

Flue Gas Economisers

Date added to ETL 2001 (Revised 2013).

1. Definition of Technology

Flue Gas Economisers are products that are specifically designed to improve boiler net thermal efficiency by recovering sensible heat from boiler flue gases.

2. Technology Description

Flue gas economisers are a type of heat exchanger that enables some of the sensible heat in boiler flue gases to be recovered. This heat is normally used to preheat the boiler's feedwater. Typically a flue gas economiser will increase boiler net thermal efficiency (expressed in percentage terms) by at least 3 points (i.e. a boiler with efficiency of 89.0% is improved to at least 92.0%).

Investments in flue gas economisers can only qualify for Enhanced Capital Allowances if the specific product is named on the Energy Technology Product List. To be eligible for inclusion on the Energy Technology Product List, products must meet the eligibility criteria as set out below.

3. Eligibility Criteria

Performance criteria

The product must increase the net thermal efficiency of the boiler system to which it is designed to be fitted by at least 3.0%, when the boiler system is operating at the test points set out in Table 1.

Table 1 - Performance test points for flue gas economisers

Test point % MCR	Increase in net thermal efficiency of boiler system.
30	>= 3.0 %
50	>= 3.0 %
100	>= 3.0 %

">=" means "greater than or equal to"

Where MCR is the maximum continuous rating (MCR) of the boiler system for which the product is designed.

For the avoidance of doubt the increase in net thermal efficiency of the boiler system must be presented to one decimal place. As an example, a flue gas economiser that delivers an increase in net thermal efficiency of 2.9% at 100% of the maximum continuous rating (MCR) of the boiler system for which the product is designed would be deemed to be a fail.

Required test procedures

The required minimum performance must be demonstrated using Methods A, B or C, as set out in Tables A, B and C below:

TABLE A	METHOD A - INDIRECT MEASUREMENT
<p>Under this test method, product performance must be demonstrated by measuring the improvement in net thermal efficiency of a test boiler resulting from the addition of the flue gas economiser. Net thermal efficiency must be measured at test points that are equivalent to 30%, 50% and 100% of the maximum continuous rating (MCR) of the boiler system for which the product is designed.</p> <p>Boiler net thermal efficiency must be measured in accordance with the procedures set out in BS 845:Part 1:1987, BS EN 303-3:1999 or BS EN 304:1992.</p> <p>Where BS 845:Part 1:1987 is used, the standard test conditions are: a maximum ambient air temperature of 25 degrees Centigrade and an excess combustion air level of not less than 15%.</p>	

TABLE B	METHOD B - DIRECT MEASUREMENT
<p>Under this test method, product performance must be demonstrated by calculating the improvement in boiler net thermal efficiency that will occur at 30%, 50% and 100% of the maximum continuous rating (MCR) of the boiler system for which the product is designed. This calculation must be based on an assessment of the transfer of heat power that will occur at each of these test points.</p> <p>The assessment of transfer of heat power must be done in accordance with the procedures set out in EN 305:1997, EN 306:1997 and/or EN308:1997.</p>	

TABLE C	METHOD C - VALIDATED DESIGN CALCULATIONS
<p>Under this test method:</p> <ol style="list-style-type: none"> 1. The product’s performance is determined from design calculations. The calculations should assess the improvement in the net thermal efficiency of a boiler system that the product will deliver at the full and part load conditions specified in Table 1 when tested in accordance with the procedures and test conditions specified in Method A. 2. The accuracy of these design calculations must be confirmed by interpolation and extrapolation of measurements of the improvement in net thermal efficiency actually realised by the product. The measurements must be obtained using an indirect method (flue gas loss method) from one of the test standards specified in Method A: <ol style="list-style-type: none"> a) At least one test point between 60% and 100% MCR, and: b) At least one test point between 20% and 40% MCR. 3. To be eligible, the improvement in the net thermal efficiency of boiler system at the full and part load conditions realised by fitting the product to the boiler system must exceed the performance thresholds specified in Table 1. <p>The test report must include (or be accompanied by):</p> <ol style="list-style-type: none"> a) Details of the calculations used to determine product performance. b) A copy of the published performance data for the product. c) Manufacturer’s design data for the product. d) The following test data, which must be obtained with the product operating under stable conditions at each selected test point before and after fitting the product: <ol style="list-style-type: none"> I) Analysis of flue gas composition, including as a minimum, the levels of oxygen (or carbon dioxide) and carbon monoxide in the flue gas. II) Ambient and flue gas temperatures. III) Net thermal efficiency of the boiler system. e) Details of the boiler system used during the test. 	

Representative Testing

Where applications are being made for flue gas economiser products of the same constructional design to be included on the Energy Technology Product List (ETPL), test data may be submitted for a single representative model provided that the maximum rated output of the products being applied for is not more than twice, or less than half, the maximum rated output of the product tested. Where the range of rated outputs exceeds these limits, products should be grouped into size ranges that comply with these rules, and test data submitted for one representative model for each group.

It should be noted that:

- If a manufacturer voluntarily removes a representative model from the ETPL then other products linked with that representative model may or may not be permitted to remain on the ETPL.
- If any product submitted under these representative model rules is later found not to meet the performance criteria when independently tested, then all products based on the same representative models will be removed from the ETPL.

4. Scope of Claim

Expenditure on the provision of plant and machinery can include not only the actual costs of buying the equipment, but other direct costs such as the transport of the equipment to site, and some of the direct costs of installation. Clarity on the eligibility of direct costs is available from HMRC.