



**Particle Physics Division
Mechanical Department Engineering Note**

Number: MD-ENG-327

Date: 1 April 2011

Project Internal Reference:

Project: NOvA Ash River Block Pivitor; FESHM 5031.1 Engineering note for drive system hydraulic piping

Title: NOvA Ash River Block Pivitor drive system hydraulic piping engineering note FESHM 5031.1

Author(s): Mike Zuckerbrot

Reviewer(s):

Key Words: Pivitor, Ash River, piping, FESHM 5031.1

Applicable Codes:

Abstract Summary: This note addresses the Fermilab furnished hydraulic piping used for the drive system provided by CMA/Flodyne/Hydradyne in the NOvA block pivitor at Ash River. Calculations will be done to show the materials chosen are suitable for the design pressure. The system uses $\frac{3}{4}$ " nominal diameter pipe, and will conform to FESHM 5031.1.

FESHM 5031.1 PIPING ENGINEERING NOTE FORM

Prepared by: Mike Zuckerbrot

Preparation Date: 4-1-2011

Piping System Title: NOvA Ash River Drive System Hydraulics

Lab Location: Ash River, Min.

Lab Location code:

Purpose of system / System description: Hydraulic piping

Piping System ID Number: N/A

Appropriate governing piping code: ASME A17.1 Safety Code for Elevators and Escalators

Fluid Service Category (if B31.3): Category-D / Normal / Category-M / High Pressure (circle one)

Fluid Contents: Mobile DTE 24 Hydraulic Fluid

Design Pressure: 3000 psig

Design Temperature: 100 F

Piping Materials: Carbon steel

Drawing Numbers (PID's, weldments, etc.): 3929.200-ME-486977

Designer/Manufacturer: Fermilab/See vendor contact information

Test Pressure: 450 psig

Test Fluid: Oil

Test Date: Tbd

Statement of Compliance

Is this piping system considered exceptional? Yes ____ No x__

If "Yes", follow the requirements for an Extended Engineering Note for Exceptional Piping Systems.

Reviewed by: _____

(Print Name)

Signature: _____ Date: _____

D/S Head's Signature: _____ Date: _____

The following signatures are required for exceptional piping systems:

ES&H Director's Signature: _____ Date: _____

Director's Signature or Designee: _____ Date: _____

Pipe Characteristics

Size: 3/4" n.d. Length: About 135'; Volume: About 12 gallons

Relief Valve Information

Type: RPEC-LNN Manufacturer: Sun

Set Pressure: 28 bar (406 psig) Relief Capacity: 95 L/min

Relief Design Code: none identified. Relief Capacity exceeds hydraulic pump capacity.

Is the system designed to meet the identified governing code? Yes / No

System Documentation

Process and Instrumentation diagram appended? Yes / No

Process and Instrumentation component list appended? Yes / No

Is an operating procedure necessary for safe operation? Yes / No
If 'yes', procedure must be appended.

Fabrication Quality Assurance

List vendor(s) for assemblies welded/brazed off site: none

List welder(s) for assemblies welded/brazed in-house: Bill Gatfield

Are welder qualification records available for in-house welded/brazed assemblies? Yes / No
If yes, append documents or make available to reviewer.

Are all quality verification records required by the identified code available? Yes / No
(e.g. examiner's certification, inspector's certification, test records, etc.)
If yes, append documents or make available to reviewer.

Discussion:

Table 1 in FESHM 5031.1 does not list a piping service or application that matches this system. This system is a hydraulic system, but not intended to lift and elevator or hoist. However, this system is more like a hydraulic elevator than any other system described in FESHM 5031.1.

Searching for hydraulic piping standards from ASME or SAE (Society of Automotive Engineers) yields no standards or specifications specific to piping. ASME B31 series codes do not fully apply to the piping used for hydraulic fluid system. For example, ASME B31 codes use ANSI B16.5 flanges, not code 61 and code 62 flanges used with hydraulic fluid power systems which conform to SAE J518 or ISO 6162.

So, the decision was to apply the ASME A17.1 Safety Code for Elevator and Escalators to this system as the governing code.

ANSI ALI ALCTV- 2006, Standard for Automotive Lifts-Safety Requirements for Construction, Testing, and Validation will also be considered.

Welder qualifications



Fermi National Accelerator Laboratory

Technical Division - Machine Shop

WELDER PERFORMANCE QUALIFICATION TEST REPORT

Welder's Name: William Garfield #04600 ASME No. 99-12
 Welding Process(es) (s) GMAW Manual Type 2aJ Type _____
 In accordance with WPS No. FERMI 0284

Joint: Flare Spot/Overlap Weld X Test Coupon
 Groove: Double-Welded: Yes No
 Single-Welded: Metal Faced Metal Non-Faced Non-Metal X Open Root Consumable Insert
 With Solid Backing X Without Solid Backing

Base Metal: Spec. SA 106 to SA 106 (ASME IX) P. No. 1 to P. No. 1
 Plate X Pipe Tube
 Actual Thickness _____ Nominal Diameter 3.125 Actual Diameter 3.5" ID _____
 Qualified Range _____ Weld Size 3/16 Qual. Thick Range 4/16-5/16 Wall _____
 Acq'd Thickness 0.037 Qual. Dia Range 3-2.5 min Qual. Thick Range _____
 Qual. Dia Range _____

Filler: 1st Process 2nd Process
 Spec. ER70S-6 Class ER70S-2 Spec. _____ Class _____
 Dia. (s) 3/32 Dia. (s) _____
 P. No. _____ P. No. _____
 Deposit Thickness 0.037 Range Qual. 4/16-5/16 Deposit Thickness _____ Range Qual. _____

Position(s) (if different): Up Down _____
 Gas (Type and Composition): Arg Shielding Gas 99.99% Root Side Backing Gas 99.99%
 Electrical: Type Current AC DC - Reverse DC - Straight
 Transfer: GMAW Spray Glue/Glob Pulse Short Circuit

FOR INFORMATION ONLY	MACHINE WELDING
Filler Metal Trade Name: _____	Control: <input type="checkbox"/> <u>Visual</u> <input type="checkbox"/> <u>Remote Visual</u>
S.A.W. Flux Trade Name: _____	Arc Voltage Control: <input type="checkbox"/> <u>None</u> <input type="checkbox"/> <u>Other</u> _____
Shielding Gas Trade Name: _____	Joint Trapping: <input type="checkbox"/> <u>Yes</u> <input type="checkbox"/> <u>No</u>

VISUAL INSPECTION
 Appearance: Satisfactory Unsound _____ Piping porosity: _____

GUIDE BEND TEST

TYPE AND FIGURE	RESULTS	TYPE AND FIGURE	RESULTS	TYPE AND FIGURE	RESULTS

Test Conducted by _____ Lab Test No. _____
 Date _____

RADIOGRAPHIC TEST
 Results: Satisfactory For ASME IX-2007 and AWS III.1-06
 Radiographer: Alloyweld Inspection Co., Inc Examiner: Benjamin Arroyo Level: I Test No. 179214 Date: 4/29/09

FILLET WELD TEST RESULTS
 Fracture Test: _____
 Location, Nature, and Size of Crack or Tear in Specimen: _____
 Length of Weld _____ inch Length of Defect _____ inch % of Defect _____
 Macro Test: Fusion _____
 Appearance: Fillet size _____ inch Convex Concave
 Test Conducted by _____ Lab Test No. _____

We certify that the measurements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of ASME IX-2007 and AWS III.1-06 Fermi National Accelerator Laboratory

By: Gregory A. Miller Date: 5/1/2009

In process weld inspection form

In-Process Weld Inspection Form
(As per In-Process Weld Inspection Guidelines)

Date: 5-02 to 5-23-2011 Project: NOVA Equipment Handling AR Rear Platform AR Drive Tank unit Assy. Print number 3929.200-ME-486977.

Pipe Section: SEE PRINTS Weld Number: 7

Weld Location: MAB Below

Welder: Mike Cooper

Inspector: Dave Erickson

Before Welding:

Type of weld: (butt) _____ (other) Socket
(1) Pipe #1 Size, Schedule and Material: pipe 3/4 sch 160
(2) Pipe #2 Size, Schedule and Material: pipe 2 1/2 sch 160

(1) Joint Preparation and Cleanliness

Joint Preparation and Cleanliness acceptable? ✓

(2) Welding Machine

(a) Remote foot pedal? ✓
(b) DC straight machine? ✓

(3) Joint Fit-up, and Internal Alignment

(a) Internal alignment acceptable? ✓
(b) Joint clearance acceptable? ✓
(c) End preparation acceptable? ✓

(4) Filler Rod

(a) AWS A5.9 stainless steel filler rod? N/A
(b) Filler rod: Class ER70S-2 Diameter 3/32

(5) Purge Gas

(a) type of purge gas: Argonne
(b) time length of purge: N/A purge flow rate: N/A
(c) Use of "Check-Weld" meter to measure Oxygen rate for purge acceptance? N/A
(d) What was "Check-Weld" meter reading at time of weld? N/A

(6) Inspection After Root Pass

(a) No visible cracks. ✓
(b) No suck holes, which are small holes in middle of weld. ✓
(c) No porosity or obvious imperfections: ✓
(d) Filler material fused along edges of weld. ✓

(7) Repeat inspection after every pass: ✓

(8) Final Inspection: Dave Erickson

(9) Cold Shock weld before leak check? N/A

(10) Leak Check Rate/pass? N/A

Prints: 3929.200-ME-486977
3929.200-ME-489002

Calculations:

Pipe Material	A106 Grade B Seamless
Maximum Operating temperature	100 F
Diameters	$\frac{3}{4}$ "
Schedule	160
Maximum Allowable Stress per ASME B31.1-2004 Appendix A, Table A-1	15,000 psi
Maximum Allowable Stress per ASME B31.3-2008 Appendix A, Table A-1	20,000 psi
Max Allowable Stress per ANSI ALI ALCTV- 2006 section 9.1.1.2.1	Burst pressure > 300% design pressure
Outside Diameter, D	See table below
Wall thickness, t	See table below
Maximum Working Pressure, P	See table below
Corrosion allowance, C	0.0 (this piping is used indoors with non-corrosive oil on the inside and is not threaded nor has any wall thickness reductions)
Joint Efficiency, e	1.0 for seamless pipe
Percent Elongation for A106Gr B, E	30
Min. Factor of Safety per ASME A17.1 Rule 1302.5a	$F = (5.04 / (30 - 2.8)) + 2.7 = 2.89$
Minimum Allowable F governs	F=3.0
Yield Point, Y.P. for A106Grade B per ASME B31.1 Table A-1	35 ksi
Allowable Stress, S, as calculated by ASME A17.1 Rule 1302.5b	$S = (Y.P. / F) = 35 \text{ ksi} / 3 = 11.67 \text{ ksi}$
Minimum tensile stress, Sten, per ASME B31.1 Table A-1	60 ksi
Max internal pressure per ASME A17.1 Rule 1302.4	$P = 2 * e * S * (t - C) / D$
Burst pressure, per Barlow's formula	$P = 2(Sten)t / D$

Result is that the ASME A17.1 Safety Code for Elevator and Escalators is more stringent for the allowable stress for A106 grade B pipe than is ASME B31.1 or ASME B31.3. ASME A17.1 and ALI ALCTV-2006 will be used for analysis below.

Using the allowable stress values from ASME A17.1, calculate the allowable internal pressure for each size of schedule 80 pipe used where the outside diameter and wall thickness come from the ANSI pipe specification and the allowable internal pressure is calculated using the formula from ASME A17.1 Rule 1302.4 as written above.

Nominal pipe diameter	Outside diameter (inches)	Sch. 160 wall thickness (inches)	Max allowable internal pressure per ASME A17.1 rule 1302.4 (psi)
3/4"	1.049	0.308	6,853

It is shown that the maximum allowable pressure is well above the design pressure.

Though ASME A17.1 will be considered the governing code on the system, the ANSI ALI ALCTV-2006, Standard for Automotive Lifts-Safety Requirements for Construction, Testing, and Validation will also be considered. ANSI ALI ALCTV-2006 section 9.1.1.2.1 specifies that rigid pipe must have a burst pressure of at least 300% the pressure required at maximum load capacity (the design pressure). The ANSI ALI ALCTV standard does not provide instruction for calculating burst pressure; therefore the burst pressure will be calculated with the commonly used Barlow formula which is a reduction of ASME A17.1 Rule 1302.4 substituting ultimate tensile stress for yield stress and setting the safety factor $F = 1$.

- Burst pressure must be greater than 300% design pressure, greater than 6,000 psig.

Nominal pipe diameter	Outside diameter (inches)	Sch. 160 wall thickness (inches)	Burst pressure per Barlow's formula above (psi)
3/4"	1.049	0.308	35,233

It is shown burst pressure is much greater than 300% design pressure (6,000 psi)



1000 Muirfield Drive
Hanover Park, IL 60133
Phone: (630) 563-3600
Fax: (630) 563-3850

Thursday, 13 August 2009

Fermilab
Kirk & Wilson Roads
P.O. Box 500
Batavia, IL 60510

Attention: Mr. David Pushka, Engineering
Subject: Hydraulic Drive for Nova Block Raiser

Dear Dave,

CMA/Flodyne/Hydradyne is please to quote a complete hydraulic solution for you Nova Block Raiser drive control. Specifications for determining the solution are as follows:

- Total maximum mass, 600,000 pounds
- Maximum speed 1 MPH
- Acceleration rate to maximum speed 30 seconds
- Road resistance polyurethane on concrete
- 1 percent grade
- Two drive wheels, 36" diameter on common axle

The system provided will consist of the following components:

- Hydrostatic closed loop drive with the following assembled skid:
 - Reservoir with filler-breather, level and temperature gauge
 - Closed loop hydrostatic pump nominal pressure rating of 5800 PSI with pressure override, variable volume
 - 75 HP 1800 RPM 460/3/60 TEFC electric motor
 - Charge pump filter with electrical bypass indicator
 - Hot oil shuttle valve
 - Return filter with electrical bypass
 - Air/oil heat exchanger to maintain adequate cool sump oil temperature
- Electrical control panel assembled and mounted on skid consisting of the following:
 - Door mounted disconnect switch

MAIN DISTRIBUTION CENTERS

3265 Gateway Road, Suite 300
Brookfield, WI 53045
Phone: (262) 781-1815
Fax: (262) 781-2521

1000 Muirfield Drive
Hanover Park, IL 60133
Phone: (630) 563-3600
Fax: (630) 563-3850

BRANCH OFFICES

Rockford, IL Tel. (815) 229-7602 Fax (815) 229-7905

Davenport, IA Tel. (563) 355-2339 Fax (563) 355-2571

Peoria, IL Tel. (309) 697-7005 Fax (309) 697-8576

Green Bay, WI Tel (920) 336-7620 Fax (920) 336-7610



1000 Muirfield Drive
Hanover Park, IL 60133
Phone: (630) 563-3600
Fax: (630) 563-3850

- Motor starter and overloads for 75 HP motor
- Motor starter and overloads for air/oil heat exchanger
- Pendant with disconnect for motor start/stop, emergency stop, joystick for forward/reverse motion of Nova Block Raiser
- All necessary transformers, power supplies, amplifiers and circuit breakers for complete machine control
- Two Bosch-Rexroth GFT0040 gear boxes with fixed displacement piston motors, wheel mount configuration to meet above specifications. Hydraulic motors will be mounted to gear boxes and shipped loose.
- Startup assistance provided by CMA/Flodyne/Hydradyne after unit is installed by Fermilab personnel

Net cost for above \$59,260.00

Terms: Net 30 after shipment

Delivery 12 - 16 weeks after approval of drawing

Drawings and engineering review will take approximately 2-5 days after receipt of order. This quotation does not include installation at Fermilab or the first fill of oil. Hydrostatic drive will be tested at CMA/Flodyne/Hydradyne for correct operation of control, pressure and flow. As noted above CMA/Flodyne/Hydradyne will provide startup assistance after unit has been installed and piped at your facility (Batavia, IL). Startup assistance and/or service work may be contracted for at facilities outside Illinois. Commercial terms for startup may be negotiated and service is provided per our attached service rates.

Thank you for thinking of CMA/Flodyne/Hydradyne for your hydraulic and control needs. If you need further information or assistance please don't hesitate to call.

Best regards,

Norman Kronowitz

cc: Mike Colaianne, CMA/Flodyne/Hydradyne MRO Salesman

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Fax (920) 336-7610

PURCHASE REQUISITION

A "C" in the item number denotes the part is for the pivot cylinders



Requisition

Requisition Number (Filled in by System)	Oracle Preparer (Filled in by System)	Date	Request originator:
		5/7/10	Mike Zuckerbrot
Division/Section Approval		Date	NEPA Approval
Business Office Approval		Date	
Directorate Approval		Date	

Requisition Header

Description (of entire requisition)
Hydraulic components for the Ash River block pivotor
Note to Approver
Justification (To Approver)

Requisition Entry Defaults

Requester	Deliver-To-Location	Buyer Note (use attachments)
Dave Pushka	Lab F	(i.e., Previous PO)
Suggested Vendor	Suggested Vendor Site	Suggested Vendor Contact
Valley Hydraulic	610 Stevenson Road, South Elgin Illinois 60177	Tom Petersen
Reference #	Need-By-Date	Project/Task/Expenditure Type and Expenditure Organization
	06-14-2010	425.2.8.1.4 NOvA Ash River Pivotor
Note to Receiver		

Requisition Lines

Line #	Line Type	PO Line Category	Description (Start with a Noun) (240 Characters Maximum, Enter Additional Description in Cell Below Line Item)	Quantity, Unit of Measure and Price			
1	GR	Hose Assy.	Hydraulic hose assembly, 3/4" i.d. Eaton Aeroquip; FC254-FH-FHA-12-16-12X81" w/ flange kit UN Number _____ Hazard Class _____	Quantity	4	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$203.80	Exp. Type	
				Extended Price	\$815.20	Exp. Org.	
2	GR	Hose Assy.	Hydraulic hose assembly, 3/4" i.d. Eaton Aeroquip; FC254-FH-FHB-12-16-12X96" w/ flange kit UN Number _____ Hazard Class _____	Quantity	4	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$202.71	Exp. Type	
				Extended Price	\$810.84	Exp. Org.	
3C	GR	Hose Assy.	Hydraulic hose assembly, 1-1/2" i.d. Eaton Aeroquip; FC254-FL-FLB-32-24-24X145" w/ flange kit UN Number _____ Hazard Class _____	Quantity	2	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$643.55	Exp. Type	
				Extended Price	\$1287.10	Exp. Org.	

4	GR	Flange kit	Flange kit, Eaton Aeroquip 1" code 62 flange kit, Part number FF595-16	Quantity	8	Project		
			UN Number	Hazard Class	Unit of Measure	each	Task	
					Price per Unit	\$36.85	Exp. Type	
					Extended Price	\$294.80	Exp. Org.	
5	GR	Flange kit	Flange kit, Eaton Aeroquip 3/4" code 62 flange kit, Part number FF595-12	Quantity	8	Project		
			UN Number	Hazard Class	Unit of Measure	each	Task	
					Price per Unit	\$31.08	Exp. Type	
					Extended Price	\$248.64	Exp. Org.	
6C	GR	Flange kit	Flange kit, Eaton Aeroquip 1-1/2" code 61 flange kit, Part number FF593-24	Quantity	2	Project		
			UN Number	Hazard Class	Unit of Measure	each	Task	
					Price per Unit	\$35.28	Exp. Type	
					Extended Price	\$70.56	Exp. Org.	
7C	GR	Flange Kit	Flange kit, Eaton Aeroquip 2" code 61 flange kit, Part number FF593-32	Quantity	2	Project		
			UN Number	Hazard Class	Unit of Measure	Each	Task	
					Price per Unit	\$48.32	Exp. Type	
					Extended Price	\$96.64	Exp. Org.	

ITEMS TO BE COMPLETED BY THE REQUESTER:

NOTE: Bolded items **must** be filled-in before requisition can be processed.

- | | |
|---|--|
| 1. APPROVALS
Directorate approvals | Area for your Division/Section, Business Office, NEPA and |
| 2. REQUEST ORIGINATOR
requisition | Name, extension and mail station of person completing the |
| 3. DESCRIPTION ON ENTIRE REQUISITION
purchased | Short description (240 characters) identifying what is being |
| 4. NOTE TO APPROVER | Short note (240 characters) to approver |
| 5. JUSTIFICATION | Short note (240 characters) to justify purchase of item |
| 6. REQUESTER | Name of person expecting delivery of item |
| 7. DELIVER TO LOCATION
the item once it comes in. Mail Station is not a valid location. | Location where Fermilab's Receiving Dept. is to deliver |
| 8. NOTE TO BUYER
number, and term of service if Line Type is SN, etc., must be placed
in Attachments | Short note (240 characters) to buyer indicating previous P.O. |
| 9. SUGGESTED VENDOR/SITE/CONTACT/TELEPHONE
name, address, contact, telephone number | Your recommendation for selecting a vendor, including |
| 10. REFERENCE # | Your internal means of identifying a requisition |
| 11. NEED-BY-DATE
delivery, for Line Type, SN the date is the day the service begins,
(Note: for SN, place the term of the service in the "Description" of the line field or "Note to Buyer" in the
Attachments) | For Line Types, GR/GN the date is the desired day of |
| 12. PROJECT/TASK/EXP. TYPE AND EXP. ORG.
charged and Exp. Org. - organization spending the money | Project/Task and Exp.Type where entire requisition is |
| 13. BUILDING MAINTENANCE
required | Circle Yes or No, if yes is circled FIMS number is |
| 14. NOTE TO RECEIVER | Short note (240 characters) to Fermilab's Receiving Dept. |
| 15. TOTAL OF REQUISITION | Total amount of all items listed on requisition |
| 16. LINE TYPE
or services; example: GR (goods receipt), SN (service non-receipt) | Valid type used to determine whether item is for goods |
| 17. PO LINE CATEGORY
clothing, furniture, medical, computers/pc's, etc. | Valid category for item being requested; example - |
| 18. DESCRIPTION OF LINE
Type is SN (240 character) | A description for each item and term of service if Line |
| 19. QUANTITY | The number of units requested per item |
| 20. UNIT OF MEASURE | Unit of measure for each item requested |
| 21. PRICE PER UNIT
Department to spend for an item | The dollar amount you have authorized the Procurement |
| 22. EXTENDED PRICE | Extended price for each item requested |
| 23. PROJECT/TASK/EXP. TYPE AND EXP. ORG. | Project/Task and Exp.Type where line items are
charged and Exp. Org. - organization spending the
money, if different from above |



PURCHASE REQUISITION

Requisition

Requisition Number (Filled in by System)	Oracle Preparer (Filled in by System)	Date	Request originator:
		5-10-10	Mike Zuckerbrot
Division/Section Approval		Date	NEPA Approval
Business Office Approval		Date	
Directorate Approval		Date	

Requisition Header

Description (of entire requisition)
Hydraulic components for the Ash River block pivotor
Note to Approver
Justification (To Approver)

Requisition Entry Defaults

Requester	Deliver-To-Location	Buyer Note (use attachments)
Dave Pushka	(not Mail Station) Lab F	(i.e., Previous PO)
Suggested Vendor	Suggested Vendor Site	Suggested Vendor Contact
Motion Industries	333 Charles Court, West Chicago	James Neske
Reference #	Need-By-Date	Project/Task/Expenditure Type and Expenditure Organization
	6-14-10	425.2.8.1.4 NOvA Ash River Pivoter
Note to Receiver		

Requisition Lines

Line #	Line Type	PO Line Category	Description (Start with a Noun) (240 Characters Maximum, Enter Additional Description in Cell Below Line Item)	Quantity, Unit of Measure and Price			
1C	GR	Mech	Pipe Flange, Daman Manifolds 2-1/2" socket weld pipe flange code 61, FG40CWG140PU UN Number _____ Hazard Class _____	Quantity	1	Project	
		Mech		Unit of Measure	each	Task	
				Price per Unit	\$49.79	Exp. Type	
				Extended Price	\$49.79	Exp. Org.	
2C	GR	Mech	Pipe Flange, Daman Manifolds 2" socket weld pipe flange code 61, FG32CWG132PU UN Number _____ Hazard Class _____	Quantity	8	Project	
		Mech		Unit of Measure	Each	Task	
				Price per Unit	\$42.92	Exp. Type	
				Extended Price	\$343.36	Exp. Org.	
3C	GR	Mech	Elbow junction block, Daman Manifolds 2"code 61 Elbow junction block; FG32CCF132FX UN Number _____ Hazard Class _____	Quantity	4	Project	
		Mech		Unit of Measure	each	Task	
				Price per Unit	\$221.23	Exp. Type	
				Extended Price	\$884.92	Exp. Org.	

4C	GR	Mech	Pipe Flange, Daman Manifolds 2-1/2" socket weld pipe flange code 61, FG40CWF140PU	Quantity	1	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$49.79	Exp. Type	
				Extended Price	\$49.79	Exp. Org.	
UN Number Hazard Class							
5C	GR	Mech	Pipe Flange, Daman Manifolds 2" socket weld pipe flange code 61, FG32CWF132PU	Quantity	2	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$42.92	Exp. Type	
				Extended Price	\$85.84	Exp. Org.	
UN Number Hazard Class							
6C	GR	Mech	Dust Cover, Daman Manifolds 2" zero psi plate; FP32CZ1U	Quantity	10	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$8.41	Exp. Type	
				Extended Price	\$84.10	Exp. Org.	
UN Number Hazard Class							
7C	GR	Mech	Dust Cover, Daman Manifolds 2 1/2" zero psi plate; FP40CZ1U	Quantity	1	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$12.54	Exp. Type	
				Extended Price	\$12.54	Exp. Org.	
UN Number Hazard Class							
9C	GR	Mech	Blanking Plate, Daman Mainfolds 2", FG32CKF1X	Quantity	8	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$40.45	Exp. Type	
				Extended Price	\$323.60	Exp. Org.	
UN Number Hazard Class							
10C	GR	Mech	Blanking Plate, Daman Mainfolds 2", FG32CKG1U	Quantity	2	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$39.02	Exp. Type	
				Extended Price	\$78.04	Exp. Org.	
UN Number Hazard Class							
11C	GR	Mech	Blanking Plate, Daman Mainfolds 2 1/2", FG40CKF1X	Quantity	1	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$58.99	Exp. Type	
				Extended Price	\$58.99	Exp. Org.	
UN Number Hazard Class							
12C	GR	Mech	Blanking Plate, Daman Mainfolds 2 1/2", FG40CKG1U	Quantity	1	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$49.81	Exp. Type	
				Extended Price	\$49.81	Exp. Org.	
UN Number Hazard Class							
13C	GR	Mech	Test Plate, Daman Manifolds 2" gauge port spacer; FP32CG1X	Quantity	2	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$47.96	Exp. Type	
				Extended Price	\$95.92	Exp. Org.	
UN Number Hazard Class							

Line #	Line Type	PO Line Category	Description (Start with a Noun) (240 Characters Maximum, Enter Additional Description in Cell Below Line Item)	Quantity, Unit of Measure and Price			
14	GR	Mech	Elbow junction block, Daman Manifolds 3/4" code 62 Elbow junction block; FG12CCF212FX	Quantity	0	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$128.39	Exp. Type	
				Extended Price	0	Exp. Org.	
UN Number Hazard Class							

15	GR	Mech	Pipe Flange, Daman Manifolds 3/4" socket weld pipe flange code 62, FG12CWG212PU UN Number Hazard Class	Quantity	12	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$26.00	Exp. Type	
				Extended Price	\$312.00	Exp. Org.	
16	GR	Mech	Pipe Flange, Daman Manifolds 3/4" socket weld pipe flange code 62, FG12CWF212PX UN Number Hazard Class	Quantity	18	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$31.00	Exp. Type	
				Extended Price	\$558.00	Exp. Org.	
17	GR	Mech Mech	Dust Cover, Daman Manifolds 3/4" zero psi plate; FP12CZ2U UN Number Hazard Class	Quantity	30	Project	
				Unit of Measure	each	Task	
				Price per Unit	\$4.98	Exp. Type	
				Extended Price	\$149.40	Exp. Org.	
18	GR	Mech Mech	Test Plate, Daman Manifolds 3/4" gauge port spacer; FP12CG2X UN Number Hazard Class	Quantity	6	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$42.40	Exp. Type	
				Extended Price	\$254.40	Exp. Org.	
19	GR	Mech Mech	Blanking Plate, Daman Mainfolds 3/4", FG12CKF2X UN Number Hazard Class	Quantity	12	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$25.74	Exp. Type	
				Extended Price	\$308.88	Exp. Org.	
20	GR	Mech Mech	Blanking Plate, Daman Mainfolds 3/4", FG12CKG2X UN Number Hazard Class	Quantity	18	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$23.39	Exp. Type	
				Extended Price	\$421.02	Exp. Org.	
21	GR	Mech Mech	Hose plug, Daman Manifolds 3/4" blanking plug, FF12CKF2 UN Number Hazard Class	Quantity	8	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$8.40	Exp. Type	
				Extended Price	\$67.20	Exp. Org.	
22	GR	Mech Mech	Hose plug, Daman Manifolds 1" blanking plug, FF16CKF2 UN Number Hazard Class	Quantity	8	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$8.61	Exp. Type	
				Extended Price	\$68.88	Exp. Org.	
23	GR	Mech Mech	Hose plug, Daman Manifolds 1 1/2" blanking plug, FF24CKF1 UN Number Hazard Class	Quantity	2	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$6.89	Exp. Type	
				Extended Price	\$13.78	Exp. Org.	
24	GR	Mech Mech	Hose plug, Daman Manifolds 2" blanking plug, FF32CKF1	Quantity	2	Project	
				Unit of Measure	Each	Task	
				Price per Unit	\$8.61	Exp. Type	

			UN Number	Hazard Class	Extended Price	\$17.22	Exp. Org.	
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ITEMS TO BE COMPLETED BY THE REQUESTER:

NOTE: Bolded items **must** be filled-in before requisition can be processed.

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| <p>1. APPROVALS
Directorate approvals</p> <p>2. REQUEST ORIGINATOR
requisition</p> <p>3. DESCRIPTION ON ENTIRE REQUISITION
purchased</p> <p>4. NOTE TO APPROVER</p> <p>5. JUSTIFICATION</p> <p>6. REQUESTER</p> <p>7. DELIVER TO LOCATION
the item once it comes in. Mail Station is not a valid location.</p> <p>8. NOTE TO BUYER
number, and term of service if Line Type is SN, etc., must be placed
in Attachments</p> <p>9. SUGGESTED VENDOR/SITE/CONTACT/TELEPHONE
name, address, contact, telephone number</p> <p>10. REFERENCE #</p> <p>11. NEED-BY-DATE
delivery, for Line Type, SN the date is the day the service begins,
(Note: for SN, place the term of the service in the "Description" of the line field or "Note to Buyer" in the
Attachments)</p> <p>12. PROJECT/TASK/EXP. TYPE AND EXP. ORG.
charged and Exp. Org. - organization spending the money</p> <p>13. BUILDING MAINTENANCE
required</p> <p>14. NOTE TO RECEIVER</p> <p>15. TOTAL OF REQUISITION</p> <p>16. LINE TYPE
or services; example: GR (goods receipt), SN (service non-receipt)</p> <p>17. PO LINE CATEGORY
clothing, furniture, medical, computers/pc's, etc.</p> <p>18. DESCRIPTION OF LINE
Type is SN (240 character)</p> <p>19. QUANTITY</p> <p>20. UNIT OF MEASURE</p> <p>21. PRICE PER UNIT
Department to spend for an item</p> <p>22. EXTENDED PRICE</p> <p>23. PROJECT/TASK/EXP. TYPE AND EXP. ORG.</p>
<p>24. SPLIT CODING QUANTITIES
Type and Expenditure Organization</p> | <p>Area for your Division/Section, Business Office, NEPA and</p> <p>Name, extension and mail station of person completing the</p> <p>Short description (240 characters) identifying what is being</p> <p>Short note (240 characters) to approver</p> <p>Short note (240 characters) to justify purchase of item</p> <p>Name of person expecting delivery of item
Location where Fermilab's Receiving Dept. is to deliver</p> <p>Short note (240 characters) to buyer indicating previous P.O.</p> <p>Your recommendation for selecting a vendor, including</p> <p>Your internal means of identifying a requisition
For Line Types, GR/GN the date is the desired day of</p> <p>Project/Task and Exp.Type where entire requisition is</p> <p>Circle Yes or No, if yes is circled FIMS number is</p> <p>Short note (240 characters) to Fermilab's Receiving Dept.
Total amount of all items listed on requisition
Valid type used to determine whether item is for goods</p> <p>Valid category for item being requested; example -</p> <p>A description for each item and term of service if Line</p> <p>The number of units requested per item
Unit of measure for each item requested
The dollar amount you have authorized the Procurement</p> <p>Extended price for each item requested
Project/Task and Exp.Type where line items are
charged and Exp. Org. - organization spending the
money, if different from above
Quantities applied to each Project/Task/Expenditure</p> |
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Line #	Line Type	PO Line Category	Description (Start with a Noun) (240 Characters Maximum, Enter Additional Description in Cell Below Line Item)	Quantity, Unit of Measure and Price		Project	Task	Exp. Type	Exp. Org.
				Quantity	Unit of Measure				
4C	GR	Mech	Class 6000 ASME B16.11 socket weld 90 degree elbow, 2 1/2"	Quantity	2	Project	Task	Exp. Type	Exp. Org.
				Unit of Measure	Each				
				Price per Unit	\$348.82				
				Extended Price	\$697.64				
			UN Number	Hazard Class					
5	GR	Mech	Class 6000 ASME B16.11 socket weld tee, 3/4"	Quantity	6	Project	Task	Exp. Type	Exp. Org.
				Unit of Measure	Each				
				Price per Unit	\$58.46				
				Extended Price	\$350.76				
			UN Number	Hazard Class					
6	GR	Mech	Class 6000 ASME B16.11 socket weld 90 degree elbow, 3/4"	Quantity	20	Project	Task	Exp. Type	Exp. Org.
				Unit of Measure	Each				
				Price per Unit	\$37.37				
				Extended Price	\$747.40				
			UN Number	Hazard Class					

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