



Fitch Gas Reformer Catalyst

Improves Combustion, Increases Efficiency, Reduces Gas Consumption and Emissions for any Application using Natural Gas or LPG (Propane)



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Overview

- ▶ Reformulates natural gas, shale gas, coke gas and propane
- ▶ No maintenance and moving parts
- ▶ Achieves a more homogeneous temperature
- ▶ Increases equipment efficiency
- ▶ Obtains excellent results with low methane concentration gas
- ▶ Increases heat output with same amount of gas
- ▶ Reduces calcification deposits and "hot spots"
- ▶ Reduces Greenhouse Emissions
- ▶ Simple installation options: (direct weld, flanged or bypass)
- ▶ Guaranteed fuel savings of at least 2 percent





Application Range

The FHD-NG series is used in a variety of industrial applications that utilize as primary fuel source natural gas, shale gas, coke gas or lpg (propane).

Power Generation

The versatility of our technology allows us to work with steam burners, boilers, furnaces, turbines and/or generators.



Industrial

The design and functionality allows our gas reformer catalyst to be used in dryers, boilers, furnaces, chillers and any application suitable for industrial needs that uses natural gas or lpg.

Our unique technology is versatile in various industrial applications. For additional questions about our reformer catalyst, please contact us.





Operating Principle

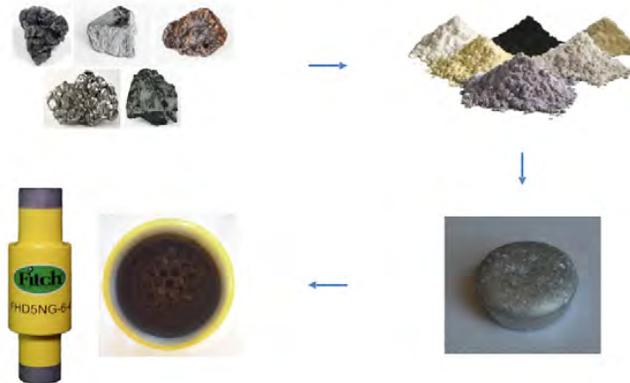
Natural gas usually contains a number of different molecules and some microorganisms. The nature of any batch of gas is based on the source and can contain methane, ethane, propane, butane, water and others elements. The concentration of each has bearing on the BTU output.

The Fitch Gas Reformer Catalyst induces reactions in the gas at or near the point of use and is easily incorporated into a heating system. This catalyst is novel in that it induces reactions in gas at temperatures far below where petroleum catalysts have historically been known to function.

The reactions the catalyst induces are beneficial and when placed in gas lines increase combustion efficiency while reducing emissions. The results occur because saturated hydrocarbons are reformed and often resuscitated to organic structures that combust fully.

The Fitch Gas Reformer Catalyst promotes removal of Hydrogen and induces formation of unsaturated hydrocarbon molecules. It increases the concentration of acyclic hydrocarbons such as Methane, Ethane, Propane and Butane. It also induces oxygenation of certain hydrocarbons to form oxygenate, such as Ethanol or Methanol, thus increasing NG's heating/energy value.

The Gas Reformer enhances oxidation of hydrocarbon molecules which is better for combustion.





Technical Specifications

- ▶ Schedule 40 carbon steel for HO-50 to FHD-180
- ▶ Nipple diameters 3/8", 3/4", 2", 3", 4", 6", 8", 10", 12" and 14"
- ▶ Available NPT or straight for welding with or without flange
- ▶ Designed to withstand 350 PSI/24 Bar
- ▶ Maximum pressure at 300°F/148°C
- ▶ ΔP (Delta P) pressure drop up to 1.5psi
- ▶ 20,000 operating hours design
- ▶ Product is made to customer specification
- ▶ Acrylic yellow paint
- ▶ Smaller & larger units available



FHD-25



HO75



Flow Capabilities per Model

Catalyst Model	Gas (Flow)			HEAT (Output)			STEAM (output)		
	SCM/HR	SCF/HR	KGs/hr	MBH	MM BTU	KWH	lbs./hr.	Kg/hr.	Kcal/ Hour
HO2 NG	5	189	7	165	0.2	48	139	63	41,675
HO5 NG	13	473	18	413	0.4	121	348	158	104,186
HO10 NG	27	945	35	827	0.8	242	696	316	208,373
HO20 NG	53	1,890	71	1,654	1.7	485	1,392	633	416,745
HO25 NG	67	2,363	89	2,067	2.1	606	1,741	791	520,931
HO35 NG	94	3,308	124	2,894	2.9	848	2,437	1,108	729,304
HO50 NG	134	4,725	177	4,134	4.1	1,211	3,481	1,582	1,041,863
HO75 NG	201	7,088	266	6,202	6.2	1,817	5,222	2,374	1,562,794
HO100 NG	267	9,450	355	8,269	8.3	2,423	6,962	3,165	2,083,725
FHD2 NG	535	18,900	710	16,538	16.5	4,845	13,925	6,329	4,167,450
FHD5 NG	802	28,350	1,065	24,806	24.8	7,268	20,887	9,494	6,251,175
FHD10 NG	1,605	56,700	2,130	49,613	49.6	14,536	41,774	18,988	12,502,350
FHD15 NG	2,407	85,050	3,195	74,419	74.4	21,805	62,661	28,482	18,753,525
FHD20 NG	3,209	113,400	4,260	99,225	99.2	29,073	83,547	37,976	25,004,700
FHD25 NG	4,012	141,750	5,325	124,031	124.0	36,341	104,434	47,470	31,255,875
FHD30 NG	4,814	170,100	6,390	148,838	148.8	43,609	125,321	56,964	37,507,050
FHD40 NG	6,418	226,800	8,520	198,450	198.5	58,146	167,095	75,952	50,009,400
FHD50 NG	8,023	283,500	10,650	248,063	248.1	72,682	208,869	94,940	62,511,750
FHD60 NG	9,628	340,200	12,780	297,675	297.7	87,219	250,642	113,928	75,014,100
FHD70 NG	11,232	396,900	14,910	347,288	347.3	101,755	292,416	132,916	87,516,450
FHD80 NG	12,837	453,600	17,040	396,900	396.9	116,292	334,190	151,904	100,018,800
FHD90 NG	14,441	510,300	19,170	446,513	446.5	130,828	375,964	170,893	112,521,150
FHD100 NG	16,046	567,000	21,300	496,125	496.1	145,365	417,737	189,881	125,023,500





Catalyst Dimensions per Model

Catalyst Model	Barrell Diameter inches	Length inches	Nipple Diameter inches	Aprox. Weight lbs.	Box Dimensions (W/L/H)	Box weight lbs.	Packing Material
HO2 NG	3	7	3	4	4x 4x 12	4.5	Cardboard
HO5 NG	3	8	3	6	4x 4x 12	6.5	Cardboard
HO10 NG	3	9	3	8	4x 4x 12	8.8	Cardboard
HO20 NG	3	10	3	11	4x 4x 12	11.5	Cardboard
HO25 NG	3	11	3	14	4x4 x16	14.5	Cardboard
HO35 NG	3	14	3	15	4x4x16	15.5	Cardboard
HO50 NG	5	13.5	1/2/3	19	6x6x18	19.5	Cardboard
HO75 NG	5	14.6	1/2/3	23	6x6x18	24	Cardboard
HO100 NG	5	15.6	1/2/3	28	6x6x18	29	Cardboard
FHD2 NG	6/10	17	2/3/4/6	32	10x10x18	33	Cardboard
FHD5 NG	6/10	19	2/3/4/6	35	10x10x20	36	Cardboard
FHD10 NG	6/10	23.5	2/3/4/6	50	10x10x24	51.5	Cardboard
FHD15 NG	6/10	25	2/3/4/6	75	10x10x26	77.5	Cardboard
FHD20 NG	6/10	29	2/3/4/6	85	10x10x30	87	Cardboard
FHD25 NG	6/10	29.5	2/3/4/6	105	10x10x30	107	Cardboard
FHD30 NG	10/12	32.5	3/4/6/10	158	10x10x33	168	wood crates
FHD40 NG	10/12	35.5	3/4/6/10	160	10x10x37	170	wood crates
FHD50 NG	10/12	38.5	3/4/6/10	180	10x10x40	190	wood crates
FHD60 NG	10/12	41.5	3/4/6/10	200	10x10x42	210	wood crates
FHD70 NG	12/14	34	3/4/6/10/12/14	335	14x14x36	350	wood crates
FHD80 NG	12/14	35	3/4/6/10/12/14	340	14x14x38	355	wood crates
FHD90 NG	12/14	36	3/4/6/10/12/14	345	14x14x38	360	wood crates
FHD100 NG	12/14	37	3/4/6/10/12/14	350	14x14x40	375	wood crates





Installation Instructions Example

Installations – Take all necessary precautions relative to installing on gas fired system. Locate a suitable location in the gas line supply line, before the regulator valve and after the filter.

Always install the Fitch with an optional bypass valve to allow for cleaning/replacement. For gas installations a bypass is not required, but highly recommended.

1. Clean the boiler then establish a baseline. Measure the exhaust gas composition and combustion efficiency and ensure the system is functioning to the boiler manufacturer's recommendation before installing or engaging gas flow through the Fitch Gas Reformer.
2. Install the Fitch Gas Reformer at the selected location in compliance with building/piping codes.
3. Once installed, check for leaks and let the boiler run at 100 percent for approx. 48 hours and take new exhaust gas and combustion efficiency measurements.

Typical Performance Indicators we track

- I) Stack Temperature
- II) O₂
- III) CO
- IV) CO₂
- V) NO_x
- VI) O₂
- VII) Excess Air
- VIII) Efficiency
- IX) Steam Pressure
- X) Fuel Flow



Typical Observations

- I) Excess Air may change
- II) Stack Temperature may change
- III) All gases may change
- IV) Steam Pressure may increase
- V) Flame color may change

4. After at least **120 Hours or 1 week** in operation, make the necessary adjustments to bring the boiler to manufacturer's recommendation and maximum combustion efficiency.





Installation Instructions Example cont.

Typical Adjustments

- I) **For pressure systems** reduce pump pressure and the nozzle size to reduce gas flow and stack temperature.
- II) **For air atomizing systems** adjust modulation to reduce gas flow and stack temperature.
- III) Adjust for optimal stack temp, minimal soot and minimal CO.
- IV) Change air flow to optimum excess air.

Typical for Commercial Boiler applications

5. Take a new exhaust gas and combustion efficiency measurement.
6. Make the necessary adjustments to bring the boiler to manufacturer's recommended reading.





Results from Pilot on a B&W 75MM BTU Boiler

Implementation Fitch Gas Reformer
 Greensboro, NC USA - May 2019
 Babcock and Wilcox Boiler 75MM BTU
 Catalyst used FHD15-6-4 NG



Fitch Fuel Catalyst installed in Boiler on May, 2019.

Before Installation

Plant was not able to turn boiler down below 10,000 lbs. per/hour of steam flow, due to the amount of excess air that was required to burn clean and not emit high levels of CO (carbon monoxide).

At 15 percent excess air was required between minimum fire and up to 30 percent of the boiler capacity.

Boiler efficiency ranged between 72–74 percent efficiency at lower ranges.

After installation

We performed the boiler combustion testing and we were able to reduce excess air to 9 percent set point on minimum fire with no measurable amounts of CO. The required excess air is now reduced as the boiler firing rate has increased with a low of 2.7 percent excess air being required at the higher firing rates. Boiler efficiency in the lower firing rates is now at 80 -82 percent and as high as 87 percent on the high firing rates.

ROI was achieved in less than 8 months.

	Firing Range	Efficiency	Excess Air
Baseline	Low/Mid-Range	74.0%	15.0%
With Fitch Gas Reformer	Low/Mid-Range	80.0%	9.0%
Baseline	High Range	85.0%	6.2%
With Fitch Gas Reformer	High Range	89.0%	2.7%





Sample Implementations & References



- Chemical Plant
- Shellmax 4 TPH Boiler
- Oilon Burner
- 3.2 percent gas savings
- 96 percent CO reduction



- Commercial Heating Site
- Buderus Logano G215 Boiler
- Giersh RG1 Burner
- 11.4 percent gas savings
- 90 percent CO reduction



- Tire Manufacturing Plant
- S1200 & 2000 Djuro Djakovi Boilers
- Weishaupt R-JMS Burner
- 6.2 percent gas savings



Sample Customers



Be apart of a selective group of companies that are business leaders not business followers and get “competitive edge” by implementing our technology

