QUESTION:
Two equivalent pieces of quality inspection equipment are being considered for purchase by a company. Machine 2 is expected to be versatile and technologically advanced enough to provide net income longer than machine 1. Machine 1 has a shorter payback period of 6.57 years at MARR=15% compared to that of 9.52 years of Machine 2.

<table>
<thead>
<tr>
<th></th>
<th>Machine 1</th>
<th>Machine 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial cost, $</td>
<td>-12 000</td>
<td>-8 000</td>
</tr>
<tr>
<td>Annual Net Cash Flow $/year</td>
<td>3 000</td>
<td>1 000 (years 1-5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 000 (years 6-14)</td>
</tr>
<tr>
<td>Salvage value, $</td>
<td>negligible</td>
<td>negligible</td>
</tr>
<tr>
<td>Maximum life, years</td>
<td>7</td>
<td>14</td>
</tr>
</tbody>
</table>

Determine which machine has to be selected on the basis of an annual equivalent (AE) comparison at an interest rate of 15% per year.

SOLUTION:

\[
AE_{\text{Machine 1}} = -12 000(A/P, 15%, 7) + 3 000 \\
= -12 000(0.2404) + 3 000 \\
= $115.20
\]

\[
AE_{\text{Machine 2}} = -8 000(A/P, 15%, 14) + 1000(P/A, 15%, 5)(A/P, 15%, 14) \\
+ 3000(P/A, 15%, 9)(P/F, 15%, 5)(A/P, 15%, 14) \\
= -8 000(0.1747) + 1000(3.3522)(0.1747) + 3000(4.7716)(0.4972)(0.1747) \\
= $431.43
\]

(Factors were taken from Table/p.890)

Decision: Select Machine 2 according to its higher annual equivalent worth ($431.43) than that of Machine 1($115.20):

\[
AE_{\text{Machine 2}} > AE_{\text{Machine 1}}
\]