



# Specification and documentation approval

**Luca Dassa**  
CERN, EN-MME



**EN-MME Meeting with Triumf – CERN – 22/03/2022**  
**EDMS 2719278 v.1**

# CERN FRONT LINE

**WP4 Crab Cavities Cryomodules**  
CERN Front Line and Responsibilities

ACTIVITY	RESPONSIBLE
<b>General</b>	Marco GARLASCHE
<b>Tracking of design changes , 'as built'</b>	Teddy CAPELLI
<b>CERN Components Center (i.e. CERN Production Readiness, feedbacks fro production,...)</b>	Simon BARRIERE
<b>Tracking of assets. CERN Logistics &amp; Shipping IN / OUT</b>	Simon BARRIERE
<b>MTF steps approval, procedures, NCRs, DevReqs,...</b>	EDMS distribution list: WP4_Cryomodule_UKCERN, WP4_Cryomodule_CANADACERN
<b>Conformity to Specifications</b>	EDMS distribution list: WP4_Cryomodule_UKCERN, WP4_Cryomodule_CANADACERN
<b>Conformity to HL Quality Assurance &amp; Control (CERN Reference Entity)</b>	Hector Garcia GAVELA
<b>Conformity to Specifications (CERN Reference Person)</b>	Luca DASSA

Cryomodule ACTIVITY	CERN KEY PERSON
<i>Overall Cryomodule Design , Assembly (&amp; support thereof)</i>	Teddy CAPELLI
<i>Vacuum</i>	Giuseppe BREGLIOZZI
<i>Alignment</i>	Vivien RUDE
<i>Cryogenics</i>	Laurent DELPRAT
<i>Materials</i>	Adria GALLIFA TERRICABRAS
<i>Transport Engineering &amp; Design</i>	Kurt ARTOOS
<i>Clean Room</i>	Nuria Valverde Alonso
<i>RF testing</i>	Rama CALAGA
...	...
Component	
<i>Couplers &amp; RF</i>	Eric MONTESINOS
<i>Tuner</i>	Kurt ARTOOS
<i>Transport Equipment</i>	Simon BARRIERE, Kurt ARTOOS
<i>Jacketed Cavity</i>	Nuria VALVERDE / Rama CALAGA
<i>PIMS &amp; Vac Components</i>	Giuseppe BREGLIOZZI



# Specs for Crab Cryomodule (1)

Courtesy of  
Luca Dassa

## Specifications for cryomodule

Name	ID code	<u>Engineering Specification</u> [EDMS nr]	<u>Guideline for compl. with CERN</u> <u>Saf. Req. [EDMS nr]</u>
Full Cryomodule, including beam screens and references to requirements for vacuum components (Sector valves, Plug-in modules)	ACFGA	<a href="#">2043014</a>	2043016
Minimum material requirements for 'standard' austenitic stainless steel and aluminum alloys - Purchase order information		<a href="#">2632333</a>	
HL-LHC LHC CRAB CAVITIES: welded joints for cryomodule assembly		<a href="#">2706475</a>	
Summary of pressure tests on Crab cryomodule sub-assemblies and final assembly		<a href="#">2698631</a>	

- **Released**
- Draft available for feedback
- Int .discussion at CERN
- In Work
- Maybe not needed

**Main specifications: they list the requirements for the final product!**

# Specs for Crab Cryomodule (2)

## Specifications for relevant sub-components

Name	ID code	Engineering Specification [EDMS nr]	Guideline for compl. with CERN Saf. Req. [EDMS nr]
Dressed cavities, HOMs couplers, Pick-up antennas, Cold magnetic shield	ACFDC, ACFHC, ACFPU, ACFCM	<a href="#">1389669</a>	<a href="#">2058183</a>
Cryogenic circuits	ACFQC	<a href="#">2093032</a>	<a href="#">2101920</a>
Thermal shield	ACFTS	<a href="#">2101922</a>	<a href="#">2101923</a>
MLI	ACFTS	<a href="#">2144140</a>	-
Vacuum vessel	ACFVT	<a href="#">2101924</a>	<a href="#">2101925</a>
Warm Magnetic shield	ACFWM	<a href="#">2101926</a>	-
Alignment monitoring system	ACFAM	-	-
Support and alignment system	ACFAH	-	-
Instrumentation	ACFIS	<a href="#">ONLY FOR RFD SPS: 2450567</a> + <a href="#">CRNLSQLj0070 (PID)</a>	-
Fundamental Power Coupler	ACFMC	<a href="#">2101934</a>	-
RF internal lines	ACFRL	<a href="#">2605345</a>	-
Tuning system	ACFTU	<a href="#">2101938</a> / Mat. Cert. 2.2	-
Safety protecting devices	ACFGA	<a href="#">2101940</a>	<a href="#">2101943</a>
Sector Valves (beam line)	VVG (TBC)	<a href="#">§ 7.7 of 2043014</a>	-
Plug-in modules for Cold-Warm transition + Intercavity bellow	ACFVW + ACFVC (TBC)	<a href="#">§ 7.7 of 2043014</a>	-
Beam screen	VSSC_	<a href="#">§ 7.7 of 2043014</a>	-

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- **Released**
- Draft available for feedback
- Int .discussion at CERN
- In Work
- Maybe not needed

Please read it carefully

Components produced shall be compliant

# Specs for Crab Cryomodule (3)

Reminder:

- A list of modifications is already available for most of the specs (cleaning requirements, filler metals, etc.): minor modifications!
- No planning present for the update. Priority to complete specs not released
- Can be done following the need of the series production.
- Please contact L. Dassa if need arises

# Importance of documentation

- Traceability shall be granted
- Acceptance of components is based on documentation
- Misunderstanding is avoided when reference is made to a document
- ...

# INFO FLOW and Approvals (1)

## WP4 Crab Cavities Cryomodules Procedures for Information and Documentation

WHEN	Raised/Notification by	e-group?	to Whom
Question. General OR Not easy to address specific key person	UK/CAN via mail	N	Marco
Question. Specific and easy to address specific key person	UK/CAN via mail	N	Key Person, CC Marco
<b>DOCS</b>			
<b>Assembly procedure</b>			
Informal discussions to define procedure	UK/CAN via mail	N	Teddy, Key Person
Assembly procedure is circulated as draft for informal approval	UK/CAN via EDMS <b>with deadline</b>	N	Marco
Document is raised in EDMS, as draft for discussion	UK/CAN via <b>HL-LHC owner release procedure with deadline</b> /	Y	EDMS-distr.-list: CERN-CRYOMODULE
Assembly/check procedure is officially approved and released in EDMS	UK/CAN	Y	EDMS-distr.-list: CERN-CRYOMODULE + CRYOMODULE-UKCERN <b>OR</b> CRYOMODULE-CANADACERN
<b>CHECKS procedure</b>			
Informal discussions	UK/CAN via mail	N	Marco, Key Person
Check procedure is circulated as draft for informal approval (and already raised in EDMS as draft for discussion)	UK/CAN via EDMS <b>with deadline</b>	N	Marco + Key Person if known
Document is raised in EDMS, as draft for discussion	UK/CAN via <b>HL-LHC owner release procedure with deadline</b>	Y	EDMS-distr.-list: CERN-CRYOMODULE
Assembly/check procedure is officially approved and released in EDMS	UK/CAN	Y	EDMS-distr.-list: CERN-CRYOMODULE + CRYOMODULE-UKCERN <b>OR</b> CRYOMODULE-CANADACERN
<b>DOCS Other (Tracking, Logistics, Travellers, ...)</b>			
General activities (no specific controls checks). Raising and approving	<b>HL-LHC owner released procedure</b> Then UK/CAN sharing via EDMS	N	Key Person, CC Marco, CC Hector
<b>Docs related to MTF step (MIP docs included)</b>			
General steps (no specific controls checks). Raising and approving	UK/CAN via EDMS	N	Key Person, CC Marco, CC Hector
Specific steps with CONFORM controls/checks. Raising of documentation for approval	<b>HL-LHC owner released procedure with deadline</b>	Y	Key Person, CC Marco, CC Hector
Specific steps with NON-CONFORM controls/checks. Raising of documentation for approval			see NCR

Key person: see slide 2

E-groups: see slide 10

See slide 9 for approval processes



# INFO FLOW and Approvals (2)

## WP4 Crab Cavities Cryomodules Procedures for Information and Documentation

WHEN	Raised/Notification by	e-group?	to Whom
<b>DevReq</b>			
Informal discussions	UK/CAN via mail	N	Key Person + Marco
Document is raised in EDMS, as <i>HL- Engineering Check</i>	UK/CAN via <b>HL-AL release procedure with deadline / TBC under discussion</b>	Y	EDMS-distr.-list: CERN-CRYOMODULE
Official circulation	HL-Office	NA	EDMS-distr.-list: COORD-CRYOMODULE +CRYOMODULE-UKCERN <b>OR</b> CRYOMODULE-CANADACERN
<b>NCR</b>			
Informal discussions	UK/CAN via mail	N	Key Person + Marco
Document is raised in EDMS, as <i>WP Evaluation</i>	UK/CAN via <b>HL-NCR Procedure with deadline</b>	Y	EDMS-distr.-list: <b>COORD-CRYOMODULE + Key Person shall approve (comments/approval Tab)</b>
Document is officially approved and released in EDMS	UK/CAN via EDMS	Y	UK/CAN are allowed to released the document + share to EDMS-distr.-list: COORD-CRYOMODULE

Key person: see slide 2

E-groups: see slide 10

See slide 9 for approval processes



E-Group Name	Mailing List account	List of People E-Group / Mailing list	EDMS Distribution list	List of People Distribution List
HI-LUMI-LHC-WP4-COORD-CRYOMODULE	<a href="mailto:HI-LUMI-LHC-WP4-COORD-CRYOMODULE@cern.ch">HI-LUMI-LHC-WP4-COORD-CRYOMODULE@cern.ch</a>	<ul style="list-style-type: none"> <li>• <a href="mailto:Kurt.Artoos@cern.ch">Kurt.Artoos@cern.ch</a></li> <li>• <a href="mailto:rama.calaga@cern.ch">rama.calaga@cern.ch</a></li> <li>• <a href="mailto:Ofelia.Capatina@cern.ch">Ofelia.Capatina@cern.ch</a></li> <li>• <a href="mailto:teddy.capelli@cern.ch">teddy.capelli@cern.ch</a></li> <li>• <a href="mailto:Luca.Dassa@cern.ch">Luca.Dassa@cern.ch</a></li> <li>• <a href="mailto:hector.garcia.gavela@cern.ch">hector.garcia.gavela@cern.ch</a></li> <li>• <a href="mailto:Marco.Garlasche@cern.ch">Marco.Garlasche@cern.ch</a></li> <li>• <a href="mailto:julien.debeux@cern.ch">julien.debeux@cern.ch</a></li> <li>• <a href="mailto:simon.barriere@cern.ch">simon.barriere@cern.ch</a></li> </ul>	WP4_COORD_CRYOMODULE	<ul style="list-style-type: none"> <li>• Kurt ARTOOS</li> <li>• Rama CALAGA</li> <li>• Ofelia CAPATINA</li> <li>• TEDDY CAPELLI</li> <li>• LUCA DASSA</li> <li>• HECTOR GARCIA GAVELA</li> <li>• MARCO GARLASCHE</li> <li>• JULIEN DEBEUX</li> <li>• SIMON BARRIERE</li> </ul>
HI-LUMI-LHC-WP4-CERN-CRYOMODULE	<a href="mailto:HI-LUMI-LHC-WP4-CERN-CRYOMODULE@cern.ch">HI-LUMI-LHC-WP4-CERN-CRYOMODULE@cern.ch</a>	<ul style="list-style-type: none"> <li>• HI-LUMI-LHC-WP4-COORD-CRYOMODULE members</li> <li>• <a href="mailto:simon.barriere@cern.ch">simon.barriere@cern.ch</a></li> <li>• <a href="mailto:krzysztof.brodzinski@cern.ch">krzysztof.brodzinski@cern.ch</a></li> <li>• <a href="mailto:paul.kohler@cern.ch">paul.kohler@cern.ch</a></li> <li>• <a href="mailto:Eric.Montesinos@cern.ch">Eric.Montesinos@cern.ch</a></li> <li>• <a href="mailto:chiara.pasquino@cern.ch">chiara.pasquino@cern.ch</a></li> <li>• <a href="mailto:vivien.rude@cern.ch">vivien.rude@cern.ch</a></li> <li>• <a href="mailto:nuria.valverde.alonso@cern.ch">nuria.valverde.alonso@cern.ch</a></li> </ul>	WP4_CERN_Cryomodule	<ul style="list-style-type: none"> <li>• Kurt ARTOOS</li> <li>• Rama CALAGA</li> <li>• Ofelia CAPATINA</li> <li>• TEDDY CAPELLI</li> <li>• LUCA DASSA</li> <li>• HECTOR GARCIA GAVELA</li> <li>• MARCO GARLASCHE</li> <li>• JULIEN DEBEUX</li> <li>• SIMON BARRIERE</li> <li>• PAUL JEAN KOHLER</li> <li>• Eric MONTESINOS</li> <li>• CHIARA PASQUINO</li> <li>• VIVIEN RUDE</li> <li>• NURIA VALVERDE ALONSO</li> </ul>
HI-LUMI-LHC-WP4-CRYOMODULE-CANADACERN	<a href="mailto:HI-LUMI-LHC-WP4-CRYOMODULE-CANADACERN@cern.ch">HI-LUMI-LHC-WP4-CRYOMODULE-CANADACERN@cern.ch</a>	<ul style="list-style-type: none"> <li>• HI-LUMI-LHC-WP4-COORD-CRYOMODULE members</li> <li>• <a href="mailto:zyvagint@triumf.ca">zyvagint@triumf.ca</a></li> <li>• <a href="mailto:bwaraich@triumf.ca">bwaraich@triumf.ca</a></li> <li>• <a href="mailto:devon@triumf.ca">devon@triumf.ca</a></li> <li>• <a href="mailto:jkeir@triumf.ca">jkeir@triumf.ca</a></li> <li>• <a href="mailto:lhenderson@triumf.ca">lhenderson@triumf.ca</a></li> <li>• <a href="mailto:rsekhon@triumf.ca">rsekhon@triumf.ca</a></li> <li>• <a href="mailto:james.keir@cern.ch">james.keir@cern.ch</a></li> <li>• <a href="mailto:devon@triumf.ca">devon@triumf.ca</a></li> <li>• <a href="mailto:olaw@triumf.ca">olaw@triumf.ca</a></li> <li>• <a href="mailto:lax@triumf.ca">lax@triumf.ca</a></li> <li>• <a href="mailto:cmackay@triumf.ca">cmackay@triumf.ca</a></li> <li>• <a href="mailto:bmatheson@triumf.ca">bmatheson@triumf.ca</a></li> <li>• <a href="mailto:zhongyuan.yao@cern.ch">zhongyuan.yao@cern.ch</a></li> </ul>	WP4_Cryomodule_UKCERN	<ul style="list-style-type: none"> <li>• Kurt ARTOOS</li> <li>• Rama CALAGA</li> <li>• Ofelia CAPATINA</li> <li>• TEDDY CAPELLI</li> <li>• LUCA DASSA</li> <li>• HECTOR GARCIA GAVELA</li> <li>• MARCO GARLASCHE</li> <li>• JULIEN DEBEUX</li> <li>• SIMON BARRIERE</li> <li>• ZVYAGINTSEV, Vladimir</li> <li>• bwaraich@triumf.ca</li> <li>• devon@triumf.ca</li> <li>• jkeir@triumf.ca</li> <li>• lhenderson@triumf.ca</li> <li>• rsekhon@triumf.ca</li> <li>• KEIR, James (ATS-DO)</li> <li>• LANG, Devon (ATS-DO)</li> <li>• LAW, Oliver (ATS-DO)</li> <li>• LAXDAL, Robert Edward (ATS-DO)</li> <li>• MACKAY, Cameron (ATS-DO)</li> <li>• MATHESON, Benjamin Jon (ATS-DO)</li> <li>• YAO, Zhongyuan (ATS-DO)</li> </ul>

## E-groups / EDMS distribution lists