

ENEFEN



How to have a successful Field Inspection / Approval

Presented by: Jozef Jachniak, P.Eng.

Where to start?

- Define the scope of your project (one-off, limited run, mass production)
- Identify which disciplines will be involved (gas, electrical, pressure, plumbing, building, fire, food, health, worker's safety, etc)
- Define where your installation(s) will be located
- Identify who has jurisdiction over that location (AHJ)
- Find out what is the outcome that you need (Initial Assessment, Certification, Field Approval, Installation Permit, or something else (??))
- Find organization(s) which is designated, knowledgeable and experienced to deal with these disciplines, jurisdictions, and the outcome.

What is AHJ?

- Authority Having Jurisdiction (AHJ) – the governmental body responsible for the enforcement of any part of a Code, or the official or agency designated by that body to exercise such a function.
- The AHJ operate mostly on a provincial level, but there is often more than one AHJ in each province.
- There are some AHJ's, which have jurisdiction across many provinces (NEB, Transport Canada)
- There are different AHJ's for different disciplines (gas, electrical, pressure, building, plumbing, health, food, etc.)
- Alberta is unique as some AHJ powers are delegated to municipalities.

What is “Certified”?

- Certified (with respect to any appliance, accessory, component, equipment, or manufacturer’s installation instructions) – investigated and identified by a designated testing organization as conforming to recognized standards, requirements, or accepted test reports.
- Certification process includes:
STANDARD(S) -> TESTING LAB -> SAMPLES OF PRODUCT -> ONGOING PRODUCTION SURVEILLANCE
- Certification cannot be done to a Code because Code does not include test requirements. CSA B149 and C22.1 are Codes.
- Certification is meant to be used for “repetitive production” of identical products.

What is “Field Approved”?

- Field Approved (with respect to any appliance, accessory, component, equipment, or manufacturer’s installation instructions) – investigated and identified by a designated inspection organization as conforming to recognized codes, requirements, or accepted test reports.
- Field Approval process includes:
CODES -> FIELD INSPECTION-> EACH PRODUCT-> ONCE IN A LIFETIME
- Field Approval is based on designated judgment of conformance of one-off non-certified products, one product at a time.

Certification vs. Field Approval

- Both require accreditation (CB to ISO 17065, IB to ISO 17020)
- Both require recognition by applicable Authority Having Jurisdiction (AHJ)
- Both are valid until the product is altered
- Once altered, such product must be Field Approved if it is not identical to its certified sample

What is “B149.3”?

- CSA B149.3 is a “Code for field approval of fuel-related components on appliances and equipment”
- B149.3 is a guideline for designated “inspection organizations”
- B149.3 is a minimum requirement which must be met. It does not prohibit better than minimum solutions
- B149.3 is not a design handbook, and it does not and never will cover all applications
- B149.3 and other Codes are not enforceable without provincial regulations behind them

SAFETY vs. COMPLIANCE vs. LEGALITY

- Safety is paramount to compliance
- Assembly of compliant components does not make the assembly automatically compliant or legal
- A compliant system, which is unsafe is not acceptable
- A compliant system, which does not work is not acceptable
- A compliant system, which is illegal is not acceptable

4 ASPECTS OF SAFETY

- Safety of people (operators and public)
- Safety of equipment (appliance and adjacent installation and building)
- Safety of process
- Safety of environment

What are “Appliance”, “Accessory”, “Equipment”, and “Component”

- **Appliance** - A device to convert gas into energy, the term includes any component, control, wiring, piping or tubing required to be part of the device
- **Accessory** – a part capable of performing an independent function and contributing to the function of an appliance that it serves
- **Equipment** – a device other than appliance, accessory or component that is connected to a piping or tubing system
- **Component** – an essential part of an appliance or equipment

What does Alberta Safety Codes Act require?

- Act applies to fire protection, and applies to the design, manufacture, construction, installation, operation and maintenance of buildings, electrical systems, elevating devices, gas systems, plumbing and private sewage disposal systems, pressure equipment.
- Responsibility for compliance rests on owner, designer, manufacturer, contractor, vendor, professional engineer.
- Regulations identify codes which are in force in each discipline (CSA B149.1, B149.2, B149.5, C22.1, etc)
- No person shall manufacture, install, sell or offer for sale any equipment related to gas systems for use in Alberta unless the equipment has been tested and certified, or inspected and accepted by a body accredited by the Standards Council of Canada

What do individual codes reference?

- CSA B149.1 references 59 codes and standards including B51, B149.2, B149.3, C22.1, Z662, also ANSI, ASME, ASTM, NRC, ULc standards
- CSA B149.2 - 29 references
- CSA B149.3 - 27 references
- CSA B149.5 - 28 references
- API, NFPA, FM, EN standards are also referenced.
- **Multiple codes, standards and regulations are interconnected with each other.**

What must be included in a Field Approval?

- Any component, control, wiring, piping or tubing required to be part of the appliance
- Accessories and connected equipment
- Performance and safety of the entire assembly
- References to other codes and standards
- Considerations for other provincial/federal regulations

Field Approval Puzzle



SCC Accredited Gas IB program

- CAN-P-1608 Appendix C – Commercial and Industrial Gas-fired Appliances and Equipment
- IB evaluates appliances and equipment for safety and suitability
- B149.1, B149.2, B149.3, C22.1, BNQ 1784-000, B51
- Variances and provincial deviations as may be issued from time to time by the Provincial or Territorial Regulatory Authority
- Relevant requirements of the National Building Code of Canada and the National Fire Code of Canada

SCC Accredited Gas IB program

- Multi-disciplinary third party inspection program
- Requires that its inspectors are registered P.Eng.(s) who are competent in the design, operation and safety inspection of gas-fired appliances and equipment
- Inspections are conducted in a consistent and systematic manner
- Inspectors can appropriately apply codes, variances and standards

Code Interpretations and Variances

- As a Type C IB and a registered engineering consulting company ENEFEN is accredited by SCC to include elements of professional judgments and engineering design in Field Approvals
- This allows for broader range of Code Interpretations as well as Variances based on the intent of the Codes
- The Variance process uses a Valid Technical Reason (VTR) method where the client provides:
 - a) technical reason for not following the Code exactly
 - b) an equal or better solution which will meet the same intent.

Who is SCC?

Standards Council of Canada	Safety Codes Council of Alberta
Federal Crown Corporation	Statutory provincial corporation
Reports to Parliament through the Minister of Industry	Responsible to Minister of Alberta Municipal Affairs
Promotes efficient and effective standardization in Canada	Works under Authority of Safety Codes Act (1991)
Accredits Standards Development Organizations (SDO), Certification Bodies (CB), Inspection Bodies (IB), GHG Verifiers and Validators	Accredits municipalities, corporations, and agencies Trains and certifies Safety Codes Officers

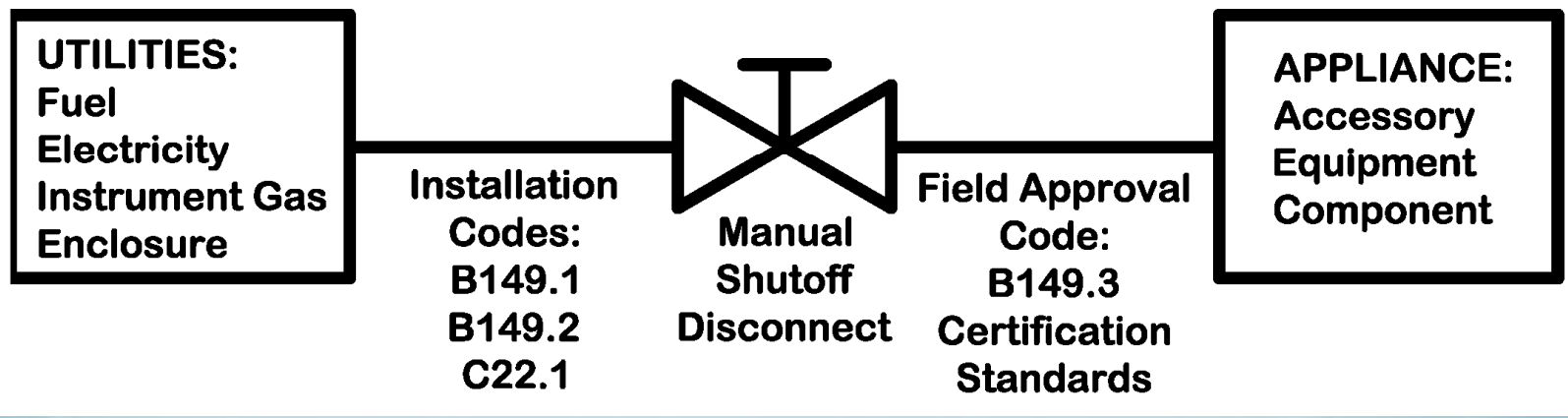
Province vs. Federal Role

PROVINCE

- Safety Codes Council of Alberta
- Accredited Municipalities
- Accredited Corporations
- Accredited Agencies
- Trained and Certified Safety Codes Officers (SCO)

FEDERAL

- Standards Council of Canada
- Accredited SDOs
- Accredited CBs
- Accredited IBs
- Accredited GHG Verifiers and Validators



Who Does What?

- Certification Bodies (CBs) – Certify Products. In some provinces provide non-accredited gas Special Inspection services under provincial legislation
- Inspection Bodies (IBs) – Field Approve (Special Inspections) Non-certified systems (electrical and gas) – DO NOT CERTIFY PRODUCTS
- Accredited Municipalities – sell permits and inspect installations / construction
- Accredited Corporations – administer their own permits and inspect their own installations / construction
- Accredited Inspection Agencies – provide inspection services to accredited municipalities and corporations
- Safety Codes Officers – work for accredited municipalities, corporations, agencies. Inspect installation / construction. DO NOT FIELD APPROVE OR CERTIFY PRODUCTS.
- Licensed Gas Fitters and Electricians – install, pull permits. ARE NOT LICENSED TO INSTALL NON-CERTIFIED OR NON-FIELD APPROVED SYSTEMS

Field Approval is required

- When installing new non-certified appliance
- When relocating stationary non-certified appliance
- When upgrading or altering existing certified, non-certified or previously field approved appliance:
change to burners, burner pressure, capacity outside previously approved maximum and minimum range, BMS, change of application, change of fuel type, voltage, instrument gas type, indoor/outdoor location, fuel train configuration – IN GENERAL WHEN DRAWINGS ARE CHANGED

Field Approval of Portable/Movable Appliances

- Applicable to appliance deployments which are short by their nature and where location of appliances changes frequently
- Includes review of mobilization and demobilization procedures and logs
- Requires qualified personnel trained in moving, testing and maintaining these appliances.

Field Approval not required

- When appliance is destined for jurisdiction which does not require it, although it can be done on a voluntary basis to limit liability
- When installing certified appliance
- When maintaining an appliance
- When moving portable/movable appliance

What is maintenance?

- All activities required to ensure continuing safety and performance of an appliance according to manufacturer's instructions
- Includes, cleaning, lubricating, refilling, painting, testing, replacing of worn-out components with parts that provide equivalent operating characteristics, re-adjusting to original performance specifications.

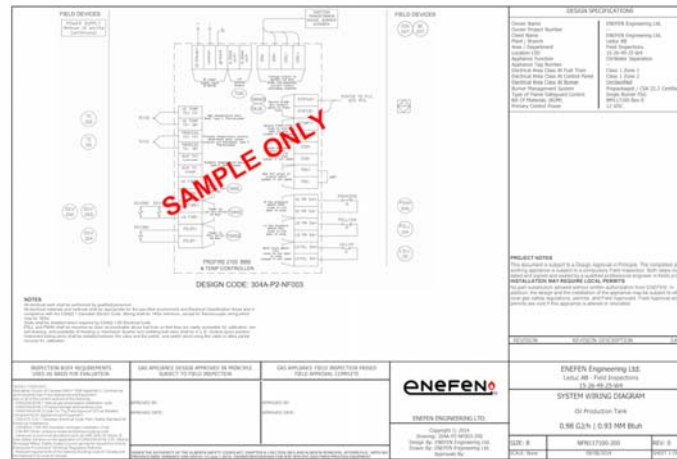
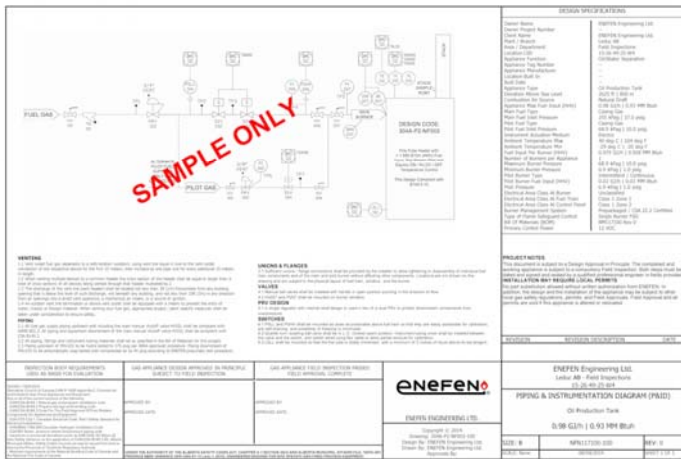
What do I want?

INITIAL DISCOVERY	DESIGN SPECIFIC
Help with code interpretation	Use Standard Design Code Documentation
Help with conceptual design	Use Custom Design Code Documentation
Review my idea	Develop Custom Design Code Documentation
I don't know what I have and I want someone to visit to find out	Help with my own Documentation
	Use my own Documentation
ASSESSMENT	FIELD APPROVAL



What is a Design Code?

- Off-the-shelf documentation package showing practical application of the Codes. Includes P&ID, Electrical and Bill of Materials



SAMPLE ONLY

BILL OF MATERIALS					
Tag Number	Component Function	Connection	Description	Compliance Statement	Comments
MTR Main Fuel Train					
SSV202	Main Burner Upstream Safety Shutoff Valve	1"NPT	3" AGCO solenoid valve, Part No. HV285926-001, 316SS, 12VDC, 12.1 W coil, 35 PSIG MOPD, -40°F ambient design, NACE compliant.	CSA Listed CGA 3.16 Certified	Valve solenoid to be mounted upright
TP3	Upstream Main SSV Pressure Test Point	1/4"NPT	3/4" NPT Plug	Accepted based on good engineering practice	Portable test gauge / calibrator to be used on as needed basis.
SSV203	Main Burner Safety Shutoff Valve	1"NPT	3" AGCO solenoid valve, Part No. HV285926-001, 316SS, 12VDC, 12.1 W coil, 35 PSIG MOPD, -40°F ambient design, NACE compliant.	CSA Listed CGA 3.16 Certified	Valve solenoid to be mounted upright
PS204	Temperature Control Valve Pressure Gauge	1/4" MNPT	Wilka Type 233-E3, Part No. 821228, 2-1/2" dia, 316SS, liquid filled, LM connection, 0-30 PSIG	Accepted based on part performance and manufacturer's recom.	
PSHG206	Main Burner Gas Pressure Switch HPI	1/2" FNPT	CCS 6900GE12 pressure switch, 3-20 psig, Class I Div 1, -34C to 71C, CSA Approved	CSA C22.2 Approved	Switch setpoint 25% above maximum burner pressure. Note: switch isolating valve is not permitted. Tubing union to be installed to allow switch removal for calibration.
TP4	Main SSV Pressure Test Point	1/4"NPT	3/4" NPT Plug	Accepted based on good engineering practice	Portable test gauge / calibrator to be used on as needed basis.
HV206	Main SSV Manual Test Valve	1"NPT	NEO Cat. No. 2500, 3"NPT ball valve, 316SS, CGA 3.16 approved and marked	CSA Listed CGA 3.16 Certified	
HV207	Main Burner Test Firing Valve	1"NPT	NEO Cat. No. 2500, 3"NPT ball valve, 316SS, CGA 3.16 approved and marked	CSA Listed CGA 3.16 Certified	Mount as close as possible to the burner (on the burner window)
PS207	Main Burner Pressure Gauge	1/4" MNPT	Wilka Type 233-E3, Part No. 821228, 2-1/2" dia, 316SS, liquid filled, LM connection, 0-30 PSIG	Accepted based on part performance and manufacturer's recom.	Mount as close as possible to the burner (on the burner window)

Documents for Field Approval


Description of any hazardous condition which may affect appliance or its installation	Specification of electrical area classification
Process and Instrumentation Diagram (P&ID)	Fuel, overpressure protection, venting specifications
Bill of Materials (BOM) or Instrument Data Sheets	Commissioning / Combustion Report and list of setpoints, stack readings
Electrical Wiring Diagram	Installation, Operation and Maintenance Manual
Burner Management System specification	Fuel switchover procedure (if applicable)
Operating narrative, shutdown key	Appliance move procedure and log


Field Approval Steps


- Step I – Design Approval in Principle – intended to ensure that the design is approvable, should be done prior to construction
- Step II – Shop Inspection – this is an optional step intended to check if the construction is progressing according to Step I
- Step III – Field Inspection – intended to check final outcome of the construction and installation in the field, should be done after the appliance is installed in its final destination, commissioned and started, but prior to handover to operations. Note: appliance can be provisionally started for testing purposes providing such startup is supervised by a qualified technician.

What Do I Get?

- Preliminary Inspection Email at the close of inspection
- Temporary Inspection Plate at the close of inspection
- PDF report with photos 1-3 days later with:
 - deficiencies**
 - advise items**
 - recommendations**

 <p>ENEFEN Energy Efficiency Engineering Ltd. 780-665-2863 www.enefen.com</p> <p>ENEFEN is accredited by the Standards Council of Canada as an Inspection Body for Gas-fired Appliances and Equipment.</p>	GAS FIRED APPLIANCE FIELD APPROVAL IN PROGRESS		+	
	Appliance can be operated.			
	This is a temporary Field Inspection Plate. It <u>must</u> be replaced with the permanent Final Field Approval / Rating Plate once received.			
	Field Approval Number			
	Inspection Date			
Inspected By				
LSD Location				
Appliance Tag / Description				

 <p>ENEFEN Energy Efficiency Engineering Ltd. 780-665-2863 www.enefen.com</p> <p>ENEFEN is accredited by the Standards Council of Canada as an Inspection Body for Gas-fired Appliances and Equipment.</p>	GAS FIRED APPLIANCE FIELD APPROVAL IN PROGRESS		+	
	This installation has minor Code deficiencies. Proof Of Correction required within 30 days of the date indicated below. Appliance can be conditionally operated during this period.			
	This is a temporary Field Inspection Plate. Once proof has been confirmed it <u>must</u> be replaced with the permanent Final Field Approval / Rating Plate once received. Reinspection is not required.			
	Field Approval Number			
	Inspection Date			
Inspected By				
LSD Location				
Appliance Tag / Description				

 <p>ENEFEN Energy Efficiency Engineering Ltd. 780-665-2863 www.enefen.com</p> <p>ENEFEN is accredited by the Standards Council of Canada as an Inspection Body for Gas-fired Appliances and Equipment.</p>	GAS FIRED APPLIANCE FIELD APPROVAL IN PROGRESS		+	
	This installation has major deficiencies, which should be corrected immediately.			
	Appliance should not be operated until deficiencies are corrected. Reinspection is required after correction of all deficiencies.			
	Field Approval Number			
	Inspection Date			
Inspected By				
LSD Location				
Appliance Tag / Description				

How to Finish an Approval Project?

- Respond to all deficiencies using online POC (proof of correction) process – upload photos, other docs, short description of what was done
- Once all POC's are accepted a final Field Approval is issued and a 6"x 8" stainless steel rating/approval plate is automatically shipped to designated address
- Replace the temporary inspection plate with final stainless steel plate, and save the report in a suitable place.
- Copy of the report is available from our online portal to the appliance owner, our client and the consultant (as applicable)

You have a successful Field Approval


SAMPLE ONLY

CONFIDENTIAL

**Design Code Field Approval
Appliance Approved
for
ENEFEN Engineering Ltd.**

Owner / Operator: ENEFEN Engineering Ltd.
Plant: Leduc AB
Area: Field Inspections
LSD: 15-26-49-25-W4

Tag Number:
Appliance Type: Oil Production Tank
Appliance Serial No:




Report / Print Date: 08/08/2014
ENEFEN Project: NFN117100

Attention

This Appliance is approved and may be operated.
 This package contains a rating/approval plate that must be attached to the appliance
 and may be subject to an inspection by the Authority Having Jurisdiction.

ENEFEN[®]
ENEFEN Energy Efficiency Engineering Ltd.

Suite 705, 101-5101 50th Ave. • Leduc, AB T9E 0B9 • +1-780-665-2863 • Fax: +1-866-583-0520
www.ENEFEN.com

GAS FIRED APPLIANCE RATING PLATE	
ENEFEN Engineering Ltd. #307 4806 47th Avenue, Leduc, AB, T9E 5X3	
New Install or Upgrade	New Install
Appliance Type	Oil Production Tank
Location LSD	15-26-49-25-W4
Elevation Above Sea Level	2625 ft 800 m
Ambient Temperature Min	-29 deg C -20 deg F
Ambient Temperature Max	40 deg C 104 deg F
Main Fuel Type	Casing Gas
Main Fuel Quality	Sweet Wet
Main Fuel Inlet Pressure	255 kPag 37.0 psig
Secondary Fuel Type	Not approved for secondary fuel use
Pilot Fuel Type	Casing Gas
Pilot Fuel Quality	Sweet Wet
Pilot Fuel Inlet Pressure	68.9 kPag 10.0 psig
Appliance Max Fuel Input (HHV)	0.98 GJ/h 0.93 MM Btuh
Number of Burners per Appliance	1
Maximum Burner Pressure	68.9 kPag 10.0 psig
Minimum Burner Pressure	6.9 kPag 1.0 psig
Pilot Pressure	6.9 kPag 1.0 psig
Electrical Area Class At Burner	Unclassified
Electrical Area Class At Fuel Train	Class 1 Zone 1
Electrical Area Class At Control Panel	Class 1 Zone 2
Primary Control Power	12 VDC
 <p style="font-size: small;">GAS FIRED APPLIANCE FIELD APPROVAL ENEFEN ENERGY EFFICIENCY ENGINEERING LTD. Field Approval Number: NFN117100 Approval Date: Approved By:</p>	
<p>ENEFEN is accredited by the Standards Council of Canada as an Inspection Body for gas-fired appliances and equipment. Gas and electrical safety evaluation based on Canadian codes requirements outlined in CAN-P-1608 Appendix C. This approval represents the results of a single field inspection and is not a product certification. This approval is void if this appliance is altered or relocated.</p> <p>ENEFEN est accrédité par le Conseil Canadien des Normes en tant qu'Organisme d'inspection pour les appareils et équipement à gaz. L'évaluation de la sécurité du gaz et électrique est basée sur les exigences des codes canadiens énoncés à l'annexe C du CAN-P-1608. Cette approbation représente les résultats d'une seule inspection sur le terrain et ne constitue pas une certification du produit. Cette approbation est nulle si cet appareil est modifié ou déplacé.</p>	