Tungsten plates for AIDA calorimeter module

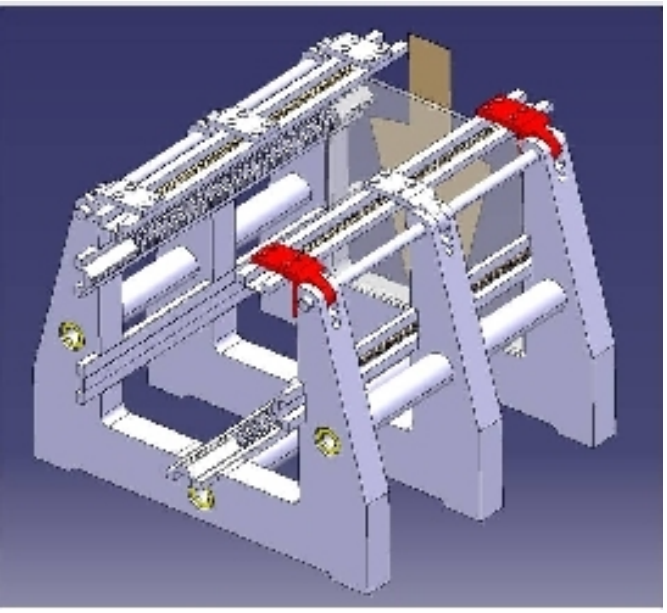
Possible producers/suppliers

Leszek Zawiejski
Institute of Nuclear Physics PAN, Cracow

FCAL 2012 , EVO Meeting, January 9, 2012

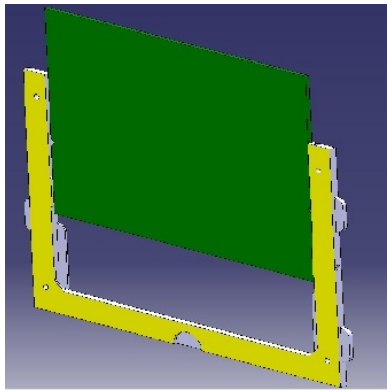
FCAL AIDA calorimeter module

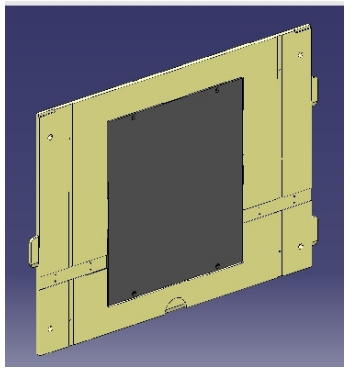
The AIDA calorimeter module will be used for future test beam measurements. Its mechanical infrastructure (design and build) is under the final construction by CERN PH-DT group (Konrad coordinate this). The challenge is to get 50 microns in mechanical accuracy



The device will allow for installation up to 30 tungsten plates interspersed with LumiCal or BeamCal sensiors. The tungsten plates should have dimensions : 3.5 mm (thick) x 140 mm x 140 mm (in X,Y directions)
A new concept: use PermaGlas holders to reduce cost for tungsten plates installation

The basic concept: use three precisely machined combs, precision-mounted on a solid, stainless steel base frame. They are equipped with brass springs. Two additional combs on the top of device, they are flipped open to insert the tungsten plates and sensors.

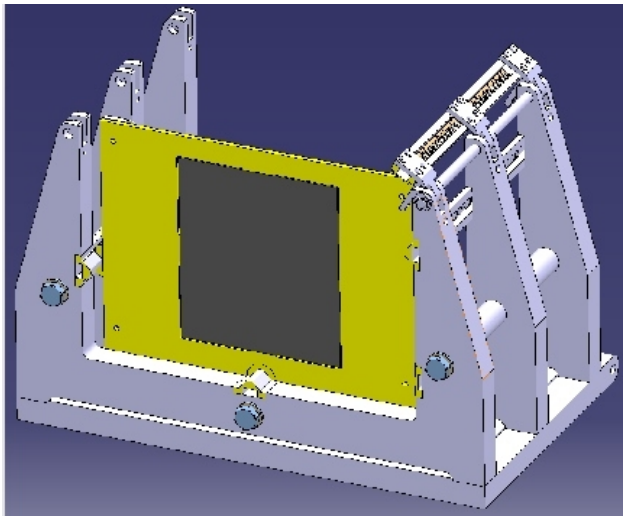




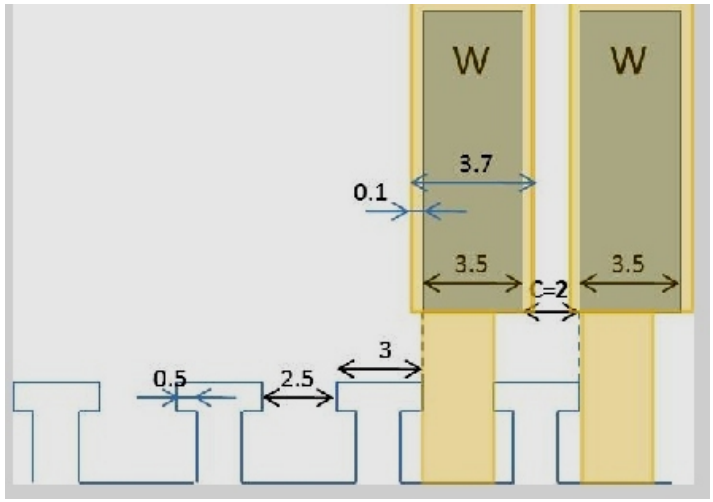
An example of sensor board and tungsten plate in different PermaGlass holders

FCAL AIDA calorimeter module (cd)

Tungsten plates inside the mechanical structure



Example: a tungsten plate together with PermaGlass holder inside the mechanical structure



Example : comb structure with neighbouring tungsten plates

Tungsten plates – possible producers/suppliers

Up to now three companies from England, France and China were ask for offers :
a) positive answer from England
b) positive answer from France
c) no answer from China

- UK : MG Sanders Co Ltd: http://www.mgsanders.co.uk/

Advanced tungsten technology – use by CALICE, experiences with CERN

Quotation **201491**

Institute of Nuclear Physics PAN
ul. Radzikowskiego 152
31-342 Kraków
Poland

MG SANDERS
DENSAMET® TUNGSTEN

MG Sanders Company Limited
Newcastle Street
Stone
Staffordshire
ST15 8JU

Tel: + 44(0)1785 815544
Fax: + 44(0)1785 815642

Enquiry Reference	**Dr Zawiejski**	**Please note:**
Dated	**21/12/11**	**If the Drawing Issue number is incorrect please advise MG Sanders immediately**

Product code	Product Description	Drawing Issue	Quantity	Price	Unit	Total
STO362428_02	Tungsten Plate - Structure Test Project Aida Option 1 99.95% Tungsten	A	30	752.27	each	22,568.13
STO362428_02	Tungsten Plate - Structure Test Project Aida Option 2 WH9375C (93W 5.25Ni 1.75Cu)	A	30	699.60	each	20,988.00

Prices are ex works

Delivery: 8-10 weeks

Currency for this Sales Order is in Euro 43,556.13

Delivery Address
Institute of Nuclear Physics PAN
ul. Radzikowskiego 152
31-342 Kraków
Poland

Please note that this quotation is ex works unless otherwise stated

This quotation is ex VAT, valid for 30 days and subject to our Terms and Conditions of Sale which are available on request. Errors & Omissions Excepted

pure or alloy
All requests for accuracy can be done

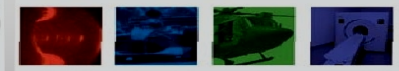
Alloy: non-magnetic, composite with tungsten, nickel and copper

According to available money from AGH UST + IFJ PAN it will be possible to buy at the moment ~ 10 such tungsten plates.

Properties of tungsten alloys

MG Sanders

MG Sanders



DENSAMET ® TUNGSTEN

Densamet ® Tungsten

Desgination AMS7725D	WH9075C Class 1 Type 1	WH9375C Class 2 Type 1	WH9570C Class 3 Type 1	WH9070F Class 1 Type 2	WH9375F Class 2 Type 2	WH9560F Class 3 Type 2	WH9766F Class 4 Type 2
Composition wt.%							
W	90	93	95	90	93	95	97
Ni	7.5	5.25	3.5	7	5.25	3	2
Cu	2.5	1.75	1.5	-	-	-	-
Fe	-	-	-	3	1.75	2	1
Nominal Density g/cc	17.2	17.7	18.0	17.1	17.6	18.1	18.5
Typical Hardness HV10	300	300	310	290	310	310	310
Max. Hardness HRC	32	33	34	32	33	34	35
Typical Tensile Strength MPa	700	650	650	900	900	900	900
Elongation % on 16mm GL	3	2	1	20	20	15	2

DENSAMET® Tungsten Division

Prismatic Machining Division

Valve Stems Division

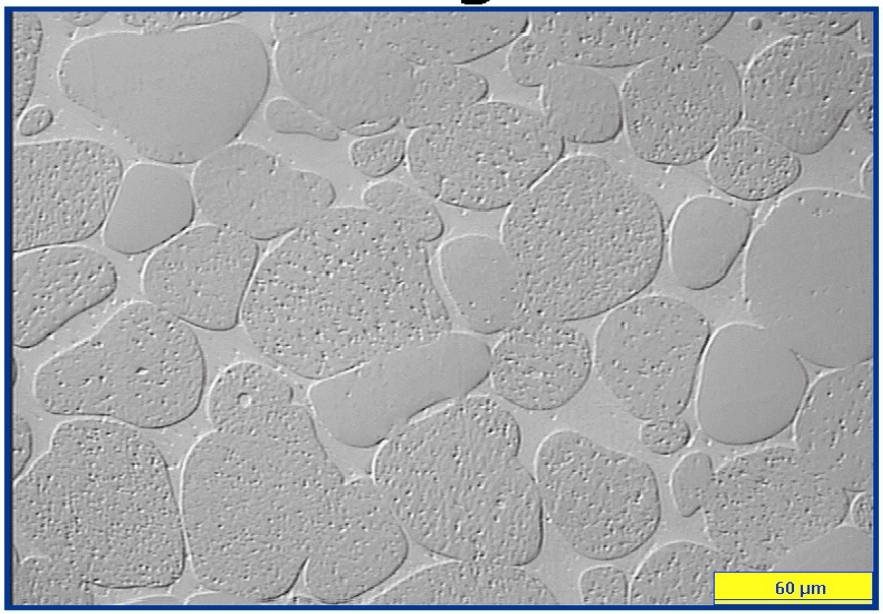
Antennas Division

Properties of WH9375C alloy

MG Sanders

DENSAMET ® TUNGSTEN

Densamet ® Tungsten WH9375C



Materials are checked in-house to ASTM B777-07 / AMS7725D (replaced AMS T 21014) standards.

DENSAMET® Tungsten Division

Prismatic Machining Division

Valve Stems Division

Antennas Division

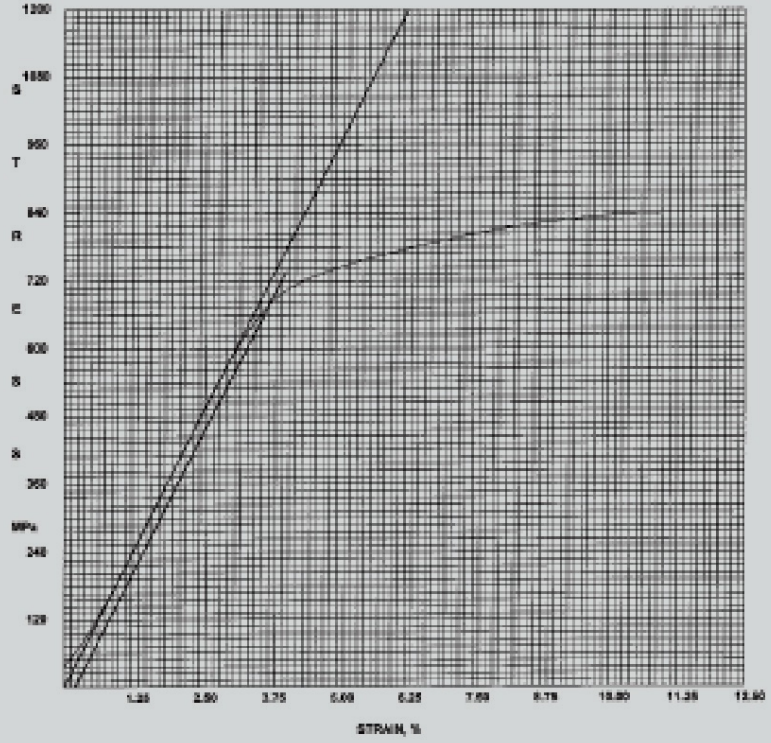
Properties of WH9375C alloy

MG Sanders

MG Sanders

DENSAMET ® TUNGSTEN

Densamet ® Tungsten WH9375C



UTS = 839 MPa

Elongation at fracture = 7.2% on 16mm GL

DENSAMET® Tungsten Division

Prismatic Machining Division

Valve Stems Division

Antennas Division

Tungsten producers (cd)

- France : http://www.deltametal.fr

DELTA METAL

12 Rue du 9E Zouaves
68140 MUNSTER - FRANCE
Tél : 03 89 77 99 00
Fax : 03 89 77 99 99

Site : deltametal.fr e-mail deltametal@wanadoo.fr

OFFRE DE PRIX

Référence : 121033

Date : 04/01/12
Mode de règlement : Chèques 30 JFDM
Délai de livraison : 5 WEEKS

DELTA METAL

12 RUE DU 9ème ZOUAVES
68140 MUNSTER
Tél :0389779900 Fax :0389779999
Interlocuteur : M HERRMANN

Contact : HERRMANN Ph.
Affaire suivie :

Codes	(1) Nuances et Dimensions	Unités	Prix unit.	Montant H.T
D95MP6/12	W95NiCu5 MEPLAT 3.5 X 140 X 140MM *FOB REICHSTETT FRANCE*	30	303,00	9 090,00

(1) Capable des Cotes Finies
(2) Poids théoriques

Récapitulatif			
Frais de Port :		**Total HT € :**	9 090,00
TVA 19,6% :	1 781,64	**Net à payer € :**	**10 871,64**

En espérant que cette offre retiendra favorablement votre attention et dans l'attente de votre prochain ordre, recevez nos sincères salutations.

Document non-contractuel

CONDITIONS GENERALES DE VENTE AU VERSO

TVA payé sur les débits

S.A.R.L DELTA METAL au capital de 25 000 €
Crédit Mutuel - 68380 Metzeral

TVA Intracom.FR 71 418 570 669 Siret 418 570 669 00030
R.I.B 10278 03293 00028610445 31

R.C.S Colmar 98 B 209
Code NAF 4672Z

Only alloy is available
but
the price is significantly
lower than for Sanders Company
Possible question:
what about required accuracy
for tungsten plates

For such price it will be possible to buy more than 20 such tungsten plates

Tungsten producers (cd)

- China : Shaanxi iXI'AN YI HenG non-ferrous Metals Industries C0. Ltd
  http://www.tiwmo.com

  No answer up to now but maybe contact will be done

Tungsten plates : purity 99.95%