

Single-barrier well completion Heat Transfer Coefficient @model

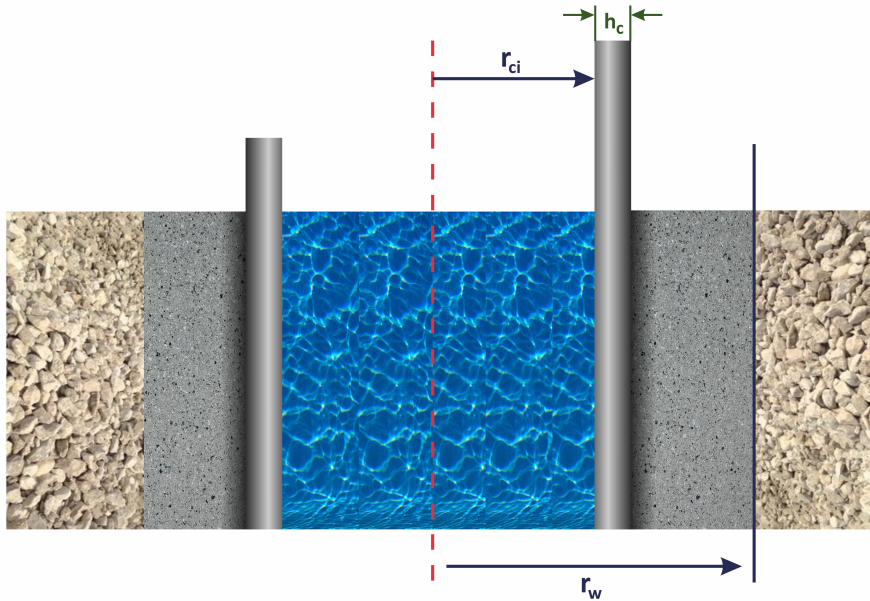


Fig. 1. Single-barrier well completion schematic

The **Heat Transfer Coefficient (HTC)** of **dual-barrier well completion** is defined by the following equation:

$$(1) \quad \frac{1}{r_{ci} U} = \frac{1}{r_{ci} U_{ci}} + \frac{1}{r_{ci} U_c} + \frac{1}{r_c U_{cem}}$$

where

r_c	outer radius of the casing
r_{ci}	inner radius of the casing
$h_c = r_c - r_i$	casing wall thickness
r_w	wellbore radius by drilling bit
$U_{ci} = \frac{\lambda}{2 r_{ci}} \text{Nu}_{ci}$	Pipe Flow Heat Transfer Coefficient
$U_c = \frac{\lambda_c}{r_{ci} \cdot \ln(r_c/r_{ci})}$	Casing Wall Conductive Heat Transfer Coefficient
$U_{cem} = \frac{\lambda_{cem}}{r_c \cdot \ln(r_w/r_c)}$	Cement Conductive Heat Transfer Coefficient
λ	thermal conductivity of fluid moving through the tubing
λ_c	thermal conductivity of casing material
λ_{cem}	thermal conductivity of cement

The equation (1) can be written explicitly as:

$$(2) \quad \frac{1}{r_{ti} U} = \frac{2}{\lambda \text{Nu}_{ci}} + \frac{1}{\lambda_c} \ln \frac{r_c}{r_{ci}} + \frac{1}{\lambda_{cem}} \ln \frac{r_w}{r_c}$$

See also

[Physics](#) / [Thermodynamics](#) / [Heat Transfer](#) / [Heat Transfer Coefficient \(HTC\)](#) / [Heat Transfer Coefficient \(HTC\) @model](#)

[[Dual-barrier well completion Heat Transfer Coefficient @model](#)]

[[Thermal conductivity](#)] [[Nusselt number \(Nu\)](#)]