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## Process synthesis

The process synthesis (PS) stage of the overall process design involves the selection of the process configuration and the identification of the process flowsheet. The PS stage is a key component of the overall process design and is often the most challenging part of the design process. The PS stage involves the selection of the process configuration and the identification of the process flowsheet. The PS stage is a key component of the overall process design and is often the most challenging part of the design process.

In order to produce a given  $H_2$  and  $CO$  syngas ratio we can start with a given  $CO_2$  and  $H_2O$  feed. The following table shows the stoichiometric requirements for the production of 1 mol of  $H_2$  and 1 mol of  $CO$  from the following reaction. The table is for a syngas ratio of  $H_2/CO = 1.5$  mol of  $H_2$  per mol of  $CO$ , which gives a  $H_2/CO$  ratio of 1.5. The efficiency of the process is 75% based on the lower heating value of the syngas. This  $H_2/CO$  ratio of 1.5 is reproduced by the feed of the Shift-React stage which is 1.5 mol of  $H_2$  per mol of  $CO$ . The overall process is shown in Figure 1. The overall process is shown in Figure 1.



When producing all of the above components, the reaction is exothermic and requires a cooling system.