

Relevant QA issues for BINP-FAIR contracts

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On behalf of Budker Team

[6th BINP-FAIR Collaboration Coordination Workshop](#)

26 April 2021 to 1 May 2021

Online

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- QA information regarding BINP Workshop
 - TUV Rheinland Certification of welders;
 - Commissioning of orbital welding equipment;
- QA information regarding BINP-FAIR Workflow
 - European and Russian standards;
 - Document workflow on BINP-FAIR contracts;
 - Supporting of WPLs which are not suppliers from BINP regarding the quality aspect of project documentation;

QA information regarding BINP Workshop

TUV Rheinland Welding Procedure Qualification and Certification of welders at BINP, planned on May 2021

- Certification of welding process;
- Certification of welders;



Welders Certificate



2 Designation: **EN ISO 9606-1 141 T BW FM5 S s5.0 D98 H-L045 ss gb**
 3
 4 WPS - Reference: **1** Reference No:
 5 Document No. (if applicable):
 6 Welder's Name: **Nikulin, Ilya Andreevich (1)**
 7 Identification:
 8 Method of Identification:
 9 Date and place of birth: **9/4/1984 in Novosibirsk**
 10 Employer: **Budker's Institution of Nuclear Physics**
 11 Code / Testing Standard: **Directive 2014/68/EU, DIN EN ISO 9606-1:2017**
 Comments:
 Supplementary fillet weld test: **no** Examiner: **Vladislav Maslov**
 12 Job knowledge: **fulfilled**

	Test piece	Range of qualification
14 Welding process(es):	141	141, 142, 143, 145
15 Product type (plate or pipe):	T	P, T
16 Type of weld:	BW	BW
17 Material group(s):	8 (X2CrNiMo17-12-2)	
Filler material group(s)	FM5	FM5
18 Filler material (Designation):	W 19 12 3 L Si	S, M, nm
19 Shielding gas:	EN ISO 14175 - I1	Similar shielding gas
20 Auxiliaries / Flux:	EN ISO 14175 - I1	
Type of current and polarity	--	---
21 Material thickness (mm):	5.00	
Deposited thickness	5.00	3.00 - 10.00
22 Outside pipe diameter. (mm):	98.00	≥ 49.00
23 Welding position(s):	H-L045	H-L045, PA, PC, PE, PF
24 Weld details:	ss gb	ss mb, bs, ss gb

25 Additional information is available on attached sheet and / or WPS

Type of test	Performed and accepted
30 Visual testing	X
31 Radiographic testing	X
32 PT testing	X

Certificate Authority: **TÜV Rheinland Industrie Service GmbH Notified Body for Pressure Equipment 0035**
 Certificate No.: **01 202 BG/S-19 607**
 Certifier: **Nikolay Stankov**
 Place / Date: **Sofia, 7/9/2019**
 Unterschrift:

37 *) Append separate sheet, if required
 Date of welding: **11/6/2018**
 Validity of: **11/5/2021**

38 According 9.3a: Confirmation of the validity by welding coordinator / examine / examining body for the following 6 month (refer to 9.2)

Date	Signature	Position or Title	Date	Signature	Position or Title

39

Edition of standard: EN ISO 9606-1:2017 created with EuroWeld Version 5.44.00.204

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Industrial Services

Нотифицированный орган по оборудованию под давлением
Certification Body for Pressure Equipment



Квалификация сварочной процедуры – Металл / Welding Procedure Qualification - Metal (WPQR)

WPQR №.: 01 202 RU/V-18 0057

Производитель: **Budker's Institution of Nuclear Physics, Russia** Сварочная процедура производителя: **Manufacturers Welding Procedure:**
 Manufacturer: **pWPS-Nr.: No 2**

Дата сваривания / Date of Welding: **06.11.2018** Образец №. / Specimen No: **2-4-1, 2-4-2**

СПЕЦИФИКАЦИИ / SPECIFICATIONS: **EN ISO 15614-1:2017 level 2, PED 2014/68/EU**

ОБРАЗЕЦ ДЛЯ ИСПЫТАНИЯ / TEST PIECE

Материал – Обозначение (подгруппа согласно ISO/TR 15608) **316 L(N) – IG (ITER_D_2A9VB8)**
 Material – Designation (Subgroup acc. ISO/TR 15608): **ISO/TR 15608: group 8.1**
 Внешний диаметр трубы, толщина/ Pipe Outer Diameter, Thickness [mm]: **ø 92.0 x 2.0 mm**

ДИАПАЗОН СОГЛАСОВАНИЯ / RANGE OF APPROVAL

Подгруппа основного металла / Base Metal Subgroup: **8b) – 8**
 Толщина стенки / Wall Thickness [mm]: **BW: 1.0 – 4.0, FW: 1.4 – 4.0**
 Внешний диаметр трубы / Pipe Outer Diameter [mm]: **≥ 46.0**
 Тип сварки, Вид соединения / Weld Type, Joint Type: **BW (См. Прил. 1, стр. 2), FW**

Сварочный процесс (ISO 4063) / Welding Process (ISO 4063): **141 manual**

Присадочный металл., Спецификация / Обозначение Filler metal, Specification/Designation: **OK Tigrod 316LSI ISO 14343-A: W 19 12 3 L Si**

Толщина наплавленного металла / Deposited weld metal thickness [mm]: **BW: max 4.0 FW: 1.5 – 3.0**
 однослойно (sl), многослойно (ml), / single-run (sl), multi-run (ml) **sl**

Газ / Gas: Спецификация – Обозначение / Флюс/Flux: Specification - Designation: **ISO 14175: I1**

Тип сварочного тока /Type of Welding Current: **DC-**
 Подвод тепла (min. – max.) / heat input (min. – max.) [kJ/mm] **0.240 - 0.339**
 Мин. темп. подогрева / Min Preheat Temperature [°C]: **--**
 Макс. темп. между проходами / Max. Interpass Temperature [°C]: **--**
 Положение при сваривании согл. ISO 6947/ Welding Position acc. ISO 6947: **Все кроме PG, J-L045 / All except PG, J-L045**
 Выдержка / Soaking: **--**
 Послеварочная термообработка / Post Weld Heat Treatment: **--**

ПРИМЕЧАНИЯ / REMARKS:
 b) Диапазон сталей в той же подгруппе либо любой нижней подгруппе той же группы.
 Covers steels in the same sub-group and any lower sub-group within the same group

РЕЗУЛЬТАТ / RESULT:
 Настоящим подтверждается, что испытательные швы были подготовлены, сварены, испытаны в соответствии с вышеуказанными спецификациями и дали удовлетворительный результат
 This is to certify that test welds were prepared, welded and tested satisfactory in accordance with the specifications indicated above.

Место: **София** **Дата:** **05.07.2019** Certification body for pressure equipment
 Location: **София** **Дата:** **05.07.2019**

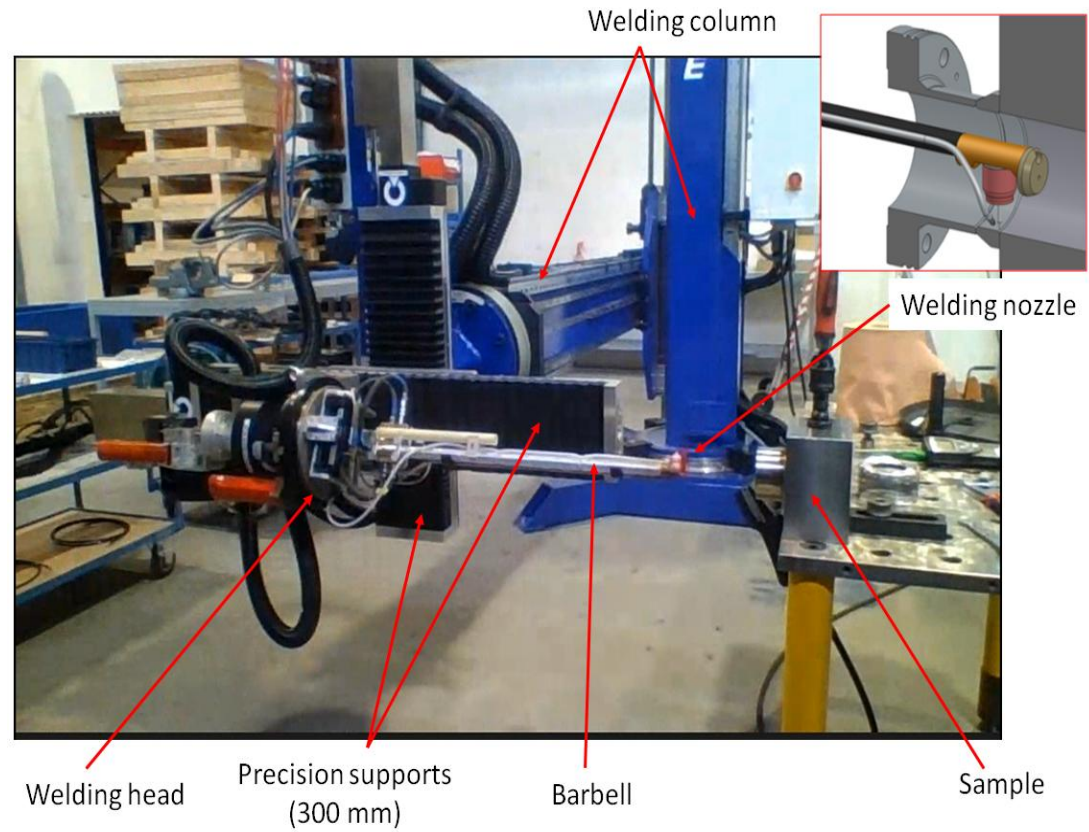
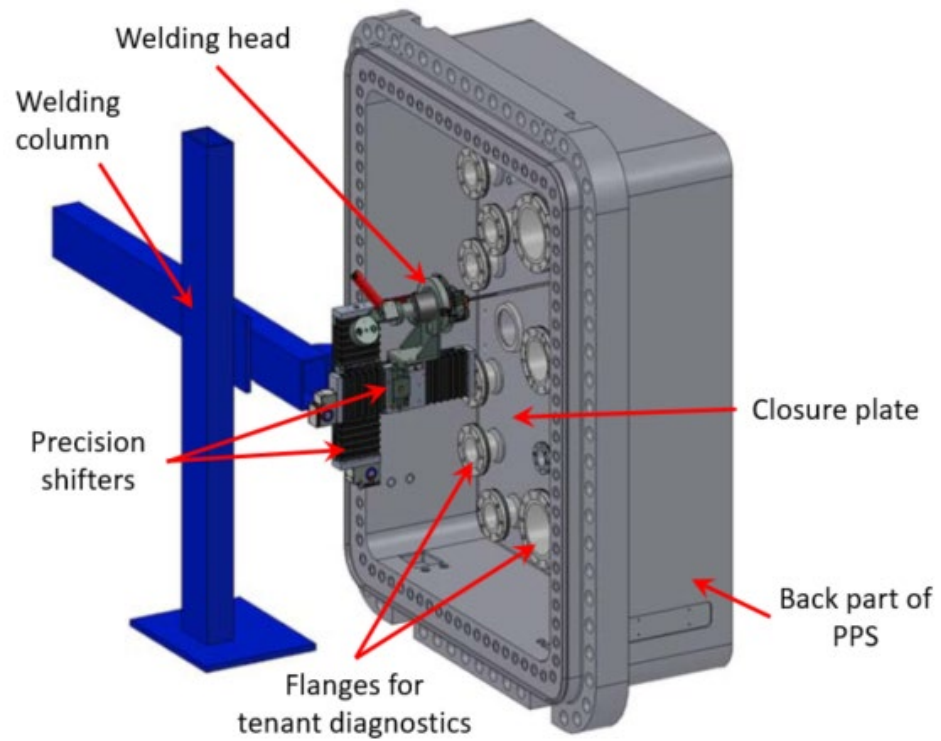
Приложения: **1. Протокол сварочного испытания / Report of Weld Test** **Dipl.Eng. N. Stankov**
 Attachments: **2. Результаты испытания / Test Results** **Сертификационный Орган № 0035**
Notified Body ID Number 0035

QA information regarding BINP Workshop

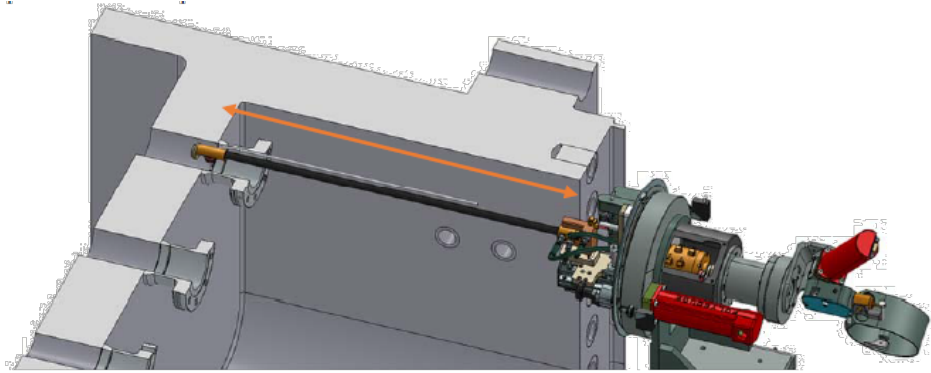
Commissioning of an orbital welding equipment

Work plan includes:

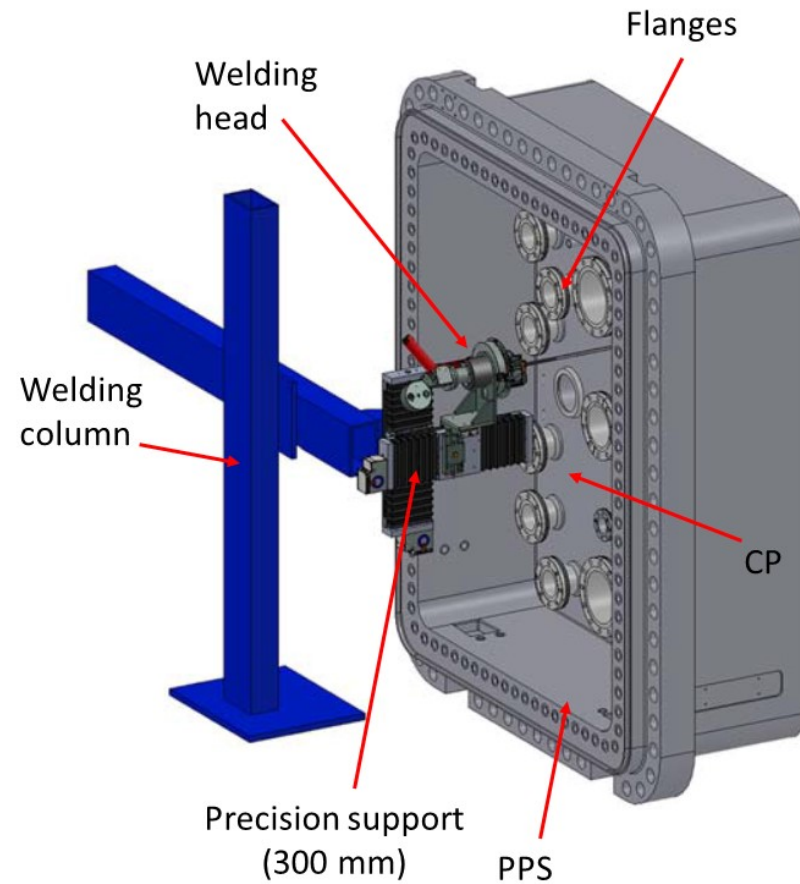
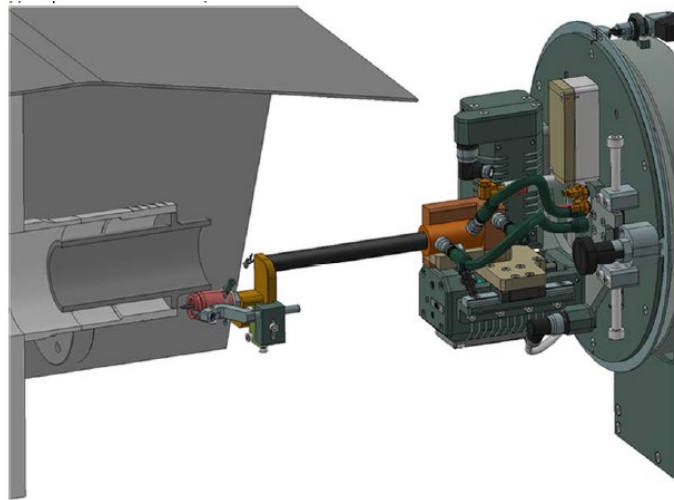
- Adjustment and commissioning of orbital welding equipment;
- Training and qualification of welding operators;
- Qualification of welding procedures;



Demonstration of a possibility internal welding on the flange mock-up



Welding heads allow to weld both from the inside of the pipes (picture above) and from the outside (picture below)



QA information regarding BINP-FAIR Workflow

- European and Russian Standards (ISO, GOST);
- Document workflow on BINP-FAIR contracts (Quality plan);
- Supporting of WPLs which are not suppliers from BINP regarding the quality aspect of project documentation (templates of documentation);


European and Russian Standards (ISO, GOST)

The International Organization for Standardization (ISO) is an international organization that issues standards.

- ISO field of activity concerns standardization in all areas excepting the electrical engineering and electronics, which fall within the purview of the International Electrotechnical Commission (IEC). Some types of work are carried out jointly by these organizations. In addition to standardization, ISO deals with certification issues.
- ISO defines its tasks as follows: to promote the development of standardization and related activities in the world in order to ensure the international exchange of goods and services, as well as the development of cooperation in the intellectual, scientific, technical and economic fields.
- The official languages are English, French and Russian.

Interstate standard (GOST) is a regional standard adopted by the Interstate Council for Standardization, Metrology and Certification of Russia and partly of countries of the former USSR. The interstate standards are applied 'voluntarily on the territory of these countries. In Russia the interstate standards are applied in accordance with the Federal Law.

Risk assessment: ISO 12100:2010 Safety of machinery — General principles for design — Risk assessment and risk reduction



ICS > 13 > 13.110

ISO 12100:2010


Safety of machinery — General principles for design — Risk assessment and risk reduction

ABSTRACT [PREVIEW](#)

ISO 12100:2010 specifies basic terminology, principles and a methodology for achieving safety in the design of machinery. It specifies principles of risk assessment and risk reduction to help designers in achieving this objective. These principles are based on knowledge and experience of the design, use, incidents, accidents and risks associated with machinery. Procedures are described for identifying hazards and estimating and evaluating risks during relevant phases of the machine life cycle, and for the elimination of hazards or sufficient risk reduction. Guidance is given on the documentation and verification of the risk assessment and risk reduction process.

ISO 12100:2010 is also intended to be used as a basis for the preparation of type-B or type-C safety standards. It does not deal with risk and/or damage to domestic animals, property or the environment.

GENERAL INFORMATION

Status :  Published	Publication date : 2010-11
Edition : 1	Number of pages : 77
Technical Committee : ISO/TC 199 Safety of machinery	
ICS : 13.110 Safety of machinery	

ГОСТ Р 54125-2010
(ISO 12100:2010)

НАЦИОНАЛЬНЫЙ СТАНДАРТ РОССИЙСКОЙ ФЕДЕРАЦИИ

БЕЗОПАСНОСТЬ МАШИН И ОБОРУДОВАНИЯ

Принципы обеспечения безопасности при проектировании

Safety of machinery and equipment. Principles for safety ensuring while designing

ОКС 13.110

Дата введения 2012-06-01

Предисловие

1 ПОДГОТОВЛЕН Федеральным государственным унитарным предприятием "Всероссийский научно-исследовательский институт стандартизации и сертификации в машиностроении" (ВНИИНМАШ) на основе собственного аутентичного перевода на русский язык международного стандарта, указанного в пункте 4

2 ВНЕСЕН Техническим комитетом по стандартизации ТК 039 "Энергосбережение, энергетическая эффективность, энергоменеджмент"

3 УТВЕРЖДЕН И ВВЕДЕН В ДЕЙСТВИЕ Приказом Федерального агентства по техническому регулированию и метрологии от 21 декабря 2010 г. N 819-ст

4 Настоящий стандарт модифицирован по отношению к международному стандарту ИСО 12100:2010* "Безопасность машин. Общие принципы расчета. Оценка рисков и снижение рисков" (ISO 12100:2010 "Safety of machinery - General principles for design - Risk assessment and risk reduction") путем изменения ссылочных стандартов и полного переформатирования элемента "Библиография" примененного международного стандарта, которые выделены в тексте курсивом**.

* Доступ к международным и зарубежным документам, упомянутым в тексте, можно получить, обратившись в [Службу поддержки пользователей](#).

** В бумажном оригинале обозначения и номера стандартов и нормативных документов в разделах "Предисловие", "Нормативные ссылки", "Библиография", таблице ДА.1 приложения ДА приводятся обычным шрифтом, остальные по тексту документа выделены курсивом. - Примечание изготовителя базы данных.


Внесение указанных технических отклонений направлено на учет целесообразности использования ссылочных национальных стандартов вместо ссылочных международных стандартов и документов.

Наименование настоящего стандарта изменено относительно наименования указанного международного стандарта для приведения в соответствие с [ГОСТ Р 1.5-2004](#) (подраздел 3.5).


Сведения о соответствии ссылочных национальных стандартов международным стандартам, использованным в качестве ссылочных в примененном международном стандарте, приведены в дополнительном [приложении ДА](#).

BINP QA team is ready to study the issue of creating a data base of ISO and GOST standards with joint cooperation of BINP and FAIR.

Document workflow on BINP-FAIR contracts (Quality plan)

	BINP SB RAS FAIR Contract No. CC2.5.2.2.1	Kind of Document: Quality plan	Document Number: FCR_BINP_Quality_plan_v1.0	Date: 15.04.2021 Page 1 of 32
Title:	BINP Quality plan			
Description:	BINP Quality plan for the design, production, measurement, storage and transportation of the contracted products for the Collector Ring (CR) of the FAIR Accelerator Project			
Organization:	Budker Institute of Nuclear Physics SB RAS			
Valid for:	FAIR Contract No. CC2.5.2.2.1			
	PSP: All			
	AID: All			
	CID: All			


PSP: All, AID: All, CID: All

	BINP SB RAS FAIR Contract No. CC2.5.2.2.1	Kind of Document: Quality plan	Document Number: FCR_BINP_Quality_plan_v1.0	Date: 15.04.2021 Page 3 of 32
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PSP: All, AID: All, CID: All

New separate document: Production plan

New separate document: Test and inspection plan

	BINP SB RAS	Kind of Document: Production Plan	Document Number: FCRV_CR_Adapters_Production Plan_v1.1	Date: 11.01.2021
	FAIR Contract No. CC2.5.2.2.1			Page 1 of 7

Title:	Production plan
Description:	Main stages for the production of CR Adapters for the Collector Ring (CR) of the FAIR Accelerator Project
Organization:	Budker Institute of Nuclear Physics SB RAS
Valid for:	FAIR Contract No. CC2.5.2.2.1
	PSP 2.5.7.1.2.1.6
	AID:0002726, AID:0002727, AID:0002728
	CID:07000086010, CID:07000086027, CID:07000086034, CID:07000086041, CID:07000086058, CID:07000086065


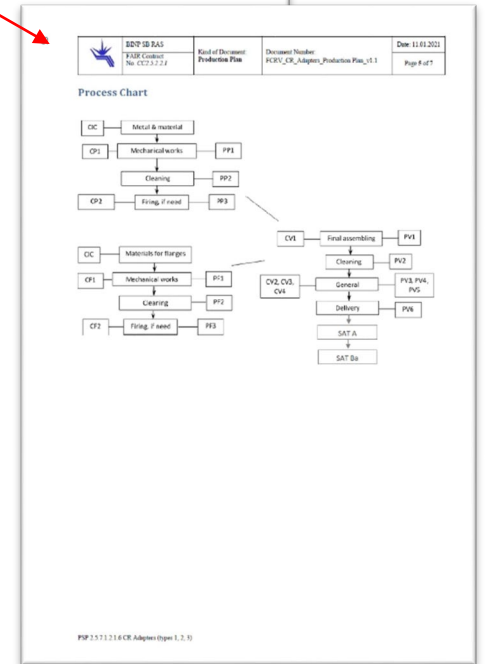

	BINP SB RAS	Kind of Document: Production Plan	Document Number: FCRV_CR_Adapters_Production Plan_v1.1	Date: 11.01.2021
	FAIR Contract No. CC2.5.2.2.1			Page 3 of 7

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	BINP SB RAS	Kind of Document: Test and Inspection Plan	Document Number: FCRV_CR_Adapters_Test_and_Inspection_Plan_v1.0	Date: 09.10.2020
	FAIR Contract No. CC2.5.2.2.1			Page 1 of 10

Title:	Test and Inspection Plan
Description:	Test and Inspection Plan of CR Adapters for the Collector Ring (CR) of the FAIR Accelerator Project
Organization:	Budker Institute of Nuclear Physics SB RAS
Valid for:	FAIR Contract No. CC2.5.2.2.1
	PSP 2.5.7.1.2.1.6
	AID:0002726, AID:0002727, AID:0002728
	CID:07000086010, CID:07000086027, CID:07000086034, CID:07000086041, CID:07000086058, CID:07000086065


	BINP SB RAS	Kind of Document: Test and Inspection Plan	Document Number: FCRV_CR_Adapters_Test_and_Inspection_Plan_v1.0	Date: 09.10.2020
	FAIR Contract No. CC2.5.2.2.1			Page 3 of 10

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FAT
SAT A
SAT Ba

Supporting of WPLs which are not suppliers from BINP regarding the quality aspect of project documentation

BINP QA team is ready to share the templates of project documentation for supporting of WPLs which are not suppliers from BINP.