Laboratório de Ensaios de Material de Irrigação (LEMI)

III INOVAGRI INTERNATIONAL MEETING (Fortaleza, 2015)

Instituto Nacional
de Ciência e Tecnologia
Engenharia da Irrigação

Antonio Pires de Camargo
Manager – LEMI
Researcher – INCT-EI

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International Network of Irrigation Testing Laboratories (INITL)

INITL

- ***Purposes of the network***
  - Cooperation among irrigation testing laboratories
  - Visits
  - Exchange of professionals
  - Research cooperation
  - Sharing of methodologies and technologies
  - Support to improvement/development of standards
- ***Participants***
  - 18 laboratories in 17 countries

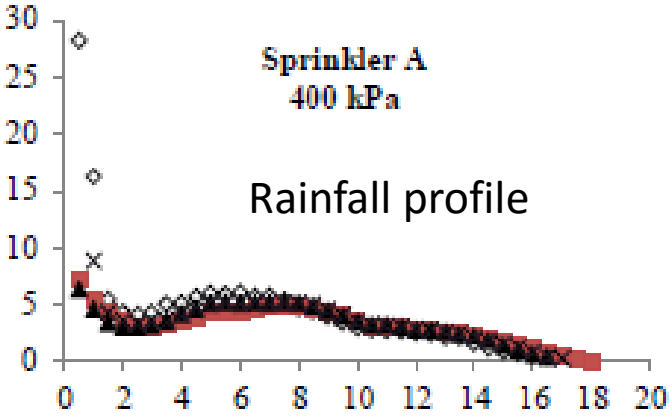
- ***Last meeting***
  - I Inovagri International Meeting (2012)
  - Representatives from:
    - France, Spain, China, Australia, South Africa and Brazil
  - A round of cross tests was started
    - Drippers
    - Sprinklers

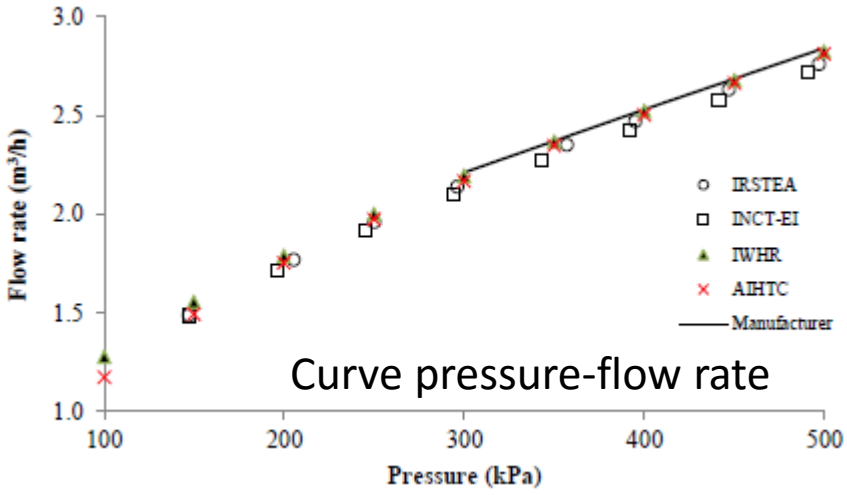
- ***Last meeting***
  - I Inovagri International Meeting (2012)
  - Representatives from:
    - France, Spain, China, Australia, South Africa and Brazil
  - A round of cross tests was started
    - Objectives:
      - Help on identifying weaknesses in methodologies or facilities by comparing results among the labs
      - Support ISO 17025 accreditation of the Chinese and Brazilian laboratories (cross tests are required)
    - Tests based on ISO standards

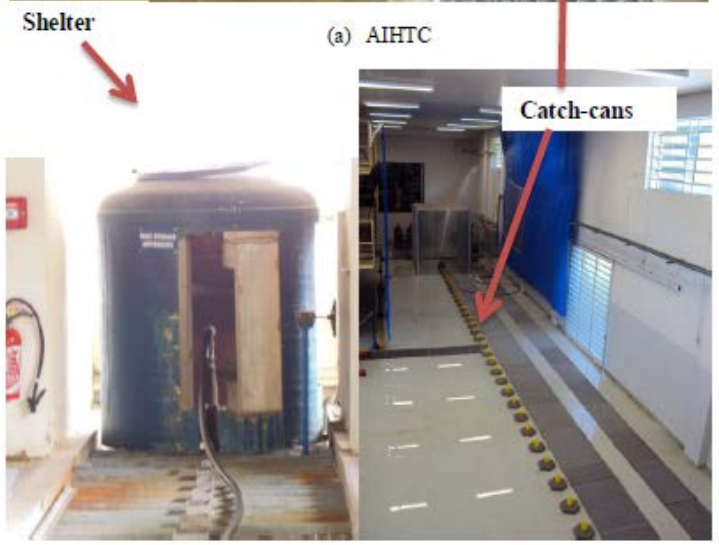
- ***Cross tests of sprinklers and drippers***
  - Curve pressure-flow rate of drippers and sprinklers
  - Water distribution uniformity of sprinklers
  - Uniformity of flow rate of drippers
  - Participants:
    - LERMI/IRSTEA (France)
    - LEMI/INCT-EI/ESALQ (Brazil)
    - IWHR (China)
    - UniSA (Australia)

INITL Activities

- ***Cross tests of sprinklers***



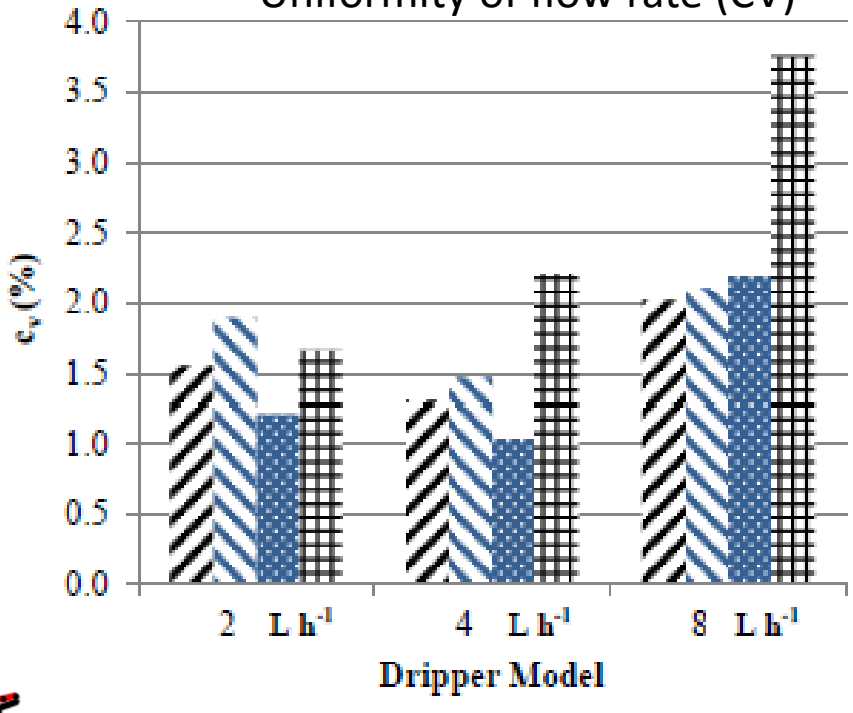




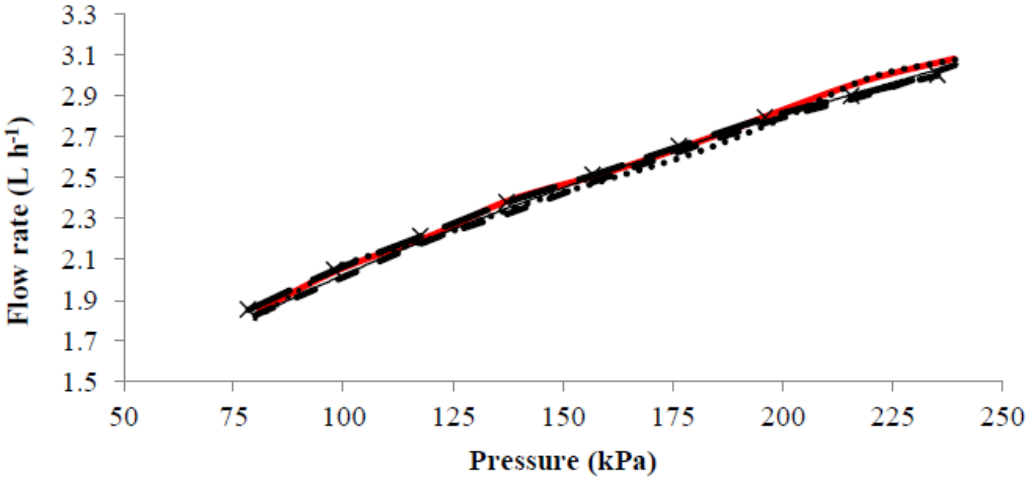
INITL Activities

- ***Cross tests of drippers***

Uniformity of flow rate (CV)



Curve pressure-flow rate



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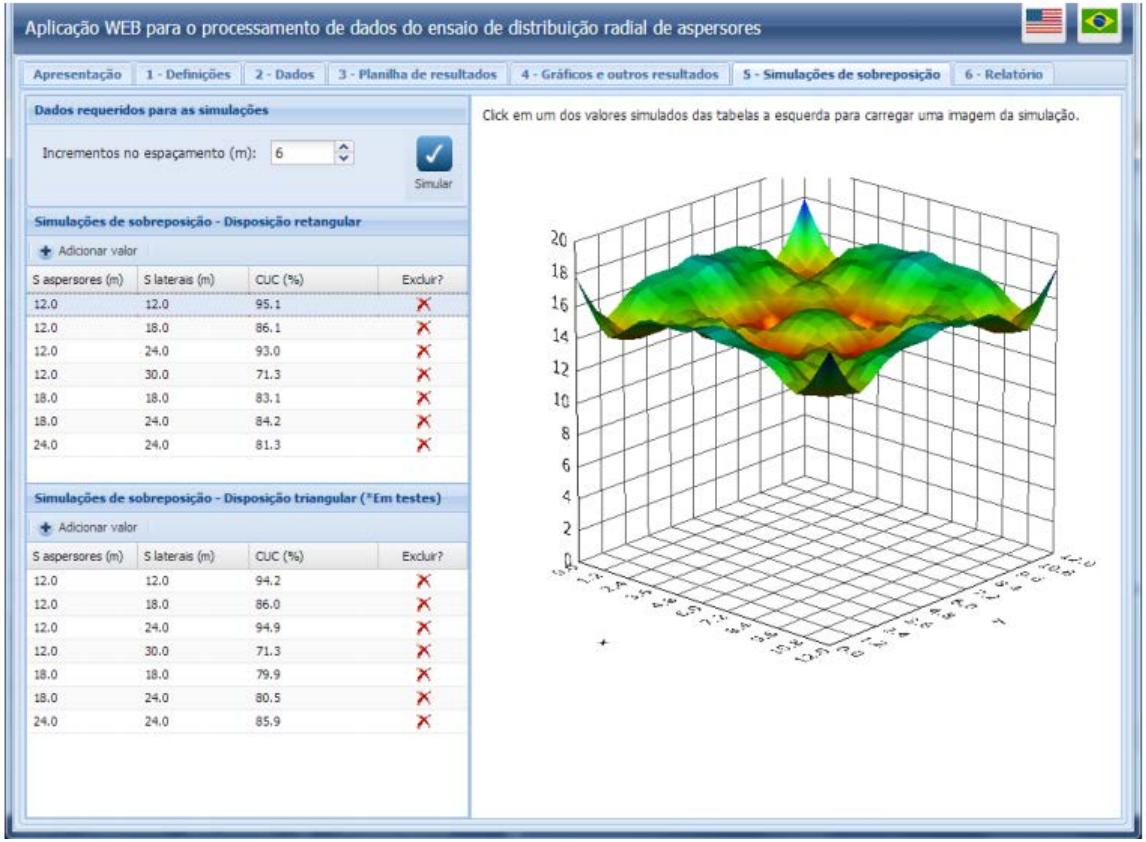
INITL Activities

- ***Web application for processing results from sprinklers tests***



http://143.107.212.131/initl/.

INITL Activities
Published papers

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ELSEVIER

Flow Measurement and Instrumentation

Available online 14 August 2015, Article FLOWMEASINSTD1500007

In Press, Accepted Manuscript — Note to users

Intercomparison dripper testing within the INITL

Richard Koech[a], Bruno Molle[b], Antonio Pires de Camargo[c], Pascal Dimaiolo[b], Mathieu Audouard[b], Ezequiel Saretta[c], José Antônio Frizzone[c], David Pezzaniti[d], Gao Benhu[e]

Journal of Irrigation and Drainage Engineering

Intercomparison testing and evaluation of sprinklers within the INITL

--Manuscript Draft--

Manuscript Number:	IRENG-7281R1
Full Title:	Intercomparison testing and evaluation of sprinklers within the INITL

http://dx.doi.org/10.12702/ii.inovagri.2014-a381

APLICAÇÃO WEB PARA PROCESSAMENTO DE DADOS DO ENSAIO DE DISTRIBUIÇÃO RADIAL DE ASPERSORES

A. P. Camargo[1], B. Molle[2], S. Tomas[3], M. F. Pinto[4], J. A. Frizzone[5]

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INITL

- ***Perspectives***
- ***Future activities***
- ***… Bruno Molle…***

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Lemi

Laboratório de Ensaios de Material de Irrigação (LEMI/INCT-EI/ESALQ/USP)

USP ESALQ

Universidade de São Paulo

Organization / Facilities

Instituto Nacional de Ciência e Tecnologia Engenharia da Irrigação

Universidade de São Paulo

University of São Paulo (USP)

College of Agriculture "Luiz de Queiroz" (ESALQ)

Department of Biosystems Engineering (LEB)

Shared facilities

National Institute of Science and Technology - Irrigation Engineering (INCT-EI)

Hydraulics

Soil-water analyses

Water quality analyses

Irrigation

Laboratories related to irrigation

Laboratory of Research and Test of Irrigation Material

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Activities

- ***Certified tests***
  - ABNT NBR ISO/IEC 17025:2005

- ***Tests, researches, and development related to Irrigation Engineering***
  - National Institute of Science and Technology – Irrigation Engineering (INCT-EI)
  - Department of Biosystems Engineering (LEB/ESALQ)

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Ensaios
NBR ISO/IEC
17025

CRL 0549

CERTIFIED TESTS

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Accreditation ISO 17025 - General requirements for the competence of testing and calibration laboratories

Rotating Sprinklers

- ***Tests complying with ABNT NBR ISO 7749-1:2000***
  - Uniformity of flow rate
  - Uniformity of distribution
  - Effective radius
  - Height of water jet

Microsprinklers

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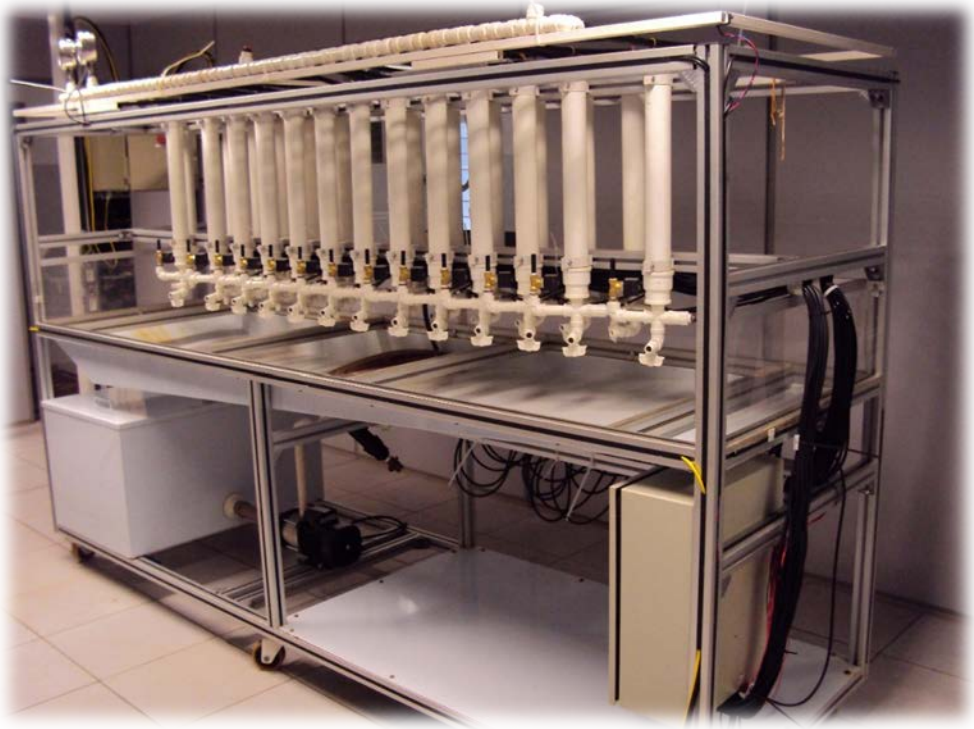
- ***Tests complying with ABNT NBR 15084:2004***
  - Uniformity of flow rate
  - Curve pressure-flow rate

Emitters and emitting pipes

- ***Tests complying with ABNT NBR ISO 9261:2006***
  - Uniformity of flow rate
  - Curve pressure-flow rate



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Tests, researches, and development related to Irrigation Engineering

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Tests Sprinklers

- ***ABNT NBR ISO 7749-1: Rotating sprinklers***
  - *Resistance*
  - *Watertightness*
  - *Rotation speed*
  - *Flow rate uniformity (certified)*
  - *Water distribution characteristics (certified)*
  - *Jet height*
  - *Curve pressure-flowrate*
  - *Durability*

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Tests Microsprinklers

- *Microsprinklers*
  - *ABNT NBR 15084:2004*

Testing bench for microsprinklers

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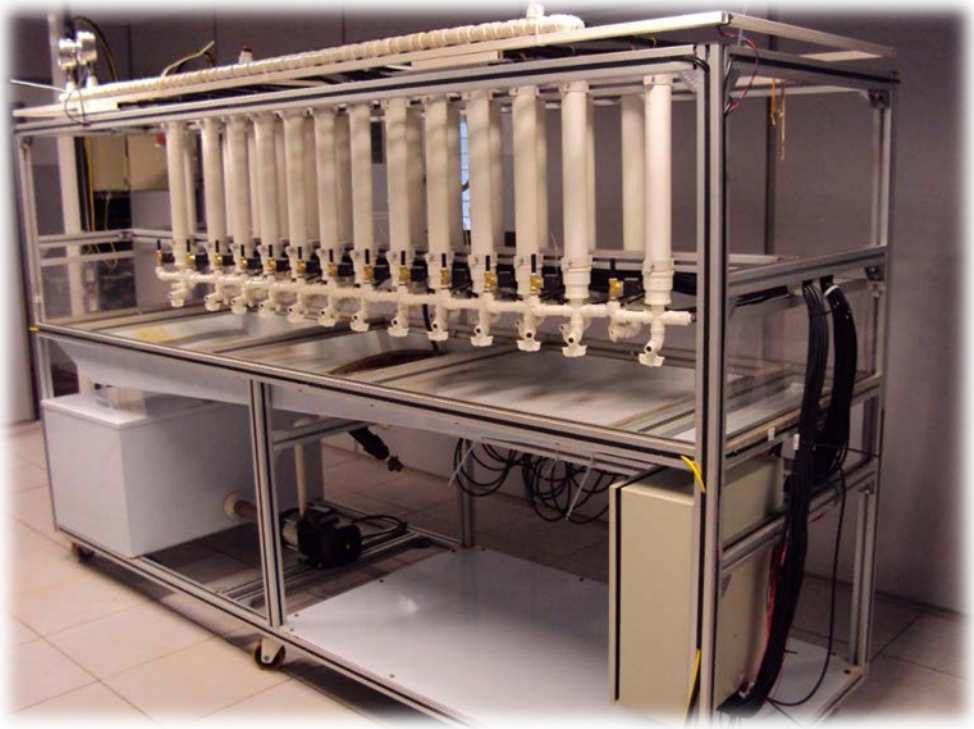
Tests
Drippers

- *Emitters and emitting pipes*
  - *ABNT NBR ISO 9261:2006*



Testing bench for drippers and emitting pipes

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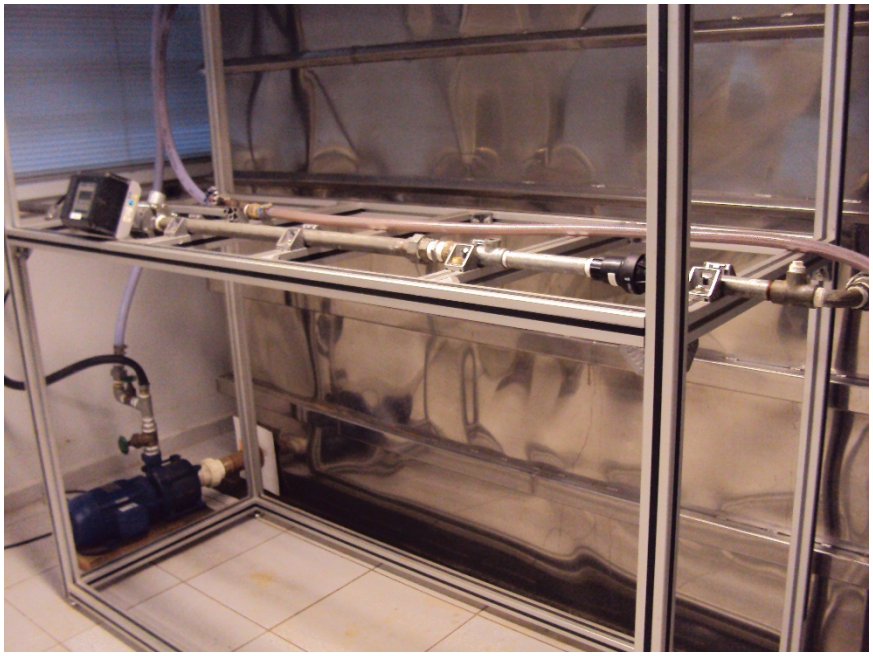
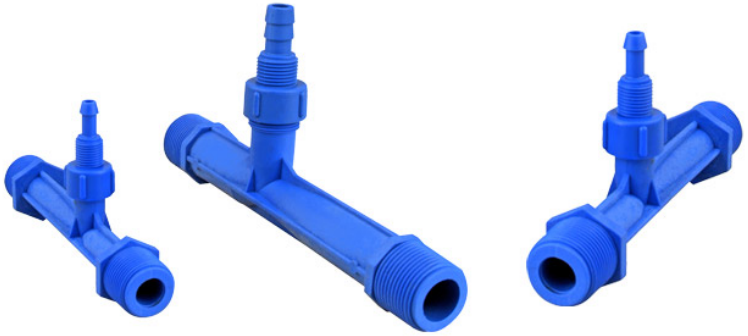
Pressure regulating valves and Venturi injectors

- *Pressure-regulating valves : ISO 10522:1993*
- *Venturi injectors : ISO 15873:2002*



Testing bench for pressure-regulating valves and Venturi injectors

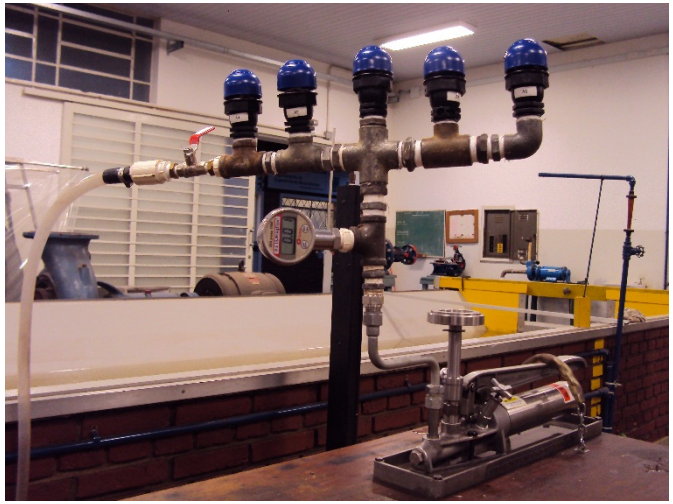
pressure-regulating valve



Venturi injectors

Tests
Air valves

- ***Air valves: ISO 9635-4***



Mechanical resistance and water tightness tests

Air flow test

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Tests
Other hydraulic tests

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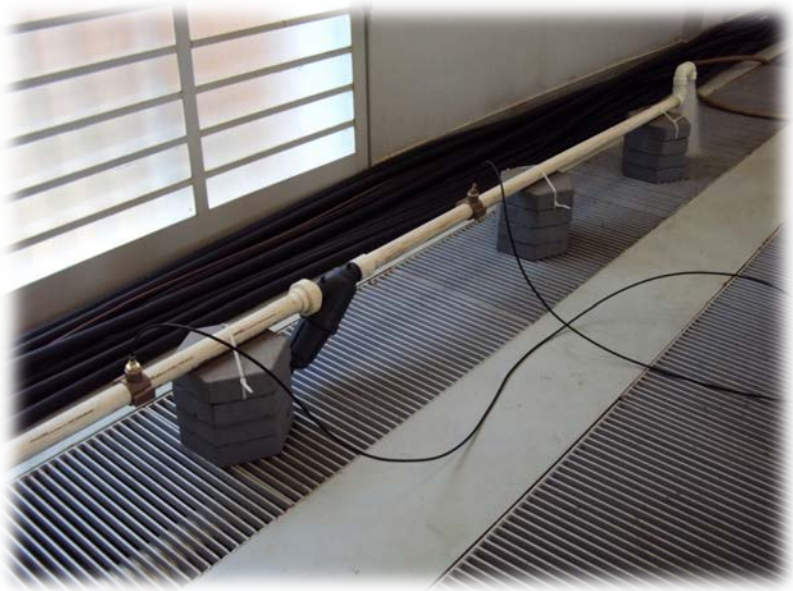
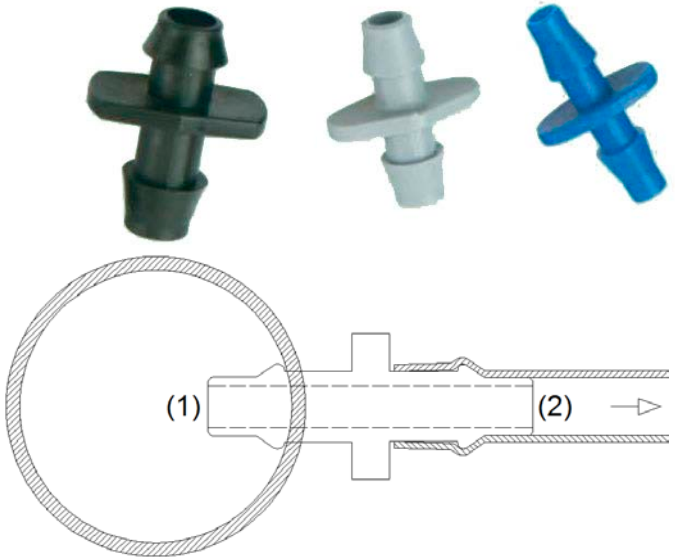
- ***Hydraulic tests of filters, fittings and accessories***
  - ***Friction and local head losses***





- ***Dimensional measurements (optical and laser equipment)***

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- ***Surface roughness measurements***

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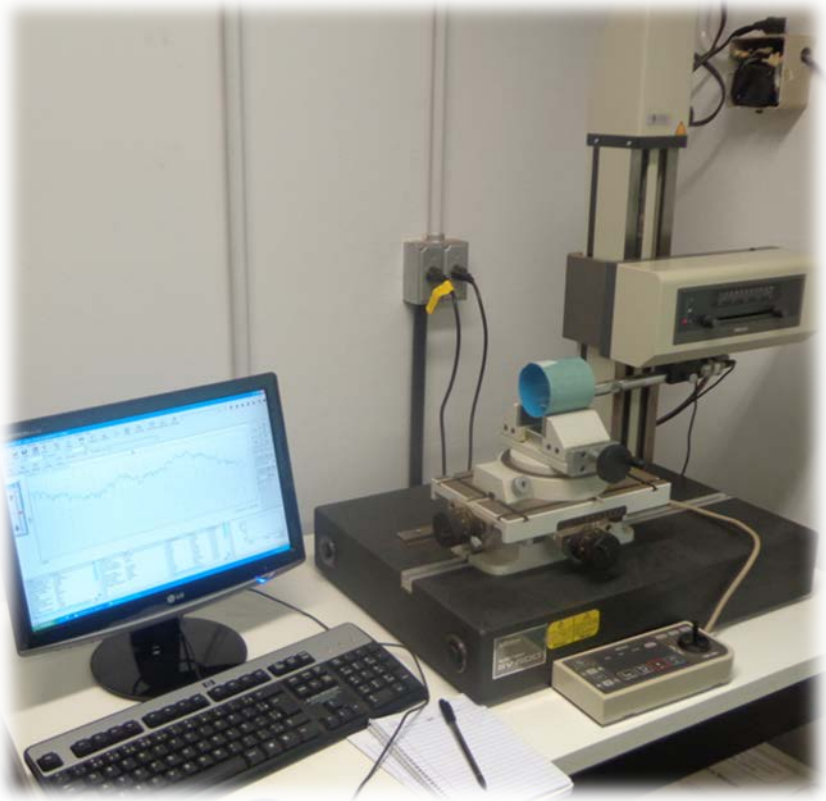

Mechanical resistance

Universal testing machine

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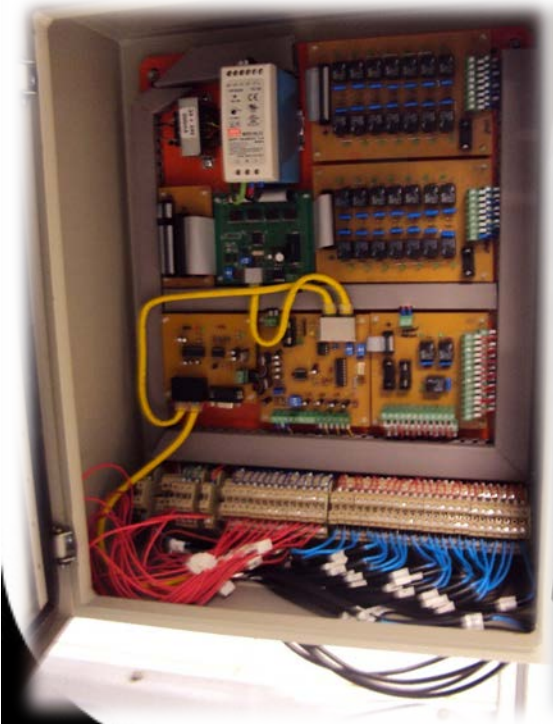
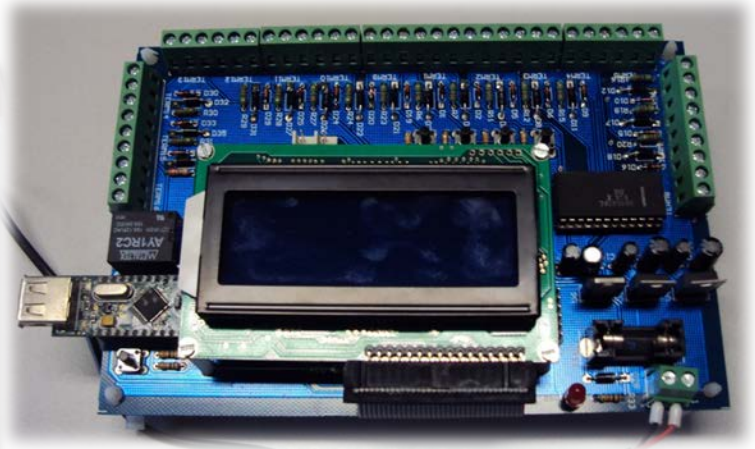
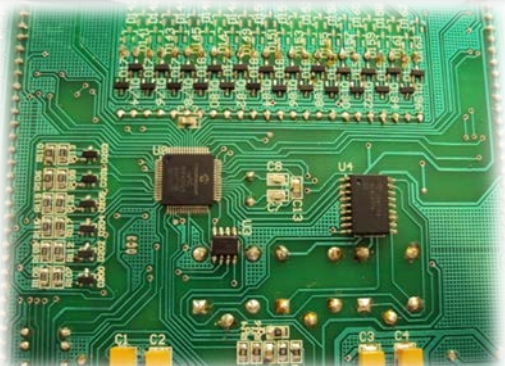
Technical activities

- ***Development of solutions for instrumentation***
  - ***Data acquisition and control of processes***
  - ***Microprocessed modules***
  - ***Automation of testing benches and experimental areas***
  - ***Our lab is being automated using our own solutions***







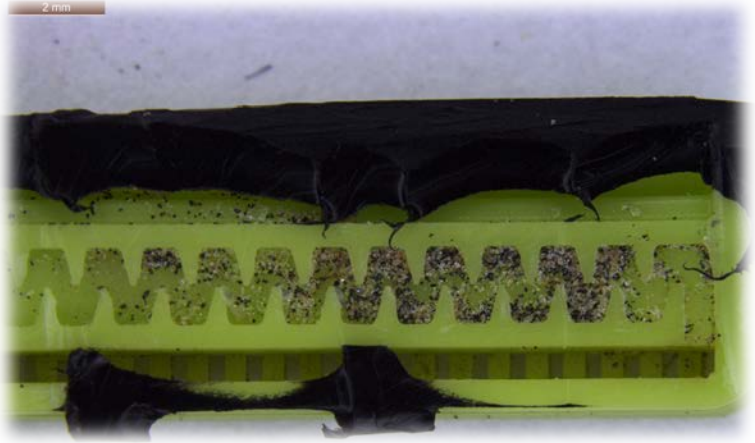
Research activities

- ***Clogging of drippers by solid particles***

- ***Main research subjects:***
  - Clogging processes within emitters
  - Methodologies for in-field identification of clogging problems
  - Testing protocols to evaluate sensitivity of emitters to clogging
  - Simulations based on Computational Fluid-Dynamics (CFD) for improvement of irrigation equipment
  - Support to improvement of ISO standards related to irrigation equipment - Support to the Committee ISO/TC 23/SC 18 – Irrigation and drainage equipment and systems

Research activities

- ***Experimental researches on clogging processes within drippers***



Research activities

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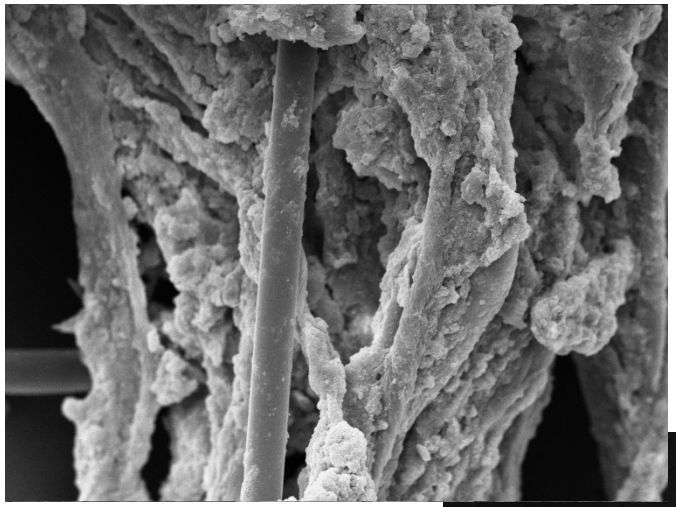

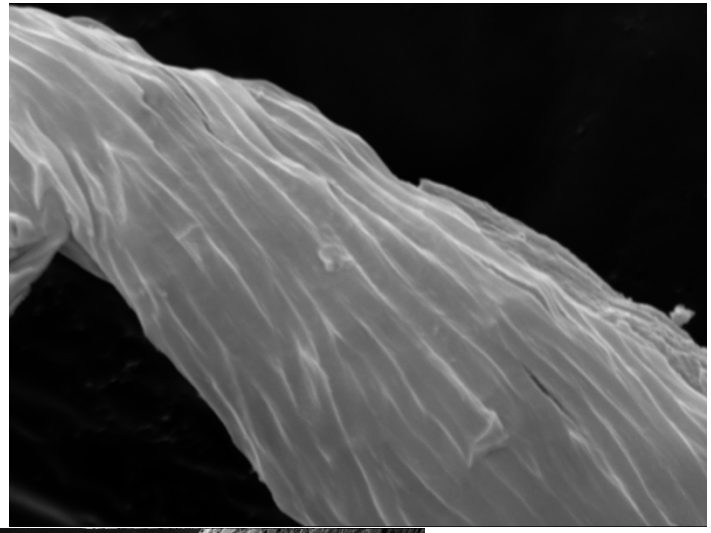

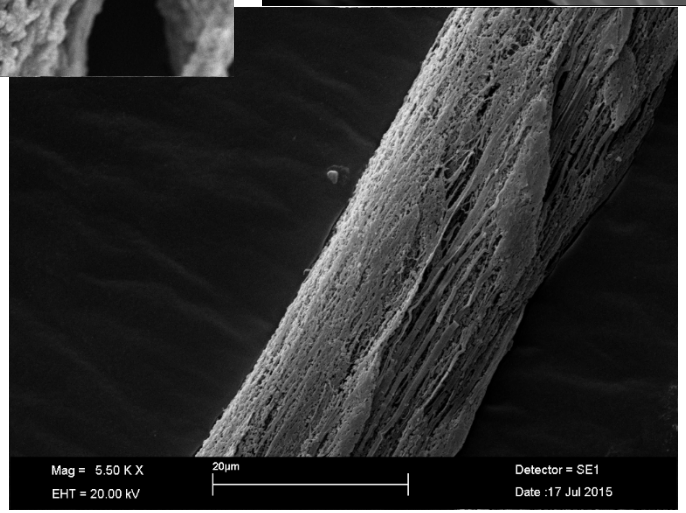

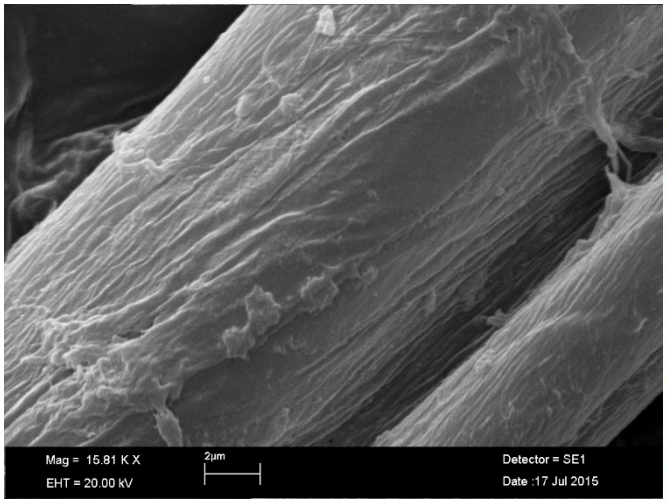

Research activities

- ***Facility for experimental researches on clogging processes***

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CONCLUSIONS

Perspectives / Conclusions

- ***Improvement of labs***
  - Automation process on going at LEMI/INCT-EI (Brazil) based on LERMI/IRSTEA facilities
  - The cross tests enabled to identify minor problems in facilities and methodologies of some of the labs

- ***LEMI's perspective about INITL***
  - We learned too much with IRSTEA (France)
  - Changes in our lab after my exchange period in France
  - Keep helping on cross tests and development of irrigation related laboratories
  - Support ISO standards development by performing the requested researches
  - Most important… Learn and Help

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Thank you!

Dr. Antonio Pires de Camargo

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