The perovskite-type oxide $(La_{0.6}Ca_{0.4})_{0.98}(Co_{0.8}Fe_{0.2})O_3-\delta$ (LCCF) was investigated for use as oxygen separation membrane. A 25 µm thick dense membrane on a porous LCCF support with a thickness of around 175 µm was prepared by a tape casting and lamination process. The optimum sintering temperature of the component was established to be 1050 °C by analysis of microstructures of membranes sintered at different temperatures. Scanning electron microscopy (SEM) examination of cross-sections of the sintered membrane showed that it consisted of two phases, the main phase being enriched in calcium (Ca) and depleted in lanthanum (La), relative to the nominal composition. A surface activation layer of LCCF was deposited onto the dense layer to increase the exchange rate of oxygen at the surface. For the coated membrane, the oxygen permeation flux increased with temperature and reached a maximum value of 3.32 Nml cm$^{-2}$ min$^{-1}$ at 900 °C when, for characterization purpose pure oxygen was used as feed and a maximum value of 2.06 Nml cm$^{-2}$ min$^{-1}$ at 900 °C was obtained when air was used at the feed side, both with N$_2$ sweep on the permeate side. The stability of the membrane against sulfur dioxide (SO$_2$) and pure carbon dioxide (CO$_2$) was tested. A small decrease in the flux was observed over 48 h in CO$_2$ at 850 °C. SEM examinations of the cross-section of the tested membrane showed that the Ca rich phase in the membrane showed a tendency to migrate to the feed side. Whereas the material shows a CO$_2$ stability superior to that of Sr or Ba containing analogues, the material stability is not sufficient for applications requiring direct exposure to sulfur-rich flue gases.