

Installing plumbing or mechanical systems often means that it necessary for combustible and non-combustible pipe or tubing to penetrate fire-resistive floor or wall assemblies. This process involves cutting or drilling oversized openings for the pipe or tubing to pass through. Once the penetrant is installed, a gap or annular space is left. If left open, these gaps could allow the spread of flames, smoke, and hot gases. Firestop materials are installed as part of a firestop system to close the gaps and restore the hourly rating of fire-resistive rated assemblies.

Listing of firestop materials for use with PEX tubing and the associated installation system designs are completed by the manufacturer of the firestop materials. The firestop system that would be used is determined by the type of installation being done.

Different standards and testing exist for Canada (CAN/ULC S115) and the USA (ASTM E814). It is important that the firestop system selected is correct for the country where the installation is being completed.

Manufacturers of firestop materials and listing holders include, but are not limited to:

- 3M™
- Hilti Inc.
- Nuco Inc.
- RectorSeal®
- Specified Technologies Inc.

Some manufacturers offer cast-in-place sleeves for concrete applications. Contact the manufacturer for product and installation information.

On the following pages are non-comprehensive tables, by standard, firestop manufacturer, and construction type.

1. The information in these tables about a specific system number is for general reference only. For specific details, please obtain a copy of the system from the supplier of the firestop material. The details in the system can change without notice.
2. Maximum rating listed. Ratings can change depending on the type of installation being done. Please reference the specific system for further details.
3. It is the responsibility of the contractor performing the installation to ensure that the installation meets the requirements of a specific system. HeatLink Group Inc. does not take any responsibility for the information in the following tables or for installations that do not meet the specifications from the firestop material manufacturer.
4. Most firestop systems require the "tubing to be rigidly supported on both sides of floor or wall assembly."
5. Only PEX tubing is listed as a penetrant in the firestop systems, fittings should not come into contact with firestop material.

3M – ASTM E814 Firestop Systems

| Assembly Type |             | Wall                   |            | Floor / Ceiling |            |
|---------------|-------------|------------------------|------------|-----------------|------------|
|               |             | Max. PEX Size          | Design     | Max. PEX Size   | Design     |
| Concrete      | 1-hour      | 2"                     | C-AJ-2626  | 2"              | C-AJ-2626  |
|               | 2-hour      | 1"                     | PHV 120-11 | 1"              | PH 120-10  |
|               |             | 1"                     | C-AJ-2213  | 1"              | PHV 120-11 |
|               |             | 1"                     | C-AJ-2378  | 1"              | C-AJ-2213  |
|               |             | 1"                     | C-AJ-2738  | 1"              | C-AJ-2378  |
|               |             | 1"                     | W-J-2110   | 1"              | C-AJ-2738  |
|               |             | 1" (x3)                | PHV 120-04 | 1" (x3)         | PHV 120-04 |
|               |             | 2"                     | C-AJ-2510  | 2"              | C-AJ-2510  |
|               |             | 2"                     | C-AJ-2536  | 2"              | C-AJ-2536  |
|               |             | 2"                     | C-AJ-2626  | 2"              | C-AJ-2626  |
|               |             | 2"                     | C-AJ-2627  | 2"              | C-AJ-2627  |
|               |             | 2"                     | W-J-2231   | 2" multiple     | C-AJ-2076C |
|               |             | 2" multiple            | C-AJ-2076C | ¾"              | F-A-2115   |
|               |             | Wood-stud / Steel-stud | 1-hour     | 1"              | PHV 120-11 |
| 1"            | W-L-2091    |                        |            | 1"              | PHV 120-11 |
| 1" (x3)       | PHV 120-04  |                        |            | 1"              | F-C-2039   |
| 1" (x3)       | W-L-2146    |                        |            | 1"              | F-C-2240   |
| 1" multiple   | W-L-2300    |                        |            | 1"              | F-E-2002   |
| 1" multiple   | W-L-2483    |                        |            | 1"              | F-E-2012   |
| ½"            | PHV 60-01   |                        |            | 1" (x3)         | PHV 120-04 |
| 2"            | W-L-2448    |                        |            | ½"              | PHV 60-01  |
| 2"            | W-L-2543    |                        |            | ½"              | F-C-2343   |
| 2"            | W-L-2547    |                        |            | ½" (x2)         | F-C-2344   |
| ¾"            | W-L-2173    |                        |            | 2"              | F-C-2391   |
|               |             |                        |            | 2"              | F-E-2040   |
| 2-hour        | 1"          |                        |            | PHV 120-11      | 1"         |
|               | 1"          |                        | W-L-2090   | 1" (x3)         | PHV 120-04 |
|               | 1"          |                        | W-L-2091   |                 |            |
|               | 1" (x3)     |                        | PHV 120-04 |                 |            |
|               | 1" (x3)     |                        | W-L-2146   |                 |            |
|               | 1" multiple |                        | W-L-2300   |                 |            |
|               | 1" multiple |                        | W-L-2483   |                 |            |
| 2"            | W-L-2448    |                        |            |                 |            |
| 2"            | W-L-2543    |                        |            |                 |            |
| 2"            | W-L-2547    |                        |            |                 |            |

Hilti – ASTM E814 Firestop Systems

| Assembly Type |                           | Wall          |           | Floor / Ceiling |           |          |
|---------------|---------------------------|---------------|-----------|-----------------|-----------|----------|
|               |                           | Max. PEX Size | Design    | Max. PEX Size   | Design    |          |
| Concrete      | 1-hour                    | 1" multiple   | W-J-2207  |                 |           |          |
|               | 2-hour                    | 1"            | C-AJ-2170 | 1"              | C-AJ-2170 |          |
|               |                           | 1"            | C-AJ-2647 | 1"              | C-AJ-2647 |          |
|               |                           | 1" multiple   | C-AJ-2407 | 1" multiple     | C-AJ-2407 |          |
|               |                           | ½" multiple   | F-A-2142  | ½" multiple     | F-A-2142  |          |
|               |                           | 2"            | F-B-2040  | 2"              | F-B-2040  |          |
|               |                           | 2"            | F-B-2041  | 2"              | F-B-2041  |          |
|               | 3-hour                    | 1" (×6)       | C-BJ-2028 | 1" (×6)         | C-BJ-2028 |          |
|               |                           | 1" (×6)       | C-BJ-2041 | 1" (×6)         | C-BJ-2041 |          |
|               |                           | 2"            | C-BJ-2040 | 2"              | C-BJ-2040 |          |
|               | Wood-stud /<br>Steel-stud | 1-hour        | 1"        | W-L-2186        | 1"        | F-C-2081 |
|               |                           |               | 1"        | W-L-2235        | 1"        | F-C-2230 |
| 1" (×6)       |                           |               | W-L-2480  | 1"              | F-C-2334  |          |
| 1" multiple   |                           |               | W-L-2466  | 1" (×3)         | F-C-2310  |          |
| 1" multiple   |                           |               | W-L-2467  | ½" (×4)         | F-C-8038  |          |
| 1" multiple   |                           |               | W-L-2537  | ½" (×4)         | F-C-8044  |          |
| ½"            |                           |               | W-L-5342  | ¾"              | F-E-2051  |          |
| ½" (×12)      |                           |               | W-L-5224  |                 |           |          |
| 2"            |                           |               | W-L-2474  |                 |           |          |
| 2-hour        |                           | 1"            | W-L-2186  | 1"              | F-C-2081  |          |
|               |                           | 1"            | W-L-2235  |                 |           |          |
|               |                           | 1" (×6)       | W-L-2480  |                 |           |          |
|               |                           | 1" multiple   | W-L-2466  |                 |           |          |
|               |                           | 1" multiple   | W-L-2467  |                 |           |          |
|               |                           | 1" multiple   | W-L-2537  |                 |           |          |
|               |                           | ½"            | W-L-5342  |                 |           |          |
|               |                           | ½" (×12)      | W-L-5224  |                 |           |          |
|               |                           | 2"            | W-L-2474  |                 |           |          |

Nuco – ASTM E814 Firestop Systems

| Assembly Type             |        | Wall          |           | Floor / Ceiling |           |
|---------------------------|--------|---------------|-----------|-----------------|-----------|
|                           |        | Max. PEX Size | Design    | Max. PEX Size   | Design    |
| Concrete                  | 1-hour | 2"            | C-AJ-2314 | 2"              | C-AJ-2314 |
|                           |        | 2"            | C-AJ-2587 | 2"              | C-AJ-2587 |
|                           | 2-hour | 1"            | C-AJ-2443 | 1"              | C-AJ-2443 |
|                           |        | 1"            | C-AJ-2504 | 1"              | C-AJ-2504 |
|                           |        | 1" (x2)       | C-BJ-8018 | 1" (x2)         | C-BJ-8018 |
|                           |        | 2"            | C-AJ-2314 | 2"              | C-AJ-2314 |
|                           |        | 2"            | C-AJ-2315 | 2"              | C-AJ-2315 |
|                           |        | 2"            | C-AJ-2406 | 2"              | C-AJ-2406 |
|                           |        | 2"            | C-AJ-2439 | 2"              | C-AJ-2439 |
|                           |        | 2"            | C-BJ-2037 | 2"              | C-BJ-2037 |
|                           |        |               |           | 2"              | F-A-2105  |
|                           |        |               |           | 2"              | F-A-2116  |
|                           | 3-hour | 2"            | C-AJ-2585 | 2"              | C-AJ-2585 |
|                           |        | 2"            | C-AJ-2587 | 2"              | C-AJ-2587 |
| Wood-stud /<br>Steel-stud | 1-hour | 1" (x6)       | W-L-2421  | 2"              | F-C-2200  |
|                           |        |               |           | 2" multiple     | F-C-2228  |
|                           | 2-hour | 1" (x6)       | W-L-2398  |                 |           |

RectorSeal – ASTM E814 Firestop Systems

| Assembly Type             |          | Wall                |             | Floor / Ceiling |           |
|---------------------------|----------|---------------------|-------------|-----------------|-----------|
|                           |          | Max. PEX Size       | Design      | Max. PEX Size   | Design    |
| Concrete                  | 1-hour   | 1"                  | W-J-2001    |                 |           |
|                           | 1.5-hour | 1" multiple         | C-AJ-2605   | 1" multiple     | C-AJ-2605 |
|                           | 2-hour   | 1 ½"                | W-J-2051    | 1 ½"            | F-A-2171  |
|                           |          | 1"                  | C-AJ-2494   | 1"              | C-AJ-2494 |
|                           |          | 1"                  | C-AJ-2679   | 1"              | C-AJ-2679 |
|                           |          | 1"                  | W-J-2025    | 1"              | F-A-2235  |
|                           |          | 1"                  | W-J-2035    | 1" (×6)         | C-AJ-2176 |
|                           |          | 1"                  | W-J-2122    | 2"              | C-AJ-2628 |
|                           |          | 1"                  | W-J-2142    |                 |           |
|                           |          | 1"                  | W-J-2162    |                 |           |
|                           |          | 1"                  | W-J-2197    |                 |           |
|                           |          | 1"                  | W-J-2266    |                 |           |
|                           |          | 1" (×6)             | C-AJ-2176   |                 |           |
|                           |          | 2"                  | W-J-2180    |                 |           |
|                           |          | 2"                  | C-AJ-2628   |                 |           |
|                           | 3-hour   | 1"                  | C-AJ-2119   | 1"              | C-AJ-2119 |
|                           |          | 1" and ¾"           | C-AJ-2194   | 1" and ¾"       | C-AJ-2194 |
| ⅝" multiple               |          | C-AJ-2623           | ⅝" multiple | C-AJ-2622       |           |
| Wood-stud /<br>Steel-stud | 1-hour   | 1 ½"                | W-L-2170    | 1"              | F-C-2192  |
|                           |          | 1"                  | W-L-2007    | 1"              | F-C-2212  |
|                           |          | 1"                  | W-L-2121    | 1"              | F-C-2298  |
|                           |          | 1"                  | W-L-2209    | 1"              | F-C-2329  |
|                           |          | 1"                  | W-L-2262    | 1"              | F-C-8039  |
|                           |          | 1"                  | W-L-2402    | 1" (×2)         | F-C-8015  |
|                           |          | 1" (×1) and ¾" (×2) | W-L-2287    | 1" and ¾" (×2)  | F-C-2221  |
|                           |          | 1" multiple         | W-L-2373    | 1" and ¾" (×2)  | F-E-2007  |
|                           |          | 2"                  | W-L-2342    | ¾" multiples    | F-C-2385  |
|                           |          | 2"                  | W-L-2430    |                 |           |
|                           | 2-hour   | 1 ½"                | W-L-2170    | 1" and ¾" (×2)  | F-C-2221  |
|                           |          | 1"                  | W-L-2104    | ¾" multiples    | F-C-2385  |
|                           |          | 1"                  | W-L-2121    |                 |           |
|                           |          | 1"                  | W-L-2262    |                 |           |
|                           |          | 1"                  | W-L-2402    |                 |           |
|                           |          | 1" (×1) and ¾" (×2) | W-L-2287    |                 |           |
|                           |          | 1" multiple         | W-L-2373    |                 |           |
| 2"                        |          | W-L-2342            |             |                 |           |
| 2"                        | W-L-2430 |                     |             |                 |           |

STI – ASTM E814 Firestop Systems

| Assembly Type          |             | Wall          |             | Floor / Ceiling |           |
|------------------------|-------------|---------------|-------------|-----------------|-----------|
|                        |             | Max. PEX Size | Design      | Max. PEX Size   | Design    |
| Concrete               | 2-hour      | 1 ¼" multiple | C-AJ-2586   | 1 ¼" multiple   | C-AJ-2586 |
|                        |             | 1"            | C-AJ-5345   | 1"              | C-AJ-5345 |
|                        |             | 1"            | W-J-2021    | 1"              | F-A-2186  |
|                        |             | 1"            | W-J-2043    | 1" multiple     | C-AJ-2140 |
|                        |             | 1"            | W-J-2076    | 1" multiple     | C-AJ-2291 |
|                        |             | 1"            | W-J-2232    | 1" multiple     | F-A-2224  |
|                        |             | 1"            | W-J-2233    | 1" multiple     | F-A-2226  |
|                        |             | 1"            | W-J-5148    | 2"              | C-BJ-2046 |
|                        |             | 1" (x3)       | W-J-2077    | 2"              | F-A-2225  |
|                        |             | 1" multiple   | C-AJ-2140   |                 |           |
|                        |             | 1" multiple   | C-AJ-2291   |                 |           |
|                        |             | 1" multiple   | F-A-2227    |                 |           |
|                        |             | 2"            | C-BJ-2046   |                 |           |
|                        |             | 2"            | F-A-2225    |                 |           |
|                        | 2"          | W-J-2291      |             |                 |           |
|                        | 3-hour      | 1 ½"          | C-AJ-2671   | 1 ½"            | C-AJ-2671 |
|                        |             | 1 ½"          | C-AJ-5344   | 1 ½"            | C-AJ-5344 |
|                        |             | 1 ½"          | C-AJ-5346   | 1 ½"            | C-AJ-5346 |
|                        |             | 1"            | C-AJ-2031   | 1 ½"            | F-A-2204  |
|                        |             | 2"            | C-AJ-2578   | 1"              | C-AJ-2031 |
|                        |             |               | 1" multiple | F-A-2203        |           |
|                        |             |               | 2"          | C-AJ-2578       |           |
| Wood-stud / Steel-stud | 1-hour      | 1"            | W-L-2100    | 1"              | F-C-8021  |
|                        |             | 1"            | W-L-2241    | 1"              | F-E-2003  |
|                        |             | 1"            | W-L-2549    | 1"              | F-E-8003  |
|                        |             | 1"            | W-L-5290    | 1" multiple     | F-C-2252  |
|                        |             | 1" multiple   | W-L-2144    | 1" multiple     | F-C-2319  |
|                        |             | 2"            | W-L-2631    | 1" multiple     | F-C-8029  |
|                        |             |               |             | 1" multiple     | F-C-8045  |
|                        |             |               |             | 1" multiple     | F-E-8010  |
|                        | 2-hour      |               |             | 2"              | F-C-2032  |
|                        |             | 1"            | W-L-2100    |                 |           |
|                        |             | 1"            | W-L-2241    |                 |           |
|                        |             | 1"            | W-L-2549    |                 |           |
|                        |             | 1"            | W-L-5290    |                 |           |
|                        | 1" multiple | W-L-2144      |             |                 |           |
|                        | 2"          | W-L-2631      |             |                 |           |

3M – CAN/ULC S115 Firestop Systems

| Assembly Type             | Rating | Wall          |            | Floor / Ceiling |            |
|---------------------------|--------|---------------|------------|-----------------|------------|
|                           |        | Max. PEX Size | Design     | Max. PEX Size   | Design     |
| Concrete                  | 2-hour | 1"            | PHV 120-11 | 1"              | PH 120-10  |
|                           |        | 1"            | PHV 120-12 | 1"              | PHV 120-11 |
|                           |        | 1" (x3)       | PHV 120-04 | 1"              | PHV 120-12 |
|                           |        | 2" multiple   | C-AJ-2076C | 1" (x3)         | PHV 120-04 |
|                           |        |               |            | 2" multiple     | C-AJ-2076C |
| Wood-stud /<br>Steel-stud | 1-hour | 1"            | PHV 120-11 | 1"              | PH 60-07   |
|                           |        | 1"            | PV 60-02   | 1"              | PH 60-04   |
|                           |        | 1" (x3)       | PHV 120-04 | 1"              | PHV 120-11 |
|                           |        | ½"            | PHV 60-01  | 1" (x3)         | PHV 120-04 |
|                           |        |               |            | ½"              | PHV 60-01  |
|                           | 2-hour | 1"            | PHV 120-11 | 1"              | PHV 120-11 |
|                           |        | 1" (x3)       | PHV 120-04 | 1" (x3)         | PHV 120-04 |

Hilti – CAN/ULC S115 Firestop System Designs

| Assembly Type             | Rating | Wall          |           | Floor / Ceiling |           |
|---------------------------|--------|---------------|-----------|-----------------|-----------|
|                           |        | Max. PEX Size | Design    | Max. PEX Size   | Design    |
| Concrete                  | 1-hour | 1"            | W-J-2011  |                 |           |
|                           | 2-hour | 1"            | C-AJ-2072 | 1"              | C-AJ-2072 |
|                           |        | 1" multiple   | W-J-2016  | 2"              | C-AJ-2061 |
|                           |        | 2"            | C-AJ-2061 | 2"              | F-A-2009  |
|                           |        |               |           | 2"              | F-A-2013  |
| 3-hour                    |        |               | 2"        | F-A-2013        |           |
| Wood-stud /<br>Steel-stud | 1-hour | 1"            | W-L-2019  | 1"              | F-C-2005  |
|                           |        | 1" (x6)       | W-L-2047  | 1"              | F-C-2378  |
|                           |        | 1" multiple   | W-L-2038  | 1"              | F-E-2005  |
|                           |        | ½" (x12)      | W-L-5224  | ½" (x4)         | F-C-8038  |
|                           |        |               |           | ¾"              | F-E-2051  |
|                           | 2-hour | 1" (x6)       | W-L-2047  |                 |           |
|                           |        | 1" multiple   | W-L-2038  |                 |           |
| ½" (x12)                  |        | W-L-5224      |           |                 |           |

Nuco – CAN/ULC S115 Firestop Systems

| Assembly Type          | Rating   | Wall          |           | Floor / Ceiling |           |
|------------------------|----------|---------------|-----------|-----------------|-----------|
|                        |          | Max. PEX Size | Design    | Max. PEX Size   | Design    |
| Concrete               | 1-hour   | 2"            | C-AJ-2012 | 2"              | C-AJ-2012 |
|                        | 2-hour   | 1 ½"          | C-AJ-2014 | 1 ½"            | C-AJ-2014 |
|                        |          | 1" (×2)       | C-BJ-8018 | 1" (×2)         | C-BJ-8018 |
|                        |          | 2"            | C-AJ-2012 | 2"              | C-AJ-2012 |
|                        |          | 2"            | C-AJ-2030 | 2"              | C-AJ-2030 |
|                        |          | 2"            | C-BJ-2008 | 2"              | C-BJ-2008 |
|                        |          | 2" multiple   | C-AJ-2029 | 2"              | F-A-2033  |
| 2" multiple            |          | 2" multiple   | C-AJ-2029 |                 |           |
| Wood-stud / Steel-stud | 1-hour   | 1"            | W-L-2012  | 2"              | F-C-2021  |
|                        |          | 1" (×6)       | W-L-2033  | 2"              | F-C-2030  |
|                        |          | 2"            | W-L-2013  | 2"              | F-E-2001  |
|                        |          | 2"            | W-L-2036  |                 |           |
|                        | 1.5-hour |               |           | 2"              | F-E-2001  |
|                        | 2-hour   | 1"            | W-L-2012  | 2"              | F-E-2001  |
|                        |          | 1" (×6)       | W-L-2029  | 2"              | F-E-2010  |
| 2"                     |          | W-L-2013      |           |                 |           |

RectorSeal – CAN/ULC S115 Firestop Systems

| Assembly Type          | Rating | Wall                |           | Floor / Ceiling |           |
|------------------------|--------|---------------------|-----------|-----------------|-----------|
|                        |        | Max. PEX Size       | Design    | Max. PEX Size   | Design    |
| Concrete               | 1-hour | 1"                  | W-J-2001  |                 |           |
|                        |        | 1"                  | W-L-2007  |                 |           |
|                        | 2-hour | 1"                  | C-AJ-2494 | 1"              | C-AJ-2494 |
|                        |        | 1"                  | C-AJ-2679 | 1"              | C-AJ-2679 |
|                        |        | 1"                  | W-J-2266  | 1"              | F-A-2235  |
|                        | 3-hour | 1" and ¾"           | C-AJ-2194 | 1" and ¾"       | C-AJ-2194 |
|                        |        | ¾" multiple         | C-AJ-2625 | ¾" multiple     | C-AJ-2624 |
| Wood-stud / Steel-stud | 1-hour | 1" (×1) and ¾" (×2) | W-L-2287  |                 |           |
|                        | 2-hour | 1" (×1) and ¾" (×2) | W-L-2287  |                 |           |



STI – CAN/ULC S115 Firestop Systems

| Assembly Type |                           | Wall        |           | Floor / Ceiling |           |
|---------------|---------------------------|-------------|-----------|-----------------|-----------|
|               |                           | PEX Size    | Design    | PEX Size        | Design    |
| Concrete      | 2-hour                    | 1"          | C-AJ-2031 | 1"              | C-AJ-2031 |
|               |                           | 1"          | C-AJ-5345 | 1"              | C-AJ-5345 |
|               |                           | 1"          | W-J-2021  | 1" multiple     | C-AJ-2140 |
|               |                           | 1"          | W-J-2043  | 1" multiple     | C-AJ-2291 |
|               |                           | 1"          | W-J-2076  | 1" multiple     | F-A-2224  |
|               |                           | 1"          | W-J-2232  | 2"              | C-BJ-2046 |
|               |                           | 1"          | W-J-2233  |                 |           |
|               |                           | 1"          | W-J-5148  |                 |           |
|               |                           | 1" (x3)     | W-J-2077  |                 |           |
|               |                           | 1" multiple | C-AJ-2140 |                 |           |
|               |                           | 1" multiple | C-AJ-2291 |                 |           |
|               |                           | 1" multiple | F-A-2225  |                 |           |
|               |                           | 2"          | C-BJ-2046 |                 |           |
|               | 3-hour                    | 1 ½"        | C-AJ-2671 | 1 ½"            | C-AJ-2671 |
|               |                           | 1 ½"        | C-AJ-5344 | 1 ½"            | C-AJ-5344 |
|               |                           | 1 ½"        | C-AJ-5346 | 1 ½"            | C-AJ-5346 |
|               |                           | 2"          | C-AJ-2578 | 1" multiple     | F-A-2203  |
|               |                           |             |           | 2"              | C-AJ-2578 |
|               | Wood-stud /<br>Steel-stud | 1-hour      | 1"        | W-L-2100        |           |
| 1"            |                           |             | W-L-2241  |                 |           |
| 1"            |                           |             | W-L-2508  |                 |           |
| 1"            |                           |             | W-L-2548  |                 |           |
| 1"            |                           |             | W-L-2549  |                 |           |
| 1"            |                           |             | W-L-5290  |                 |           |
| 1" multiple   |                           |             | W-L-2242  |                 |           |
| 2"            |                           |             | W-L-2423  |                 |           |
| 2-hour        |                           | 1"          | W-L-2100  |                 |           |
|               |                           | 1"          | W-L-2241  |                 |           |
|               |                           | 1"          | W-L-2508  |                 |           |
|               |                           | 1"          | W-L-2548  |                 |           |
|               |                           | 1"          | W-L-2549  |                 |           |
|               |                           | 1"          | W-L-5290  |                 |           |
|               |                           | 1" multiple | W-L-2242  |                 |           |
| 2"            | W-L-2423                  |             |           |                 |           |

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