**The PG model:** The PG (Perfect Gas) model simplifies the IG (Ideal Gas) model by assuming the specific heats to be constant (a material property). Although it is less accurate than the IG model, particularly if there is significant change in temperature, it is the simplest gas model and is ideally suitable for simplified analysis.

**Assumptions:**

(i) A perfect gas obeys the ideal gas equation of state:

 (1)

.

(ii) For both the IG and PG models,is assumed to be a function of temperature only (it is actually a corollary to the first assumption.

(iii) For the PG model,  is also assumed to be a material property and, therefore, has a constant value for a given perfect gas.

**PG model equations:** (Constant value of  and are read from tables, where  (2)

, , where  (3)

; ; also, ,  (4)

 process: (5)

For polytropic process replace  with 

**General state equations:** (Applies to any substance)

 ; ; ; ; ; ;  (6)

 ; ; ;  (7)

 ; ; ;  (8)

 ; ;  (9)

**Reference:** Chapter 1 introduces the concept of states and properties, Chapter 3 covers various material models and state evaluation, and Chapter 11 introduces advanced concepts on property evaluation. Read more about the PG model in Sec. 3.5.2.