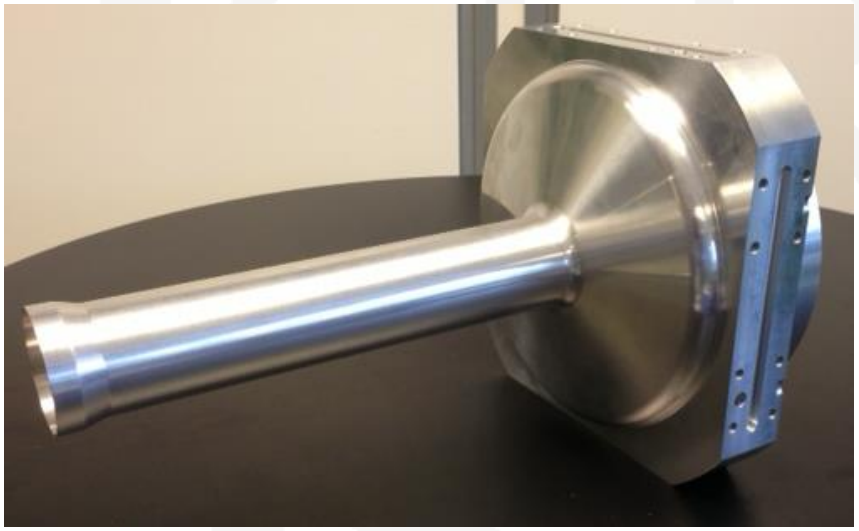
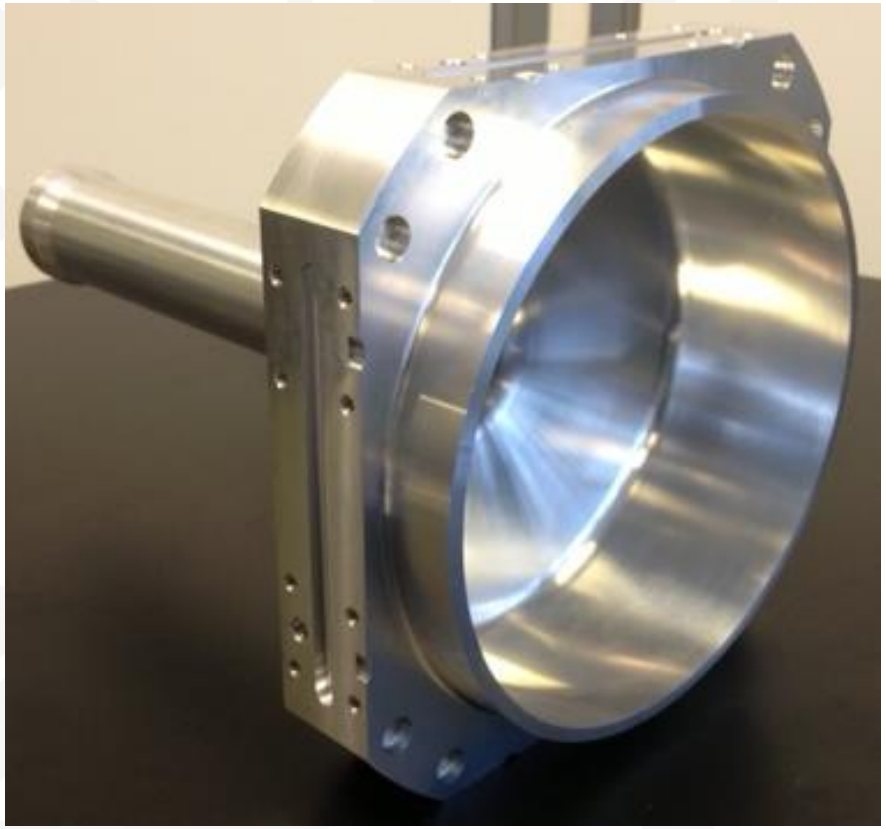
BGV Chamber Mechanical Design

Paolo Magagnin

Window's prototype





Currently under metrology

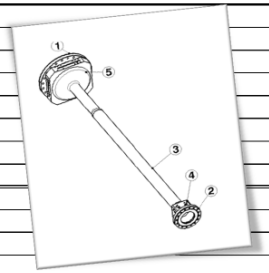
Gamme de fabrication AP

Engineering Department — MME Mechanical & Materials Engineering

Numero JOB: J3014937 Titre: CHAMBRE A VIDE FENETRE DETECTEUR

Plans: LHCBGVCA0004 Quantite: 1

Operation: **GAMME DE FABRICATION FINALISEE SUITE REUNION DU 07/02/14**



	S/PH	POS	DESIGNATION DES PHASES	Qty	Technologie
Approvisionnement	100	1	Bride bi-métallique commandée par le client	1	P.Magagnin
	200	2	Bride bi-métallique commandée par le client	1	P.Magagnin
	300	3	Tube 58/60 AW-2219 éxistant à prélever sur stock chambres Atlas, tube déjà décapé dispo bat. 102	1	ATLAS
	400	4	Bloc forgé AW-2219 fourni par le client	1	P.Magagnin
	500	5	Bloc forgé AW-2219 commandé par le client	1	P.Magagnin
	600	outillage	Appro magasin matière pour outillage reprise longueur tube POS3	1	E.Rigutto
	700	outillage	Appro magasin matière pour outillage assemblage FE	1	E.Rigutto
	800	outillage	Appro magasin matiere pour cimblots tournage POS5	1	E.Rigutto
Gamme opératoire	900	outillage	Mise en plan outillage berceau reprise longueur tube POS3	1	R.Ricol
	1000	outillage	Mise en plan outillage assemblage FE	1	R.Ricol
	1100	outillage	Fabrication outillage berceau reprise longueur tube POS3 suivant plan **CRNHZMW_???? (plans en cours)**	1	FRAISAGE
	1200	outillage	Fabrication outillage assemblage FE suivant plan **CRNHZMW_???? (plans en cours)**	1	MECANIQUE
	1300	3	Mise à longueur finie sur aléseuse avec berceaux de reprise, plan LHCBGVCA0010, usinage à l'alcool, +0.2mm à chaque extr. Pour retrait FE	1	ALESEUSE
	1400	4	Fraisage d'une portée cylindrique pour prise en tournage, plan LHCBGVCA0009	1	FRAISAGE
	1500	4	Tournage finition, plan LHCBGVCA0009, +0.2mm pour retrait soudure FE	1	TOURNAGE
	1600	4	Fraisage finition, plan LHCBGVCA0009	1	FRAISAGE
	1700	5	Tournage ébauche, plan LHCBGVCA0008, prélèvement échantillon suivant plan spécial	1	TOURNAGE
	1800	5	Fraisage finition, plan LHCBGVCA0008	1	FRAISAGE
	1900	5	Tournage finition, plan LHCBGVCA0008, +0.2mm pour retrait soudure FE	1	TOURNAGE
	2000	1	Ouverture bride, ajuster avec POS5, plan LHCBGVCA0007	1	TOURNAGE
	2100	1	Fraisage bride, plan LHCBGVCA0007	1	FRAISAGE
	2200	2	Ouverture bride, ajuster avec POS4, plan LHCBGVCA0006	1	TOURNAGE
	2300	1 -2	Test fuite des brides après ouverture mécanique	1 + 1	P.Magagnin
	2400	3	Contrôle métrologie perpendicularité des faces / axes du tube	1	METROLOGIE
	2500	4	Contrôle métrologie des diamètres de la sortie tubulaire	1	METROLOGIE
	2600	5	Contrôle métrologie des épaisseurs, position des clavettes, de la forme	1	METROLOGIE
	2700	1	Nettoyage, transport Emilien	-	TE-VSC
	2800	2	Nettoyage, transport Emilien	-	TE-VSC
	2900	3	Décapage (voir avec Pedro), transport Emilien	-	TE-VSC
	3000	4	Décapage, transport Emilien	-	TE-VSC
	3100	5	Décapage, transport Emilien	-	TE-VSC
	3200	Outillage FE	Nettoyage, transport Emilien	-	TE-VSC
	3300	Ens.	Assemblage FE, transport Emilien	1	FE
	3400	Ens.	Contrôle radio des soudures FE en charge de Manuel	-	FE / RADIO
	3500	Ens.	Test fuite, transport Emilien	1	40-30
	3600	Ens.	Décapage "ALMECO", transport Emilien	1	TE-VSC
	3700	Ens.	Dépôt NEG, transport Emilien	1	Pedro Costa Pinto
	3800				

Other components to be produced

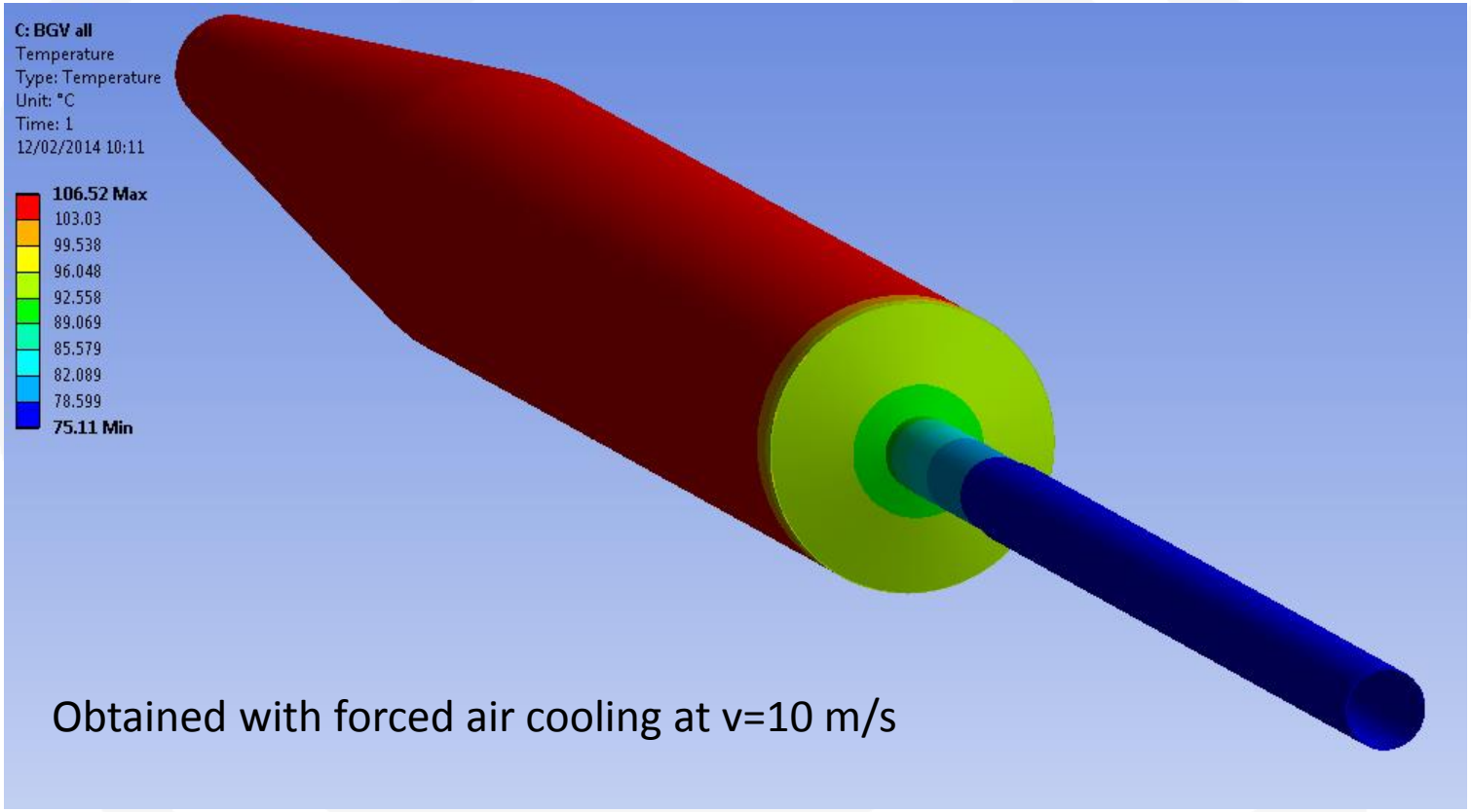
Level 2	Level 3	Level 4	Level 5	Quantity	Specification	Contract	Resp.	Notes	Status
BGV chamber									
	Gas injection section				LHCBGVCA0002				
		Gas injection vacuum chamber		1	LHCBGVCA0001	Cinel	Moyret		under manufacture, delivery end of March
		NEG coating tools							
			blind flanges and gaskets for lateral flanges?						Pedro needs to check if he already has them
			Cup + prolongation for DN 235 flange						Pedro needs to check if he already has it
		Big targets		2					Ordered by J.F. Fuchs
		target 1.5'		6					
		Blind flange DN235		1				SCEM 18.60.18.035.7	Ordered
		Blind flange DN152		1				SCEM 18.60.18.015.1	Ordered
		Blind flange DN63		2				SCEM 18.60.18.010.6	Ordered
		Blind flange DN16		1				SCEM 18.60.18.001.7	Ordered
	Detector window vacuum chamber			1	LHCBGVCA0004				When machined?
		Bi-metallic DN 235 flange		1	LHCBGVCA0007	E. Rigutto			When machined?
		Bi-metallic DN 100 flange		1	LHCBGVCA0006	E. Rigutto			When machined?
		Tube D58/D60		1	LHCBGVCA0010	E. Rigutto			When machined?
		Transition D58/D80		1	LHCBGVCA0009	E. Rigutto			When machined?
		Window vacuum chamber		1	LHCBGVCA0008	E. Rigutto			When Machined?
		Key 8 x 8 x 140		6	??	E. Rigutto	N. Chritin		Missing drawings
		Copper gasket DN235		10?	?				to be ordered
		Copper gasket DN100		10?	?				to be ordered
		NEG coating tools							
			Cap with feedtrougth and prolongation						Pedro needs to define the cathodes, then drawings and production
		Big targets		2					
		target 1.5'		9					
		Blind flange DN235		1				SCEM 18.60.18.035.7	Ordered
		Blind flange DN152		1				SCEM 18.60.18.015.1	Ordered
	Rimovable support			1	?				Missing drawings
	Support for cleaning			1	?				Missing drawings
Girder									
	Girder base								Missing drawings
	Alignment device								Missing drawings
Upstream chamber									
	Upstream vacuum chamber			1	LHCBGVCA0003				under manufacture, delivery end of March
		Copper coating tools							
			Bottom flange	1				in PVC, with holes for air	Missing drawings
			Top flange	1				in PVC, without holes for air	Missing drawings
			Gaskets	2				in VITON or EPDM, to be ordered to Angst+Pfister	Missing drawings
			copper bars 30 x 3 x 900 [mm]	2					Missing drawings
			spacer block	1				in PVC	Missing drawings
			cork	1				in PVC	Missing drawings
		Blind flanges DN152		2				SCEM 18.60.18.015.1	Ordered
Upstream girder									Missing drawings
				2?					To be prodecud

Thermal study

Beam distribution	Scheme	Bunch length	Power loss (total)	Power loss (main mode)
Gaussian	25 ns	1 ns	3 kW	600 W
$\cos^2$	25 ns	1 ns	1 kW	270 W
Gaussian	50 ns	1 ns	1.5 kW	300 W
$\cos^2$	50 ns	1 ns	500 W	130 W
Gaussian	25 ns	1.25 ns	420 W	100 W
$\cos^2$	**25 ns**	**1.25 ns**	**50 W**	**8 W**
Gaussian	50 ns	1.25 ns	200 W	50 W
$\cos^2$	**50 ns**	**1.25 ns**	**23 W**	**4 W**

It is important to note that there are many assumptions undertaken in this estimation, and that appropriate safety factors should be applied by the designers to ensure that the BGV will sustain such power losses.

Thermal simulation: 3 [kW]



Maximum allowed temperature: 120°C → to have an *appropriate* safety factor we will need a water cooling system . Needing of evaluate a reasonable value of the safety factor, in relation the assumption made to calculate the power loss.