**APPLICATION**—These S&C Coordinating Speed refill units should be applied only where the maximum continuous load current does not exceed 400 amperes and where all fault currents below 2000 amperes for refill units rated 410 amperes, and 4000 amperes for refill units rated 420 amperes, will be cleared by another fuse. They are for use where load conditions do not require a fuse or higher amperage rating, but where additional time margin in the “protected” fuse is necessary for coordination with a “protecting” fuse or other device, or to withstand transient overcurrents associated with the switching and starting of electrical equipment.

Since these refill units have silver element construction which is not subject to damage by aging or transient overcurrents, it is unnecessary to replace blown refill units in single-phase or three-phase installations when one or more refill units have blown.

**COORDINATION**—These curves represent the total time required for a refill unit to melt and interrupt a fault current, and should be followed in coordination problems where fuses are applied as “protection” devices.

1. When close coordination is required:
   - These refill units are tested in accordance with the procedure described in ANSI Standard C37.41–1981. As required by this standard, the minimum melting and total clearing curves are based on tests starting with the refill unit at an ambient temperature of 20°C and no initial load.

2. When, regardless of the preciseness of coordination, the protected fuse is subjected to temporary overloads.
   - There are cases where the coordination requirements may be very exacting, for example, in coordinating a transformer-primary fuse with a secondary breaker and a source-side breaker. The time interval between the adjusted minimum melting curve and the total clearing curve may be very narrow. Under these circumstances there must be an extremely short time interval between the minimum melting and the total clearing characteristics of the fuse.

The refill units represented by these curves possess this short time interval feature, since—having a nondamageable fusible element construction which is helically coiled fusible element construction can better resolve a coordination impasse than the use of another ampere rating for either the protecting or protected device, or to withstand transient overcurrents associated with the switching and starting of electrical equipment.

Since these refill units have silver element construction which is not subject to damage by aging or transient overcurrents, it is unnecessary to replace blown refill units in single-phase or three-phase installations when one or more refill units have blown.

**TOLERANCES**—Curves are plotted to maximum test points. All variations are minus.

**CONSTRUCTION**—Fuseless elements are silver and of solderless construction.

**BASE**—These refill units are tested in accordance with the procedure described in ANSI Standard C37.41–1981. As required by this standard, the minimum melting and total clearing curves are based on tests starting with the refill unit at an ambient temperature of 20°C and no initial load.

**TIME IN SECONDS**

<table>
<thead>
<tr>
<th>Ampere Ratings</th>
<th>K2 Nom. Ratings</th>
<th>Ampere Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>410 420</td>
<td>7.2 and 14.4</td>
<td>410 and 450</td>
</tr>
</tbody>
</table>

**SM REFILL UNITS—S&C COORDINATING SPEED**

**TOTAL CLEARING TIME-CURRENT CHARACTERISTIC CURVES**

**CURRENT IN AMPERES**

<table>
<thead>
<tr>
<th>CURRENT IN AMPERES</th>
<th>TIME IN SECONDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>10</td>
</tr>
<tr>
<td>900</td>
<td>20</td>
</tr>
<tr>
<td>800</td>
<td>30</td>
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<tr>
<td>700</td>
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<tr>
<td>600</td>
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<td>300</td>
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<tr>
<td>200</td>
<td>90</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

This narrow time band normally will provide the desired coordination. If the selected S&C Coordinating Speed refill unit does not meet the coordination requirements, check to see if a refill unit in the S&C Slow Speed or S&C Standard Speed will satisfy.

Sometimes a selected amperage rating will fail to meet the coordination requirements in any available speed. In this case the selection of another amperage rating for either the protecting or protected fuse usually will satisfy all requirements.

Do not assume that other fuses that do not employ S&C's silver, helically coiled fusible element construction can better resolve a coordination impasse than the use of another amperage rating in one of the S&C speed options. Such other fuses, including “time-lag” speeds, “super-slow” speeds, and “high-surge” speeds, require the use of “safety-zone” or setback allowances and, in addition, they have larger construction tolerances (plus 20% in current; plus 40% in terms of time). The application of these two factors will give a time interval between the adjusted minimum melting curve and the total clearing curve greater than in the case of S&C speed options.