U. S. Department of Commerce
Malcolm Baldrige
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate

Standard Reference Material 1891

Cobalt-Chromium-Molybdenum Alloy

for Pitting or Crevice Corrosion

This Standard Reference Material (SRM) is intended for use with ASTM Test Method F746 in evaluating metallic surgical implant materials for pitting and/or crevice corrosion. This test applies only to passive metals and alloys. This SRM is not subject to pitting or crevice corrosion under the conditions of the ASTM Test Method F746, and thus serves as a benchmark for Co-Cr-Mo alloys used as implant materials.

SRM 1891 consists of two Co-Cr-Mo Alloy rods and two tapered polytetrafluorethylene collars. A small steel rod has been inserted in the Co-Cr-Mo rod, and a threaded steel adapter is provided for attaching the specimen to the corrosion testing apparatus. Each rod and collar can be used for only one test. The surface of the rod should be lightly polished with 600 grit SiC paper before testing, as required in the ASTM Test Method.

The certification of SRM 1891 is based on the results of tests on five specimens using the ASTM Test Method F746.

The initial corrosion potential of this SRM, as measured against a saturated calomel electrode at 37 °C, on immersion in a saline electrolyte, is:

$$-0.520 \pm 0.025 \text{ volt.}$$

The final corrosion potential at the end of one hour is:

$$-0.280 \pm 0.030 \text{ volt.}$$

The corrosion potential at which breakdown starts after ten to twelve stimulations is:

$$+0.225 \pm 0.030 \text{ volt.}$$

The uncertainties are the standard deviations of tests on five specimens.

Preparation of specimens and measurements leading to certification were performed under the direction of A.C. Fraker of the Metallurgy Division, Institute for Materials Science and Engineering.

The support aspects involved in the certification of this SRM were coordinated through the Office of Standard Reference Materials by R.W. Seward.

Gaithersburg, MD 20899
August 21, 1985

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Stanley D. Rasberry, Chief
Office of Standard Reference Materials

Supplemental Information

The materials for this SRM were supplied by Howmedica, Inc., Rutherford, N.J.

The cobalt-chromium-molybdenum rods are in the as-cast condition. The two photomicrographs included with the SRM show representative microstructures of this Co-Cr-Mo alloy.

The chemical composition of the Co-Cr-Mo is provided for information only:

C	(0.25) wt. %	Fe	(0.33)
Mn	(0.71)	Al	(0.009)
P	(0.014)	N	(0.152)
S	(0.004)	O	(0.018)
Si	(0.71)	Ti	(0.003)
Ni	(0.19)	V	(0.005)
Cr	(27.88)	B	(0.004)
Mo	(5.63)	Co	Balance
W	(0.01)		