



Update

FUELS EDITION



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Message from the Director

By John Marshall, BA, CIGC, Director of Fuels Safety Program

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Another heating season is upon us, and industry partners are encouraged to remind customers of the importance of regular maintenance.

Having a furnace, fireplace and any other fuel-burning appliance professionally inspected is the only way to ensure safe operation of a fuel-burning system – under strict adherence to applicable safety codes, manufacturers' instructions, and provincial regulations. It is the smart thing to do and it is a shared responsibility between contractors, fuels suppliers and safety-minded home owners.

To such an end, and in view of observed safety concerns, TSSA issued a Director's Order last fall that legally requires all heating contractors to perform a carbon monoxide safety check when entering a home with a natural draft boiler – whether requested by a homeowner or not. The technician is obligated to take action when an unsafe condition is identified. This check, however, is only required once during the heating season.

The gas technician must also visually examine the boiler and, if there are signs of poor operation, additional steps may be required including a home depressurization test or non-compliances corrected by adding combustion air, make-up air, installing a water bypass, etc. TSSA is additionally requiring that carbon monoxide alarm(s) be located in the vicinity or within the sleeping quarters of the home. The technician must ensure alarms are present or issue a directive that they be installed.

Additionally, in this edition of *Update*, you will find articles providing clarification on appliance connectors, digester plants, vehicle conversion to propane and direct vent gas fireplaces, and an update on safety clearances to combustibles, day tank venting considerations, a cautionary look at nesting concerns, and variance for underground single-walled tanks.

“TSSA is requiring that carbon monoxide alarm(s) be located in the vicinity of or within the sleeping quarters of the home.”

TSSA also recently implemented two important amendments – one to CSA B149.2-05 (*Propane Storage and Handling Code*) with regard to emergency shutdown systems for liquid withdraw lines to a direct-fired vaporizer, and another to Ontario Regulation 440/08 (*Propane Storage and Handling*) regarding the interpretation of risk acceptance criteria. Further clarification is provided to the adopted Major Industrial Accidents Council of Canada (MIACC) guidelines with respect to classification of retail centres,

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IT'S ONLY NATURAL...

By **Stu Seaton**, Fuels Safety Investigation and Enforcement

Between now and this winter's freeze-up, every creature, big and small, will be looking for a place to hang its hat for the cold months to come, leaving remnants of an abandoned nest somewhere. This is a cycle of nature that's normal and to be expected... until the local critter populace decides to forego natural surroundings and make your home, *their* home.

Over the years, I've had the requirement to attend scenes that involve humans, animals and heating systems. The scenes range from some 'odd smells' and strange happenings to multiple fatalities. Small wild animals and your home is not a marriage that will stand the test of time and, unfortunately, it happens far too often.

In order to understand why animals view your home as their home, you need to look at a residential structure through the eyes of a squirrel, understand the nocturnal wanderings of a raccoon or nesting birds looking for some high-end realty to raise a brood.

A natural draft chimney is high and isolated from the ground. For nesting birds in the spring, a chimney is often a perfect spot to call home, as it's hard for the family cat to pay a visit or for other predators to bother it. Once the nesting season is complete, birds just take off without giving a hoot or a peep about what they leave behind. As the summer season progresses, the remaining nesting material becomes wet, compacts and sinks further down the chimney. I can attest to the tenacity and work ethic of some bird breeds, particularly a murmuration of European Starlings. I watched in awe as a four-metre tall starling's nest was removed from an

A-vent stainless steel chimney. There were another two-metres of nesting material in the base of the chimney before the ingenious birds were able to get a nest to stay put within the slippery surface of polished stainless steel. Fortunately, the venting was connected to a non-operating, oil-fired boiler and the technician knew there was a problem the moment he removed the vent for annual cleaning.

In urban areas, it's also common to see squirrels and raccoons nest in a chimney. A dray or scurry of squirrels is most common, as raccoons will often prefer lower elevations; however, I have dealt with them before, so don't consider chimneys off limits to any curious raccoon. Until there's a prolonged, solid freeze-up, animals will be at work and it can be taken for granted that a chimney (somewhere) is currently being renovated into a warm home for squirrels or some other kind of animal.

As a technician or homeowner, it's wise to watch for telltale signs of animal travel and discarded nesting material. On one near-miss carbon monoxide scene, you could easily see the path that squirrels used to haul nesting material (sticks) into a chimney. The path was somewhat arduous but very doable for some dedicated squirrels. The path was up a tree, across a limb, a short one-metre jump onto the roof and up a concrete block chimney to the chimney cap. At that point, the construction process became very clever. The squirrels managed to work two screws loose on the chimney cap, in turn making it like a hatch door, allowing them to open and close the cap on the remaining screw. From there, they hauled their nesting material down the corrugated chimney liner. Even though it was a large chimney, it didn't discourage the squirrel construction team. The nest completely plugged the chimney.

Technicians should always be vigilant with any opening that insects or animals can use as home. Always make sure that a chimney has no obstructions and confirm it with documented draft readings. Ask questions of the homeowner if you suspect animal damage or a possible nesting problem. Often people will hear the sounds of squirrels or birds, but never associate that sound with something being constructed in their chimney. Suburban homes, which are older and have well established mature trees, are often the most damaged by animals. Trees with overhanging branches to a structure are a natural pathway and if it can be used, it *will* be used.

We often take nature for granted and feel that our homes are impervious to serious issues like chimney blockage from small animals. As technicians, a look up and around a chimney top can speak volumes. A gentle warning of animal activity to a homeowner and immediate action on chimney damage can literally be a lifesaver.



APPLIANCE CONNECTORS

By Zenon Fraczkowski, P.Eng., Senior Engineer, Fuels Safety Program

Section 6.21 of the B149.1-05 contemplates the use of gas connectors for certain appliances and specifies certification requirements for these connectors. The basic premise is that connectors certified to the CSA 6.10 standard are used for appliances that do not move. Connectors certified using the CSA 6.16 standard are suitable for appliances that are moved such as ranges on casters. Hoses on the other hand are typically used on portable appliances. It is important to keep these different certification standards in mind when selecting the type of connector as CSA 6.10 connectors are not designed and are not tested for repeated movement. It will simply break and leak if it is bent too many times. This is what happens when they are used to connect radiant tube heaters, which may move as they heat up by as much as a foot, with respect to the fixed gas supply piping.

Some manufacturers of heaters prescribe very specific connector configurations in their installation instructions. Please make sure you follow these instructions to a tee.

When the 2010 version of CSA B149.1 is adopted in Ontario¹, most likely in 2011, only type 1 hoses 90 ± 15 cm (36 ± 6 inches) long certified to CSA CAN/CGA 8.1 standard will be allowed for connection of tube-type infra red heaters. Until then please check connectors for leakage every time you inspect or service a tube-type infra red heater.

¹ **Clause 7.22.3 of CSA B149.1-2010**

An **infrared heater** of the **vented** type shall be installed in accordance with the **certified** markings and the manufacturer's **certified** installation instructions. It shall be protected against physical damage. A tube-type **infrared heater** shall only be connected with a Type I **gas hose** that is (a) **certified** as being in compliance with CSA CAN/CGA-8.1; and (b) of a length of 36 ± 6 in (90 ± 15 cm).



TSSA CUSTOMER CONTACT CENTRE

By Luisa Armstrong, Director of Customer Services



During the fiscal year 2009/2010, TSSA's Customer Contact Centre tracked over 140,000 contacts initiated by telephone, email and in-person. Approximately 70 per cent of all enquiries were related to accounts receivables, and licensing, registration and certification services. This unparalleled increase in contacts over the second and third quarter of the fiscal year resulted in a significant increase in wait times for this period. In order to improve TSSA's ability to respond to customer queries in a more timely and efficient manner, a decision was made to outsource the function of the Customer Contact Centre in December 2009. Outsourcing was completed on February 16, 2010.

Implemented in the last quarter, these changes restored TSSA's Customer Contact Centre service levels. The outsourced call centre now successfully answers 85 per cent of calls within a 30 second period with an average answering speed of 15 seconds and a 5 per cent abandon rate.

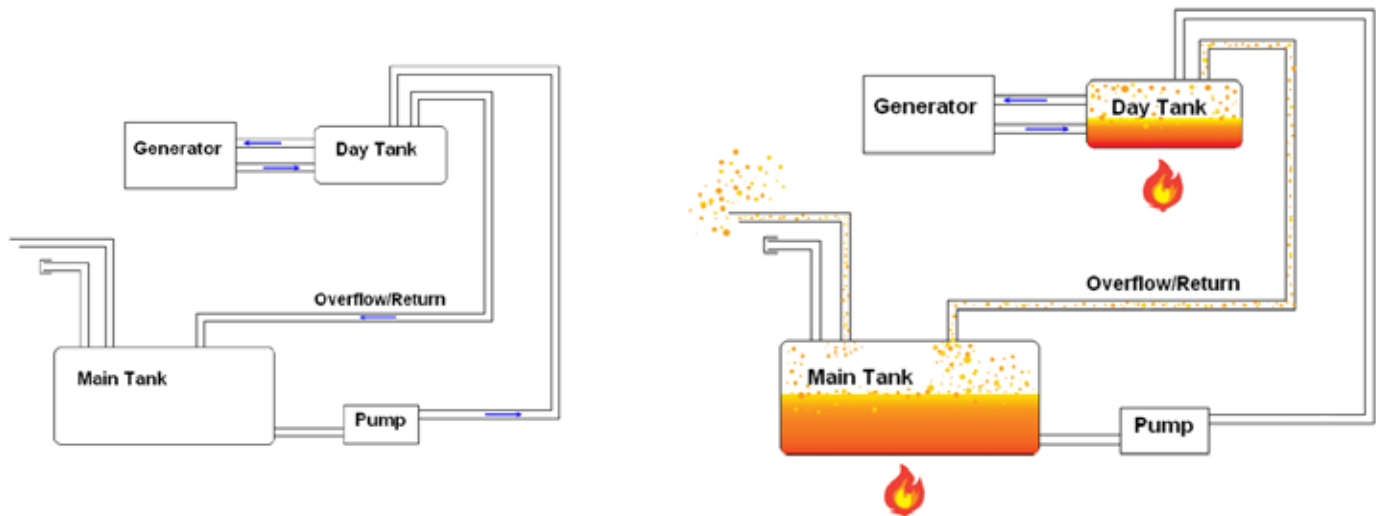
While such quantitative measures are positive indications, TSSA will also undertake a qualitative analysis of its outsourced call centre in the current fiscal year.

DAY TANK VENTING CONSIDERATIONS

By Richard Huggins, P.Eng., Engineer, Fuels Safety Program

Fuel oil tanks must be vented to prevent them from being overpressurized. Day tanks can be vented to the outside or vented back to their main tank. Both methods require special consideration, and this article will address venting to the main tank via the overflow/return line.

This schematic shows a typical arrangement:



There are three functions performed by the overflow line:

- Firstly, the venting must be able to pass any oil vapour generated during a fire. It must do this without overpressurizing the day tank.
- Secondly, the overflow/return must be adequate for passing the liquid oil during an overflow. If the piping is too restrictive, then the pump might overpressurize the day tank.
- Finally, the overflow/return must not create too large a vacuum after an overflow. That is, the falling oil must not collapse the day tank.

The oil code specifies some minimum sizes for the overflow lines. These are based on the "equivalent length" of the line. Equivalent length takes into account any fittings in the line; however, once a line is over 30.5 m (100 ft) then the code requires that the design of the vent be performed by a professional engineer.

The two cases that seem to cause the most concern are during a fire, and after an overflow has occurred.

In a fire, vapour from the day tank must flow through the overflow/return line to the main tank. In a worst case scenario, it will join vapour from the main tank and proceed out through the main tank's vent.

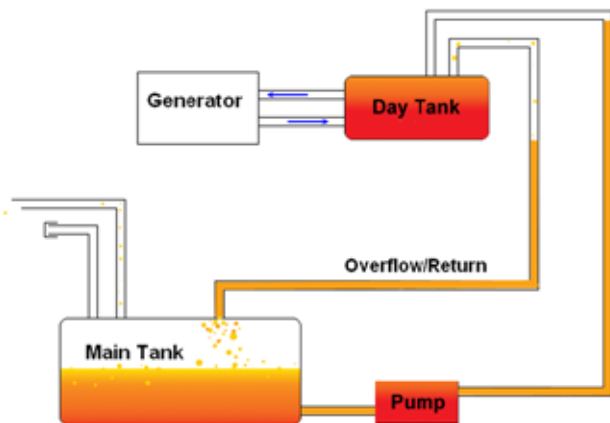
The day tank must not be subjected to an excessive vacuum. When an overflow occurs and the pump is stopped, the oil in the overflow/return line will fall into the main tank. As gravity draws the oil down, a vacuum is created behind the falling oil. This vacuum can exceed the limits of the day tank, crushing it.

Calculations must be made, or non-destructive testing must be done, to show that:

- the overflow/return line is not too restrictive and that the day tank will not be under pressured, **or**
- the capacity of installed vacuum breaker(s) is/are sufficient and the day tank will not be under pressured.

Manufacturer's recommendations for vacuum breakers can be accepted in lieu of calculations or testing.

The following sketch details this scenario:



The designer must find the rate at which fumes are generated from their tank during a fire. With this flow rate in hand, and with the equivalent length of the pipe, it is possible to then calculate the pressure needed to push through these fumes. The pressure must not exceed what the tank can safely withstand.

After an overflow has occurred, the tanks are in danger. As oil falls down the overflow line, back to the main tank, a vacuum is created. This must not exceed the scope of tank certification, i.e. it must not exceed 300 Pa vacuum. A simple test of overflowing the tank, then measuring the resulting vacuum draw on the tank, is often the easiest way to confirm that your tanks are safe. Please ensure that only a certified tradesperson performs this test, and that safety measures are put in place to protect the tank.

CLEARANCES TO COMBUSTIBLES

By Zenon Fraczkowski, P.Eng., Senior Engineer, Fuels Safety Program

The typical regulatory approach in this area is to refer to the certified installation instructions for installation details, such as the type of vent, its size and length, type of fuel and its characteristics, pressure and quantity, etc. Among these installation details are clearances to combustible materials. Where certified installation instructions do not prescribe these minimum clearances, one needs to refer to Section 7.32 of CSA B149-05, which requires a minimum 76.2 cm (30 inches) above, 15.24 cm (6 inches) from sides and back, and 121.92 cm (48 inches) in front of a gas or propane fuelled residential range.

What TSSA is finding now are very elaborate custom-designed vent hoods over gas ranges that are closer than the required 76.2 cm above the ranges. This could be due to a common misunderstanding between multiple service providers who are directly or indirectly involved surrounding the installation of a custom-designed vent hood. This could include the designer or builder of the kitchen cabinets who did not know that the range was going to be gas-fired to the person who installed the gas range relying on the designer/engineer/architect to ensure everything is up-to-code, or even the building inspector whose focus is on the structural integrity of the building envelope, not the appliances.

The reasons for maintaining clearances are very compelling while the responsibility is shared by everyone – among them, the gas technician's responsibility and ultimate accountability to install appliances in accordance with the code requirements and certified installation instructions. This is where you come in and, if not for the regulatory requirements then for peace-of-mind and your family's security, you may want to ask yourself whether allowing such non-code compliant installations are worth the reduced installation time or aggravation you may cause to the general contractor, kitchen builder or home owner – not to mention safety. Safety regulations are there for a reason. These are not theoretical. They are practical applications and literal prescriptive requirements of the law – and they exist, first and foremost, for your safety and all concerned.



RE-USE OF UNDERGROUND SINGLE-WALL FUEL STORAGE TANKS

When Fuels Safety inspectors find retail facilities that have been operating without a license, they order them to obtain one. Facilities applying for a license shall meet the current code requirements unless they have equipment that is approved by virtue of having been installed in accordance with a previous code (i.e. 'grandfathered' approvals). Grandfathered approval status is lost when a license has lapsed (ie. not maintained for longer than one year).

Typically, the facilities found operating without a license are installations with single-wall tanks and piping. The current *Liquid Fuels Handling Code* requires that all underground tank systems be double-walled. In order to allow the reuse of the single-wall tank system, the owner of the equipment shall apply for a variance from Section 2.1.1.1 of the *Liquid Fuels Handling Code*.

TSSA has made some changes to the type of equipment that will be considered for re-use. A variance will not be considered for re-use in the following situations:

- single-wall tanks that have been out of use for more than two years;
- single-wall fibreglass tanks manufactured prior to 1986 since there is evidence that ethanol is absorbed into the walls of the tanks potentially causing a 30 to 50% reduction in structural strength (please refer to Advisory FS-077-06, *The Compatibility of Ethanol with Fibre-Reinforced Plastic Tanks*); or
- any tank system that has been upgraded, in accordance with sections 7(52)(b), (c) or (d) of Regulation 532 of Revised Regulations of Ontario 1990, with fibreglass lining or impressed current cathodic protection; fibreglass lining has proven to be ineffective in containing product and there is no way to ascertain that an impressed current system has been in continuous operation.

TSSA will not accept applications for any type of single-wall tank and variances will not be granted after September 1, 2013. To consider the application for reuse of single-wall tanks and piping, the site shall be inspected by a TSSA Fuels inspector before submitting an application. Then, the following documents shall be provided with the completed variance application form:

1. An environmental assessment report as per the TSSA guidelines titled *Environmental Assessment Requirements to Abandon an Underground Fuel Storage Tank in Place or Re-Use an Abandoned Tank*.
2. A precision leak test report, completed within the last three months, for the tank and piping system. The testing should be completed by a company that is listed in Advisory FS-100-07, *Fuels Safety Recognition of Precision Leak Testing Companies*.
3. For all underground steel tanks located at a facility, records required to confirm that the mandated cathodic protection has been effective for the life of the tank; that is, a copy of all required, bi-annual cathodic protection surveys.

Please note:

- It may be more prudent for equipment owners to replace single-wall, underground steel tanks as variances will not be accepted under any circumstances if the applicant cannot provide all of the documentation required – specifically, the complete history of cathodic protection for steel tanks.
- If a variance is granted, typical requirements may include replacement of galvanized product pipe with approved double-wall pipe, the installation of electronic line leak detection for single-wall fibreglass pipe and/or the installation of an electronic, in-tank leak detection system.
- A license will not be granted until the site has passed an inspection and there are no outstanding orders.
- Variance requests are subject to posting on the Environmental Bill of Rights registry.

For further information, please contact TSSA's Fuels Safety Program toll-free at 1-877-682-8772 or via email at customerservices@tssa.org.



USE OF EXISTING CHIMNEYS WITH DIRECT VENT GAS FIREPLACES

By **Marvin Evans**, Certified Engineering Technologist, Fuels Safety Program



If you are a licensed gas fitter or contractor, you have been trained to follow the manufacturer's certified instructions and the *Natural Gas and Propane Installation Code*.

It has been brought to the attention of TSSA that some direct vented gas fireplaces are using existing masonry and factory built chimneys as their outdoor air conduit for combustion air. A flue pipe is often routed from the fireplace, through the existing chimney and is connected to a vent terminal. A kit connects the bottom of the chimney to the air intake of the fireplace. Combustion air is drawn through the existing chimney and the kit to the fireplace.

The certification standards for direct vented gas fireplaces require that the vent/air intake pipes are to be supplied as part of the direct vent system and a leakage test be performed on the fireplace which includes the vent/air intake pipes.

The use of existing chimneys does not satisfy either of these requirements. Furthermore, there is no way to ensure existing chimneys meet the leakage requirements, which is a fundamental principle on how a balanced flue system works. This option was presented and discussed at the joint CSA/ANSI certification standards committee for fireplaces in the mid-to-late 1990s and was ultimately rejected.

Though instructions for the use of these kits have been found in certified instructions, TSSA will be treating any such installation as unapproved since it is not in compliance with the certification standard. Any installation discovered in the province of Ontario shall be treated as an unacceptable condition, which is an immediate hazard and the fuel supply terminated as per Section 13 of Ontario Regulation 212/01 (Gaseous Fuels).

If you require further clarification or have questions, please contact TSSA toll-free at 1-877-682-8772.

DIGESTER PLANTS AND LANDFILL SITES FACILITIES – MAINTENANCE VS. SERVICE

By **Marvin Evans**, Certified Engineering Technologist, Fuels Safety Program

As stated in the last TSSA Fuels Update (Spring 2010), TSSA assumed jurisdiction for digester plants, landfill sites and bio gas production sites in November 2007. TSSA's involvement is limited to the portion of the plant or site that involves the production, transmission and handling of gas. The primary code being used is the CAN/CGA-B105-M93 – *Code for Digester Gas and Landfill Gas Installations*.

Sections 12 and 21 of the CAN/CGA-B105-M93 code have requirements for operation, and maintenance questions have been asked as to who can perform these duties.

Section 3(1) of Ontario Regulation 215/01 (Fuel Industry Certificates) states: no person shall perform the functions of a certificate holder without first having obtained a certificate from the director.

The certificates which would be commonly required for digester plants and landfill sites include:

- G1 – Gas Technician Certificate;
- G2 – Gas Technician Certificate; and
- IMT – Industrial Maintenance Technician.

The scope of these certificates is defined in Ontario Regulation 215/01, which can be found on TSSA's website through the link noted below.

<http://www.tssa.org/regulated/fuels/training/fuelsTraining01.asp>

If you require further clarification or have questions, please contact TSSA toll-free at 1-877-682-8772 or via email at customerservices@tssa.org.



CERTIFIED COMPONENTS FOR CONVERSION OF VEHICLES TO PROPANE FUELLED

Oscar Alonso, P.Eng., Engineering Specialist, Fuels Safety Program

Several regulations under the *Technical Standards and Safety Act, 2000* require the use of “approved” appliances, equipment, components or accessories. This means that these items are certified by a designated testing organization and bear that organization’s label or symbol.

The designated testing organizations that are authorized to place these labels or symbols are laboratories specifically registered by the Standards Council of Canada. The purpose of this requirement is to protect the general public from appliances, equipment, components or accessories that are not up to standards and, consequently, are potentially unsafe.

The cost of certification for appliances, equipment, components or accessories can be significant; however, when there are a large number of units sold, the prorated cost is incidental. When only a small number of units are sold, the additional cost per unit may be very high. This happens in certain areas of fuels, in particular, with the conversion of gasoline to propane fuelled vehicles as the number of vehicles being presently converted is only a few hundred per year. This situation makes it exceptionally difficult for a parts manufacturer to be able to amortize the cost of certification.

For this reason, TSSA, with the support of CSA, approached the Interprovincial Gas Advisory Council to allow the use of components approved in Europe under the ECE R67, *Prescription for Wheeled Vehicles*, for the conversion of vehicles to propane in Canada.

Under the title of “IGAC Protocol No. 09-17” and under the conditions stated in this document, parts approved under ECE R67 can be used in Ontario. This benefits the local market since the cost of components are lower (components are manufactured in large number for the big European and international markets), and also because the components are used in a larger number of vehicles, which provides exposure to diverse conditions and accumulated experience, thus increasing the safety factor and providing the market with advance design and technology.



MESSAGE FROM THE DIRECTOR

(continued from the front cover)

restaurants, entertainment centres, and sporting complexes by adopting the Planning Advice for Development of Hazardous Installation (PADHI) guidelines from the United Kingdom. The PADHI guidelines are based on: the location or zone of the proposed development; the sensitivity level of the development; and the use of a decision-matrix based on zone and sensitivity levels – such as vulnerable members of the public (children, those with mobility difficulties or those unable to recognize physical danger). See TSSA’s website – under Director’s Order and Bulletins/Propane Storage and Handling – for further information on each.

In closing, as the director of TSSA’s Fuels Safety Program, I encourage industry and impacted stakeholders to bring forward issues that need resolution. We continue to have industry forums such as the one looking at how best to implement the regulatory requirements in propane. Only with your support, can we best ensure the continued safe use and handling of fuels in Ontario.



Update

FUELS EDITION

We welcome your comments and story ideas for future editions of this newsletter. Please contact:

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