



Consolidated Edison Company of New York, Inc.
 Indian Point Station
 Broadway & Bleakley Avenue
 Buchanan, New York 10511-1099

January 20, 1988

Re: Indian Point Unit No. 2
 Docket No. 50-247

Document Control Desk
 U.S. Nuclear Regulatory Commission
 Washington, DC 20555

Subject: Fastener Testing to Determine Conformance with Applicable
 Material Specifications

Attachment A to this letter contains our response to NRC Compliance
 Bulletin No. 87-02, "Fastener Testing to Determine Conformance with
 Applicable Material Specification."

This response is being provided pursuant to Section 182a, Atomic Energy Act
 of 1954, as amended. Should you or your staff have any additional
 questions, please contact us.

Very truly yours,

Stephen B. Bram
 Stephen B. Bram
 Vice President
 Nuclear Power

Attachments

Subscribed and sworn to
 before me this 20 day
 of January, 1988.

Anthony R. Arnone
 Notary Public

ANTHONY R. ARNONE
 Notary Public, State of New York
 No. 4889047
 Qualified in Westchester County
 Commission Expires January 20, 1989

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 PDR ADOCK 05000247
 Q PDR

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cc: Ms. Marylee M. Slosson
Project Directorate I-1
Division of Regulatory Commission
Washington, DC 20555

Mr. William Russell
Regional Administrator - Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 38
Buchanan, NY 10511

50-247

RESPONSE TO NRC BULLETIN 87-02

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ATTACHMENT A

Response to Bulletin No. 87-02
"Fastener Testing to Determine Conformance with
Applicable Material Specification"

Consolidated Edison Company of New York, Inc.
Indian Point Unit No. 2
Docket No. 50-247
January, 1988

Response to Bulletin No. 87-02

- Item 1. Describe a) the characteristics currently examined during receipt inspection of fasteners (i.e., head markings for grade and manufacturer symbols, review of certified material test report or certificate of conformance), and b) internal controls utilized during storage and issuance from stock to assure the appropriate use of fasteners.

Response to 1a:

The characteristics examined during receipt inspection of fasteners includes the following:

1. Sample dimensional verification, including diameter, length of point, overall length, finish, shape, and threads. Sample quantity is determined per Military Specifications 105D.
2. Review of Certified Material Test Report (CMTR) or Certificate of Conformance (C of C).
3. Damage
4. Marking per ASTM Specification

Response to 1b:

Safety related fasteners are "green tagged" following receipt inspection acceptance by Quality Control. As a minimum the following information appears on the green tag:

Green Tag Number (G.T. No.)
Purchase Order Number (P.O. No.)
Class/Stock Number (C/S No.)

The fasteners are then stored in a heated warehouse in Cortlandt, NY, inside individual bins or pallets. Only green tagged items may be stored. Periodic surveillance and audits of Stores are performed to assure this.

The C/S No. controls the issuance of the fasteners. When the need for a fastener arises through either a maintenance action or a modification, the planning department prepares a stores requisition after matching the C/S description to the engineering requirements for the specific job. The requisition is issued to stores, who select the fastener from the appropriate bin and deliver it to the planner. The fastener is then issued to the maintenance personnel with the work package. The green tag number is traceable to the P.O. number and to the receipt inspection for the fastener. The green tag number and the purchase order number are recorded on the material used list which is included in the work package.

Non-safety related fasteners are purchased on a blanket order and stored in bins onsite. These fasteners are not green tagged, and can be accessed for general use by station personnel.

Item 2. Select a minimum sample of ten (10) non-safety related fasteners (studs, bolts and/or cap screw), and ten (10) safety-related fasteners (studs, bolts, and/or cap screws) from current, in use, stock. The sample is to be obtained by the licensee with the participation of an NRC inspector. Fasteners procured to meet the following chemical and mechanical properties are of interest: A-193 grades B7, B8, and B16; SAE J429 grades 5 and 8; A-449; A-325 Types 1, 2, or 3; A-354 grades BB, BC, BD; A-490; A-320 LTM; A-307; A-563; or equivalent.

Response to 2:

For the most part, Consolidated Edison stocks continuously threaded studs of different diameters and lengths, purchased to ASTM A193.B7 specification; both for safety-related and non-safety related applications. Therefore, the sample selection reflects the different sizes for the above material specification. Twenty-four (24) studs were sampled for testing to represent safety related fasteners. Two of these studs were removed from service (from Main Steam to Aux Feed Water Pump Turbine Valve MS-4-10 and Boiler Feed Isolation Valve BFD 6). The remainder were sampled from the stock. Ten (10) non-safety related studs were sampled for testing, of which two were removed from service (from Boiler Feed Discharge Valve BFD 2-22, and Extraction Steam Level Control Valve LCV 1211), and the rest were sampled from the station supply. The Senior Resident Inspector, Mr. Lawrence W. Rossbach participated during the sampling process.

Item 3. For the selected sample of fasteners in item 2, include a sample of typical nuts that would be used with each fastener (one-for-one). In particular, nuts purchased to the chemical and mechanical specifications of A-194 are of interest.

Response to 3:

Nineteen (19) safety related and eight(8) non-safety related nuts were sampled for testing. Four of the sample nuts were removed from service with the studs mentioned in the Response to 2 above. Some of the sample nuts selected can be used with more than one sample stud, since some studs differ in length only. Therefore, it was not necessary for the number of nuts sampled to be the same as the number of studs sampled. Con Edison employs nuts purchased to ASTM A-194, 2H specification, exclusively. Again, Mr. Rossbach was a full participant in the sampling process.

Item 4. Chemical testing shall be performed on all samples. Mechanical testing shall be performed on each safety-related fastener. Hardness testing shall be performed on each nut and non-safety related fastener. All testing shall be performed by a laboratory which the licensee has qualified for this type of testing and appears on the licensee's approved vendor list. Testing performed shall be done in accordance with the requirements of the fastener's specification, grade, and class, and the test shall evaluate the ultimate tensile strength, hardness and chemical properties as required by the fastener's specification, grade, and class. Each sample shall be tagged with the sample's ID number.

Response to 4:

The services of "City Testings and Research Laboratories, Inc.", which is on Con Edison's approved vendor list, were employed for the testing. Regardless of safety classification, all samples were tested in accordance with the requirements of the samples ASTM specification and grade. Each sample was tagged with the sample's ID number, that consists of the prefix IP which are the initials for "Indian Point".

Item 5. The results of all tests, together with supporting information, are to be reported to the NRC utilizing the format shown in Attachments 1 and 2 of this bulletin. Include the names and addresses of suppliers and manufacturers of safety related fasteners and, to the extent possible, of non-safety related fasteners. For any fastener found out of specification, provide an evaluation of safety significance including consideration of the most limiting application.

Response to 5:

The results of the tests are summarized on the attached Table A1 (Pages 1 & 2), which is constructed similar to Attachment 2 of Bulletin 87-02 with additional information (such as type, size, P.O. No....) included on it. The detailed test results, and identifications for each specimen are recorded on City Testing & Research Lab's form (Table A2, Pages 1 thru 61). Most of the information called for on Attachment 1 of Bulletin 87-02 are given on Tables A1 and A2*. The general information missing from the Tables is provided below.

- (I) Description of Sample Stock location:
 - Samples IP 1 thru IP 22b were selected from the safety related fastener stock at the Cortlandt Warehouse.
 - Samples IP 23 thru IP 30 were removed from service (see Responses to items 2 and 3).
 - Samples IP 31 thru IP 44 were selected from the non-safety fastener bins at the station.

- (II) Class/Procurement Level:
 - Samples IP 1 thru IP 22b are safety related.
 - Samples IP 23, IP 24, IP 27, and IP 28 are safety related, removed from service.
 - Samples IP 25, IP 26, IP 29, and IP 30 are non-safety related, removed from service.
 - Samples IP 31 thru IP 44 are non-safety related.

- (III) General Plant Application(e.g., Pressure Boundary, Structural):
 - Both safety related and non-safety related fasteners can be used in any application.

* Per conversation with Mr. E.T. Baker, NRR Bulletin 87-02 Technical Contact, it is acceptable to use Con Edison's formats in lieu of the formats in Attachments 1 and 2.

(IV) Vendor:

- Last column on Table A1 provides only the abbreviated vendor names, the following are the corresponding written-out forms:
 - Tx Blt -- Texas Bolt Co.
 - Cml Fs -- Commercial Fastener
 - Hdw Sp -- Hardware Specialty
 - Sh Bo -- Shallcross Bolt

(V) QA Requirements Imposed on Vendors:

- All vendors are required to have been evaluated and approved for Class A (safety related) status.
- Original equipment manufacturers (OEM) are required to establish and maintain traceability for all components and replacement parts for their equipment as well as proof of its design integrity.
- Commercial vendors must substantiate integrity through the traceable documentation demanded by purchasing contracts.
- Purchase orders require submittal of Certified Material Test Report (CMTR), (see attached Table A3).
- Markings are required per ASTM specification.

With only two exceptions (IP3c and IP23), the test results for all specimens conformed with the ASTM minimum requirements. The yield strength for IP3C (103 ksi) is slightly lower than the minimum required (105 ksi). However, two other specimens (IP3a and b) which are identical to IP3c conformed with the minimum requirement, yield strengths being 107.4 ksi for IP3a and 109.4 ksi for IP3b. The slight deviation from the required minimum exhibited by IP3c is the result of variation in heat treatment. A review of technical literature on ASTM A193, B7 and B16 materials, specifically AISI 4140, reveal that the higher the temperature for the same period of time the lower the tensile and yield strengths. At Con Ed, per Mechanical Engineering Procedure, the maximum torque that can be applied to a ½ in. diameter, ASTM 193, B7 and B16, stud is limited to 45 ft-lb, which results in 45 ksi stress (the maximum stress for any size stud in any application is limited to 72 ksi, for ASTM 193, B7 and B16 alloys). Thus, the yield strength for IP3c is more than twice its intended load, hence its application does not impact safety.

The yield strength and the tensile strength for sample IP23 are also slightly below the minimum required; 104.6 ksi vs 105 ksi for yield strength, and 119.2 ksi vs 125 ksi for tensile strength. This specimen was removed from valve BFD-6, during a regularly scheduled maintenance activity. The marking on the sample cannot be determined, since the stud was damaged during removal. However, the test results show that its properties conform with ASTM specification A193, B16. The stud was part of the original equipment, and has been in service since the beginning of the unit's operating life. As in the case of IP3c above, both the tensile and yield strength for IP23 are way above the maximum stress it can possibly be subjected to in service. Hence its application does not impact safety.

Item 6. Based on the results of the testing and review of current procedures, describe any further actions being taken to assure that fasteners used in the plant meet the requisite specifications and requirements and that the operability of safety-related plant components is not affected.

Response to 6:

The test results established that fasteners used at IP-2 meet applicable requirements and that the operability of safety related plant components is not affected. No further actions are thought to be necessary and, therefore, no further actions are being taken.

TABLE A-1

TEST RESULTS SUMMARY FOR NRC
COMPLIANCE BULLETIN 87-02

TEST RESULTS SUMMARY FOR NRC COMPLIANCE BULLETIN 87-02

Spec. No.	Type	Size	Markg	Yield Str	Tensile Str	% Elong.	% Reduct'n	Proof Test	Rock'l Hrdns	Chemical Analysis in Percent								Cl's/ Stk No.	PO No	Vendor	
										C	Mn	P	S	Si	Cr	Mo	Ni				V
IP1	Stud	1/2-13x5/8	"1" (B7)	162,200	174,200	16.40%	55.20%	---	C36	0.390	0.750	0.011	0.015	0.210	1.010	0.160	0.090	<0.010	182-1057	609851	Tx Bit
IP2	Stud	1/2-13x6	B7C	138,000	155,000	20.70%	56.60%	---	C35	0.470	0.800	0.012	0.023	0.240	1.050	0.160	0.080	<0.010	182-1065	8760373	Cmi Fs
IP3a	Stud	5/8-11x4-1/2	B7J	107,400	134,500	22.00%	59.40%	---	C33	0.430	0.800	0.014	0.023	0.210	0.900	0.160	0.120	<0.010	182-1081	4726089	hdw sp
IP3b	Stud	5/8-11x4-1/2	B7J	109,400	136,800	21.00%	59.80%	---	C34	0.470	0.780	0.012	0.021	0.200	0.890	0.170	0.120	<0.010	182-1081	4726089	hdw sp
** IP3c	Stud	5/8-11x4-1/2	B7J	102,700	129,900	23.00%	63.60%	---	C34	0.440	0.780	0.012	0.021	0.220	0.890	0.160	0.110	<0.010	182-1081	4726089	hdw sp
IP4	Stud	5/8-11x6	B7C	113,800	136,500	21.50%	61.70%	---	C30	0.410	0.800	0.012	0.022	0.220	1.020	0.150	0.090	<0.010	182-1199	8760373	Cmi Fs
IP5	Stud	3/4-10x4	B7C	116,000	136,100	21.00%	59.60%	---	C28	0.380	0.840	0.012	0.017	0.350	0.990	0.160	0.070	<0.010	182-1107	8760373	Cmi Fs
IP6a	Stud	3/4-10x6	Tb7	137,000	154,700	19.00%	57.70%	---	C31	0.400	0.840	0.017	0.026	0.300	1.010	0.190	0.020	<0.010	182-1123	609851	Tx Bit
IP6b	Stud	3/4-10x6	Tb7	131,900	147,600	19.00%	59.20%	---	C31	0.380	0.840	0.019	0.025	0.270	1.010	0.160	0.090	<0.010	182-1123	609851	Tx Bit
IP7	Stud	3/4-10x8	B7C	134,500	148,900	19.00%	53.90%	---	C32	0.440	0.750	0.021	0.027	0.290	0.920	0.160	0.090	<0.010	182-1131	8760373	Cmi Fs
IP8	Stud	3/4-10x8	Tb7	134,000	148,800	19.00%	61.40%	---	C31	0.390	0.830	0.020	0.026	0.310	0.960	0.160	0.090	<0.010	182-1131	609851	Tx Bit
IP9a	Stud	7/8-9x6	D67	125,800	144,100	20.50%	59.80%	---	C31	0.430	0.710	0.019	0.019	0.210	0.930	0.150	0.040	<0.010	182-1156	5693916	hdw sp
IP9b	Stud	7/8-9x6	D67	127,800	145,700	20.00%	60.10%	---	C31	0.440	0.730	0.016	0.021	0.230	1.070	0.160	0.040	<0.010	182-1156	5693916	hdw sp
IP10	Stud	7/8-9x7	B7C	134,500	145,400	19.50%	54.80%	---	C31	0.380	0.860	0.011	0.028	0.210	0.930	0.160	0.140	<0.010	182-1164	8760373	Cmi Fs
IP11a	Stud	7/8-9x6-1/4	JB7	119,700	127,800	19.50%	56.60%	---	C30	0.420	0.810	0.012	0.019	0.210	1.090	0.150	0.070	<0.010	182-1156	5696182	hdw sp
IP11b	Stud	7/8-9x6-1/4	JB7	121,500	131,500	19.00%	54.40%	---	C30	0.420	0.750	0.013	0.016	0.190	1.050	0.170	0.060	<0.010	182-1156	5696182	hdw sp
IP12	Stud	1-8x5	B7C	122,100	139,300	18.50%	54.00%	---	C29	0.440	0.750	0.014	0.026	0.210	1.070	0.018	0.290	<0.010	182-1180	8760373	Cmi Fs
IP13a	Stud	1-8x6	B7C	113,600	133,900	21.00%	58.70%	---	C28	0.450	0.760	0.016	0.021	0.220	1.050	0.150	0.070	0.010	182-1198	2861268	Cmi Fs
IP13b	Stud	1-8x6	B7C	105,600	129,800	22.50%	61.10%	---	C26	0.420	0.760	0.016	0.019	0.230	1.040	0.150	0.070	0.010	182-1198	2861268	Cmi Fs
IP13c	Stud	1-8x6	B7C	111,000	130,400	21.00%	60.30%	---	C26	0.440	0.760	0.011	0.023	0.230	1.030	0.150	0.070	0.010	182-1198	2861268	Cmi Fs
IP14	Stud	1-8x7	B7C	122,200	139,100	19.00%	51.90%	---	C31	0.410	0.700	0.014	0.028	0.180	1.050	0.170	0.270	<0.010	182-1206	8760373	Cmi Fs
IP15	Stud	1-8x8	B7C	128,900	143,400	17.50%	53.10%	---	C30	0.370	0.750	0.010	0.031	0.230	0.990	0.150	0.090	<0.010	182-1214	8760373	Cmi Fs
IP16a	nut	5/8"-11	TH2	---	---	---	---	Pass	C32	0.470	0.640	0.007	0.027	0.210	<0.010	<0.010	0.010	---	182-1230	7697048	TxBlt
IP16b	nut	5/8"-11	TH2	---	---	---	---	Pass	C32	0.420	0.620	0.011	0.024	0.210	<0.010	<0.010	0.020	---	182-1230	7697048	TxBlt
IP17a	nut	3/4"-10	TH2	---	---	---	---	Pass	C29	0.440	0.640	0.010	0.023	0.210	<0.010	<0.010	0.020	---	182-1248	6694350	hdw sp
IP17b	nut	3/4"-10	TH2	---	---	---	---	Pass	C30	0.420	0.660	0.012	0.025	0.240	<0.010	<0.010	0.020	---	182-1248	6694350	hdw sp
IP18a	nut	3/4"-10	IS2H	---	---	---	---	Pass	C28	0.490	0.700	0.010	0.038	0.210	0.160	<0.010	0.070	---	182-1248	8760373	Cmi Fs
IP18b	nut	3/4"-10	IS2H	---	---	---	---	Pass	C27	0.510	0.630	0.090	0.038	0.210	0.160	<0.010	0.070	---	182-1248	8760373	Cmi Fs
IP19a	nut	7/8"-9	NH2H	---	---	---	---	Pass	C27	0.520	0.610	0.011	0.040	0.190	0.330	<0.010	0.040	---	182-1255	5962728	hdw sp
IP19b	nut	7/8"-9	NH2H	---	---	---	---	Pass	C27	0.460	0.630	0.012	0.045	0.210	0.370	<0.010	0.020	---	182-1255	5962728	hdw sp
IP19c	nut	7/8"-9	NH2H	---	---	---	---	Pass	C26	0.410	0.620	0.012	0.045	0.210	0.370	<0.010	0.050	---	182-1255	5962728	hdw sp
IP20a	nut	7/8"-9	U2H	---	---	---	---	Pass	C26	0.450	0.610	0.009	0.034	0.200	<0.010	0.010	0.050	---	182-1255	5695473	hdw sp
IP20b	nut	7/8"-9	U2H	---	---	---	---	Pass	C26	0.410	0.540	0.016	0.039	0.190	<0.010	0.010	0.050	---	182-1255	5695473	hdw sp
IP21a	nut	1"-8	Th2	---	---	---	---	Pass	C28	0.430	0.660	0.011	0.025	0.200	<0.010	0.020	0.020	---	182-1263	609851	Tx Bit
IP21b	nut	1"-8	Th2	---	---	---	---	Pass	C28	0.450	0.640	0.009	0.026	0.190	<0.010	0.020	0.040	---	182-1263	609851	Tx Bit
IP21c	nut	1"-8	Th2	---	---	---	---	Pass	C29	0.430	0.710	0.009	0.026	0.190	<0.010	0.020	0.040	---	182-12+3	609851	Tx Bit
IP21d	nut	1"-8	Th2	---	---	---	---	Pass	C28	0.410	0.650	0.009	0.025	0.230	<0.010	<0.010	0.020	---	182-1263	609851	Tx Bit
IP22a	nut	1-1/2"-8	BPGJ2H	---	---	---	---	Pass	C28	0.460	0.670	0.010	0.023	0.230	<0.010	<0.010	0.110	---	182-5355	4834313	hdw sp
IP22b	nut	1-1/2"-8	BPGJ2H	---	---	---	---	Pass	C28	0.430	0.690	0.009	0.027	0.230	<0.010	<0.010	0.110	---	182-5355	4834313	hdw sp

** Fastener found out of specification

TABLE A1 Page 2 of 2

TEST RESULTS SUMMARY FOR NRC COMPLIANCE BULLETIN B7-02

Spec. No.	Type	Size	Markg	Yield Str	Tensile Str	% Elong	% Reduct'n	Proof Test	Rock '11 Hrdns	Chemical Analysis in Percent								Remarks*	Vendor	
										C	Mn	P	S	Si	Ch	Mo	Ni			Va
**IP23	Stud	1-3/8x10-1/2	---	104,600	119,200	25.00%	70.00%	---	C24	0.430	0.520	0.010	0.017	0.210	0.910	0.500	0.350	0.090	Cnfrms to Alloy B16	Crane
IP24	Stud	1-8x8	B7T	127,000	143,500	20.00%	60.10%	---	C30	0.390	0.840	0.022	0.026	0.260	0.960	0.180	0.130	<0.010		Crane
IP25	Stud	1-8x8	SB7	133,000	146,500	18.50%	57.30%	---	C31	0.440	0.800	0.019	0.020	0.210	1.050	0.150	0.090	0.010		Fisher
IP26	Stud	2-8x? *	---	112,000	138,000	20.00%	60.10%	---	C30	0.480	0.800	0.015	0.026	0.220	0.780	0.210	0.220	<0.010	Stud cut by torch	Crane
IP27	nut	1-3/8"-8	S2H	---	---	---	---	*	C26	0.430	0.580	0.007	0.035	0.290	<0.010	0.020	0.060	---	Thds Dmgd/no Test	Crane
IP28	nut	1-1/8"-8	2H?	---	---	---	---	*	C27	0.470	0.650	0.010	0.035	0.220	<0.010	0.030	0.090	---	Thds Dmgd/no Test	Crane
IP29	nut	1"-8	A2H	---	---	---	---	Pass	C27	0.420	0.670	0.140	0.020	0.220	<0.010	<0.010	0.010	---		Fisher
IP30	nut	2"-8	R2H	---	---	---	---	*	C32	0.400	0.670	0.007	0.034	0.220	<0.010	0.010	0.060	---	Load exceeds cpcty	Crane
IP31	Stud	3/4-10x6-1/2	B7K	129,900	139,800	18.00%	60.80%	Stud	C30	0.480	0.780	0.011	0.017	0.270	1.180	0.150	0.110	<0.010		Sh Bo
IP32	Stud	3/4-10x6	B7S	127,800	143,600	19.50%	62.90%	Stud	C30	0.400	0.770	0.009	0.020	0.220	1.080	0.170	0.020	<0.010		
IP33	Stud	1-8x5-1/2	B7S	126,300	141,000	19.50%	61.40%	Stud	C30	0.430	0.840	0.016	0.024	0.210	0.980	0.150	0.020	<0.010		
IP34	Stud	3/4-10x4-1/2	B7C	137,000	149,500	17.50%	59.60%	Stud	C31	0.450	0.870	0.014	0.021	0.270	0.860	0.170	0.090	<0.010		
IP35	Stud	5/8-11x4-1/2	B7K	136,300	148,100	21.20%	63.80%	Stud	C31	0.410	0.790	0.017	0.021	0.250	1.070	0.150	0.020	<0.010		
IP36	Stud	5/8-11x3-1/2	B7S	122,100	127,200	21.20%	64.10%	Stud	C25	0.410	0.790	0.016	0.020	0.350	1.150	0.160	0.070	<0.010		
IP37	Stud	1-1/8-8x9-1/2	B7DE	122,600	142,000	20.00%	59.20%	Stud	C30	0.390	0.910	0.014	0.021	0.350	0.960	0.200	0.060	<0.010		
IP38	Bolt	1-8x2-1/2*	---	---	125,500	---	---	Pass	C42	0.440	0.840	0.010	0.021	0.370	0.980	0.170	0.020	---	Cap Screw	
IP39	nut	3/4"-10	2H-A	---	---	---	---	Pass	C26	0.440	0.710	0.014	0.025	0.150	<0.010	0.050	0.020	---		
IP40	nut	3/4"-10	2H-A	---	---	---	---	Pass	C28	0.410	0.650	0.014	0.025	0.140	<0.010	0.050	0.030	---		
IP41	nut	1"-8	2H-A	---	---	---	---	Pass	C27	0.430	0.780	0.011	0.016	0.250	0.120	0.080	0.020	---		
IP42	nut	3/4"-10	2H-A	---	---	---	---	Pass	C28	0.430	0.670	0.016	0.024	0.150	<0.010	0.050	0.010	---		
IP43	nut	5/8"-11	2H-S	---	---	---	---	Pass	C28	0.400	0.620	0.014	0.014	0.250	<0.010	0.030	0.010	---		
IP44	nut	5/8"-11	2H-S	---	---	---	---	Pass	C28	0.440	0.710	0.011	0.024	0.340	<0.010	0.030	0.010	---		

Material	Yld	Tnsl	elong	Reduct %	Chem Cont:	C	Mn	P	S	Si	Cr	Mo	Ni	V						
ASTM A193, B7	105k	125k	16.00%	55.20%		.37	.49	.65	1.1	.035mx	.04mx	.15	.35	.75	1.2	.15	.25	---	---	
ASTM A193, B16	105k	125k	18.00%	55.20%		.37	.47	.45	.70	.035mx	.04mx	.15	.35	.8	1.1	.15	.50	.65	.25	.35
ASTM A194, B7	---	---	---	---		.40min	---	---	.04mx	.05mx	---	---	---	---	---	---	---	---	---	

** Fastener found out of specification

TABLE A-2

DETAILED TEST RESULTS



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74682

MATERIAL B-7 Alloy Steel Stud ($\frac{1}{2}$ -13X4-5/8")

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP1			RE:	P.O.No. 6-09851	
Marked	"1"				Class/Stk. 182/1057	
Dimensions, in.	0.342				Heat No. - -	
Area, sq. in.	0.0919				Chemical Analysis	%
Dimensions after Fracture, in.	0.229					
Fractured Area, sq. in.	0.0412					
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	14,900					
Maximum Load, lbs. actual	16,000					
Elongation in $\frac{1.4}{2}$ inches	0.23					
		<u>Required</u>				
Yield Strength, lbs. per sq. in.	162,200	105,000	Minimum		Carbon	0.39 0.37/0.49
Tensile Strength, lbs. per sq. in.	174,200	125,000	Minimum		Manganese	0.75 0.65/1.10
Percent Elongation in $\frac{1.4}{2}$ inches	16.4	16.0	Minimum		Phosphorus	0.011 0.035 Max.
Percent Reduction of Area	55.2	50.0	Minimum		Sulphur	0.015 0.040 Max.
					Silicon	0.21 0.15/0.35
					Chromium	1.01 0.75/1.20
					Molybdenum	0.16 0.15/0.25
					Nickel	0.09 ---
					Vanadium	L0.01 ---
Rockwell Hardness	C36	- -				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 16, 1987 Witnessed by

Ass't. Technical Director

967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74683

MATERIAL B-7 Alloy Steel Stud $\frac{1}{2}$ -13 X 6")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP2			RE: P.O. No. 8-760373 Class/Stk. 182/1065 Heat No. "N"
Marked	"B7C"			Chemical Analysis, %
Dimensions, in.	0.357			<u>Results</u> <u>Required</u>
Area, sq. in.	0.1000			Carbon 0.47 0.37/0.49
Dimensions after Fracture, in.	0.235			Manganese 0.80 0.65/1.10
Fractured Area, sq. in.	0.0434			Phosphorus 0.012 0.035 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	13,800			Sulphur 0.023 0.040 Max.
Maximum Load, lbs. actual	15,500			Silicon 0.24 0.15/0.35
Elongation in ^{1.4}/₂ inches	0.29			Chromium 1.05 0.75/1.20
		<u>Required</u>		Molybdenum 0.16 0.15/0.25
Yield Strength, lbs. per sq. in.	138,000	105,000	Minimum	Nickel 0.08
Tensile Strength, lbs. per sq. in.	155,000	125,000	Minimum	Vanadium L0.01
Percent Elongation in ^{1.4}/₂ inches	20.7	16.0	Minimum	
Percent Reduction of Area	56.6	50.0	Minimum	
Rockwell Hardness	C35	- -		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by *H. Goldenberg*, P.E. **Date** Dec. 16, 1987 **Witnessed by**

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74684-A

MATERIAL B-7 Alloy Steel Stud (5/8-11X4½")

Your Order No. 6-22245, Rel No. 149

FROM Consolidated Edison of NY
Astoria, N.Y. 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP3a			RE: P.O. No. 4-726089
Marked	"B7J"			Class/Stk. 182/1081
Dimensions, in.	0.499			Heat No. "BDO"
Area, sq. in.	0.1956			<u>Chemical Analysis</u> %
Dimensions after Fracture, in.	0.318			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0794			Carbon 0.43 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	21,000			Manganese 0.80 0.65/1.10
Maximum Load, lbs. actual	26,300			Phosphorus 0.014 0.035 Max.
Elongation in 2 inches	0.44			Sulphur 0.023 0.040 Max.
		<u>Required</u>		Silicon 0.21 0.15/0.35
Yield Strength, lbs. per sq. in.	107,400	105,000	Minimum	Chromium 0.90 0.75/1.20
Tensile Strength, lbs. per sq. in.	134,500	125,000	Minimum	Molybdenum 0.16 0.15/0.25
Percent Elongation in 2 inches	22.0	16.0	Minimum	Nickel 0.12 - -
Percent Reduction of Area	59.4	50.0	Minimum	Vanadium L0.01 - -
<u>Rockwell Hardness</u>	C33	- -		

L=less than

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by *H. Goldenberg* P.E. **Date** Dec. 16, 1987 **Witnessed by**
Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74684-b

MATERIAL B-7 Alloy Steel Stud (5/8-11X4-1/2")

Your Order No. 6-22245, Rel No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP3b			RE: P.O. No. 4-726089
Marked	"B7J"			Class/Stk. 182/1081
Dimensions, in.	0.492			Heat No. "BDO"
Area, sq. in.	0.1901			<u>Chemical Analysis, %</u>
Dimensions after Fracture, in.	0.312			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0765			Carbon 0.47 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	20,800			Manganese 0.78 0.65/1.10
Maximum Load, lbs. actual	26,000			Phosphorus 0.012 0.035 Max.
Elongation in 2 inches	0.42			Sulphur 0.021 0.040 Max.
				Silicon 0.20 0.15/0.35
				Chromium 0.89 0.75/1.20
				Molybdenum 0.17 0.15/0.25
				Nickel 0.12 - -
				Vanadium L0.01 - -
		<u>Required</u>		
Yield Strength, lbs. per sq. in.	109,400	105,000	Minimum	
Tensile Strength, lbs. per sq. in.	136,800	125,000	Minimum	L=less than
Percent Elongation in 2 inches	21.0	16.0	Minimum	
Percent Reduction of Area	59.8	50.0	Minimum	
<u>Rockwell Hardness</u>	C-34	- -		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 16, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74684-C

MATERIAL B-7 Alloy Steel Stud (5/8-11 X 4-1/2")

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP3C			RE:	P.O. No. 4-726089	
Marked	"B7J"				Class/Stk. 182/1081	
Dimensions, in.	0.484				Heat No. BDO	
Area, sq. in.	0.1840				Chemical Analysis	%
Dimensions after Fracture, in.	0.292				Results	Required
Fractured Area, sq. in.	0.0670				Carbon	0.44 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	18,900				Manganese	0.78 0.65/1.10
Maximum Load, lbs. actual	23,900				Phosphorus	0.012 0.035 MAX.
Elongation in 2 inches	0.46				Sulphur	0.021 0.040 MAX.
					Silicon	0.22 0.15/0.35
					Chromium	0.89 0.75/1.20
					Molybdenum	0.16 0.15/0.25
					Nickel	0.11 - -
					Vanadium	L0.01 - -
Yield Strength, lbs. per sq. in.	102,700*	105,000	Minimum			
Tensile Strength, lbs. per sq. in.	129,900	125,000	Minimum			L=less than
Percent Elongation in 2 inches	23.0	16.0	Minimum			
Percent Reduction of Area	63.6	50.0	Minimum			
Rockwell Hardness	C34	- -				

REMARKS *The yeild strength does not conform to the minimum requirements.
The remainder of the results conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 16, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74685

MATERIAL B-7 Alloy Steel Stud (5/8-11X6")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP4			RE: P.O. No. 8-760373
Marked	"B7C"			Class/Stk. 182/1099
Dimensions, in.	0.480			Heat No. T
Area, sq. in.	0.1810			Chemical Analysis, %
Dimensions after Fracture, in.	0.297			Results
Fractured Area, sq. in.	0.0693			Required
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	20,600			Carbon 0.41 0.37/0.49
Maximum Load, lbs. actual	24,700			Manganese 0.80 0.65/1.10
Elongation in 2 inches	0.43			Phosphorus 0.012 0.035 Max.
		<u>Required</u>		Sulphur 0.022 0.040 Max.
Yield Strength, lbs. per sq. in.	113,800	105,000	Minimum	Silicon 0.22 0.15/0.35
Tensile Strength, lbs. per sq. in.	136,500	125,000	Minimum	Chromium 1.02 0.75/1.20
Percent Elongation in 2 inches	21.5	16.0	Minimum	Molybdenum 0.15 0.15/0.25
Percent Reduction of Area	61.7	50.0	Minimum	Nickel 0.09 - -
<u>Rockwell Hardness</u>	C30	- -		Vanadium 0.01 - -

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 16, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74686

MATERIAL B-7 Alloy Steel Stud (3/4-10X4)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, N.Y. 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP5			RE: P.O. No. 8-760373
Marked	"B7C"			Class/Stk. 182/1107
Dimensions, in.	0.497			Heat No. H
Area, sq. in.	0.1940			<u>Chemical Analysis</u> %
Dimensions after Fracture, in.	0.316			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0784			Carbon 0.38 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	22,500			Manganese 0.84 0.65/1.10
Maximum Load, lbs. actual	26,400			Phosphorus 0.012 0.035 Max.
Elongation in 2 inches	0.42			Sulphur 0.017 0.040 Max.
				Silicon 0.35 0.15/0.35
				Chromium 0.99 0.75/1.20
				Molybdenum 0.16 0.15/0.25
				Nickel 0.07 - -
				Vanadium 0.01 - -
				L=less than
Yield Strength, lbs. per sq. in.	116,000	105,000	Minimum	
Tensile Strength, lbs. per sq. in.	136,100	125,000	Minimum	
Percent Elongation in 2 inches	21.0	16.0	Minimum	
Percent Reduction of Area	59.6	50.0	Minimum	
<u>Rockwell Hardness</u>	C28	- -		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 16, 1987. Witnessed by
Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

MATERIAL B-7 Alloy Steel Stud (3/4-10X6")

FROM Consolidated Edison of NY
Astoria, NY 11105

Reference No. S-74687-a

Your Order No. 6-22245, Rel. No. 149

Specification No. ASTM A193-86
grade B7

Specimen Number	IP6a			RE: P.O. No. 6-09851
Marked	"TB7"			Class/Stk. 182/1123
Dimensions, in.	0.501			Heat No. -
Area, sq. in.	0.1971			<u>Chemical Analysis, %</u>
Dimensions after Fracture, in.	0.326			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0835			Carbon 0.40 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	27,000			Manganese 0.84 0.65/1.10
Maximum Load, lbs. actual	30,500			Phosphorus 0.017 0.035 Max.
Elongation in 2 inches	0.38			Sulphur 0.026 0.040 Max.
				Silicon 0.30 0.15/0.35
				Chromium 1.01 0.75/1.20
				Molybdenum 0.19 0.15/0.25
				Nickel 0.02 -
				Vanadium L0.01 -
Yield Strength, lbs. per sq. in.	37,000	105,000	Minimum	
Tensile Strength, lbs. per sq. in.	54,700	125,000	Minimum	L=less than
Percent Elongation in 2 inches	19.0	16.0	Minimum	
Percent Reduction of Area	57.7	50.0	Minimum	
<u>Rockwell Hardness</u>	C31	- -		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tested by H. Goldenberg, P.E. Date Dec. 16, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74687-b

MATERIAL B-7 Alloy Steel Stud (3/4-10X6")

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86 grade B7

Specimen Number	IP6b			RE: P.O. No. 6-09851
Marked	"TB7"			Class/Stk. 182/1123
Dimensions, in.	0.501			Heat No. -
Area, sq. in.	0.1971			<u>Chemical Analysis, %</u>
Dimensions after Fracture, in.	0.320			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0804			Carbon 0.38 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	26,000			Manganese 0.84 0.65/1.10
Maximum Load, lbs. actual	29,100			Phosphorus 0.019 0.035 Max.
Elongation in 2 inches	0.38			Sulphur 0.025 0.040 Max.
		<u>Required</u>		Silicon 0.27 0.15/0.35
Yield Strength, lbs. per sq. in.	131,900	1-5,000	Minimum	Chromium 1.01 0.75/1.20
Tensile Strength, lbs. per sq. in.	147,600	125,000	Minimum	Molybdenum 0.16 0.15/0.25
Percent Elongation in 2 inches	19.0	16.0	Minimum	Nickel 0.09 -
Percent Reduction of Area	59.2	50.0	Minimum	Vanadium 0.01 -
<u>Rockwell Hardness</u>	C31	-		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this..... day of..... 19.....

Tests by H. Goldenberg, P.E. Date Dec. 16, 1987 Witnessed by.....
Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74688

MATERIAL B-7 Alloy Steel Stud (3/4-10X8")

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP7			RE: P.O. No. 8-760 373
Marked	"B7C"			Class/Stk. 182/1131
Dimensions, in.	0.498			Heat No. H8
Area, sq. in.	0.1948			<u>Chemical Analysis</u> %
Dimensions after Fracture, in.	0.338			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0897			Carbon 0.44 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	26,200			Manganese 0.75 0.65/1.10
Maximum Load, lbs. actual	29,000			Phosphorus 0.021 0.035 Max.
Elongation in 2 inches	0.38			Sulphur 0.027 0.040 Max.
				Silicon 0.29 0.15/0.35
				Chromium 0.92 0.75/1.20
				Molybdenum 0.16 0.15/0.25
				Nickel 0.09 - -
				Vanadium 10.01 - -
Yield Strength, lbs. per sq. in.	134,500	105,000	Minimum	
Tensile Strength, lbs. per sq. in.	148,900	125,000	Minimum	L=less than
Percent Elongation in 2 inches	19.0	16.0	Minimum	
Percent Reduction of Area	53.9	50.0	Minimum	
<u>Rockwell Hardness</u>	C32	-		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E.
Ass't. Technical Director

Date Dec. 16, 1987

Witnessed by

City Testing & Research Laboratories, Inc.



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74689

MATERIAL B-7 Alloy Steel Stud (3/4-10X8")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP8			RE: P.O. No. 6-09851
Marked	"TB7"			Class/Stk. 182/1131
Dimensions, in.	0.499			Heat No. - - -
Area, sq. in.	0.1956			<u>Chemical Analysis, %</u>
Dimensions after Fracture, in.	0.310			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0755			Carbon 0.39 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	26,200			Manganese 0.83 0.65/1.10
Maximum Load, lbs. actual	29,100			Phosphorus 0.020 0.035 MAX.
Elongation in 2 inches	0.38			Sulphur 0.026 0.040 MAX.
				Silicon 0.31 0.15/0.35
				Chromium 0.96 0.75/1.20
				Molybdenum 0.16 0.15/0.25
				Nickel 0.09 - - - -
				Vanadium 0.01 - - - -
		<u>Required</u>		
Yield Strength, lbs. per sq. in.	134,000	105,000	Minimum	
Tensile Strength, lbs. per sq. in.	148,800	125,000	Minimum	L=less than
Percent Elongation in 2 inches	19.0	16.0	Minimum	
Percent Reduction of Area	61.4	50.0	Minimum	
<u>Rockwell Hardness</u>	C31	- -		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P. E. Date Dec. 14, 1987. Witnessed by
Ass't. Technical Director

967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74690-a

MATERIAL B-7 Alloy Steel Stud (7/8-9X6")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY T1105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP9a			RE: P.O. No. 5-693916	
Marked	DB7			Class/Stk. 182/1156	
Dimensions, in.	0.500			Heat No. - - - -	
Area, sq. in.	0.1963			Chemical Analysis	%
Dimensions after Fracture, in.	0.317				Results
Fractured Area, sq. in.	0.0789			Carbon	0.43
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	24,700			Manganese	0.71
Maximum Load, lbs. actual	28,300			Phosphorus	0.019
Elongation in 2 inches	0.41			Sulphur	0.019
				Silicon	0.21
				Chromium	0.93
				Molybdenum	0.15
				Nickel	0.04
				Vanadium	L0.01
Yield Strength, lbs. per sq. in.	125,800	105,000	Minimum		
Tensile Strength, lbs. per sq. in.	144,100	125,000	Minimum		L=less than
Percent Elongation in 2 inches	20.5	16.0	Minimum		
Percent Reduction of Area	59.8	50.0	Minimum		
Rockwell Hardness	C31	- - -			

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74690-b

MATERIAL B-7 Alloy Steel Stud (7/8-9X6")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP9b				RE:	P.O. No. 5-693916	
Marked	DB7					Class/Stk. 182/1156	
Dimensions, in.	0.500					Heat No. - - -	
Area, sq. in.	0.1963					<u>Chemical Analysis, %</u>	
Dimensions after Fracture, in.	0.316					<u>Results</u>	<u>Required</u>
Fractured Area, sq. in.	0.0784					Carbon 0.44	0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	25,100					Manganese 0.73	0.65/1.10
Maximum Load, lbs. actual	28,600					Phosphorus 0.016	0.035 Max.
Elongation in 2 inches	0.40					Sulphur 0.021	0.040 Max.
						Silicon 0.23	0.15/0.35
						Chromium 1.07	0.75/1.20
						Molybdenum 0.16	0.15/0.25
						Nickel 0.04	- - -
						Vanadium L0.01	- - -
Yield Strength, lbs. per sq. in.	127,800	105,000	Minimum				
Tensile Strength, lbs. per sq. in.	145,700	125,000	Minimum				L=less than
Percent Elongation in 2 inches	20.0	16.0	Minimum				
Percent Reduction of Area	60.1	50.0	Minimum				
<u>Rockwell Hardness</u>	C31	- - -					

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this _____ day of _____ 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by _____
Ass't. Technical Director

City Testing & Research Laboratories, Inc.

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967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74691

MATERIAL B-7 Alloy Steel Stud (7/8-9X7")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP10			RE:	P.O. No. 8-760373	
Marked	B7C				Class/Stk. 182/1164	
Dimensions, in.	0.497				Heat No. Q6	
Area, sq. in.	0.1940				<u>Chemical Analysis, %</u>	
Dimensions after Fracture, in.	0.334				<u>Results</u>	<u>Required</u>
Fractured Area, sq. in.	0.0876				Carbon 0.38	0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	26,100				Manganese 0.86	0.65/1.10
Maximum Load, lbs. actual	28,200				Phosphorus 0.011	0.035 Max.
Elongation in 2 inches	0.39				Sulphur 0.028	0.040 Max.
					Silicon 0.21	0.15/0.35
					Chromium 0.93	0.75/1.20
					Molybdenum 0.16	0.15/0.25
					Nickel 0.14	- - -
					Vanadium 10.01	- - -
Yield Strength, lbs. per sq. in.	134,500	105,000	Minimum			
Tensile Strength, lbs. per sq. in.	145,400	125,000	Minimum			L=less than
Percent Elongation in 2 inches	19.5	16.0	Minimum			
Percent Reduction of Area	54.8	50.0	Minimum			
<u>Rockwell Hardness</u>	C31	- - -				

REMARKS

The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E.
Ass't. Technical Director

Date Dec. 14, 1987

Witnessed by

City Testing & Research Laboratories, Inc.

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967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74692-a

MATERIAL B-7 Alloy Steel Stud (7/8-9X6 1/4")

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86-
grade B7

Specimen Number	IP11a			RE:	P.O. No. 5-696182	
Marked	JB7				Class/Stk. 182/1156	
Dimensions, in.	0.501				Heat No. - - -	
Area, sq. in.	0.1971				<u>Chemical Analysis</u> , %	
Dimensions after Fracture, in.	0.330				<u>Results</u>	<u>Required</u>
Fractured Area, sq. in.	0.0855				Carbon	0.42 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	23,600				Manganese	0.81 0.65/1.10
Maximum Load, lbs. actual	25,200				Phosphorus	0.012 0.035 Max.
Elongation in 2 inches	0.39				Sulphur	0.019 0.040 Max.
					Silicon	0.21 0.15/0.35
					Chromium	1.09 0.75/1.20
					Molybdenum	0.15 0.15/0.25
					Nickel	0.07 - - -
					Vanadium	0.01 - - -
Yield Strength, lbs. per sq. in.	119,700	105,000	Minimum			
Tensile Strength, lbs. per sq. in.	127,800	125,000	Minimum			L=less than
Percent Elongation in 2 inches	19.5	16.0	Minimum			
Percent Reduction of Area	56.6	50.0	Minimum			
Rockwell Hardness	C30	- -				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this..... day of..... 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by.....
Ass't. Technical Director

City Testing & Research Laboratories, Inc.

TABLE A2

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967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74692-b

MATERIAL B-7 Alloy Steel Stud (7/8-9X6 1/4")

Your Order No. 6-22245, Rel.No. 149

FROM Con Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP11b			RE: P.O. No. 5-696182
Marked	JB7			Class/Stk. 182/1156
Dimensions, in.	0.493			Heat No. - - -
Area, sq. in.	0.1909			<u>Chemical Analysis, %</u>
Dimensions after Fracture, in.	0.333			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0871			Carbon 0.42 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	23,200			Manganese 0.75 0.65/1.10
Maximum Load, lbs. actual	25,100			Phosphorus 0.013 0.035 Max.
Elongation in 2 inches	0.38			Sulphur 0.016 0.040 Max.
		<u>Required</u>		Silicon 0.19 0.15/0.35
Yield Strength, lbs. per sq. in.	121,500	105,000	Minimum	Chromium 1.05 0.75/1.20
Tensile Strength, lbs. per sq. in.	131,500	125,000	Minimum	Molybdenum 0.17 0.15/0.25
Percent Elongation in 2 inches	19.0	16.0	Minimum	Nickel 0.06 - - -
Percent Reduction of Area	54.4	50.0	Minimum	Vanadium 0.01 - - -
<u>Rockwell Hardness</u>	C30	- -		L=less than

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74693

MATERIAL B-7 Alloy Steel Stud (1-8X5")

Your Order No. 6-22245, Rel.No 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
Grade B7

Specimen Number	IP12			RE: P.O. No. 8-760373
Marked	B7C			Class/STk. 182/1180
Dimensions, in.	0.494			Heat No. A2
Area, sq. in.	0.1917			<u>Chemical Analysis, %</u>
Dimensions after Fracture, in.	0.335			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0881			Carbon 0.44 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	23,400			Manganese 0.75 0.65/1.10
Maximum Load, lbs. actual	26,700			Phosphorus 0.014 0.035 Max
Elongation in 2 inches	0.37			Sulphur 0.026 0.040 Max
				Silicon 0.21 0.15/0.35
				Chromium 1.07 0.75/1.20
				Molybdenum 0.18 0.15/0.25
				Nickel 0.29 -
				Vanadium 0.01 -
				L=less than
		<u>Required</u>		
Yield Strength, lbs. per sq. in.	122,100	105,000	Minimum	
Tensile Strength, lbs. per sq. in.	139,300	125,000	Minimum	
Percent Elongation in 2 inches	18.5	16.0	Minimum	
Percent Reduction of Area	54.0	50.0	Minimum	
<u>Rockwell Hardness</u>	C29	- - -		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

City Testing & Research Laboratories, Inc.

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967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74694-a

MATERIAL B-7 Alloy Steel Stud (1-8X6")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
Grade B7

Specimen Number	IP13a			RE: P.O.No. 2-861268
Marked	B7C			Class/Stk. 182/1198
Dimensions, in.	0.501			Heat No. CE304
Area, sq. in.	0.1971			<u>Chemical Analysis, %</u>
Dimensions after Fracture, in.	0.322			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0814			Carbon 0.45 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	22,400			Manganese 0.76 0.65/1.10
Maximum Load, lbs. actual	26,400			Phosphorus 0.016 0.035 Max.
Elongation in 2 inches	0.42			Sulphur 0.021 0.040 Max.
				Silicon 0.22 0.15/0.35
				Chromium 1.05 0.75/1.20
				Molybdenum 0.15 0.15/0.25
				Nickel 0.07 -
				Vanadium 0.01 -
				L=less than
		<u>Required</u>		
Yield Strength, lbs. per sq. in.	113,600	105,000	Minimum	
Tensile Strength, lbs. per sq. in.	133,900	125,000	Minimum	
Percent Elongation in 2 inches	21.0	16.0	Minimum	
Percent Reduction of Area	58.7	50.0	Minimum	
<u>Rockwell Hardness</u>	C28	-		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P. E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74694-C

MATERIAL B-7 Alloy Steel Stud (1-8X6")

Your Order No. 6-22245, Rel.No 149

FROM Consolidated Edison Co. of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP13C			RE: P.O. No. 2-861268
Marked	B7C			Class/Stk. 182/1198
Dimensions, in.	0.500			Heat No. CE304
Area, sq. in.	0.1963			Chemical Analysis, %
Dimensions after Fracture, in.	0.315			<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0779			Carbon 0.44 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	21,800			Manganese 0.76 0.65/1.10
Maximum Load, lbs. actual	25,600			Phosphorus 0.011 0.035 Max
Elongation in 2 inches	0.42			Sulphur 0.023 0.040 MAX
		<u>Required</u>		Silicon 0.23 0.15/0.35
Yield Strength, lbs. per sq. in.	111,000	105,000	Minimum	Chromium 1.03 0.75/1.20
Tensile Strength, lbs. per sq. in.	130,400	125,000	Minimum	Molybdenum 0.15 0.15/0.25
Percent Elongation in 2 inches	21.0	16.0	Minimum	Nickel 0.07 -
Percent Reduction of Area	60.3	50.0	Minimum	Vanadium 0.01 -
<u>Rockwell Hardness</u>	C26	-		

REMARKS The alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74695

MATERIAL B-7 Alloy Steel Stud (1-8X7")

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP14				RE:	P.O.No. 8-760373
Marked	B7C					CLASS/STK. 182/1206
Dimensions, in.	0.499					Heat No. A7
Area, sq. in.	0.1956					<u>CHEMICAL ANALYSIS, %</u>
Dimensions after Fracture, in.	0.346					<u>Results</u> <u>Required</u>
Fractured Area, sq. in.	0.0940					Carbon 0.41 0.37/0.49
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	23,900					Manganese 0.70 0.65/1.10
Maximum Load, lbs. actual	27,200					Phosphorus 0.014 0.035 Max.
Elongation in 2 inches	0.38					Sulphur 0.028 0.040 Max.
						Silicon 0.18 0.15/0.35
						Chromium 1.05 0.75/1.20
						Molybdenum 0.17 0.15/0.25
						Nickel 0.27 - -
						Vanadium L0.01 - -
						L=less than
Yield Strength, lbs. per sq. in.	122,200	105,000	Minimum			
Tensile Strength, lbs. per sq. in.	139,100	125,000	Minimum			
Percent Elongation in 2 inches	19.0	16.0	Minimum			
Percent Reduction of Area	51.9	50.0	Minimum			
<u>Rockwell Hardness</u>	C31	---				

REMARKS The alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74696

MATERIAL B-7 Alloy Steel Stud (1-8X8")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
Grade B-7

Specimen Number	IP15			RE: P.O. No. 8-760373 Class/Stk. 182/1214 Heat No. A8
Marked	"B7C"			Chemical Analysis, %
Dimensions, in.	0.495			<u>Results</u> <u>Required</u>
Area, sq. in.	0.1924			Carbon 0.37 0.37/0.49
Dimensions after Fracture, in.	0.339			Manganese 0.75 0.65/1.10
Fractured Area, sq. in.	0.0903			Phosphorus 0.010 0.035 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	24,800			Sulphur 0.031 0.040 Max.
Maximum Load, lbs. actual	27,600			Silicon 0.23 0.15/0.35
Elongation in 2 inches	0.35			Chromium 0.99 0.75/1.20
		<u>Required</u>		Molybdenum 0.15 0.15/0.25
Yield Strength, lbs. per sq. in.	128,900	105,000	Minimum	Nickel 0.09 - -
Tensile Strength, lbs. per sq. in.	143,400	125,000	Minimum	Vanadium 0.01 - -
Percent Elongation in 2 inches	17.5	16.0	Minimum	
Percent Reduction of Area	53.1	50.0	Minimum	
<u>Rockwell Hardness</u>	C30	- -		

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

City Testing & Research Laboratories, Inc.

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967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74697-a

MATERIAL Grade 2H Carbon Steel Heavy Hex Nut (5/8-11) **Your Order No.** 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP16a				
Marked	"2HT"				
	RE: P.O. No. 7-697048 Class/Stk. 182/1230 Heat No. E13210				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 39,550 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C32	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.47	0.40	Minimum		
Manganese	0.64	-			
Phosphorus	0.007	0.040	Maximum		
Sulphur	0.027	0.050	Maximum		
Silicon	0.21	-			
Chromium	LO.01	-			
Molybdenum	LO.01	-			
Nickel	0.01	-			
	L=less than				

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74697-b

MATERIAL grade 2H Carbon Steel heavy hex nut(5/8-11) **Your Order No.** 6-22245, Rel.No. 149
FROM Consolidated Edison of NY **Specification No.** ASTM A194-85a
 Astoria, NY 11105 grade 2H

Specimen Number	IP16b		
Marked	"2HT"		
RE:	P.O. No. 7-697048 Class/\$tk. 182/1230 Heat No. E13210		
	<u>Required</u>		
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 39,550 pounds without stripping or rupture.	
<u>Rockwell Hardness</u>	C32	C24/38	
<u>Chemical Analysis, %</u>			
Carbon	0.42	0.40	Minimum
Manganese	0.62	-	
Phosphorus	0.011	0.040	Maximum
Sulphur	0.024	0.050	Maximum
Silicon	0.21	-	
Chromium	L0.01	-	
Molybdenum	L0.01	-	
Nickel	0.02	-	
	L=less than		

REMARKS

The submitted carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74698-a

MATERIAL grade 2H Carbon Steel Heavy hex nut (3/4-10) **Your Order No.** 6-22245, Rel.No. 149
FROM Consolidated Edison of NY **Specification No.** ASTM A194-85a
 Astoria, NY 11105 grade 2H

Specimen Number	IP17a				
Marked	"2HT"				
	RE: P.O. No. 6-694350				
	Class/Stk. 182/1248				
	Heat No. B66803				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 58,450 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C29	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.44	0.40	Minimum		
Manganese	0.64	-			
Phosphorus	0.010	0.040	Maximum		
Sulphur	0.023	0.050	Maximum		
Silicon	0.21	-			
Chromium	LO.01	-			
Molybdenum	LO.01	-			
Nickel	0.02	-			
	L=less than				

REMARKS

The carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Tests by H. Goldenberg, P.E.
 Ass't. Technical Director

Date Dec. 14, 1987

Witnessed by

Subscribed and sworn to before me
 this day of 19

City Testing & Research Laboratories, Inc.

TABLE A2

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967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74698-b

MATERIAL grade 2H Carbon Steel heavy hex nut(3/4-10) **Your Order No.** 6-22245, Rel.No.

149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP17b				
Marked	"2HT"				
	RE: P.O. No. 6-694350 Class/Stk. 182/1248 Heat No. B66803				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 58,450 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C30	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.42	0.40	Minimum		
Manganese	0.66	-			
Phosphorus	0.012	0.040	Maximum		
Sulphur	0.025	0.050	Maximum		
Silicon	0.24	-			
Chromium	LO.01	-			
Molybdenum	LO.01	-			
Nickel	0.02	-			
	L=less than				

REMARKS The carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, F.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74699-a

MATERIAL grade 2H Carbon Steel heavy hex nut (3/4-10) **Your Order No.** 6-22245, Rel. No.

149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP18a		
Marked	"JS2H"		
	RE:	P.O.No. 8-760373 Class/Stk. 122/1248 Heat No. J4 <u>Required</u>	
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 58,450 pounds without stripping or rupture.	
<u>Rockwell Hardness</u>	C28	C24/38	
<u>Chemical Analysis, %</u>			
Carbon	0.49	0.40	Minimum
Manganese	0.70	-	
Phosphorus	0.010	0.040	Maximum
Sulphur	0.038	0.050	Maximum
Silicon	0.21	-	
Chromium	0.16	-	
Molybdenum	L0.01	-	
Nickel	0.07	-	
	L=less than		

REMARKS The carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74699-b

MATERIAL grade 2H Carbon Steel heavy hex nut(3/4-10) **Your Order No.** 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP18 b				
Marked	"JS2H"				
	RE: P.O.No. 8-760373				
	Class/Stk. 182/1248				
	Heat No. J4				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 58,450 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C27	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.51	0.40	Minimum		
Manganese	0.63	-			
Phosphorus	0.09	0.040	Maximum		
Sulphur	0.038	0.050	Maximum		
Silicon	0.21	-			
Chromium	0.16	-			
Molybdenum	0.01	-			
Nickel	0.07	-			
	L=less than				

REMARKS The carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P. E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74700-a

MATERIAL grade 2H Carbon Steel heavy hex nut (7/8-9) **Your Order No.** 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP19a		
Marked	"NH2H"		
	RE;	P.O.No. 5-692728	
		Class/Stk. 182/1255	
		Heat No. B85511	
		<u>Required</u>	
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 80,850 pounds without stripping or rupture	
<u>Rockwell Hardness</u>	C27	C24/38	
<u>Chemical Analysis, %</u>			
Carbon	0.52	0.40	Minimum
Manganese	0.61	-	
Phosphorus	0.011	0.040	Maximum
Sulphur	0.040	0.050	Maximum
Silicon	0.19	-	
Chromium	0.33	-	
Molybdenum	L0.01	-	
Nickel	0.04	-	
	L=less than		

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H.C. Goldenberg, P.E. Date Dec, 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74700b

MATERIAL grade 2H Carbon Steel heavy hex nut (7/8-9) **Your Order No.** 6-22245, Re1.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP19b				
Marked	"NH2H"				
	RE: P.O.No.5-692728 Class/Stk.182/1255 Heat No. B85511				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 80,850 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C27	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.46	0.40	Minimum		
Manganese	0.63	-			
Phosphorus	0.012	0.040	Maximum		
Sulphur	0.045	0.050	Maximum		
Silicon	0.21	-			
Chromium	0.37	-			
Molybdenum	L0.01	-			
Nickel	0.02	-			
	L=less than				

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me

this day of 19

Tests by H.C. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74700-C

MATERIAL grade 2H Carbon Steel heavy hex nut (7/8-9) **Your Order No.** 6-22245, Rel.No 149

FROM Consolidated Edison of N.Y.
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP19C				
Marked	"NH2H"				
	RE;	P.O.No. 5-692728			
		Class/Stk. 182/1255			
		Heat No. B85511			
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 80,850 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C26	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.41	0.40	Minimum		
Manganese	0.62	-			
Phosphorus	0.012	0.040	Maximum		
Sulphur	0.045	0.050	Maximum		
Silicon	0.21	-			
Chromium	0.37	-			
Molybdenum	L0.01	-			
Nickel	0.05	-			
	L=less than				

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74701-a

MATERIAL grade 2H Carbon Steel heavy hex nut (7/8-9)

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP20a				
Marked	"U2H"				
	RE: P.O. No. 5-695473				
	Class/Stk. 182/1255				
	Heat No. -				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 80,850 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C26	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.45	0.40	Minimum		
Manganese	0.61	-			
Phosphorus	0.009	0.040	Maximum		
Sulphur	0.034	0.050	Maximum		
Silicon	0.20	-			
Chromium	L0.01	-			
Molybdenum	0.01	-			
Nickel	0.05	-			
	L=less than				

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

City Testing & Research Laboratories, Inc.

TABLE A2

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967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74701-b

MATERIAL Grade 2H Carbon Steel Heavy Hex Nut (7/8-9)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP20b				
Marked	"U2H"				
RE:	P.O. No. 5-695473 Class/Stk. 182/1255 Heat No. -				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 80,850 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C26	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.41	0.40	Minimum		
Manganese	0.54	-			
Phosphorus	0.016	0.040	Maximum		
Sulphur	0.039	0.050	Maximum		
Silicon	0.19	-			
Chromium	L0.01	-			
Molybdenum	0.01	-			
Nickel	0.05	-			
	L=less than				

REMARKS

The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74702-a

MATERIAL grade 2H Carbon Steel Heavy Hex Nut(18)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP21a				
Marked	"2HT"				
	RE; P.O. No.	6-09851			
	Class/Stk.	182/1263			
	Heat No.	-			
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 106,000 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C28	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.43	0.40	Minimum		
Manganese	0.66	-			
Phosphorus	0.011	0.040	Maximum		
Sulphur	0.025	0.050	Maximum		
Silicon	0.20	-			
Chromium	0.01	-			
Molybdenum	0.02	-			
Nickel	0.02	-			
	L=less than				

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74702-b

MATERIAL grade 2H Carbon Steel heavy hex nut(1-8)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP21b			
Marked	"2HT' RE: P.O.No. 6-09851 Class/Stk. 182/126B Heat No. -			
		<u>Required</u>		
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 106,000 pounds without stripping or rupture.		
<u>Rockwell Hardness</u>	C28	C24/38		
<u>Chemical Analysis, %</u>				
Carbon	0.45	0.40	Minimum	
Manganese	0.64	-		
Phosphorus	0.009	0.040	Maximum	
Sulphur	0.026	0.050	Maximum	
Silicon	0.19	-		
Chromium	L0.01	-		
Molybdenum	0.02	-		
Nickel	0.04	-		
	L=less than			

REMARKS

The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74702-C

MATERIAL grade 2H Carbon Steel heavy hex nut (1-8) **Your Order No.** 6-22245, Rel.No. 149
FROM Consolidated Edison of NY **Specification No.** ASTM A194-85a
 Astoria, NY 11105 grade 2H

Specimen Number	IP21C		
Marked	"2HT"		
	RE:	P.O. No. 6-09851 Class/Stk. 182/1263 Heat No. -	
		<u>Required</u>	
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 106,000 pounds without stripping or rupture.	
<u>Rockwell Hardness</u>	C29	C24/38	
<u>Chemical Analysis, %</u>			
Carbon	0.43	0.40	Minimum
Manganese	0.71	-	
Phosphorus	0.009	0.040	Maximum
Sulphur	0.026	0.050	Maximum
Silicon	0.19	-	
Chromium	L0.01	-	
Molybdenum	0.02	-	
Nickel	0.04	-	
	L=less than		

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director

967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74702-d

MATERIAL grade 2H Carbon Steel heavy hex nut (1-8) **Your Order No.** 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP21d			
Marked	"2HT" RE: P.O. No. 6-09851 Class/Stk. 182/1263 Heat No. -			
<u>Proof Load Test</u>	Pass	<u>Required</u> Nut shall resist an axial load of 106,000 pounds without stripping or rupture.		
<u>Rockwell Hardness</u>	C28	C24/38		
<u>Chemical Analysis, %</u>				
Carbon	0.41	0.40	Minimum	
Manganese	0.65	-		
Phosphorus	0.009	0.040	Maximum	
Sulphur	0.025	0.050	Maximum	
Silicon	0.23	-		
Chromium	L0.01	-		
Molybdenum	L0.02	-		
Nickel	0.02	-		
	L=less than			

REMARKS

The submitted carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74703-a

MATERIAL grade 2H Carbon Steel heavy hex nut (1½-8)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP22a				
Marked	"BPGJ2H"				
	RE: P.O.No. 4-834313				
	Class/STk. 182/5355				
	Heat No. -				
		<u>Required</u>			
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 261,100 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C28	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.46	0.40	Minimum		
Manganese	0.67	-			
Phosphorus	0.010	0.040	Maximum		
Sulphur	0.023	0.050	Maximum		
Silicon	0.23	-			
Chromium	LO.01	-			
Molybdenum	LO.01	-			
Nickel	0.11	-			

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H.C. Goldenberg, P.E. Date Dec. 14, 1987. Witnessed by
Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74703-b

MATERIAL grade 2H Carbon Steel heavy hex nut(1½-8) **Your Order No.** 6-22245, Rel.No. 149
FROM Consolidated Edison of NY **Specification No.** ASTM A194-85a
 Astoria, NY 11105 grade 2H

Specimen Number	IP22b		
Marked	"BPGJ2H"		
	RE: P.O.No.	4-834313	
	Class/Stk.	182/5355	
	Heat No.	-	
		<u>Required</u>	
Proof Load Test	Pass	Nut shall resist an axial load of 261,100 pounds without stripping or rupture.	
Rockwell Hardness	C28	C24/38	
Chemical Analysis, %			
Carbon	0.43	0.40	Minimum
Manganese	0.69	-	-
Phosphorus	0.009	0.040	Maximum
Sulphur	0.027	0.050	Maximum
Silicon	0.23	-	
Chromium	L0.01	-	
Molybdenum	L0.01	-	
Nickel	0.11	-	
	L=less than		

REMARKS The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
 this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74704

MATERIAL B-16 Alloy Steel Stud (1-3/8-8X10 $\frac{1}{2}$)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B-16

Specimen Number	IP23			<u>Chemical Analysis, %</u>		
Marked	BFD-6 Removed	from Service		Results	Required	
Dimensions, in.	0.502			Carbon	0.43	0.37/0.47
Area, sq. in.	0.1979			Manganese	0.52	0.45/0.70
Dimensions after Fracture, in.	0.275			Phosphorus	0.010	0.035 Max.
Fractured Area, sq. in.	0.0594			Sulphur	0.017	0.040 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	20,700			Silicon	0.21	0.15/0.35
Maximum Load, lbs. actual	23,600			Chromium	0.91	0.80/1.15
Elongation in 2 inches	0.50			Molybdenum	0.50	0.50/0.65
		<u>Required</u>		Vanadium	0.35	0.25/0.35
Yield Strength, lbs. per sq. in.	104,600	105,000	Minimum	Nickel	0.09	- -
Tensile Strength, lbs. per sq. in.	119,200	125,000	Minimum			
Percent Elongation in 2 inches	25.0	18.0	Minimum			
Percent Reduction of Area	70.0	50.0	Minimum			
<u>Rockwell Hardness</u>	C24					

REMARKS The yield and tensile strengths are below the specified minimum requirements while the chemical analysis conforms to the requirements for a B16 alloy steel.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74705

MATERIAL B-7 Alloy Steel Stud (1-1/8-8X8")

Your Order No. 6-22245, Rel. No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP24			Chemical Analysis, %	
				Results	Required
Marked	MS-4.10				
Dimensions, in.	Gate, Crane, Stamp "B7T" Removed from Service				
Area, sq. in.	0.505			Carbon 0.39	0.37/0.49
Dimensions after Fracture, in.	0.200			Manganese 0.84	0.65/1.10
Fractured Area, sq. in.	0.319			Phosphorus 0.022	0.035 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	0.0799			Sulphur 0.026	0.040 Max.
Maximum Load, lbs. actual	25,400			Silicon 0.26	0.15/0.35
Elongation in 2 inches	28,700			Chromium 0.96	0.75/1.20
	0.40			Molybdenum 0.18	0.15/0.25
				Nickel 0.13	-
				Vandadium 0.01	-
				L=less than	
		Required			
Yield Strength, lbs. per sq. in.	127,000	105,000	Minimum		
Tensile Strength, lbs. per sq. in.	143,500	125,000	Minimum		
Percent Elongation in 2 inches	20.0	16.0	Minimum		
Percent Reduction of Area	60.1	50.0	Minimum		
Rockwell Hardness	C30	--			

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74706

MATERIAL B-7 Alloy Steel Stud (1-8X8")

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP25 LCV, 1211	Fisher, Stamp "SP7" Removed from service	Chemical	Analysis	
				Results	%
Marked					<u>Required</u>
Dimensions, in.	0.496		Carbon	0.44	0.37/0.49
Area, sq. in.	0.1932		Manganese	0.80	0.65/1.10
Dimensions after Fracture, in.	0.324		Phosphorus	0.019	0.035 Max.
Fractured Area, sq. in.	0.0824		Sulphur	0.020	0.040 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	25,700		Silicon	0.21	0.15/0.35
Maximum Load, lbs. actual	28,300		Chromium	1.05	0.75/1.20
Elongation in 2 inches	0.37		Molybdenum	0.15	0.15/0.25
		<u>Required</u>	Nickel	0.09	- -
Yield Strength, lbs. per sq. in.	133,000	105,000	Vanadium	0.01	- -
Tensile Strength, lbs. per sq. in.	146,500	125,000			
Percent Elongation in 2 inches	18.5	16.0			Minimum
Percent Reduction of Area	57.3	50.0			Minimum
<u>Rockwell Hardness</u>	C31	- -			

REMARKS The B-7 Alloy Steel Stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74708

MATERIAL grade 2H Carbon Steel Heavy hex nut(1-3/8-8)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	Ip27		
Marked	BFD-6 Stamp "S2H"		
	RE:	"removed from service"	
		<u>Required</u>	
<u>Proof Load Test</u>	*	Nut shall resist an axial load of 215,800 pounds without stripping or rupture.	
<u>Rockwell Hardness</u>	C26		
<u>Chemical Analysis, %</u>			
Carbon	0.43	0.40	Minimum
Manganese	0.58	-	
Phosphorus	0.007	0.040	Maximum
Sulphur	0.035	0.050	Maximum
Silicon	0.29	-	
Chromium	L0.01	-	
Molybdenum	0.02	-	
Nickel	0.06	-	
	L=less than		

REMARKS *Threads damaged when nut was removed from service; could not be tested for proof load.
The hardness and chemical analysis conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74709

MATERIAL Grade 2H Carbon Steel Heavy Hex Nut(1-1/8-8) **Your Order No.** 6-22245, Rel.No. 149
FROM Consolidated Edison of NY **Specification No.** ASTM A194-85a
 Astoria, NY 11105 grade 2H

Specimen Number	IP28				
Marked	MS-4,10"	Gate, Crane, Stamp "2H" Removed from service			
		<u>Required</u>			
<u>Proof Load Test</u>	*	Nut shall resist an axial load of 138,200 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C27	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.47	0.40	Minimum		
Manganese	0.65	-			
Phosphorus	0.010	0.040	Maximum		
Sulphur	0.035	0.050	Maximum		
Silicon	0.22	-			
Chromium	L0.01	-			
Molybdenum	0.03	-			
Nickel	0.09	-			
	L=less than				

REMARKS *Threads damaged when nut was removed from service; could not be proof tested.
 The hardness and chemical analysis conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
 this day of 19

Tests by H. Goldenberg, P.E. **Date** Dec. 14, 1987 **Witnessed by**
 Ass't. Technical Director

City Testing & Research Laboratories, Inc.

TABLE A2

Page 46 of 61



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74710

MATERIAL grade 2H Carbon Steel heavy hex nut (1-8)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP29				
Marked	LCV, 1211, Fisher, Stamp "A2H" Removed from service				
Proof Load Test	Pass	<u>Required</u> Nut shall resist anaxial load of 106,000 pounds without stripping or rupture.			
Rockwell Hardness	C27	C24/38			
Chemical Analysis, %					
Carbon	0.42	0.40	Minimum		
Manganese	0.67	-			
Phosphorus	0.14	0.040	Maximum		
Sulphur	0.020	0.050	Maximum		
Silicon	0.22	-			
Chromium	0.01	-			
Molybdenum	0.01	-			
Nickel	0.01	-			
	L=less than				

REMARKS

The submitted carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987. Witnessed by
Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74711

MATERIAL grade 2H Carbon Steel heavy hex nut(2-8)

Your Order No. 6-22245, Rel.No. 149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP30		
Marked	BFD 2-22, Stamp "R2H" Removed from Service		
		<u>Required</u>	
<u>Proof Load Test</u>	*	Nut shall resist an axial load of 485,000 pounds without stripping or rupture.	
<u>Rockwell Hardness</u>	C32		
<u>Chemical Analysis, %</u>			
Carbon	0.40	0.40	Minimum
Manganese	0.67	-	
Phosphorus	0.007	0.040	Maximum
Sulphur	0.034	0.050	Maximum
Silicon	0.22	-	
Chromium	L0.01	-	
Molybdenum	0.01	-	
Nickel	0.06	-	
	L=less than		

REMARKS * Proof load requirement of 485,000 exceeds maximum capacity of test equipment.

The hardness and chemical analysis conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 14, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

MATERIAL B-7 Alloy Steel Stud (3/4-10X6-12")

Reference No. S-74737

Your Order No. 6-22245, Rel.No.149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
Grade B7

Specimen Number	IP31				Chemical Analysis, %	
					Results	Required
Marked	"B7K"					
Dimensions, in.	0.495			Carbon	0.48	0.37/0.49
Area, sq. in.	0.1924			Manganese	0.78	0.65/1.10
Dimensions after Fracture, in.	0.310			Phosphorus	0.011	0.035 Max.
Fractured Area, sq. in.	0.0755			Sulphur	0.017	0.040 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	25,000			Silicon	0.27	0.15/0.35
Maximum Load, lbs. actual	26,900			Chromium	1.18	0.75/1.20
Elongation in 2 inches	0.36			Molybdenum	0.15	0.15/0.25
				Nickel	0.11	- - -
				Vanadium	0.01	- - -
Yield Strength, lbs. per sq. in.	129,900	105,000	Minimum			
Tensile Strength, lbs. per sq. in.	139,800	125,000	Minimum		L=less than	
Percent Elongation in 2 inches	18.0	16.0	Minimum			
Percent Reduction of Area	60.8	50.0	Minimum			
<u>Rockwell Hardness</u>	C30	- -				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 22, 1987. Witnessed by
Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74738

MATERIAL B-7 Alloy Steel Stud (3/4-10X6")

Your Order No. 6-22245, Rel No.149

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP32				Chemical Analysis, %	
Marked	"B7S"				Results	Required
Dimensions, in.	0.501				Carbon	0.40 / 0.37/0.49
Area, sq. in.	0.1971				Manganese	0.77 / 0.65/1.10
Dimensions after Fracture, in.	0.305				Phosphorus	0.009 / 0.035 Max.
Fractured Area, sq. in.	0.0731				Sulphur	0.020 / 0.040 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	25,200				Silicon	0.22 / 0.15/0.35
Maximum Load, lbs. actual	28,300				Chromium	1.08 / 0.75/1.20
Elongation in 2 inches	0.39				Molybdenum	0.17 / 0.15/0.25
		<u>Required</u>			Nickel	0.02 / -
Yield Strength, lbs. per sq. in.	127,800	105,000		Minimum	Vanadium	10.01 / -
Tensile Strength, lbs. per sq. in.	143,600	125,000		Minimum	L=less than	
Percent Elongation in 2 inches	19.5	16.0		Minimum		
Percent Reduction of Area	62.9	50.0		Minimum		
<u>Rockwell Hardness</u>	C30	-				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E.
Ass't. Technical Director

Date Dec. 24, 1987

Witnessed by



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74739

MATERIAL B-7 Alloy Steel Stud (1-8X5-1/2")

Your Order No. 6-22245, Rel.No.149/

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP33				Chemical Analysis, %	
		Marked			Results	Required
Dimensions, in.	0.502			Carbon	0.43	0.37/0.49
Area, sq. in.	0.1979			Manganese	0.84	0.65/1.10
Dimensions after Fracture, in.	0.312			Phosphorus	0.016	0.035 Max.
Fractured Area, sq. in.	0.0765			Sulphur	0.024	0.040 MAX.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	25,000			Silicon	0.21	0.15/0.35
Maximum Load, lbs. actual	27,900			Chromium	0.98	0.75/1.20
Elongation in 2 inches	0.39			Molybdenum	0.15	0.15/0.25
				Nickel	0.02	-
				Vanadium	LO.01	-
Yield Strength, lbs. per sq. in.	126,300	105,000	Minimum			
Tensile Strength, lbs. per sq. in.	141,000	125,000	Minimum			L=less than
Percent Elongation in 2 inches	19.5	16.0	Minimum			
Percent Reduction of Area	61.4	50.0	Minimum			
Rockwell Hardness	C30	-				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E.
Ass't. Technical Director

Date Dec. 22, 1987

Witnessed by



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74740

MATERIAL B-7 Alloy Steel Stud (3/4-10X4 1/2")

Your Order No. 6-22245, Rel.No.149A

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP34				Chemical Analysis, %	
					Results	Required
Marked	"B7C"					
Dimensions, in.	0.505					
Area, sq. in.	0.200				Carbon	0.45 0.37/0.49
Dimensions after Fracture, in.	0.320				Manganese	0.87 0.65/1.10
Fractured Area, sq. in.	0.0804				Phosphorus	0.014 0.035 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	27,400				Sulphur	0.021 0.040 Max.
Maximum Load, lbs. actual	29,900				Silicon	0.27 0.15/0.35
Elongation in 2 inches	0.35				Chromium	0.86 0.75/1.20
					Molybdenum	0.17 0.15/0.25
					Nickel	0.09 - -
Yield Strength, lbs. per sq. in.	137,000	105,000	Minimum		Vanadium	10.01 - -
Tensile Strength, lbs. per sq. in.	149,500	125,000	Minimum			
Percent Elongation in 2 inches	17.5	16.0	Minimum			
Percent Reduction of Area	59.8	50.0	Minimum			
<u>Rockwell Hardness</u>	C31	-				

REMARKS The submitted alloy steel stud conforms to the requirements noted..

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 24, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74741

MATERIAL B-7 Alloy Steel Stud (5/8-11X4 1/2")

Your Order No. 6-22245, Rel. No. 149A

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP35				Chemical Analysis, %	
					Results	Required
Marked	"B7K"					
Dimensions, in.	0.429					
Area, sq. in.	0.1445			Carbon	0.41	0.37/0.49
Dimensions after Fracture, in.	0.258			Manganese	0.79	0.65/1.10
Fractured Area, sq. in.	0.0523			Phosphorus	0.017	0.035 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	19,700			Sulphur	0.021	0.040 Max.
Maximum Load, lbs. actual	21,400			Silicon	0.25	0.15/0.35
Elongation in 2 ^{4D(1.7)} inches	0.36			Chromium	1.07	0.75/1.20
		Required		Molybdenum	0.15	0.15/0.25
Yield Strength, lbs. per sq. in.	136,300	105,000	Minimum	Nickel	0.02	-
Tensile Strength, lbs. per sq. in.	148,100	125,000	Minimum	Vanadium	10.01	-
Percent Elongation in 2 ^{4D(1.7)} inches	21.2	16.0	Minimum			
Percent Reduction of Area	63.8	50.0	Minimum			
<u>Rockwell Hardness</u>	C31	-				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E. Date Dec. 22, 1987 Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74742

MATERIAL B-7 Alloy Steel Stud (5/8-11X3 1/2")

Your Order No. 6-22245, Rel.No.149.

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP36				Chemical Analysis, %	
					Results	Required
Marked	"B7S"					
Dimensions, in.	0.421				Carbon	0.41 / 0.37/0.59
Area, sq. in.	0.1392				Manganese	0.79 / 0.65/1.10
Dimensions after Fracture, in.	0.252				Phosphorus	0.016 / 0.035 Max.
Fractured Area, sq. in.	0.0499				Sulphur	0.020 / 0.040 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	17,000				Silicon	0.35 / 0.15/0.35
Maximum Load, lbs. actual	17,700				Chromium	1.15 / 0.75/1.20
Elongation in ^{4D(1.7)} 2 inches	0.36				Molybdenum	0.16 / 0.15/0.25
		<u>Required</u>			Nickel	0.07 / -
Yield Strength, lbs. per sq. in.	122,100	105,000	Minimum	Vanadium	LO.01 / -	
Tensile Strength, lbs. per sq. in.	127,200	125,000	Minimum		L=less than	
Percent Elongation in ^{4D(1.7)} 2 inches	21.2	16.0	Minimum			
Percent Reduction of Area	64.1	50.0	Minimum			
<u>Rockwell Hardness</u>	C25	-				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E.
Ass't. Technical Director

Date Dec. 22, 1987

Witnessed by



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74743

MATERIAL B-7 Alloy Steel Stud (1-1/8-8X9 1/2")

Your Order No. 6-22245, Rel. No. 149A

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A193-86
grade B7

Specimen Number	IP37				Chemical Analysis, %	
					Results	Required
Marked	"B7DE"					
Dimensions, in.	0.501				Carbon	0.39 / 0.37/0.49
Area, sq. in.	0.1971				Manganese	0.91 / 0.65/1.10
Dimensions after Fracture, in.	0.320				Phosphorus	0.014 / 0.035 Max.
Fractured Area, sq. in.	0.0804				Sulphur	0.021 / 0.040 Max.
Yield Strength, lbs. actual @ 0.2% or Extension under load, in./2 in.	24,200				Silicon	0.35 / 0.15/0.35
Maximum Load, lbs. actual	28,000				Chromium	0.96 / 0.75/1.20
Elongation in 2 inches	0.40				Molybdenum	0.20 / 0.15/0.25
					Nickel	0.06 / -
					Vanadium	L0.01 / -
Yield Strength, lbs. per sq. in.	122,800	105,000	Minimum			
Tensile Strength, lbs. per sq. in.	142,000	125,000	Minimum			
Percent Elongation in 2 inches	20.0	16.0	Minimum	L=less than		
Percent Reduction of Area	59.2	50.0	Minimum			
<u>Rockwell Hardness</u>	C30	-				

REMARKS The submitted alloy steel stud conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by ... H. Goldenberg, P.E. ... Date Dec. 22, 1987 ... Witnessed by

Ass't. Technical Director



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74744

MATERIAL Alloy Steel Socket head cap screw (1-8X2½")

Your Order No. 6-22245, Rel. No. 149A

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A574-83

Specimen Number	IP38				
Marked	-				
		<u>Required</u>			
<u>Rockwell Hardness</u>	C42	C37/45			
<u>Proof Load Test</u>					
Change in length at 135,000 psi inch (81,800 lbs. @ 0.606 in ² stress areas.	0.0000	0.0005			
<u>Axial Tensile Strength, lbs.</u>	125,500	103,000	Minimum		
<u>Chemical Analysis, %</u>					
Carbon	0.44	0.31	Minimum		
Manganese	0.84	-			
Phosphorus	0.010	0.045	Maximum		
Sulphur	0.021	0.045	Maximum		
Silicon	0.37	-			
Chromium	0.98	-			
Molybdenum	0.17	-			
Nickel	0.02	-			

REMARKS The alloy steel socket head cap screw conforms to the requirements noted.

I certify that this report is a true report of
results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E.
Ass't. Technical Director

Date Dec. 22, 1987

Witnessed by

967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065



REPORT OF TESTS

Reference No. S-74745

MATERIAL Grade 2H Carbon Steel heavy hex nut (3/4-10)

Your Order No. 6-22245, Rel. No. 149a

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP39				
Marked	"2HA"				
<u>Proof Load Test</u>	Pass	<u>Required</u>	Nut shall resist an axial load of 58,450 pounds without stripping or rupture.		
<u>Rockwell Hardness</u>	C26	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.44	0.40	Minimum		
Manganese	0.71	-			
Phosphorus	0.014	0.040	Maximum		
Sulphur	0.025	0.050	Maximum		
Silicon	0.15	-			
Chromium	LO.01	-			
Nickel	0.05	-			
Molybdenum	0.02	-			

REMARKS The submitted 2H carbon steel heavy hex nut sample conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg, P.E., Ass't. Technical Director Date Dec. 21, 1987 Witnessed by



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74746

MATERIAL grade 2H Carbon Steel heavy hex nut (3/4-10)

Your Order No. 6-22245, Re1.No.149a

FROM Consolidated Edison Co. of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP40					
Marked	"2HA"					
		<u>Required</u>				
<u>Proof Load Test</u>	Pass	Nut shall resist an axial load of 58,450 pounds without stripping or rupture.				
<u>Rockwell Hardness</u>	C28	C24/38				
<u>Chemical Analysis, %</u>						
Carbon	0.41	0.40	Minimum			
Manganese	0.65	-				
Phosphorus	0.014	0.040	Maximum			
Sulphur	0.025	0.050	Maximum			
Silicon	0.14	-				
Chromium	LO.01	-				
Nickel	0.05	-				
molybdenum	0.03	-				

REMARKS The submitted 2H Carbon steel heavy hex nut sample conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, P.E., Ass't. Technical Director Date Dec. 21, 1987 Witnessed by



967 E. HAZELWOOD AVE.

(201) 388-7711

RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74747

MATERIAL grade 2H Carbon Steel heavy hex nut (1-8)

Your Order No. 6-22245, Rel.No.149a

FROM Consolidated Edison Co. of NY
Astoria, N.Y. 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP41				
Marked	"2HA"				
<u>Proof Load Test</u>	Pass	<u>Required</u>	nut shall resist an axial load of 106,000 pounds without stripping or rupture.		
<u>Rockwell Hardness</u>	C27	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.43	0.40	Minimum		
Manganese	0.78	-			
Phosphorus	0.011	0.040	Maximum		
Sulphur	0.016	0.050	Maximum		
Silicon	0.25	-			
Chromium	0.12	-			
Nickel	0.08	-			
Molybdenum	0.02	-			

REMARKS The submitted 2H carbon steel heavy hex nut (1-8) conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, Date Dec. 21, 1987 Witnessed by

P.E., Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74748

MATERIAL grade 2H Carbon Steel heavy hex nut (3/4-10)

Your Order No. 6-22245, Rel. No. 149a

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP42					
Marked	"2HA"					
<u>Proof Load Test</u>	Pass	<u>Required</u>	nut shall resist an axial load of 58,450 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C28	C28/38				
<u>Chemical Analysis, %</u>						
Carbon	0.43	0.40	Minimum			
Manganese	0.67	-				
Phosphorus	0.016	0.040	Maximum			
Sulphur	0.024	0.050	Maximum			
Silicon	0.15	-				
Chromium	LO.01	-				
Nickel	0.05	-				
Molybdenum	0.01	-				

REMARKS

The submitted 2H carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg Date Dec. 21, 1987 Witnessed by

P.E., Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74749

MATERIAL grade 2H Carbon Steel heavy hex nut(5/8-11)

Your Order No. 6-22245, Rel.No.149a

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a

Specimen Number	IP43					
Marked	"2HS"					
<u>Proof Load Test</u>	Pass	<u>Required</u>	nut shall resist an axial load of 39,550 pounds without stripping or rupture.			
<u>Rockwell Hardness</u>	C28	C24/38				
<u>Chemical Analysis, %</u>						
Carbon	0.40	0.40	Minimum			
Manganese	0.62	-				
Phosphorus	0.014	0.040	Maximum			
Sulphur	0.014	0.050	Maximum			
Silicon	0.25	-				
Chromium	10.01	-				
Nickel	0.03	-				
Molybdenum	0.01	-				

REMARKS

The submitted 2H carbon steel heavy hex nut conforms to the requirements noted.

I certify that this report is a true report of results obtained from our tests of this material.

Subscribed and sworn to before me this day of 19

Tests by H. Goldenberg, Date Dec. 21, 1987 Witnessed by
P.E., Ass't. Technical Director



967 E. HAZELWOOD AVE. (201) 388-7711 RAHWAY, N.J. 07065

REPORT OF TESTS

Reference No. S-74750

MATERIAL grade 2H Carbon Steel heavy hex nut(5/8-11)

Your Order No. 6-22245, Rel.No.149a

FROM Consolidated Edison of NY
Astoria, NY 11105

Specification No. ASTM A194-85a
grade 2H

Specimen Number	IP44				
Marked	"2HS"				
<u>Proof Load Test</u>	Pass	<u>Required</u>	Nut shall resist an axial load of 39,550 pounds without stripping or rupture.		
<u>Rockwell Hardness</u>	C28	C24/38			
<u>Chemical Analysis, %</u>					
Carbon	0.44	0.40	Minimum		
Manganese	0.71	-			
Phosphorus	0.011	0.040	Maximum		
Sulphur	0.024	0.050	Maximum		
Silicon	0.34	-			
Chromium	10.01	-			
Nickel	0.03	-			
Molybdenum	0.01	-			

REMARKS The submitted 2H Carbon steel heavy hex nut conforms to the requirements noted.

We certify that this report is a true report of results obtained from our tests of this material

Subscribed and sworn to before me
this day of 19

Tests by H. Goldenberg Date Dec. 21, 1987 Witnessed by
P.E., Ass't. Technical Director

TABLE A-3

SAMPLE "CERTIFIED MATERIAL TEST REPORT"

HARDWARE SPECIALTY CO INC

48-75 36 Street ,L.I.C., N.Y. 11101

CERTIFIED MATERIAL TEST REPORT

Customer : CON EDISON
 Quantity : 75 PCS pieces ✓
 P/O# : ~~472089~~ ITEM-1 4-726089 ✓ PER TELEPHONE W/ JAMES CARROTHERS
 Heat/Lot # : A19765/BDO ✓ H.S. Co. Q.C. 8/2 8/17/84
 Description : 5/8-11 X 4 1/2 CONT THRD STUD ✓ 1545
 Register# : 35173
 Specification and Material: ASTM A-193, Gr. B7 ✓

CHEMICAL PROPERTIES

Carbon : .42 ✓
 Manganese : .92 ✓
 Phosphorus : .022 ✓
 Sulphur : .011 ✓
 Silicon : .28 ✓
 Chromium : .87 ✓
 Molybdenum : .16 ✓

PHYSICAL PROPERTIES

Tensile : 142,800PSI ✓
 Yield : 124,200 PSI ✓
 Elongation in 2" : 20% ✓
 Reduction of area : 60% ✓

NOTES

1. This material is free from mercury contamination.
2. Minimum tempering temp 1100oF. ✓
3. Parts are marked J ✓ (Man'f I.D.) and B7 ✓ (Mat'l).

4. PARTS ARE MARKED BDO LOT #.

The contents of this report are correct and accurate.
 All results and operations performed by HARDWARE SPECIALTY CO and their sub-contractors are in compliance with the above codes and specifications.

Insp : R/S

Date: 6/12/84


 A. Lawrence Mueller
 Quality Control Manager