

§ 178.818 Tear test.

(a) *General.* The tear test must be conducted for the qualification of all flexible IBC design types.

(b) *Special preparation for the tear test.* The flexible IBC must be filled to not less than 95 percent of its capacity and to its maximum net mass, the load being evenly distributed.

(c) *Test method.* Once the IBC is placed on the ground, a 100-mm (4-inch) knife score, completely penetrating the wall of a wide face, is made at a 45° angle to the principal axis of the IBC, halfway between the bottom surface and the top level of the contents. The IBC must then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum net mass. The load must be applied for at least five minutes. An IBC which is designed to be lifted from the top or the side must, after removal of the superimposed load, be lifted clear of the floor and maintained in that position for a period of five minutes.

(d) *Criterion for passing the test.* The IBC passes the tear test if the cut does not propagate more than 25 percent of its original length.

[Amdt. 178-103, 59 FR 38074, July 26, 1994, as amended at 66 FR 45386, Aug. 28, 2001]

§ 178.819 Vibration test.

(a) *General.* The vibration test must be conducted for the qualification of all rigid IBC design types. Flexible IBC design types must be capable of withstanding the vibration test.

(b) *Test method.* (1) A sample IBC, selected at random, must be filled and closed as for shipment.

(2) The sample IBC must be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The IBC must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(3) The test must be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1.6-mm (0.063-inch) thickness (such as steel strapping or paperboard) can be passed between the bottom of the IBC and the platform. Other methods at least equally effective may be used (see § 178.801(i)).

(c) *Criteria for passing the test.* An IBC passes the vibration test if there is no rupture or leakage.

[Amdt. 178-103, 59 FR 38074, July 26, 1994, as amended by Amdt. 178-108, 60 FR 40038, Aug. 4, 1995; Amdt. 178-110, 60 FR 49111, Sept. 21, 1995; 66 FR 45386, Aug. 28, 2001]

APPENDIX A TO PART 178—SPECIFICATIONS FOR STEEL

TABLE 1

[Open-hearth, basic oxygen, or electric steel of uniform quality. The following chemical composition limits are based on ladle analysis.]

Designation	Chemical composition, percent-ladle analysis		
	Grade 1 ¹	Grade 2 ^{1,2}	Grade 3 ^{2,4,5}
Carbon	0.10/0.20	0.24 maximum	0.22 maximum.
Manganese	1.10/1.60	0.50/1.00	1.25 maximum.
Phosphorus, maximum	0.04	0.04	0.045. ⁶
Sulfur, maximum	0.05	0.05	0.05.
Silicon	0.15/0.30	0.30 maximum	
Copper, maximum	0.40		
Columbium		0.01/0.04	
Heat treatment authorized	(³)	(³)	(³).
Maximum stress (p.s.i.)	35,000	35,000	35,000.

¹Addition of other elements to obtain alloying effect is not authorized.
²Ferritic grain size 6 or finer according to ASTM E 112-96 (IBR, see § 171.7 of this subchapter).
³Any suitable heat treatment in excess of 1,100 °F., except that liquid quenching is not permitted.
⁴Other alloying elements may be added and shall be reported.
⁵For compositions with a maximum carbon content of 0.15 percent of ladle analysis, the maximum limit for manganese on ladle analysis may be 1.40 percent.
⁶Rephosphorized Grade 3 steels containing no more than 0.15 percent phosphorus are permitted if carbon content does not exceed 0.15 percent and manganese does not exceed 1 percent.