



CLAYTON EG504-1-FMB STEAM GENERATOR ACHIEVES ULTRA- LOW EMISSIONS LEVELS

Needing more steam capacity for its expanding operations, in August, 2001, Cosmetic Labs, a division of Alberto Culver, Inc. elected to replace one of their older Clayton Steam Generators with a new Model EG504-1-FMB unit rated at 500 boiler horsepower. The new unit not only gave them the needed additional capacity but also fulfilled three primary requirements of the project. First, Its compact size allowed it to be installed in the same location as the older 300 BHP unit without any major changes to their existing boiler room. Second, its linear efficiency curve and rapid response characteristics provided Cosmetic Labs a new steam source capable of handling their widely varying steam load profile without any loss in system pressure or efficiency. And third, its new ultra-low NOx burner design allowed them to meet the South Coast Air Quality Air Management District's (SCAQMD) increasingly strict emissions regulations. Currently, all new boiler/ steam generator installations in the Los Angeles area under SCAQMD control with a fuel heat input rating of 20 MMBTU/hr or greater are required to reduce emissions to less than or equal to 9 ppmv NOx (corrected to 3% O₂).



**E-504/SE-504-FMB
STEAM GENERATOR**

Cosmetic Labs uses the steam in the manufacture of shampoos and lotions and is planning to gear up production at their Chatsworth, California facility. The steam is used to heat a variety of stainless steel mixing tanks, jacketed kettles, and in their DI system and Leslie hot water system. Boiler operating pressure is normally 100 psig and pressure reducing stations are used in the plant to reduce the pressure as required by the various equipment. The operating profile is one that can have very large load swings and the plant operates 24 hours a day, seven days a week. There is also an older Clayton EG202 Steam Generator installed in the existing boiler room which is available for backup as needed.



The new Model EG504-1-FMB unit has an unique ultra-low NOx fiber metal burner system developed by Clayton Industries. This system utilizes a combination of highly efficient pre-mixing, high excess air and fiber metal burner diffusion technologies. The design is an advanced version of the original low NOx burner design first introduced in 1994 which produced NOx results under 12 ppmv. The pre-mix chamber, air damper, inlet volute and burner designs have been modified to reduce not only emissions but also reduce blower motor horsepower requirements and burner efficiency losses. The redesigned air damper design now uses a multi-vane arrangement to improve air flow and reduce duct losses. The bluff body burner head has been replaced by a diffuser plate configuration and a fiber metal burner dome.

Third party source tests conducted on April 23, 2002 at the installation shows a NOx emissions range of 4.6 to 6.2 ppmv NOx over the unit's operating range. The CO emissions also are very low, ranging from 31 to 37 ppmv CO. CO₂ values ranged from 5.6 to 7.0. All values noted have been corrected to 3% O₂. Clayton plans to expand this design to cover their complete line of units from 20 to 600 BHP. For further information, please contact Clayton Industries at 800-423-4585.