Table 1: Shape Factors C_A for Common Drainage Area Geometries

Drainage Geometry	**Shape Factor** C_A (dimensionless)
Circular area, well at center	$4\pi \approx 12.57$
Square area, well at center	31.62
Square area, well at corner	6.25
Square area, well at side center	15.8
Rectangle (2:1 aspect ratio), well at center	26.2
Rectangle (4:1 aspect ratio), well at center	24.0
Rectangle (6:1 aspect ratio), well at center	23.3
Irregular shapes (approximate)	10–30

The choice of C_A is crucial for accurately estimating flow rate and productivity in finite reservoirs. When not directly known, it can be approximated from simulation or inferred from matching historical data.

When these shape factors are applied to Equation (1), engineers can evaluate the performance of wells in bounded reservoirs with a variety of drainage configurations.

$$q = \frac{kh}{\mu B} \cdot \frac{A}{C_A} \cdot (\bar{p}_r - p_w) \tag{1}$$

This general equation applies for both undersaturated oil reservoirs and for compressible gas systems if p is replaced with real gas pseudopressure $m(p)$, as shown earlier in Equation (**??**).