



# Status of task 17.3 and publications on Shocks and Vibrations

Aries WP17 progress meeting

Lorenzo Peroni (POLITO)

# Task 3 description

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## *Task 3: Dynamic testing and online monitoring*

Testing of material samples in a broad range of environments:

- Mechanical testing in quasi-static and dynamic conditions, at various temperatures
- Tests under very high power laser and particle beams
- Irradiation tests with online monitoring of properties evolution
- Hydrodynamic simulations of experiments - constitutive models, spall strengths for new materials

**Participants: CERN, ELI-NP, GSI, POLIMI, POLITO**



# Task 3 description

## *Task 3: Polito testing*

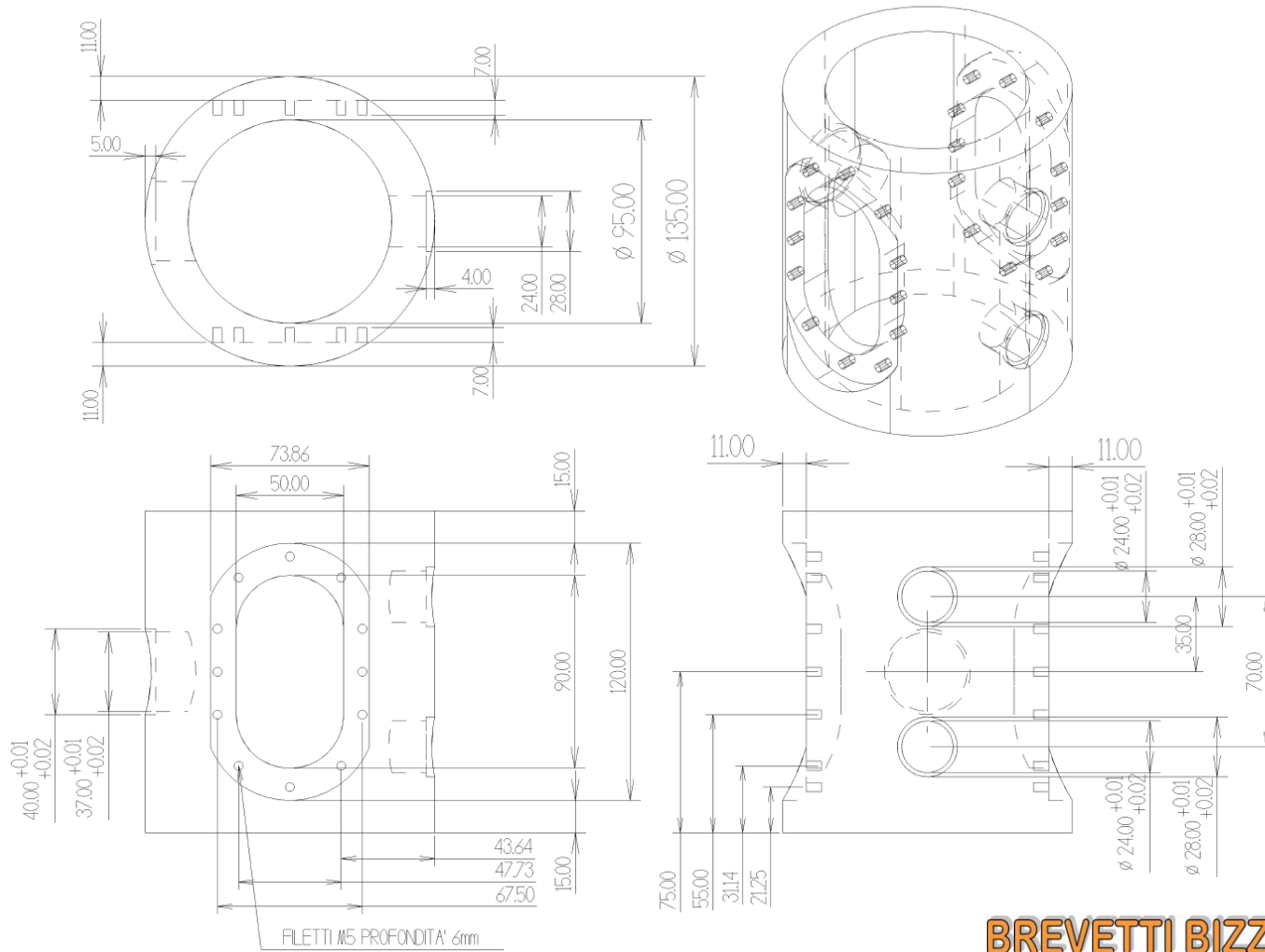
- Mechanical testing in quasi-static and dynamic conditions, at various temperatures



**BREVETTI BIZZ**



# Task 3 description



**BREVETTI BIZZ**

# Milestones

Milestone number <sup>18</sup>	Milestone title	WP number <sup>9</sup>	Lead beneficiary	Due Date (in months) <sup>17</sup>	Means of verification
MS58	Organisation of PowerMat kick-off meeting (Task 17.1)	WP17	1 - CERN	6	Agenda, summary report
MS59 ✓	Irradiation campaigns at GSI for radiation hardness studies (Task 17.3)	WP17	23 - POLITO	27	Report to StCom
MS60 ✓	Irradiation effects analysis (Task 17.3)	WP17	1 - CERN	36	Report to StCom
MS61	Comparative compendium of materials developed (Task 17.2)	WP17	1 - CERN	40	Report to StCom
MS62	Dissemination of R&D results on novel materials for accelerator and societal applications (Task 17.5)	WP17	12 - GSI	46	Report to StCom



# Deliverables

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<b>Deliverable Number<sup>14</sup></b>	<b>Deliverable Title</b>	<b>Lead beneficiary</b>	<b>Type<sup>15</sup></b>	<b>Dissemination level<sup>16</sup></b>	<b>Due Date (in months)<sup>17</sup></b>
D17.1	Material characterization	1 - CERN	Report	Public	12
D17.2	Irradiation effect simulations	1 - CERN	Report	Public	44
D17.3	Irradiation test results	23 - POLITO	Report	Public	46

# Special Issue

Shock and Vibration



## Special Issue on Structural and Wave Propagation Effects in High-Energy Particle Impacts

# CALL FOR PAPERS

### Journal metrics

Acceptance rate	36%
Submission to final decision	92 days
Acceptance to publication	38 days
CiteScore	2.400
Impact Factor	1.298

APC \$2200

### Publishing date

01 Jan 2021

### Status

Open

### Submission deadline

11 Sep 2020

### Lead Editor

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When subatomic particles or ions interact with matter, they tend to transfer part of their energy to the medium they traverse. The energy deposited in the material produces a dynamic response of the structure, entailing stress waves and vibrations, or even the failure of the component, with effects comparable to those induced by the action of dynamic mechanical and thermal loads. These phenomena may severely affect the integrity and functionality of the impacted equipment. The correct understanding and prediction of beam-induced shocks and damages is therefore extremely important in the design of any component exposed to direct interaction with intense and energetic particle beams. However, it could also be considered for many other civil and aerospace applications in which structures are subjected to similar scenarios, such as mechanical and high-velocity impacts, explosions, and thermally induced vibrations. Moreover, impacts with high-energy particle beams allow researchers to investigate material behavior in extreme conditions that cannot be reached with laboratory-controlled experiments. For example, the HiRadMat facility at the European Organization for Nuclear Research (CERN) could potentially be a very useful tool for such shock community research. Theoretical and numerical models are strictly related to the particle accelerator field.

This special issue aims to publish original research in the field of high-energy particle beam impacts from a shock and vibration perspective. Papers concerning the assessment of beam-induced shockwaves and their structural effects on mechanical components will be considered. Contributions that discuss the development and validation of experiments, alongside analytical and numerical tools for the analysis of wave propagation and dynamic loading scenarios, are particularly welcome. This special issue also encourages researchers to submit review articles that overview the state of the art and seek to stimulate and support continuing efforts in studying the macroscale mechanical and hydrodynamic responses induced on materials and in evaluating structural integrity.

Potential topics include but are not limited to the following:

- Mechanics and behaviors of materials in high-energy impacts from a shock and vibration perspective
- Analysis of elastoplastic shock wave generation and propagation in matter
- Modeling and simulation of structural effects during particle beam interaction with matter
- Development and validation of novel material models and/or equations of state for high-energy impact applications from a shock and vibration perspective
- Development of innovative experimental techniques for testing and characterizing materials and structures under extreme shock conditions
- Data acquisition and signal processing in high-energy impact and shock experiments

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/sv/dpp/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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Submission Deadline  
Friday, 11 September 2020

Publication Date  
January 2021

CANCELLED

