

Dedusting for Efficient Biodiesel Production

SunDiesel, a synthetic biodiesel product of the latest generation from Choren Industries of Freiberg/Saxony, delivers especially high, reproducible diesel qualities due to the production process. The “Carbo-V® Process”, a feature of the new SunDiesel production plant, is a complex multistage technology. At temperatures up to 2550°F (1400°C), biomass is converted into a raw gas rich in hydrogen and carbon monoxide and free of tar, and subsequently modified to a liquid diesel end product. The production process generates dusts and flue gases which the dust removal and gas cleaning system must remove efficiently at different stages.

Two MikroPul high efficiency cyclones separate the coke dust from the tar-laden raw gas generated in the low temperature gasification stage. Variable operating gas volumes of several thousand m³/h are made possible by splitting the flow into two streams. The separated coarser particles are reintroduced to the main coke stream. The MikroPul cyclones are designed for operating temperatures up to 1020°F (550°C) and maximum pressure of 100 psi (7 bar). The selected steel grade is 1.4541 for high temperatures and high resistance to oxidation. Housing diameters range between 2.5-3' (0.8-1m) at heights of 6.5-8' (2-2.5m).

A third MikroPul cyclone serves as pre-separator in front of the Mikro-Pulsaire fine dust collector. Gas volumes can be adjusted over a 3-fold range. High amounts of coke and ash with high concentration of fines below 50µm are included in the gas stream. The cyclone housing features a diameter of 4.31' (1.3m), a height of 9' (2.8m), and a weight of 3 tons (2.7 metric tons). The cone section of this cyclone is equipped with Thermplate® double wall heating. Over 50 % of the fine dust fraction (below 20µm) is separated by the cyclone.



To separate the finest dust particles, a Mikro-Pulsaire dust collector, model 120 HP 10 TRH PR 7, was designed and built of acid-resistant stainless steel material. Its filter bags use PTFE media, a reliable and efficient filter material. The Mikro-Pulsaire is equipped with 120 filter bags and 1,463 ft² (136m²) active filter area. Flow rates can be up to 4120 cfm (7,000 m³/h) at a maximum operating temperature of 390°F (200°C). The gas tight filter elements are fastened to the tube sheet, using snap ring technology with spring tension. All parts are designed for 100 psi maximum pressure.

As a special feature, the raw gas is directed in a downstream configuration from the top through clean gas chamber and tube sheet into the filter. The parallel flow of raw

gas and dislodged dust from filter bags maximizes cleaning efficiency. The filter hopper is manufactured with Thermplate heating, a hydraulically expanded and laser welded double wall, which is divided into four heating circuits and can be filled with steam at 174 psi (12 bar) and 248°F (120°C).

The design of the filter ensures a reliable plant operation with clean gas emission levels lower than 0.006 g/ft³ (15mg/m³), whereby 99.99% of the dust is separated. Throughout the entire SunDiesel production plant, MikroPul's cyclones and dust collector separate more than 2.7 tons (2,500 kg) dust per hour, enabling efficient operating of the downstream Fischer-Tropsch-Synthesis and the production of biofuel of the finest quality.