

71-9222

February 3, 1994



Mr. Cass R. Chappell, Section Leader
Cask Certification Section
Storage and Transport Systems Branch
Division of Industrial and Medical Nuclear Safety, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

References:

1. Letter dated January 26, 1993 from Timothy B. Ramsey to Charles E. MacDonald - Application for renewal of Certificate of Compliance No. 9222.
2. Letter dated June 10, 1993 from Timothy B. Ramsey to Charles E. MacDonald - Response to request for additional information.
3. Letter dated October 4, 1993 from Timothy B. Ramsey to Cass R. Chappell - Response to request for additional information.

Dear Mr. Chappell:

We are pleased to provide the additional information requested in your letter dated December 15, 1993 concerning our application for the renewal of Certificate of Compliance No. 9222 for the Model 14-215 shipping package.

The information requested is included within Attachment 1 to this letter and incorporated within the enclosed Drawing STD-02-077 Rev. 8. The responses provided within Attachment 1 correspond to items 1 and 2 listed in the Enclosure of your letter dated December 15, 1993.

If you have any questions concerning our responses or the application please contact me at 615-376-8156.

Sincerely,

Timothy B. Ramsey
Senior Engineer

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Attachment 1
Responses to Request for Additional
Information on items 1 and 2

1. Note 21 on Drawing STD-02-077, Rev. 8 has been revised to specify the bolting material for the optional 1 1/4" x 5 tpi ACME thread Socket Head Screw (item 34) to be ASTM A540, Grade B24, Class 3 or equivalent. This specification is for alloy-steel bolting material for special applications and for the grade and class specified provides a minimum tensile yield stress of 130,000 psi. In our previous response dated June 10, 1993 we demonstrated a minimum tensile yield strength of 125,000 psi was required for the bolting material if the 1 1/4" x 5 tpi ACME threads were used. The A540 material specification exceeds the required minimum tensile strength and provides an acceptable bolting material for 1 1/4" x 5 tpi ACME Screw.

2. The analysis of the shear capacity of the upper block (item 33) has been revised to use the yield shearing stress (.6 Fy) of the A516, Grade 70 material. Because the shear yield stress is lower than the tensile yield stress, additional thread engagement is necessary to achieve a margin of safety greater than zero. To achieve the additional engagement the threaded portion of the upper block (item 33) must be increased as well as the length of the socket headed screw (item 34). By increasing the screw length to 8 1/2 inches and requiring the threaded portion of the block to extend completely through the section an additional .75 inches of thread engagement may be obtained.

From previous analysis presented in our letter dated October 4, 1993 the shear area of the threads was determined to be 1.928 in²/in. With the additional .75 inches of engagement added to the original engagement of 1.875 inches, the total length of engagement becomes 2.625 inches. The total shear area of the threads becomes,

$$A_T = 1.928 \text{ in}^2/\text{in} \times 2.625 \text{ in}$$
$$A_T = 5.061 \text{ in}^2$$

By multiplying the total shear area by the shear yield stress of the upper block material, the yield capacity of the threaded area is obtained as follows,

$$\text{Yield Capacity} = .6(38,000 \text{ psi}) \times 5.061 \text{ in}^2$$
$$= 115,391 \text{ pounds}$$

Comparing this value to the rated capacity of the ratchet binder of 100,000 pounds the Margin of Safety is determined to be,

$$\text{M.S.} = \frac{115,391}{100,000} - 1$$

$$\text{M.S.} = .15$$

Based on the above, the upper block material is acceptable for use with the 1 1/4" x 5 tpi ACME thread screw, provided the screw length is extended to 8 1/2 inches and the engagement portion of the block is threaded completely through. These changes have been made to Drawing STD-02-077 Rev. 8 and do not result in any interferences for the operation of the ratchet binder.

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