



Energystream 100kW-20 MW ES/ESX

Nozzle-Mix Gas Burner

- High output capacity up to 600 kW per 300mm
- Wide turndown range
- Versions available for fixed air/gas ratios (including stoichiometric) and gas only control
- Modular construction based on nominal 152mm and 305mm increments with tee and cross elements
- Minimum service maintenance
- Available in package forms with or without combustion air fan
- Side or rear air inlet for combustion air fan versions to suit customers' application

The Nu-way ENERGYSTREAM burners represent a new concept in direct fired air heating. They are nozzle mixing line type modules, available in straight or cross pattern that can be built into an infinite variety of patterns to suit duct dimensions and application constraints.

The basic ES burner head comprises burner section, integral pilot assembly, spark ignition and either flame probe or UV flame monitoring.

The ES burner package may also include a combustion air fan and gas control train, and can be mounted onto a sideplate for ease of installation in ducts.

Modulating or high/low control options are available for gas and air control, or gas only control.

Combustion air for the burner would normally be provided by a blower mounted either directly to the burner head or at a position adjacent to the duct.

Stainless steel casings and nozzles are additional options to allow operation at higher temperatures.

OPERATION MODES

Three modes of operation are available from the basic design concept.

- i. On-ratio or fixed ratio firing, utilising a control system giving on-ratio air/gas turndown throughout the burner output range. The turndown available will be dependent on the selection of the control system and can be up to 30:1. In this mode the ES burner is particularly suitable for recirculation heating systems where it is desirable to minimise excess air input into the system, in the interests of fuel economy and overall plant efficiency.

The basic system offered as standard and found to be acceptable in most instances is the linked butterfly valve arrangement. Both air and gas valves have been carefully selected for each burner/fuel combination to give the best flow/pressure drop balance, which will give up to 10:1 on ratio turndown and, as is usual, a degree of excess air can be accepted at the minimum or maximum firing capacities, the overall gas turndown can be as high as 25:1.

Variable flow characterised air/gas control valves	: Maximum turndown	: 30:1
Air butterfly / gas proportionator system	: Maximum turndown	: 15:1
Air / gas matched butterfly valves	: Maximum turndown	: 10:1 (25:1 with excess air)

- ii. Gas only turndown, utilising a single flow control gas valve and fixed flow combustion air fan mounted either to the back or side of the burner or external to the duct, offer turndown in the order of 20:1. In this mode the ES burner is suitable for a wide range of air heating and dryer applications, particularly for fresh air "once through" systems, where the presence of excess air through the burner forms only a small proportion of the total air in the system.

The combustion air fan must be capable of providing a differential pressure of 5 mbar across the burner and a volume output in the order of 400 s.c.f.m. per foot length of burner. (11m³/min per 305mm length of burner).

- iii. The burner can also be used in "open-back" form without combustion air fan, taking air from the duct system, providing there is sufficient level of oxygen in the process air. In this form, gas only turndown in the order of 20:1 is possible, providing the velocity across the burner is suitable to provide an adequate pressure drop. In this mode the unit is particularly suitable for high temperature fume incineration and make up air heating applications.

The oxygen content in the process air should not fall below 17% without reference to Nu-way. The profile plates adjacent to the burner should be sized such as to give a 3.75 mbar pressure drop over the burner. It is recommended that these plates are made adjustable and set on commissioning of the plant.

CAPACITY

System capacities are based on an output of 600 kW per nominal 305mm module. The modules available are 152mm and 305mm straight section and a 305mm x 305mm cross-section rated at 1200 kW. The modules may be assembled to match any required rating and to suit the duct cross-section available in most cases.

Note: Module lengths are nominal – see dimension sheet for burner sizes.

DESIGN CRITERIA

The range of applications for the Nu-way ES burner is considerable and the following data can only provide a guide for the design and selection of an appropriate system. Nu-way engineers are always on hand and will be pleased to assist you to utilise the equipment to its best potential.

- All duct design should follow “good design practice” as for any air movement system.
- A minimum clearance of 200mm should be allowed around the burner/head within the duct section.
- Sufficient clearance downstream of the burner must be provided to prevent flame impingement and to allow for adequate temperature dilution across the duct section. Profile plates (normally required for “open-back” operation) may be desirable to ensure temperature uniformity, although not required for burner operation. Downstream clearance should be a minimum of 1500mm.
- For optimum performance for burners with combustion air fans, duct velocity should be of the order of 10 m/sec. A wide range of duct velocities may be accommodated and references should be made to Nu-way to ensure satisfactory conditions. For “open-back” burner, duct velocity over the burner should be 20 m/sec, ensured by a profile plate.
- For the standard specification ES burner the upstream temperature should not exceed 400°C and downstream temperature 820C. If the combustion air fan is mounted on the burner within the duct the upstream temperature should not exceed 50C. Higher temperatures may be accommodated by use of alternative materials, and modified burner design. Nu-way will be pleased to advise on this aspect of equipment selection.

INSTALLATION

The ES burner system may be mounted either inside the duct section, with integral combustion air fan or “open-back” or with the combustion air fan external to the duct. Versions for face mounting, sealed or gap firing, can also be supplied. In all cases the burner unit can be mounted on a sideplate with the full complement of ancillary controls, to minimise on-site fitting and fabrication.

SITE SERVICES REQUIREMENTS

Where the ES system is supplied with integral combustion air fan and control ancillaries, i.e. HT transformer, sequence control box, gas control valvetrain, it is only necessary to bring gas and electric services to the burner for operation. If required, the ES burner is available as burner head only, with or without combustion air fan, as the application may require.

For balanced draught duct/chamber conditions, the air and gas pressure requirements are as detailed below. Where a duct/chamber pressure exists, these will be differential pressures.

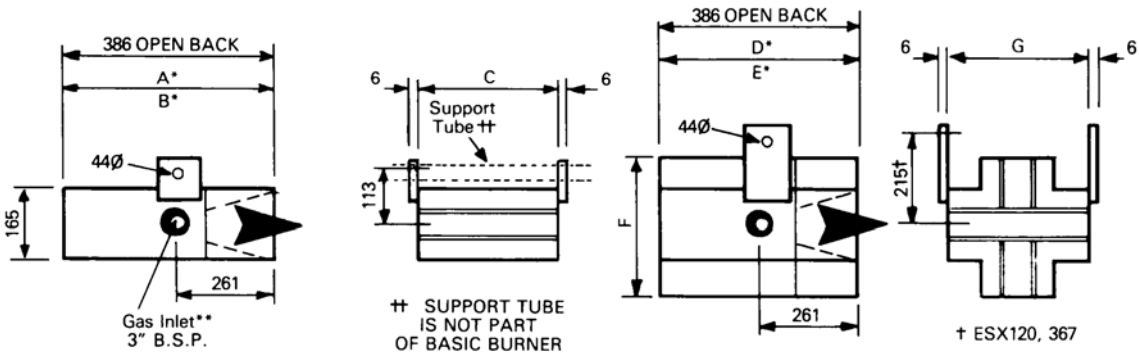
GAS ONLY CONTROL

GAS PRESSURE AT BURNER MANIFOLD INLET (3" BSP)	10 mbar
AIR PRESSURE AT BURNER AIR FLANGE INLET	5 mbar

GAS/AIR RATIO CONTROL

GAS PRESSURE AT BURNER MANIFOLD INLET (3" BSP)	10 mbar
AIR PRESSURE AT BURNER AIR FLANGE INLET	10 mbar

ES LEADING DIMENSIONS



* DIMENSIONS

SERIES ES
a and D: SIDE AIR INLET
B and E: REAR AIR INLET

SERIES ESX
** BURNERS WITH CAPACITIES AT AND ABOVE 3000 kW
WILL HAVE A MINIMUM OF TWO GAS INLETS

BURNER REF.	DIMENSIONS (mm)							BURNER REF.	DIMENSIONS (mm)						
	A	B	C	D	E	F	G		A	B	C	D	E	F	G
ES10	647	572	231	-	-	-	-	ES80	796	600	1298	-	-	-	-
ES20	647	572	384	-	-	-	-	ESX80	-	-	-	796	600	360	689
ES30	647	572	536	-	-	-	-	ES90	796	600	1451	-	-	-	-
ES40	647	572	689	-	-	-	-	ESX90	-	-	-	796	600	360	841
ESX40	-	-	-	647	572	360	384	ES100	796	600	1635	-	-	-	-
ES50	647	572	841	-	-	-	-	ESX100	-	-	-	796	600	360	1036
ES60	647	572	994	-	-	-	-	ESX110	-	-	-	796	600	360	1182
ESX60	-	-	-	647	572	-	-	ESX120	-	-	-	796	600	665	725
ESX70	796	643	1146	-	-	-	-								

BURNER REF.	CAPACITY		
	kW	kcal x 1000/h	
ES10	300	250	▶ ☒
ES20	600	500	▶ ☒
ES30	900	750	▶ ☒
ES40	1200	1000	▶ ☒
ESX40	1200	1000	▶ ☒
ES50	1500	1250	▶ ☒
ES60	1800	1500	▶ ☒
ESX60	1800	1500	▶ ☒
ES70	2100	1750	▶ ☒
ES80	2400	2000	▶ ☒

BURNER REF.	CAPACITY		
	kW	kcal x 1000/h	
ESX80	2400	2000	▶ ☒
ES90	2700	2250	▶ ☒
ESX90	2700	2250	▶ ☒
ES100	3000	2500	▶ ☒
ESX100	3000	2500	▶ ☒
ESX110	3000	2750	▶ ☒
ESX120	3600	3000	▶ ☒

▶ DENOTES GAS INLET ☒ 152mm MODULE ☒ 305mm MODULE ☒ CROSS MODULE

Incremental sizes available in varying configurations to outputs of 20MW+. (For information contact our office).

