

NCSX Work Approval Form (WAF)

WBS Number: 145

WBS Title: Modular Coil-Coil Interfaces

Job Number: 1431

Job Title: Modular Coil Interface Hardware

Job Manager: Larry Dudek

Description:

Procure necessary parts and consumables to support assembly and fabrication of Modular Coils interfaces. This job only covers M&S support - labor to procure the parts and consumables is covered under WBS 82 (where L. Dudek labor is covered).

Schedule:

Approvals:

_____	_____
Job Manager	Date
_____	_____
Responsible Line Manager	Date
_____	_____
Project Manager	Date
_____	_____
Engineering Department Head	Date

NCSX June 2007 ETC
TABLE I - DESIGN LABOR

WBS Number: 145																
WBS Title: Modular Coil-Coil Interfaces																
Job Number: 1431																
Job Title: Modular Coil Interface Harware																
Job Manager: Larry Dudek																
Description:																
No Design Work Associated with This Job.																

NCSX June 2007 ETC
TABLE III - Fabrication/Assembly Installation

WBS Number: 145														
WBS Title: Modular Coil-Coil Interfaces														
Job Number: 1431														
Job Title: Modular Coil Interface Harware														
Job Manager: Larry Dudek														
In-house Fabrication and Assembly and Installation														
Description: N/A														

NCSX June 2007 ETC
TABLE IV - Uncertainty of Estimate and Residual Risk Assessment

WBS Number: 145
WBS Title: Modular Coil-Coil Interfaces
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Uncertainty of the Estimate

	<u>High</u>	<u>Medium</u>	<u>Low</u>	<u>Uncertainty Range (%)</u>	<u>Comments/Other Considerations</u>
Design Maturity		X			Design still evolving - no drawings of shims, bushings (even material choice uncertain) => only studs pretty well finalized.
Design Complexity		X		-15%/+25%	Complexity rated as medium since criteria for loads is demanding.

Note: High/Medium/Low uncertainty assessment from Job Manager. Uncertainty range based on ACEI recommended practice 18R-97 as amended for NCSX.

Residual Impacts

<u>Job</u>	<u>Risk Description</u>	<u>Likelihood of Occurring</u>	<u>Mitigation Plan</u>	<u>Basis of estimate</u>	<u>Cost Impact</u>		<u>Schedule Impact</u>	
					<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
NONE								

Notes:

- [1] Low cost and schedule impacts are considered the minimum (0-percentile) impacts should the event occur.
 High cost and schedule impacts are considered the maximum (100-percentile) impacts should the event occur
- [2] Cost impacts should be entered as man-hours (by demographic) and M&S direct cost under basis of estimate.
 Cost impacts should NOT include standing army costs which are separately calculated from the schedule impact
 Project control is responsible for quantifying the low and high cost impacts based on the labor hours and M&S identified
- [3] The schedule impacts should be entered as the min and max impacts on the critical path.
 If there is no critical path impact then the schedule entries should be zero.
- [4] Likelihood of occurrence should be entered consistent with our risk classification methodology, i.e.
 VL= Very Likely (P>80%), L=Likely (80%>P>40%), U=Unlikley (40%>P>10%), VU=Very Unlikley (P<10%), NC=Non-credible (P<1%)

NCSX June 2007 ETC
TABLE V - Basis of Estimate

WBS Number: 145
WBS Title: Modular Coil-Coil Interfaces
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Job Manager: Larry Dudek

Flange Hole Configuration											
Hole #	C-C on C) for tensioner	C-B on C	C-B on B	A-B on B	A-B on A	A-A on A					
1	T	OK	H	OK maybe	T	H	NO	H	NO - D&L	H	NO - D
2	T	OK	H	OK	T	H	OK	H	NO - D&L	H	NO - D
3	T	OK maybe	H	NO - D	T	H	OK	H	NO - D&L	H	NO - D
4	H	NO - D	H	NO - D	T	H	NO - D	H	NO - D&L	H	NO - D
5	H	NO - D	H	OK	T	H	OK	H	NO - D&L	H	NO - D
6	H	NO - D	H	OK	T	H	OK	H	NO - D	H	NO - D&L
7	H	NO - D	H	OK	T	H	OK	H	NO - D	H	NO - D
8	H	NO - D	H	OK	T	H	OK	H	NO - D	H	NO - D
9	H	NO - D	H	OK	T	H	NO - D	H	NO - D	H	NO - D
10	H	NO - D	H	NO - D	T	H	OK	H	NO - D	H	NO - D
11	H	NO - D	H	OK	T	H	NO way	H	NO - D	H	NO - D&L
12	H	OK	H	OK	T	H	OK	H	NO - D	H	NO - 1' clearance to bus lead block
13	H	OK	H	OK Remove 2 poloidal break bolts	T	H	OK	H	NO - D	H	NO - 1' clearance to bus lead block
14	H	OK	H	OK	T	H	OK	H	NO - D	H	NO - 4' clearance to bus lead block
15	H	OK Remove 2 poloidal break bolts	H	OK	T	H	OK	T	H	NO - D	NO - D
16	T	Maybe	H	OK	T	H	OK	H	NO - D	H	NO - D
17	H	Maybe	H	OK	T	H	OK Remove poloidal break	H	NO - D	H	NO - D
18	H	OK Remove 2 poloidal break bolts	H	OK	T	H	NO - D	H	NO - D	H	NO - L
19	H	OK	H	NO - D&L	T	H	NO - D	H	NO - D	H	NO - L
20	H	OK	H	OK	T	H	OK	H	NO - D	H	NO - L
21	H	OK	H	OK	T	H	OK	H	NO - D	H	NO - L
22	H	NO - D	H	NO - D&L	T	H	OK	H	NO - D	H	NO - D
23	H	NO - D	H	NO - D&L	T	H	OK	H	NO - D	H	NO - D
24	H	NO - D	H	NO - D&L	T	H	NO - D	H	NO - D	H	NO - D
25	H	NO - D	H	NO - D&L	T	H	NO - D	H	NO - D	H	NO - D
26	H	NO - D	H	NO - D&L	T	H	OK	T			
27	H	NO - D	T	H	NO - D&L	H					
28	H	NO - D	T	H	NO - D&L	H					
29	H	NO - D	T	H	NO - D&L	H					
30	H	OK maybe	H								
31	H	OK	H								
32	H	OK	H								

Flange Hole Configuration

Qty Holes	28	26	3	24	23	19	123	3-Coil Total
							738	Machine Total
							75	10%
							813	
							Say 1.5 inches tall x	
							813	100 Feet

Nose Shim Material Estimate							Comments
	A to A Join	A to B-E	A to B-D	B to C-E	B to C-E	C to C-D	
Area (sq. ft)	345.5	521	535	203	223	426	Scaled off of template drawings SE
Weight (lbs)	64.8	97.7	100.3	38.1	41.8	79.9	
310SS=0.3#/cu.in.							
Quantity	3	3	3	3	3	3	
Pounds	194.3	293.1	300.9	114.2	125.4	239.6	1267.59
Total Area	1,036.5	1,563.0	1,605.0	609.0	669.0	1,278.0	6760.50 Sq. In.
							253.52 25% Extra for Wastage
							633.80 50% Extra for Various Thicknesses
							8915.41
							71300.00 Cost @ \$8/#

	Total Machine	1 FPA	10% Spare	Total	Tests	TOTAL	Unit
Line 1: 10.5" Studs	136	45	5	50	10	60	
Line 2: 7.5" Studs	350	117	12	128	10	138	
Line 3: Washer	622	207	21	228	30	258	
Line 4: Spherical Sets	622	207	21	228	30	258	
Insulating Washers	622	207	21	228	30	258	
Insulating Bushing Stock	486	162	48.6	535		133.65 Feet	33.4125
Supernuts	486	162					
Nuts	116	39					

NCSX June 2007 ETC
TABLE V - Basis of Estimate

WBS Number: 145
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Job Number: 1431
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Job Manager: Larry Dudek

PPPL Princeton Plasma Physics Laboratory Procurement Card System

Name: Return to Procurement Approval Card ID: 44016

P-Card Log # 1 191-114278 12 R G11-CR) 2.0 ID X 2.25 OD Tube
Requestor: Michael E Cole Status: Requisition Cardholder: Inquiries: Created: 3/12/2007

P-Card Log Line Item

Line	Quantity	UOM	Unit Price	Extended	Forecast Date	Forecast Comment
1	112	PCS	14.50	\$1613.00	3/12/2007	

Enter Complete Description - include make, model, item specifications, etc.
12 R G11-CR) Organic non-brazed lamina tube 2.0 ID X 2.2500 X .48" long

Cost Center Distribution Accounts for this Line Item

Cost Ctr	Rate Pct	Job Pct	Expense Class	Dollar Amount	Details
0000	100%	1421	41001-44016/PLAS/LS-000000	\$1613.00	

Add 0 Line Status: All 0 Cost Centers: Add Lines

Vendor Name: Princeton Plasma Physics Corp 352-652-3423 Date Ordered: 3/12/2007 Date Expected: 3/12/2007

Proposed Amount: \$1,613.00
Shipping/Handling: 7.50
Sales Tax: 0
Other Charges: 0
Total Charges: \$1,620.50

Other Charges Comment: G-11 Backup

Submit for Approval Copy Log Delete Log

http://www.pppl.gov/procurement/procurement.asp?menu=04Pages%20of%201247788&urlpages=0 Page 1 of 3

Superbolt Quote

From: Steve Susalovich
Sent: Wednesday, March 28, 2007 2:43 PM
To: Cole, Michael
Subject: Superbolt Quote

Mike,

Our job for this special will be: 4-02200
For 500pcs = \$225.00 each, Delivery = 4-6 wks
For 1700pcs = \$295.00 each, Delivery = 3-4 wks

Terms: NET 30 (upon credit approval)
FOB: Shipping Point

Freight: Cradle, via Truck prepay & add or collect, 350 rate charge

Note: we need the C.D. to be 2.00" to keep dimensions given for the Nitronic 50 nut body. However, we can hold the same heights as the CV samples.

I will provide approval drawing tomorrow.

Regards,

Steve Susalovich,
Engineering Manager,
SUPERBOLT, INC.
SU 412-275-1149
ssusalov@superbolt.com

From: Steve Susalovich
Sent: Wednesday, March 14, 2007 3:25 PM
To: Cole, Michael
Cc: 'michael@pppl.gov'
Subject: RE: NITRONIC 33

Mike,

Late use \$225.00 each for 480 pieces special 1-3/8" - 8 lip. Materials will be

AMERICAN PLASMA PHYSICS CORPORATION
421 S. BIRD STREET
DENVILLE, ND 58037
TEL: 605-466-1472 FAX: 605-466-1472

QUOTATION

Updated Bladder Quote - Note the engineering charge is higher than originally estimated. This is because the bag we ended up with is actually larger, so they needed to build some fixturing.

QUOTATION # 1297

To: FOM Division
Princeton Plasma Physics Lab
P.O. Box 411
Princeton, New Jersey
USA, 08542

Quotation No. 1297
Requested by: Lawrence Dudek
Quotation Valid: 30 Days
Delivery: "See Below"
F.O.B.: Originator: NED/USA
Trade: No. 0
Bill: Make/Ship/Apply

TEL: 605-243-2185
FAX: 605-243-2246

Item	Qty	Description	Unit Price	Amount
1.	1	Engineering set up fee, non-refundable bag # 127-PPPL	\$3,888.00	\$3,888.00
1.	1	Special bag, A/C Angle 30° PPPL, ref PPPL-452-146-4099	\$ 181.00	\$ 181.00
4.	1	REF: Wing Support Bladder		
SHIPPING				
TOTAL				

COMMENTS:
1. Change & dimension requires non-approval, additional engineering fee.
2. Delivery time after approval of drawing and purchase order: 30 working days.
3. 10% of engineering time for the WBS order.
4. Payment: net 30 - 5%VC CRG of 2% per 30s (total to 24%) will be added to post due invoices.

Handwritten signature: M. Cole
Date: May 9, 2007

Main nut body in Nitronic 50, and Jackbolts & washer in Inconel 718
How did the sample Torqueman I sent fit?

Regards,

Steve Susalovich,
Engineering Manager,
SUPERBOLT, INC.
PH: 412-275-1149
ssusalov@superbolt.com

From: Cole, Michael (michael.cole@pppl.gov)
Sent: Wednesday, March 14, 2007 3:31 AM
To: Steve Susalovich
Subject: RE: NITRONIC 33

Steve,

Sorry for the delay in getting back to you.

We finally found a link to the Nitronic 60 material. I have attached the data for your information.

You can price the material for Nitronic 50 or Nitronic 60.

Mike

Michael J. Cole
Oak Ridge National Laboratory
Bldg 5700, Rm. 0206, MS 5709
Burlington, VA Road
P. O. Box 2008
Oak Ridge, TN 37831-6160

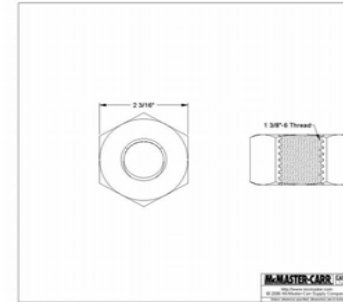
Phone: 865-574-2954
Fax: 865-541-4128
E-mail: cole@m.gov

McMaster Carr Quote on Nuts dated May 9, 2007

Nuts
This product matches all of your selections.

Part Number: 9120A042 \$21.15 per Pack of 1

Nut Type: Machine Screw and Hex Nut
Hex
Type: Machine Screw and Hex Nut
Material Type: Stainless Steel
Finish: Pass
Grade/Class Type: 316 Stainless Steel
System of Measurement: Inch
Lock Thread Size: 1-3/8"-6
Thread Direction: Right-Hand Thread
Width: 2-3/16"
Thread Type: Standard Threads
Rockwell Hardness: 340
Specifications Mat: American National Standards Institute (ANSI) and American Society of Mechanical Engineers (ASME)
ANSI Specification: ANSI B 18.2.2
ASME Specification: ASME B 18.2.2



NCSX June 2007 ETC
TABLE V - Basis of Estimate

WBS Number: 145
WBS Title: Modular Coil-Coil Interfaces
Job Number: 1431
Job Title: Modular Coil Interface Harware
Job Manager: Larry Dudek

From: Larry Dudek
 Subject: **Price and Delivery 310SS**
 Date: May 15, 2007 1:58:53 PM EDT
 To: FRED DAHLGREN
 Cc: Wayne T. Reiersen <reiersen@pppl.gov>
 2 Attachments, 852 KB [Save](#) [Slideshow](#)

Allegany Ludlum quoted delivery end of July for 3000# of 1/2" thick 310SS.
 Price \$3.36/# + \$4.54/# SURCHARGE= \$7.90/# total.

Larry Dudek
 X2185

310 SS Quote


[309_310.pdf \(754 KB\)](#)



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 - Grain Oriented Silicon Steels

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 Heat Treating, Chemical Processing, Food Processing Industry

Sheet	Plate	Strip
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-  Technical Data Sheet
-  Surcharge
-  OGHA
-  WIMIS (French)
-  WIMIS (English)

Search: [Find It!](#)

From: Phil Heitzenroeder
 Subject: **RE: Weld Material**
 Date: December 15, 2006 2:02:24 PM EST
 To: Ruud, Chuck <Charles.Ruud@metatek.com>
 Cc: Lawrence E. Dudek <luddek@pppl.gov>

[Show in Mailbox](#)

Chuck,
 I talked with Larry, and he feels that the 60 lbs. is plenty for our needs. Thanks for the offer, though.
 Phil

From: Ruud, Chuck [mailto:Charles.Ruud@metatek.com]
 Sent: Tuesday, December 12, 2006 6:06 PM
 To: Phil Heitzenroeder
 Subject: RE: Weld Material

Any word?
 Chuck

I can offer a lower price for the last 1/2. The \$40 includes the welding and testing costs.
 Material is \$26/lb.
 To summarize 60 lbs at \$40 and the balance at \$26.
 Fair?

Chuck Ruud
 Quality Manager
 MetalTek International
 Carondelet Division
 8600 Commercial Blvd.
 Pevely, MO 63070
charles.ruud@metatek.com
 636-475-2199

From: Phil Heitzenroeder [mailto:pheltzen@pppl.gov]
 Sent: Thursday, December 07, 2006 4:08 PM
 To: Ruud, Chuck; Lawrence E. Dudek
 Subject: RE: Weld Material

Chuck,
 Thanks for the offer....Larry, what do you think. - should we buy it all? Chuck, we'll get back to you soon.
 Phil

From: Ruud, Chuck [mailto:Charles.Ruud@metatek.com]
 Sent: Tuesday, December 05, 2006 6:20 PM
 To: Phil Heitzenroeder
 Subject: Weld Material

We have the order for 60 pounds of weld wire.
 Turns out we have 141 pounds of the LNM 4455 weld wire. All from the same certified lot.
 Do you want to purchase all?

Chuck Ruud
 Quality Manager
 MetalTek International

Activity ID	MILE-stones (level 2 & 3)	Activity Description	Duration (work days)	Baseline Start	Baseline Finish	Shifts	Total Float	% cmplt	Proposed Budgeted								
										FY07	FY08	FY09	FY10	FY11	FY12		
Job: 1431 - Mod. Coil Interface Hardware-DUDEK																	
Bladders																	
1421-3022		Receive first 5 Bladders	10	02JUL07*	16JUL07		45		0.00								
1421-3023		Test Bladders	10	17JUL07	30JUL07		45		0.00								
1421-3024		Prep Req, Bid, & Award Bladders	10	31JUL07	13AUG07		45		0.00								
1421-3025		Deliver bladders	5	14AUG07	20AUG07		45		16,396.60								41=12.85\$K ;
1421-3028		Bladders available for FPA	0		20AUG07		45		0.00								
Bushings																	
1421-3105		Prep Req, Bid, & Award Bushings	15	01MAY07	21MAY07		59		0.00								
1421-3106		Deliver Bushings Material	29	22MAY07	02JUL07		59		10,271.80								41=08\$K ;
1421-3107		PPPL Machine bushings Bushings	248	01AUG07*	29JUL08		39		43,915.58								EMT/TB =554 ;
1421-3108		Bushings available for first coil-to-coil fitup	0	29AUG07			39		0.00								
1421-3109		All Bushings delivered	0		29JUL08		105		0.00								
Shims-Outboard																	
1429-3059		Requisition, Bid, Award Shim Stock (out & inboard)	15	01AUG07	21AUG07		18		0.00								
1429-3060		Deliver Shim Stock	10	22AUG07	05SEP07		18		77,274.56								41=60.556\$K ;
1429-3062		PPPL Cut, Grind, debur Outboard Shims	130	06SEP07	18MAR08		18		19,227.06								emt/tb=187hrs;41=3.35k 3days to cut,debur, grind per joint,anneal
1429-3065		Prep Req, Bid, Award Alumina Application	15	27JUL07	16AUG07		36		0.00								
1429-3066		Apply Alumina to OutboardShims	130	13SEP07	25MAR08		18		42,152.99								41=32.3\$K ; route = 10-15 days for all;say 3 days/3 pack
1429-3069		Outboard Shims Available for 1st 3 pack MC assy	0	20SEP07			18		0.00								
S21-5.04X	2	Shims required for 1st 3 pack MC assy	0	31OCT07			0		0.00								
1429-3070		Outboard Shims Available for 2nd 3 pack MC assy	0	18OCT07			83		0.00								
1429-3071		Outboard Shims Available for 3rd 3 pack MC assy	0	03DEC07			90		0.00								
1429-3072		Outboard Shims Available for 4th 3 pack MC assy	0	23JAN08			113		0.00								
1429-3073		Outboard Shims Available for 5th 3 pack MC assy	0	20FEB08			159		0.00								
1429-3074		Outboard Shims Available for 6th 3 pack MC assy	0	26MAR08			187		0.00								
Shims-Inboard																	
1429-3062X		PPPL cut, grind and debur Inboard Shims	130	12SEP07	24MAR08		54		19,258.90								emt/tb=187hrs;41=3.35k 2 days to cut, debur and grind per joint
1429-3069X		Inboard Shims Available for 1st 3 pack MC assy	0	19SEP07			54		0.00								
1429-3070X		Inboard Shims Available for 2nd 3 pack MC assy	0	17OCT07			84		0.00								
1429-3071X		Inboard Shims Available for 3rd 3 pack MC assy	0	28NOV07			109		0.00								
1429-3072X		Inboard Shims Available for 4th 3 pack MC assy	0	22JAN08			132		0.00								
1429-3073X		Inboard Shims Available for 5th 3 pack MC assy	0	19FEB08			167		0.00								
1429-3074X		Inboard Shims Available for 6th 3 pack MC assy	0	25MAR08			194		0.00								

Activity ID	MILEstones (level 2 & 3)	Activity Description	Duration (work days)	Baseline Start	Baseline Finish	Shifts	Total Float	% cmlpt	Proposed Budgeted							
										FY07	FY08	FY09	FY10	FY11	FY12	
Shims- C-C Joint																
1429-3062C		PPPL Cut, Grind, debur Outboard Shims	10	01OCT09*	14OCT09		12		8,170.84							
1429-3066C		Apply Alumina to OutboardShims	40	08OCT09	04DEC09		12		9,308.00							
1429-3075X		Shims Req'd for C-C joint	0	07DEC09			12		0.00							
Studs,Washers,Nuts																
1421-3060		Deliver Stud Kit (PE007330) (for 1st 3 pack only	57*	01MAY07A	20JUL07		66		98,992.08	41=78\$k ;						
1421-3061		Stud kit available for 1st 3 pack MC assy	0		20JUL07		66		0.00	▼						
1421-3062		Re-order balance of stud kits	65	19JUL07	18OCT07		78		408,475.32	41=312\$k ;						
1421-3063		Stud kits available for balance of MC assy	0		18OCT07		78		0.00	▼						
1421-3065		Deliver Superbolts (PE007332)	22*	01MAY07A	31MAY07		101		157,905.00	41=123.75k ;						
1421-3070		Order Add'l stud kits for c-c joint&weld clmp	15	01OCT07*	19OCT07		181		0.00							
1421-3072		Deliver Add'l stud kits for c-c joint&weld clmp	30	22OCT07	04DEC07		181		59,827.92	41=45.738k ;						
1421-3080		Purchase G-11 shims and machine for C-C inboard	65	01OCT07*	10JAN08		497		5,728.80	41=1.44k ;em/tb=48						
1421-3066		Super bolts available for FPA	0		31MAY07		101		0.00	▼						
Misc Tech Shop Support																
1421-4000		Misc Tech Shop support through FPA sta 3	250*	01OCT07*	30SEP08		999	LOE	76,905.60	em/tb=960						
Subtotal			0		04DEC09		705		1,053,811.05	▼						