DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING PERMIT

This is to certify that PORTLAND WATER DISTRICT

Located At EASTERN PROMENADE

Job ID: 2012-10-5264-HVAC

CBL: 006- B-005-001

has permission to INSTALL A Webster JB -3 Heating System

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.	A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

11/09/2012

Fire Prevention Officer **Code Enforcement Officer / Plan Reviewer**

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY

PENALTY FOR REMOVING THIS CARD

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

Final Inspection

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

PORTLAND MAINE

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Director of Planning and Urban Development
Jeff Levine

Job ID: 2012-10-5264-HVAC **Located At:** EASTERN PROMENADE **CBL:** 006- B-005-001

Conditions of Approval:

Fire

1. Installation shall comply with City Code Chapter 10.
2. Fuel-fired boilers shall be protected in accordance with NFPA 101, *Life Safety Code*.
3. Installation shall comply with NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel–Burning Appliances*;
4. NFPA 31, *Standard for the Installation of Oil-Burning Equipment*;
5. NFPA 54, *National Fuel Gas Code*;
6. NFPA 91, *Standard for Exhaust Systems for Air Conveying Vapors, Gases, Mists, and Noncombustible Particulate Solids*;
7. NFPA 70, *National Electrical Code*; and the manufacturer's published instructions.

City of Portland, Maine - Building or Use Permit Application
389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No:	Date Applied:	CBL:	
2012-10-5264-HVAC	**10/24/2012**	**009- A-006-001**	
Location of Construction: **500 MARGINAL WAY /EASTERN PROMENADE**	Owner Name: **PORTLAND WATER DISTRICT**	Owner Address: **225 DOUGLASS STREET PORTLAND, MAINE 04102**	Phone:
Business Name:	Contractor Name: **MECHANICAL SERVICES, INC.**	Contractor Address: **400 PRESUMPSCOT ST PORTLAND MAINE 04103**	Phone: **774-1531**
Lessee/Buyer's Name:	Phone:	Permit Type: **HVAC**	Zone: **ROS**
Past Use: **Utility – East End Treatment Plant**	Proposed Use: **Same: Utility- Treatment Plant – to install Webster JB-3 heating system**	Cost of Work: **$34,000.00**	CEO District:
		Fire Dept: ___ Approved ___ Denied ___ N/A Signature: 11/8/12	Inspection: Use Group: Type: Signature:
Proposed Project Description: **Install Webster JB-3 heating system**		Pedestrian Activities District (P.A.D.)	
Permit Taken By: Gayle			

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building Permits do not include plumbing, septic or electrial work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
___ Shoreland	___ Variance	within
___ Wetlands	___ Miscellaneous	___ Not in Dist or Landmark
___ Flood Zone	___ Conditional Use	___ Does not Require Review
___ Subdivision	___ Interpretation	___ Requires Review
___ Site Plan	___ Approved	___ Approved
___ Maj ___ Min ___ MM	___ Denied	___ Approved w/Conditions
Date: OK - 10/25/12	Date:	___ Denied
		Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE

Gas # P0+2372 Cost of Work: $ 33,606

FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT
HEATING OR POWER EQUIPMENT

009 A006   Gayle G.   2012 10 5264 (ROS)

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL ~~41 Marginal 009 A 006~~ EAST END TREATMENT PLANT Eastern Prom Use of Building INDUSTRIAL Date 9-26-12

Sub station on end

Name and address of owner of appliance PORTLAND WATER DISTRICT 774 5961
500 MARGINAL WAY PORTLAND MAINE 04101

Installer's name and address MECHANICAL SERVICES, INC.
400 PRESUMPSCOT ST. PORTLAND MAINE Telephone (207) 774-1531

Location of appliance:

- ☐ Basement
- ☑ Floor
- ☐ Attic
- ☐ Roof

Type of Fuel:

- ☑ Gas
- ☐ Oil
- ☐ Solid

Appliance Name: WEBSTER JB-3

U.L. Approved ☐ ~~Yes~~ ☐ No

Will appliance be installed in accordance with the manufacture's installation instructions? ☑ Yes ☐ No

ADDING NATURAL GAS TO THE EXISTING BURNERS.

IF NO Explain:

The Type of License of Installer:

- ☐ Master Plumber #
- ☐ Solid Fuel #
- ☑ Oil # MASTER MS20001782
- ☑ Gas # PNT2372
- ☐ Other

Type of Chimney:

- ☐ Masonry Lined
  Factory built
- ☑ Metal
  Factory Built ~~U.L.~~ Listing # STAINLESS STEEL - SITE BUILT
- ☐ Direct Vent
  Type ______ UL#

RECEIVED
OCT 24 2012
Dept. of Building Inspections

Type of Fuel Tank

- ☐ Oil
- ☐ Gas

Size of Tank

Number of Tanks

Distance from Tank to Center of Flame ______ **feet.**

Cost of Work: $ 33,606

Permit Fee: $ ~~370.00~~ 360.00

Approved

Fire:

Ele.:

Bldg.:

Approved with Conditions

☐ See attached letter or requirement

Inspector's Signature   Date Approved

Signature of Installer Colby Green

White - Inspection   Yellow - File   Pink - Applicant's   Gold - Assessor's Copy

PORTLAND MAINE

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Receipts Details:

Tender Information: Check , BusinessName: Mechanical Services, Check Number: 4872
Tender Amount: 360.00

Receipt Header:

Cashier Id: gguertin
Receipt Date: 10/24/2012
Receipt Number: 49606

Receipt Details:

Referance ID:	8507	Fee Type:	BP-Constr
Receipt Number:	0	Payment Date:	
Transaction Amount:	360.00	Charge Amount:	360.00
Job ID: Job ID: 2012-10-5264-HVAC - Install Webster JB-3 heating system			
Additional Comments: Mechanical services Inc. 411 Marginal Way			

Thank You for your Payment!

Assessor's Office | 389 Congress Street | Portland, Maine 04101 | Room 115 | (207) 874-8486

This page contains a detailed description of the Parcel ID you selected. Press the **New Search** button at the bottom of the screen to submit a new query.

Current Owner Information:

CBL	006 B005001
Land Use Type	GOVERNMENTAL
Property Location	0 EASTERN PROMENADE
Owner Information	PORTLAND WATER DISTRICT 225 DOUGLASS ST PORTLAND ME 04102
Book and Page	
Legal Description	6-B-5-6 8-A-1-2 15-G-2 EASTERN PROM R329-455 U=1237750 F=170700
Acres	32.3335

lead CBL - 6-B-5
This is the correct CBL
please change & return
to Marge —

Current Assessed Valuation:

TAX ACCT NO.	764
LAND VALUE	$7,440,600.00
BUILDING VALUE	$49,693,600.00
PORTLAND WATER DISTRICT	($57,134,200.00)
NET TAXABLE - REAL ESTATE	$0.00
TAX AMOUNT	$0.00

OWNER OF RECORD AS OF APRIL 2012
PORTLAND WATER DISTRICT

225 DOUGLASS ST
PORTLAND ME 04102

Any information concerning tax payments should be directed to the Treasury office at 874-8490 or e-mailed.

View Map

New Search!

Services

Applications

Doing Business

Maps

Tax Relief

Tax Roll

Q & A

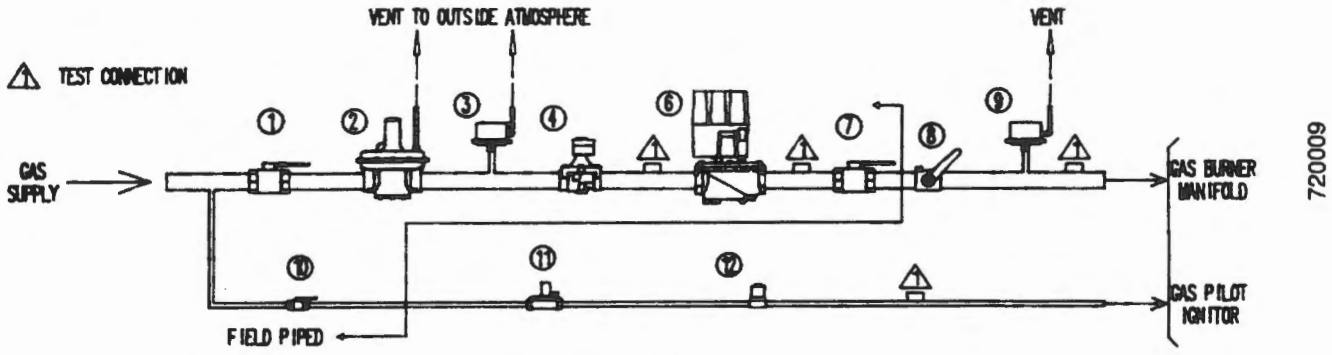
browse city services a-z

browse facts and links a-z

Best viewed at 800x600, with Internet Explorer

GENERAL DATA
GAS TRAINS — UL, FM & IRI

GENERAL — Gas trains are an essential and important part of a burner system. They vary in configuration by agency code, the burner mode of operation and capacity, the amount of gas pressure available, the specific gravity and the type of gas being burned.



TYPICAL UL GAS TRAIN

LEGEND

1	Manual Shutoff Valve	X	N.O. Vent Valve (not shown)	9	High Gas Pressure Switch
2	Gas Pressure Regulator	6	Main Gas Valve	10	Pilot Manual Valve
3	Low Gas Pressure Switch	7	Manual Shutoff Valve	11	Pilot Regulator Valve
4	Safety Gas Valve	8	Metering Valve	12	Pilot Solenoid Valve

NOTE: Gas train components are normally supplied loose, but may be pre-piped at the factory when so ordered. The illustrations in this data sheet show the gas trains in the piped condition for the sake of clarity.

GOVERNING CODES — Each Webster burner is **UL** listed thus **UL** requirements form the basis for all standard configurations. The **UL** version accounts for the majority of units supplied, however, other agency codes such as **FM, IRI, NFPA, MIL, CGA** and **CSA** are frequently specified and sometimes local or area codes prevail. This data sheet covers **UL, FM & IRI** gas trains.

BURNER MODE OF OPERATION AND CAPACITY — Variations in gas train configuration are inherent to burner mode of operation and capacity. There are basically three modes of operation, these being: On-Off, Low Fire Start and Modulating. The Low Fire Start systems can be controlled to perform in a low-high-low or low-high-off manner to meet load demand. The Webster designations for these three systems are as follows:

Operation Mode	Webster Designation
On-Off	A
Low Fire Start	L

ILLUSTRATED GAS TRAINS BY CAPACITY AND CODE — The following illustrations show the **WEBSTER** configuration for **UL, FM** and **IRI** as grouped by **UL** capacity ratings. Refer to the legend below for component part identification. These illustrations are not to be used for field erection and/or system design purposes. Request a certified drawing when specific application details are needed.

UL Capacity Range BTU/Hr.	Operation Mode	Webster Designation	Code			Illustration
			UL	FM	IRI	
To 2,500,000	On-Off	A	x	x		I
	On-Off	A			x	II
	Low Fire Start	L	x	x		III
	Low Fire Start	L			x	II
	Modulating	M	x	x		IV
	Modulating	M			x	V
2,500,000 to 5,000,000	Low Fire Start	L	x	x		VI
	Low Fire Start	L			x	II
	Modulating	M	x	x		VII
	Modulating	M			x	V
5,000,000 to 12,500,000	Low Fire Start	L	x	x		VI
	Modulating	M	x	x		VII
	Modulating	M			x	V
12,500,000 And Up	Modulating	M	x	x		VIII
	Modulating	M			x	V
A proof of closure switch is used on one of the automatic gas valves at 5,000,000 BTU/Hr.						

NOTE

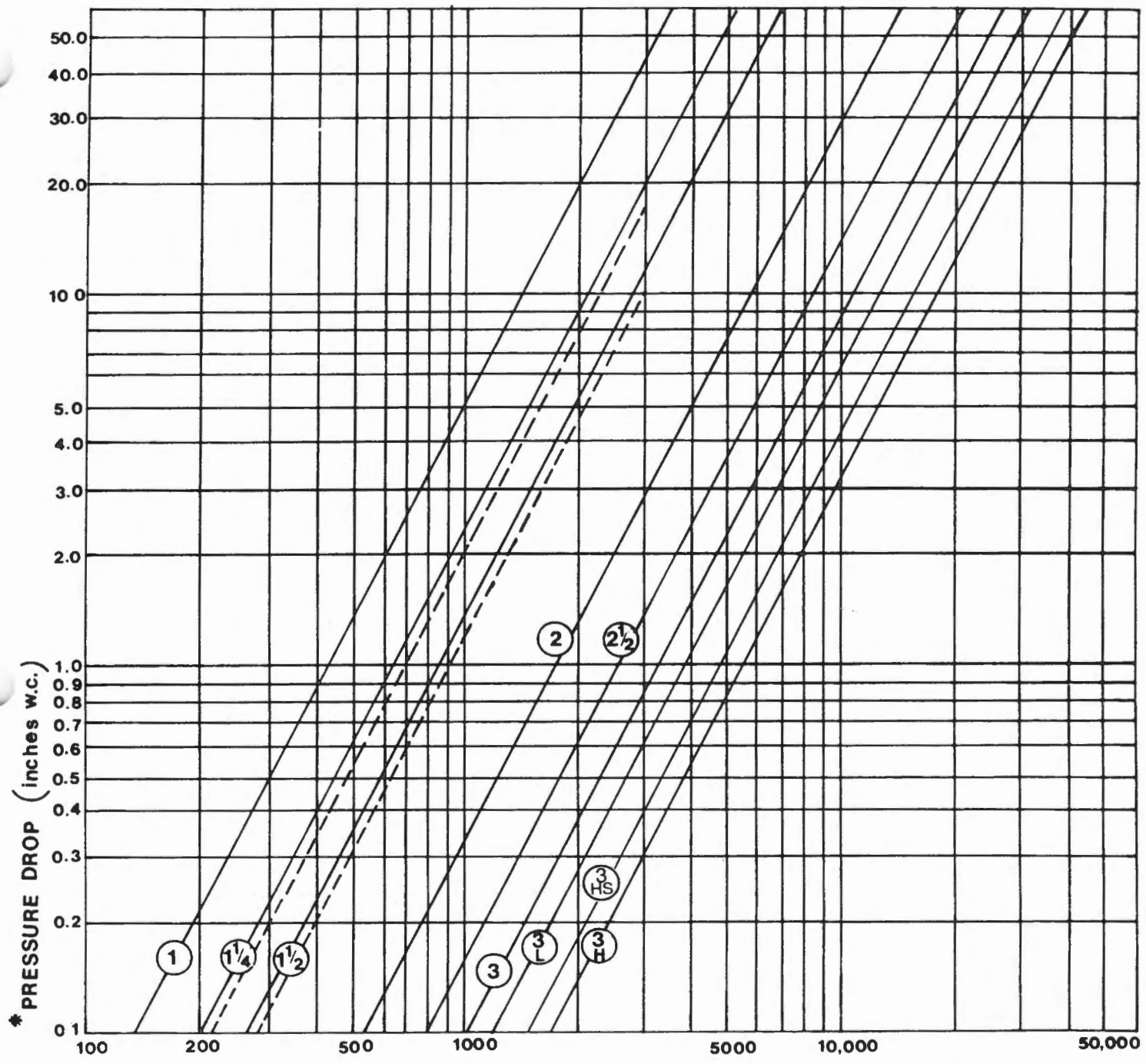
PRESSURE DROPS — Pressure drop through a given gas train will vary somewhat in relation to the individual items used, the specific gravity of the gas to be burned and the overall length. Use flow capacity and pressure drop graphs shown on pages 5 and 6 to make approximate determinations.

USE THIS LEGEND FOR COMPONENT PART IDENTIFICATION IN THE FOLLOWING ILLUSTRATIONS

LEGEND

1. Manual Shutoff Valve
2. Gas Pressure Regulator
3. Low Gas Pressure Switch
4. Safety Gas Valve
5. Normally Open Vent Valve
6. Main Gas Valve
7. Main Gas Checking Valve
8. Metering Valve
9. High Gas Pressure Switch
10. Pilot Manual Valve
11. Pilot Regulator Valve
12. Pilot Solenoid Valve

UL/FM GAS TRAINS

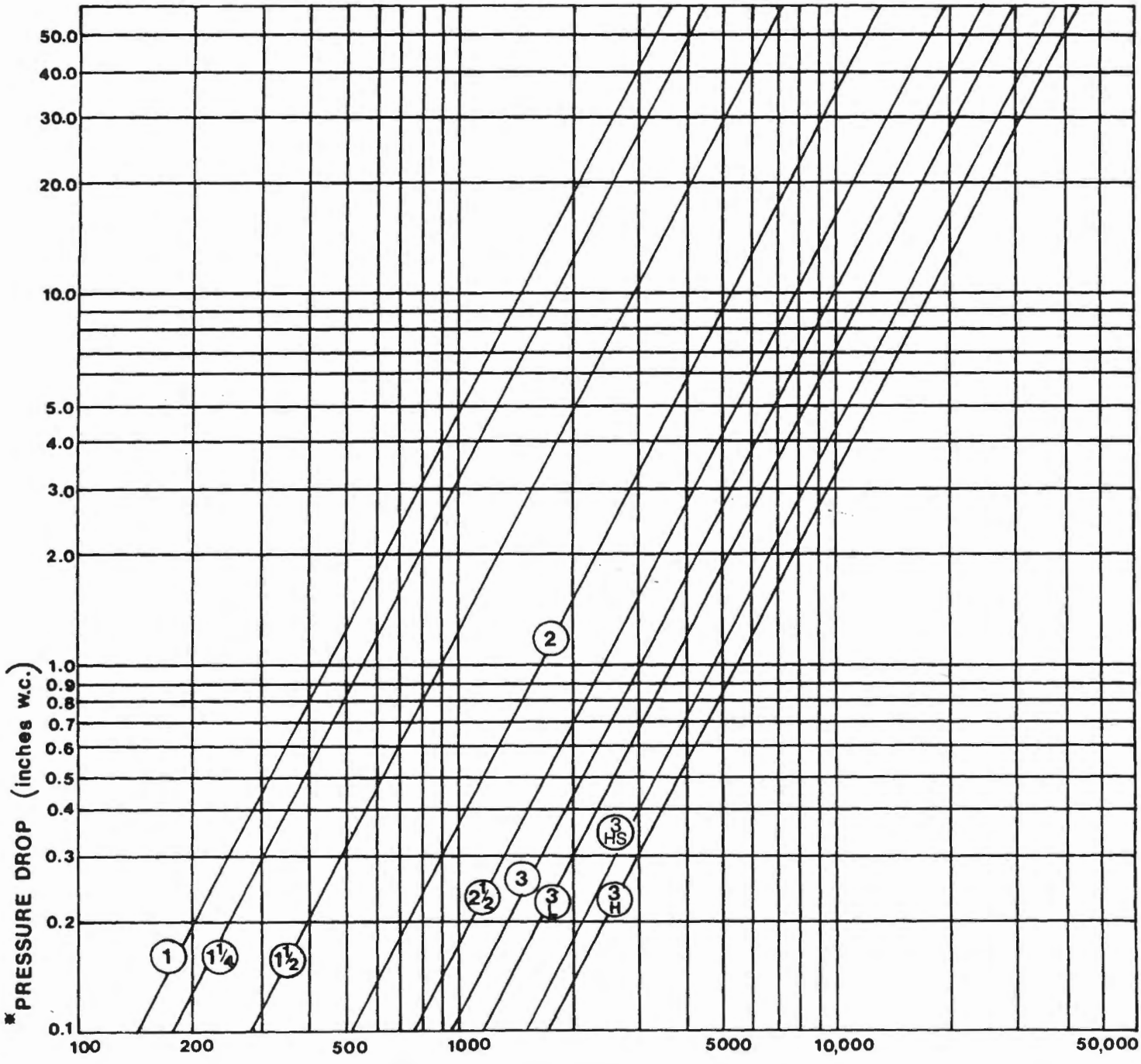


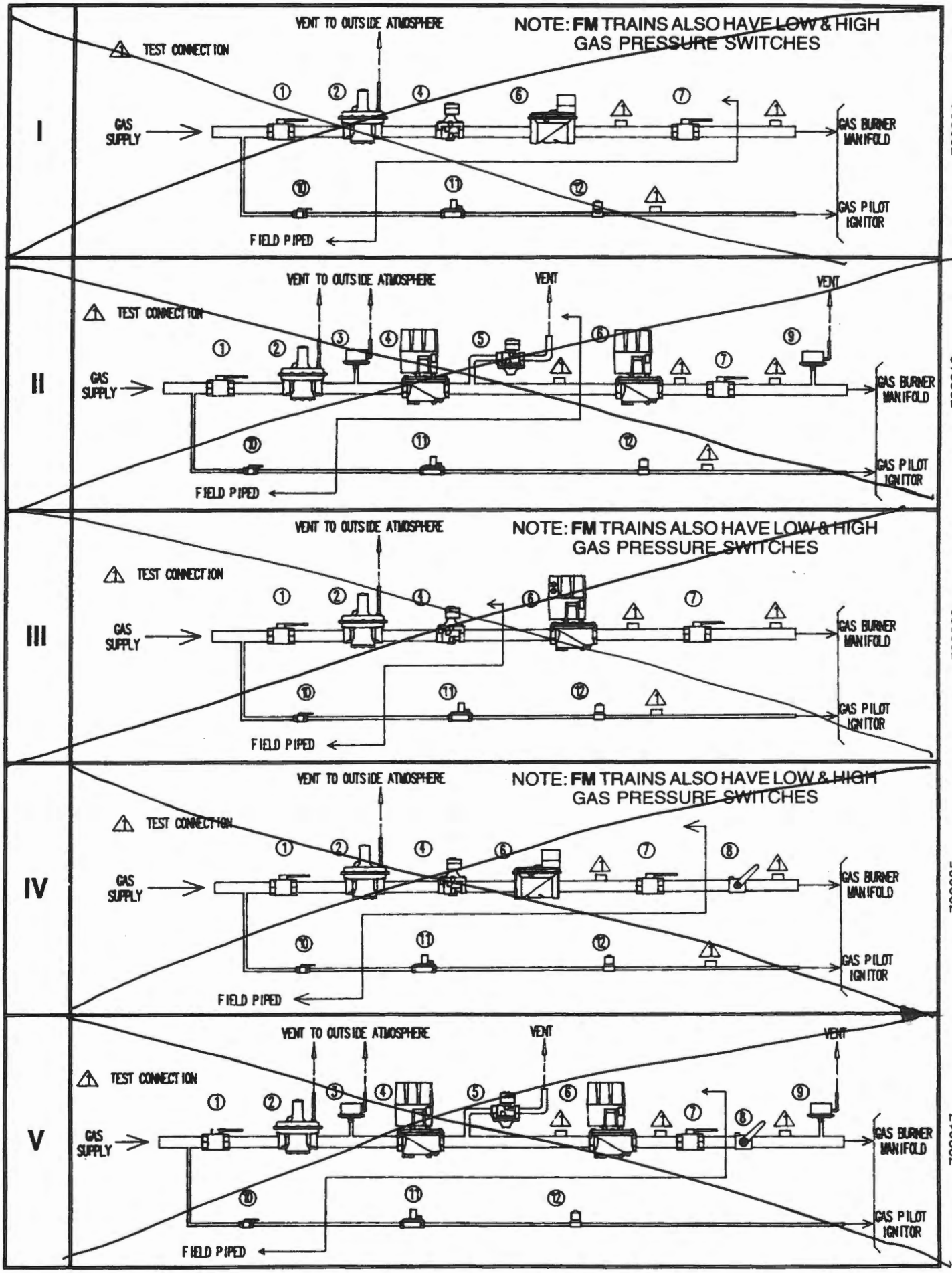
FLOW CAPACITY (CFH or MBH)

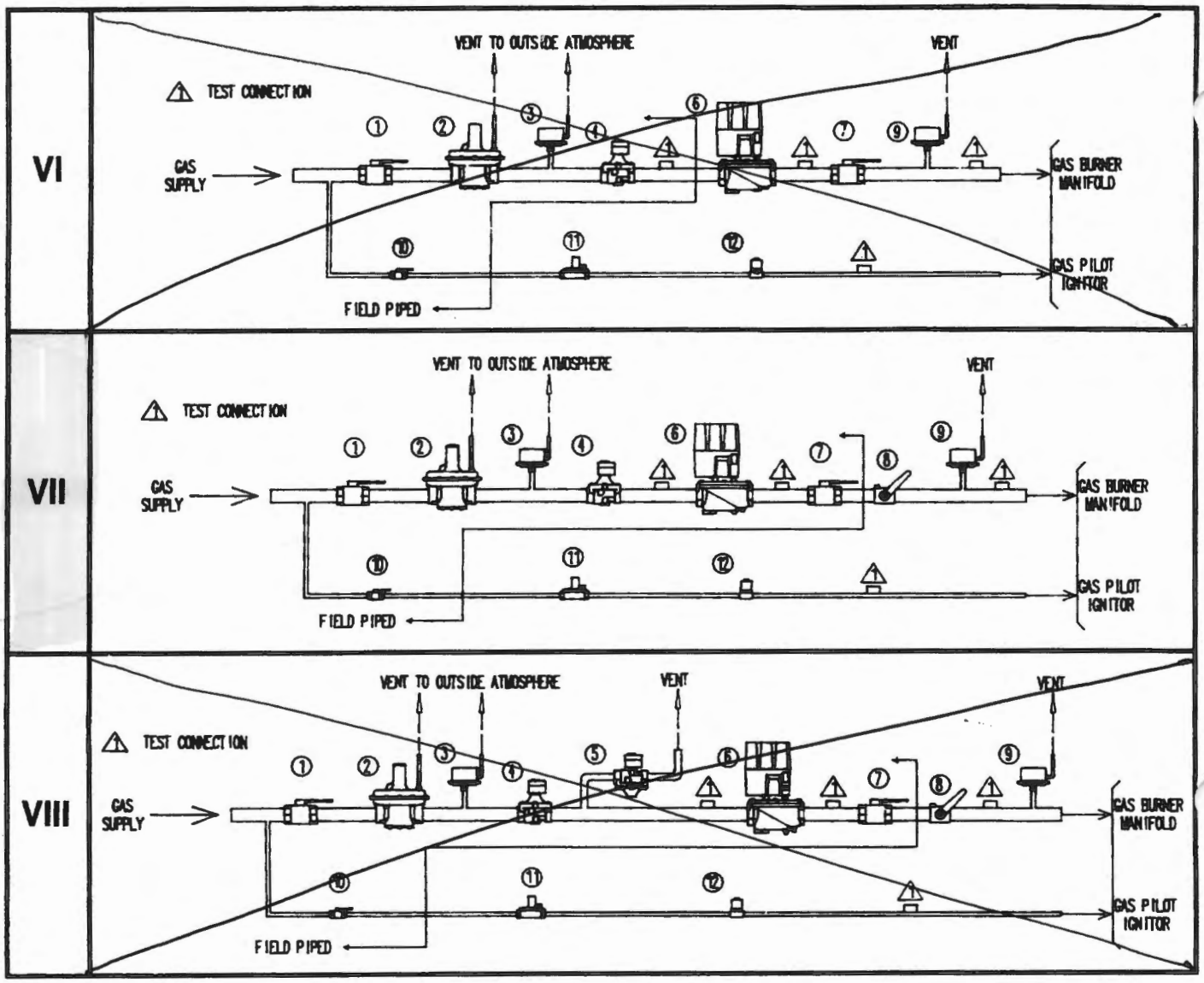
(see next page for **IRI** gas trains)

GAS TRAIN FLOW CAPACITIES (continued from previous page)

IRI GAS TRAINS




I
VENT TO OUTSIDE ATMOSPHERE
NOTE: FM TRAINS ALSO HAVE LOW & HIGH GAS PRESSURE SWITCHES
TEST CONNECTION
GAS SUPPLY
GAS BURNER MANIFOLD
GAS PILOT IGNITOR
FIELD PIPED
720004
II
VENT TO OUTSIDE ATMOSPHERE
VENT
VENT
TEST CONNECTION
GAS SUPPLY
GAS BURNER MANIFOLD
GAS PILOT IGNITOR
FIELD PIPED
720016
III
VENT TO OUTSIDE ATMOSPHERE
NOTE: FM TRAINS ALSO HAVE LOW & HIGH GAS PRESSURE SWITCHES
TEST CONNECTION
GAS SUPPLY
GAS BURNER MANIFOLD
GAS PILOT IGNITOR
FIELD PIPED
720023
IV
VENT TO OUTSIDE ATMOSPHERE
NOTE: FM TRAINS ALSO HAVE LOW & HIGH GAS PRESSURE SWITCHES
TEST CONNECTION
GAS SUPPLY
GAS BURNER MANIFOLD
GAS PILOT IGNITOR
FIELD PIPED
720005
V
VENT TO OUTSIDE ATMOSPHERE
VENT
VENT
TEST CONNECTION
GAS SUPPLY
GAS BURNER MANIFOLD
GAS PILOT IGNITOR
FIELD PIPED
720017



GAS TRAIN FLOW CAPACITIES — **UL/FM & IRI.** The following graphs show the gas flow capacity and pressure drops for pertinent pipe sizes using 0.60 specific gravity and 1000 BTU/CF per MBH natural gas. These calculations do not include the gas metering valve used in modulating systems. There is a slight decrease in pressure drop when diaphragm (non-motorized) gas valves are used in the 1¼" and 1½" sizes. This is shown by the dotted lines in the **UL/FM** graph.

NOTE

Most flow capacity charts, graphs and tables are based upon gas with heat value of 1000 BTU/Hr. and 0.60 specific gravity. In order to use this data for gases with other known characteristics, it is necessary to determine a multiplier against this data for a given MBTU/Hr. (or input). Multipliers can be calculated using the formulas shown on the back page of this bulletin.

STANDARD GAS TRAIN SPECIFICATION DATA — The following tables show **WEBSTER** standard gas train configurations grouped by UL capacity range and pipe size. Individual components are itemized by vendor part or model number and composite pressure drops are shown for estimating purposes. Webster reserves the right to substitute vendor items for those shown when the need arises.

NOTES:

- Pressure drops shown are based upon 0.60 specific gravity gas at a flow rate of 1,000 CFH for 1½" and smaller sizes, 10,000 CFH for 2" and larger. These pressure drops include our standard length of pipe but do not include the gas metering (butterfly) valve used in modulating systems.
- MBV = Manual Ball Valve. LGV = Lubricated Plug Valve.
  - [1] For UL trains, gas pressure switches are used only above 2,500,000 BTU/Hr.
  - [2] Normally open vent valves are used at 12,500,000 BTU/Hr. and up.
  - [3] A proof of closure switch is used on one automatic gas valve at 5,000,000 BTU/Hr. and up.

Illustration Reference	Item No.	UL/FM Up To 2,500,000 BTU/Hr. Using Diaphragm Gas Valve								
		Gas Train Size	1"	1¼"	1½"	2"	2½"	3"	3"L	3"H
I	1	Manual Shutoff Valve	MBV	●		→		Not Applicable		
	2	Gas Pressure Regulator	RV53	RV61	RV81	RV91				
	3	Low Gas Pressure Switch	C645A1030	●		→		Used on FM Trains Only		
IV	4	Safety Gas Valve	K3A	●	→	S261				
	6	Main Gas Valve	V48A	●		→				
	7	Main Gas Checking Valve	MBV	●		→				
	9	High Gas Pressure Switch	C645B1013	●		→		Used on FM Trains Only		
		Pressure Drop	5.20	2.12	1.24	32.44				

Illustration Reference	Item No.	UL/FM Up To 5,000,000 BTU/Hr. Using Motorized Gas Valve									
		Gas Train Size	1"	1¼"	1½"	2"	2½"	3"	3"L	3"HS	3"H
III-[1]	1	Manual Shutoff Valve	MBV	●						→	
	2	Gas Pressure Regulator	RV53	RV61	RV81	RV91	RV91	RV111	●	→	RV131
	3	Low Gas Pressure Switch	C645A1030	●						→	
VI	4	Safety Gas Valve	K3A	●	→	S261	●		→		H117A
	6	Main Gas Valve	V5055	●				→	H117A		H117A
VII	7	Main Gas Checking Valve	MBV	●						→	
	9	High Gas Pressure Switch	C645B1013	●						→	
		Pressure Drop "W.C.	5.35	2.37	1.38	34.30	15.80	10.08	7.03	4.35	3.27

Illustration Reference	Item No.	UL/FM 5,000,000 BTU/Hr. and Up									
		Gas Train Size	1"	1¼"	1½"	2"	2½"	3"	3"L	3"HS	3"H
VI-[2][3]	1	Manual Shutoff Valve			MBV	●				→	
	2	Gas Pressure Regulator			RV81	RV91	RV91	RV111	●	→	RV131
VII-[2][3]	3	Low Gas Pressure Switch			C645A1030	●				→	
	4	Safety Gas Valve	Not Applicable		K3A	S261	●		→		H117A
	5	Norm. Open Vent Valve			¾" K10	1" S262	1¼" S262	●		→	
VIII-[3]	6	Main Gas Valve			V5055	●		→	H117A		H117A
	7	Main Gas Checking Valve			MBV	●				→	
	9	High Gas Pressure Switch			C645B1013	●				→	
		Pressure Drop "W.C.			1.38	34.30	15.80	10.08	7.03	4.35	3.27

Illustration Reference	Item No.	IRI All Ranges									
		Gas Train Size	1"	1¼"	1½"	2"	2½"	3"	3"L	3"HS	3"H
II-[3]	1	Manual Shutoff Valve	MBV	●						→	
	2	Gas Pressure Regulator	RV53	RV60	RV81	RV91	RV91	RV111	●	→	RV131
V-[3]	3	Low Gas Pressure Switch	C645A1030	●						→	
	4	Safety Gas Valve	V5055	●					→		H117A
	5	Norm. Open Vent Valve	¾" K10	●	→	1" S262	1¼" S262	●		→	
	6	Main Gas Valve	V5055	●				→	H117A		H117A
	7	Main Gas Checking Valve	LGV	●						→	
	9	High Gas Pressure Switch	C645B1013	●						→	
		Pressure Drop "W.C.	4.55	2.94	1.21	35.40	16.61	10.60	7.40	4.35	3.27

Formulas for calculating gas flows and pressure drops for gases with heat value and specific gravity **OTHER** than 1000 BTU cubic foot and 0.60 specific gravity.

At a given pressure drop, **TO FIND GAS FLOW** in terms of 1000 BTU/Hr. (input), use the following conversion tables and formula.

Multiplier	Heat Value BTU/Cubic Foot	Specific Gravity
M_1	H	S
1.56	2500	1.53
1.0	1000	0.60
0.876	1300	1.32
0.50	500	0.60
0.56	650	0.85

$$M_1 = \frac{H}{1000} \times \sqrt{\frac{0.60}{S}}$$

EXAMPLE: $M_1 = \frac{2500}{1000} \times \sqrt{\frac{0.60}{1.53}} = 2.5 \times \sqrt{0.392} = 2.5 \times 0.626 = 1.56$

At a given 1000 BTU/Hr. input, **TO FIND PRESSURE DROP,** use the following conversion tables and formula.

Multiplier	Heat Value BTU/Cubic Foot	Specific Gravity
M_2	H	S
0.408	2500	1.53
1.0	1000	0.60
1.3	1300	1.32
4.0	500	0.60
3.36	650	0.85

$$M_2 = \left(\frac{1000}{H}\right)^2 \times \frac{S}{0.60}$$

EXAMPLE: $M_2 = \left(\frac{1000}{2500}\right)^2 \times \frac{1.53}{0.60} = 0.16 \times 2.55 = 0.408$

FLOW vs PRESSURE EQUATIONS

F1 = Low Flow Rate
F2 = High Flow Rate
P1 = Low Pressure
P2 = High Pressure

BASIC EQUATION

$$\frac{P2}{P1} = \left(\frac{F2}{F1}\right)^2$$

(1) $F1 = F2 \sqrt{\frac{P1}{P2}}$ $\quad P1 = P2 \times \left(\frac{F1}{F2}\right)^2$ (3)

(2) $F2 = F1 \sqrt{\frac{P2}{P1}}$ $\quad P2 = P1 \times \left(\frac{F2}{F1}\right)^2$ (4)

NOTE

These formulas can be applied to liquids or gases for fixed orifices or given pipe sizes.

To find the pressure at 60% of selected high fire rate, multiply high fire rate by 0.60 and use formula (3).

EXAMPLE:
High Fire Rate is 3000 MBH at 4.0" W.C.

$F1 = 0.60 \times 3000 = 1800$ MBH
$F2 = 4.0 \times \left(\frac{1800}{3000}\right)^2 = 1.4$" W.C.

WEBSTER
Engineering & Manufacturing Co. L.L.C.

619 Industrial Road • Winfield, KS 67156
Phone 1-800-835-1123 • FAX 1-620-221-9447
Website: www.webster-engineering.com
E-Mail: sales@webster-engineering.com