80	0.17%	189.08
JC-14/15	06-OTHER EQUIPMENT	Mechanic's Shop Jerry Can 14/15	Gasoline	62.70	0.12%	125.06
JC-2	06-OTHER EQUIPMENT	C/S Jerry-Can	Gasoline	168.00	0.31%	335.08
JC-6	06-OTHER EQUIPMENT	SWM Jerry-Can	Gasoline	182.90	0.34%	364.80
JC-7	06-OTHER EQUIPMENT	SWM Jerry-Can	Gasoline	10.90	0.02%	21.74
E1003-93	07-MOBILE TRACT	Bobcat Loader (742B)	Gasoline	461.90	0.85%	921.28

*fuel consumption for bylaw vehicles calculated from yearly total of 18,622 L, for 3 bylaw vehicles per year

3. Calculation of fuel savings for fuel-efficient vehicles

To calculate the fuel savings for fuel-efficient vehicles for replacement of the City's bylaw vehicles, the following calculation procedure was used:

Use fuel mileage from existing bylaw vehicles: MPG_{old} , and annual fuel consumption per bylaw vehicle. First find the miles driven (per year) per vehicle.

$$\text{Miles driven} = MPG_{old} * \text{annual fuel consumption}$$

Use fuel mileage from fuel-efficient vehicle MPG_{new} . Find the fuel consumption for driving the same distance, for a fuel-efficient vehicle.

$$\text{Fuel-efficient vehicle fuel consumption} = \text{Miles driven} / MPG_{new}$$

Compare the difference in fuel consumption between existing bylaw vehicles and the proposed fuel-efficient vehicles. Table B5 shows the details for each calculation. The MSRP cost per unit was then multiplied by the current exchange rate, to show the estimated cost of each option in the report.

Table B6 Comparison of current bylaw vehicle fuel efficiency with hybrids and *Smart Cars*

			2003 Dodge Intrepid	1999 Crown Victoria	2002 Crown Victoria
		Fuel	Gasoline	Gasoline	Gasoline
	Yearly	Quantity (L)	6207	6207	6207
	Type		Bylaw vehicle	Bylaw vehicle	Bylaw vehicle
Current Vehicle	MPG	city	27	17	17
Replace with 2006 Honda Accord Hybrid	Cost	USD	\$20,990	\$20,990	\$25,285
	MPG	city	25	25	25
	Cost	USD	\$30,990	\$30,990	\$30,990
	miles driven/yr		44,105	27,770	27,770
	hybrid fuel cons	L	6,704	4,221	4,221
	fuel savings	L	- 497	1,986	1,986
		MJ	- 18,622	74,488	74,488
	GHG abatement	kg CO2e	- 1,319	5,276	5,276
Replace with 2006 Honda Civic Hybrid	MPG	city	49	49	49
	Cost	USD	\$22,150	\$22,150	\$22,150
	miles driven/yr		44,105	27,770	27,770
	hybrid fuel cons	L	3,420	2,154	2,154
	fuel savings	L	2,787	4,054	4,054
		MJ	104,512	152,017	152,017
	GHG abatement	kg CO2e	7,403	10,768	10,768
	Replace with 2006 Honda Insight	MPG	city	57	57
Cost		USD	\$19,330	\$19,330	\$19,330
miles driven/yr			44,105	27,770	27,770
hybrid fuel cons		L	2,940	1,851	1,851
fuel savings		L	3,267	4,356	4,356
		MJ	122,513	163,351	163,351
GHG abatement		kg CO2e	8,678	11,571	11,571
Replace with 2006 Toyota Prius		MPG	city	60	60
	Cost	USD	\$21,725	\$21,725	\$21,725
	miles driven/yr		44,105	27,770	27,770
	hybrid fuel cons	L	2,793	1,759	1,759
	fuel savings	L	3,414	4,449	4,449
		MJ	128,027	166,823	166,823
	GHG abatement	kg CO2e	9,069	11,817	11,817
	Replace with <i>Smart Car</i>	MPG	city	67.8	67.8
Cost		USD	\$22,000	\$22,000	\$22,000
miles			44,105	27,770	27,770

	driven/yr				
	<i>Smart Car</i>				
	fuel cons	L	2,472	1,556	1,556
	fuel savings	L	3,735	4,651	4,651
		MJ	140,077	174,410	174,410
	GHG abatement	kg CO2e	9,922	12,354	12,354
<p>Replace with 2005 Honda Civic GX 1 GLE = 0.678 kg CNG Natural gas price: \$0.66/GLE</p>	MPG	city	30	30	30
		hwy	34	34	34
		combined	32	32	32
	Cost	USD	21760	21760	21760
	miles driven/yr		44104.74	27769.6521	27769.65
	CNG fuel cons	GLE	5237.438	3297.64619	3297.646
	fuel savings	GLE	970	2910	2910
		kg of CNG	658	1973	1973
		MJ	32222	96666	96666
	GHG abatement	kg CO2e	1753	5259	5259
	savings	\$	769.5154	2308.54631	2308.546

Appendix C

Fuel Sense program driving tips

From:

<http://www.edmonton.ca/portal/server.pt/gateway/PTARGS_0_2_279_218_0_43/http%3B/CMS/Server/COEWeb/city+government/departments+and+branches/corporate+services/mobile+equipment+services/fuel_sense_training.htm>

Fuel Saving Tips

Reduce unnecessary braking

Reduce speeding. Fuel efficiency decreases by about 10% for every 10 km/h over 90 km/h.

Use cruise control on flat stretches of highway while keeping your speed below 100 km/h

Avoid excessive idling. Idling wastes gas. Don't start your car until you are ready to go and keep winter engine warm-ups brief (1-3 minutes). If you must wait longer, turn the engine off.

Don't rev the engine. Revving the engine wastes gas. It may also dump gas on the cylinder walls, which can increase engine wear and overheat the vehicle's catalytic converter.

Drive smoothly. Accelerate slowly, avoiding "jackrabbit" starts and accelerate gently if you have an automatic transmission. If your vehicle is equipped with overdrive, use it at the appropriate speeds.

Avoid sudden starts and stops, which increase wear on your tires.

Consolidate trips. Vehicles burn more gas and emit far more pollutants in their first few minutes of operation because the emission control systems have not warmed up and reached peak efficiency.

Minimize drag. Driving with the windows open, using roof or rear mounted racks and carrying heavy loads increase vehicle drag. Remove heavy items from the vehicle when you don't need to carry them (i.e. sandbags in trunk over the summer)

A clean car body can reduce drag by up to 12 per cent thereby improving fuel economy.

Keep a regular maintenance schedule for your vehicle (oil and filter change, tune up, exhaust system, brakes, spark plugs, belts, hoses) to maximize fuel efficiency and minimize operating costs

Balanced, rotated and well aligned tires perform better on the road and increase fuel efficiency

Keep tires properly inflated (underinflated tires can increase fuel consumption by up to 8%).

Use a lighter weight multigrade oil in the fall. A heavy oil decreases engine efficiency, which can increase operating costs and emissions.

Don't overfill your gas tank (gasoline vapors will escape when your tank is too full and contribute to smog).

Select the proper fuel for your vehicle as outlined in the owner's manual. Do not use a higher-octane gasoline than your vehicle engine needs. Higher-octane fuels are more harmful to the environment because they require more crude oil to produce than lower octane fuels.

Carpool where possible

Walk, cycle or take the bus

Appendix D

Product Brochures and Information

1. **Webasto BlueHeat System**



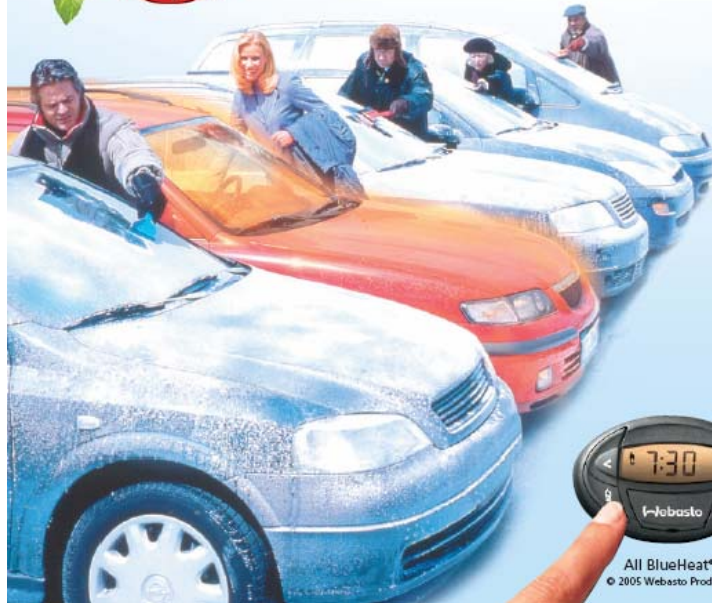
2005 - 2006 Ford F-250/350 SD
6.0 Liter Engine (Diesel)



BlueHeat® is also available for 1999-2004 Ford F-250/350 SD



BlueHeat® is a compact device that installs under the hood, heats the vehicle's engine and interior, and defrosts the windshield without running the vehicle's engine. Because BlueHeat® eliminates the need to idle for heat, you benefit from fuel savings, less engine wear, and reduced harmful exhaust emissions.



BlueHeat® Thermo Top Information



Heater Part #
5000515B

Installation Kit Part #
5000962B

Dimensions: 9.1" x 4.1" x 6.4"

BlueHeat® Options

- 1) BlueHeat® Thermo Top with digital timer \$ _____
- 2) BlueHeat® Thermo Top with digital timer and remote \$ _____



The digital timer allows you to program start times for your BlueHeat® 24 hours in advance.



The optional remote adds convenience.

All BlueHeat® heaters come with a 3-year limited warranty
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Webasto BlueHeat Dealers

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2. Pony Pack unit

Generator specifications

Type	Vertical, 4-cycle liquid-cooled diesel
Number of Cylinders	2
Bore x Stroke [in. (mm)]	2.64 x 2.68 (67 x 68)
Total Displacement [cu. in. (cc)]	29.23 (479)
Combustion System	Spherical (E-TVCS)
SAE Gross Intermit. Brake HP (HP/rpm)	13.9/3600
SAE Net Intermit. Brake HP (HP/rpm)	12.5/3600
SAE Net Cont. Brake HP (HP/rpm)	10.8/3600
No Load High Idling Speed (rpm)	3800
No Load Low Idling Speed (rpm)	800
Governing	Centrifugal flyweight mechanical type governor
Direction of Rotation	Counterclockwise from flywheel side
Starter (V x kW)	12 x 0.8
Dynamo (V x W)	12 x 150
Fuel	Diesel fuel No. 2-D (ASTM D975)

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