

# Proposal standards for Microfluidic contacts

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# Introduction

This presentation is the result of discussions during the European Microfluidic Consortium meetings in 2010/2011.

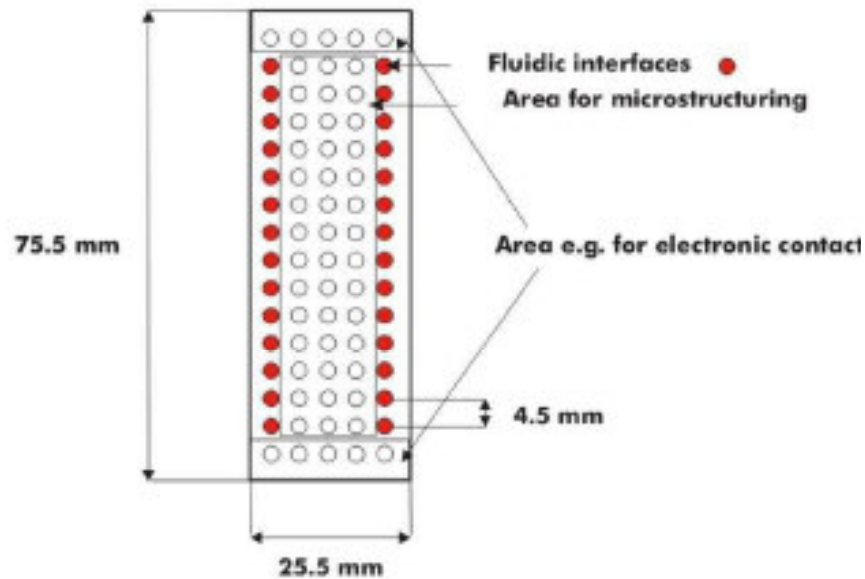
It gives an overview of commercially available microfluidic interconnects and sets out a program for standardization in microfluidic interconnects.

# Microfluidic interconnects

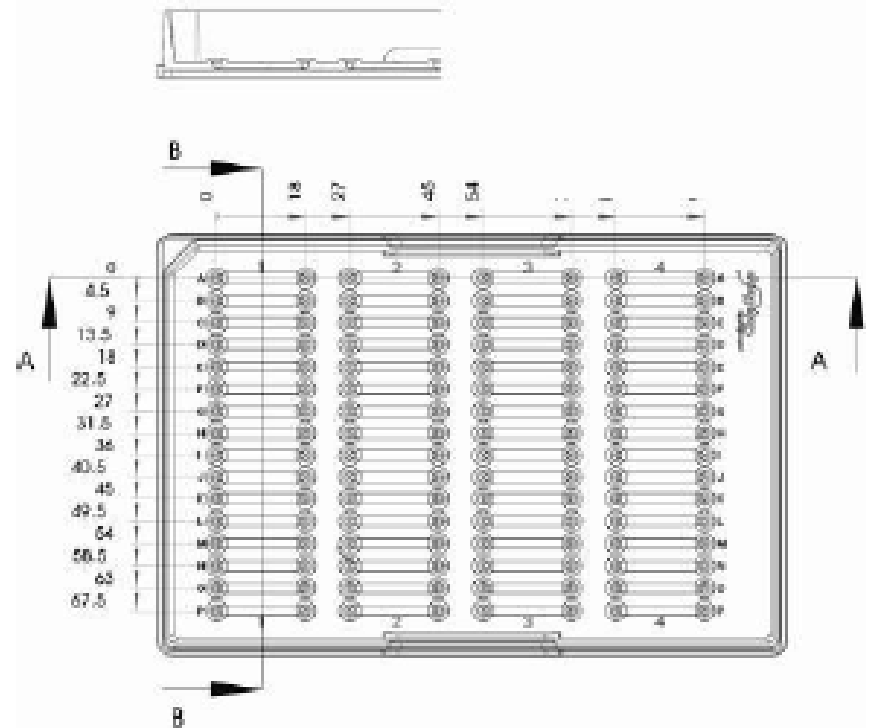
	Suitable for reusable chips	Suitable for multi connects	Suitable for higher P&T	Market status
Screw	+	--	+	Commercial available, but single port only
Plug	+	0	--	Commercial available, but single port only
Clamp	++	++	+	One supplier of multiport clamp
Needle	--	++	--	Used by one company only?
HOLDERS	++	++	++	Several suppliers

	Multi connect	Temperature	Pressure	Ease of connect	Supported by	
<a href="#">Upchurch</a>	No			--	<a href="#">Micralyne</a>	
Quick connect	Yes			++	<a href="#">SFC</a>	Patented
Mini Luer	No	<80 C	<2 bar	++	<a href="#">ThinXXS</a> , <a href="#">MFCS</a> , <a href="#">Translume</a>	
<a href="#">Swagelok</a>	No			--	<a href="#">Epigem</a>	
<a href="#">Dolomite</a>	Yes	<150 C	<30 bar	++	<a href="#">Dolomite</a>	
<a href="#">Micronit</a>	No	< 80 C	< 100 bar	+	<a href="#">Micronit</a>	
<a href="#">Cheminert</a>		<50 C	340 bar	?	<a href="#">Epigem</a>	
<a href="#">Omnifit</a>					<a href="#">Epigem</a> , <a href="#">Diba</a>	
<a href="#">Epigem</a>	Yes			+	<a href="#">Epigem</a>	Chip to chip
U of Cal	Yes	?	<336 kPa	++?		In development
Semi USA	Yes	?	?			In discussion

# De facto standards



microscopy slide platform, used in connection with mini luer connects



Microtiter plate format, based on layouts with 96, 384 or 1536 wells.

# Standard discussions

- Semi: proposal for multi port interconnect in discussion.
- Nessi: mainly about sampling for processcontrol.
- DIN standardization group on microreaction technology: produced vocabulary, now working on some characterization processes.
- European Microfluidic Consortium: multi port interconnects.

# Program for standardisation in microfluidics

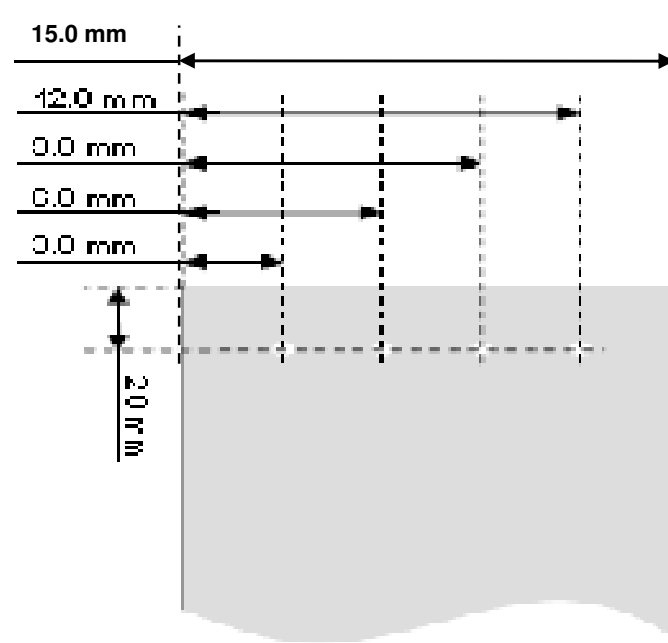
- Chip layout for clamped interconnects
  - > Concrete proposals under consideration
- Layout for microfluidic chip holder
  - > Expressions of interest put forward
- Low cost disposable interconnects
- Inclusion of electrical interconnects
- Inclusion of optical interconnect

# Chip layout for clamped interconnects (CI-001)

- This proposal builds on the agreement achieved at MF2.5 and describes possible layouts for fluidic holes on a chip
- The objective is to ensure
  - interchangeability of connectors
  - interchangeability of chips



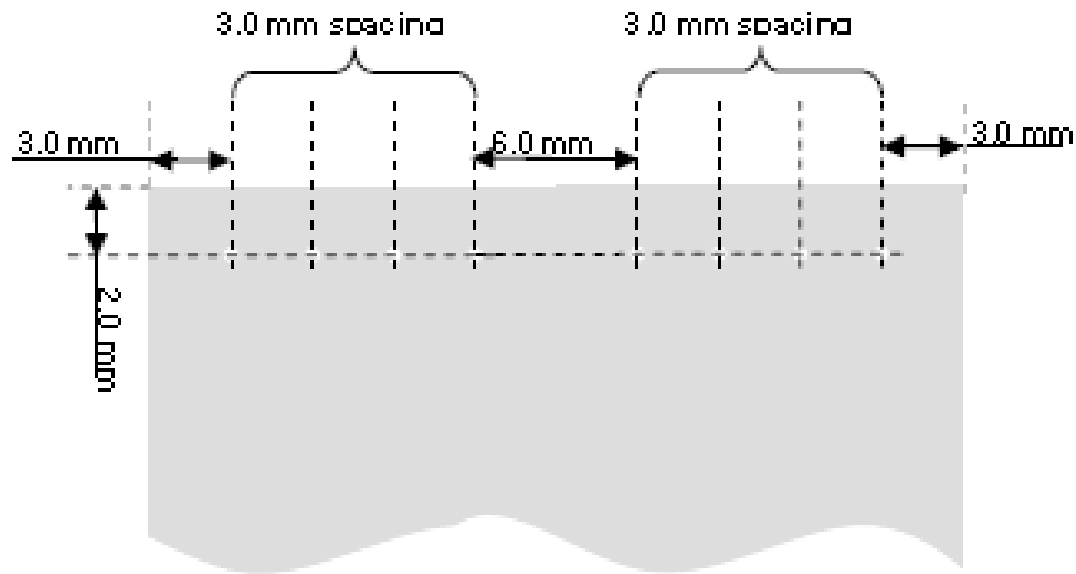
# Chip layout for 4 point connect (CI-001/4)



To be discussed:

- 1) Area reserved for clamping
- 2) Tolerances dimension holes
- 3) Tolerances all other dimensions including thickness chip

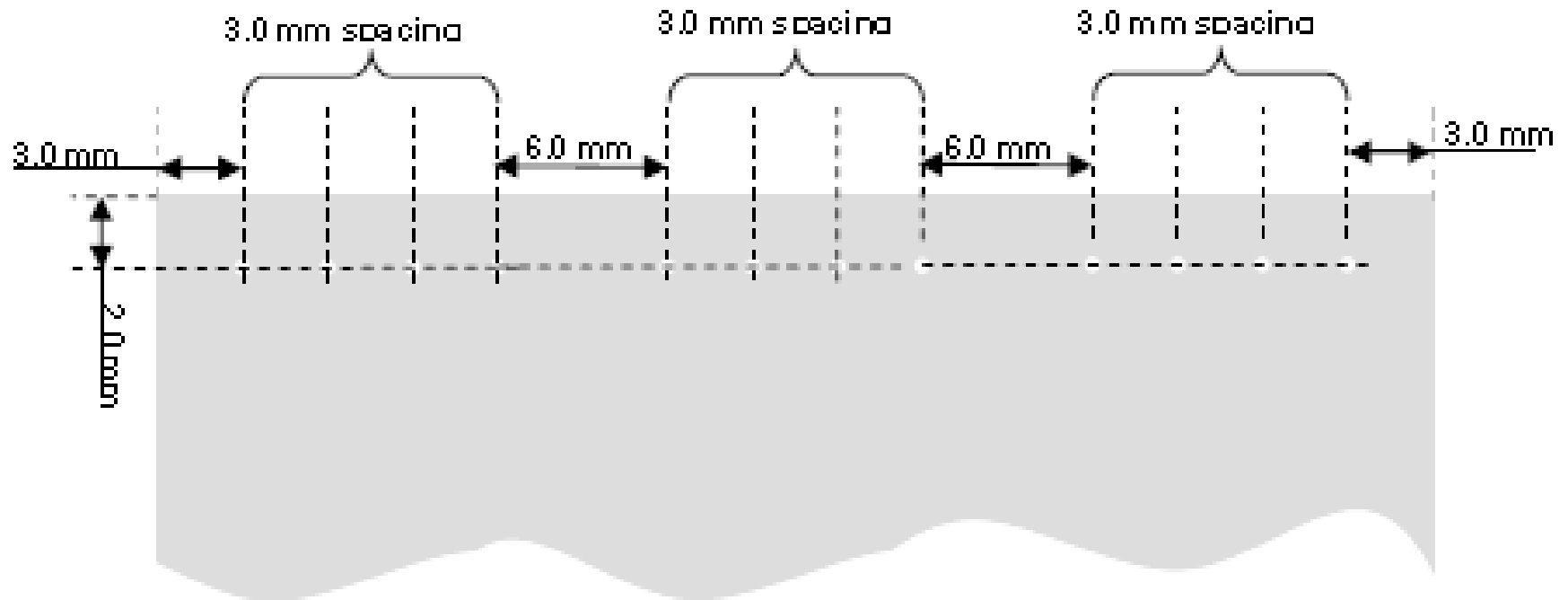
# Chip layout for 8 point connect (CI-001/8)



To be discussed:

- 1) Area reserved for clamping
- 2) Tolerances dimension holes
- 3) Tolerances all other dimensions including thickness chip

# Chip layout for 12 point connect (CI-001/12)

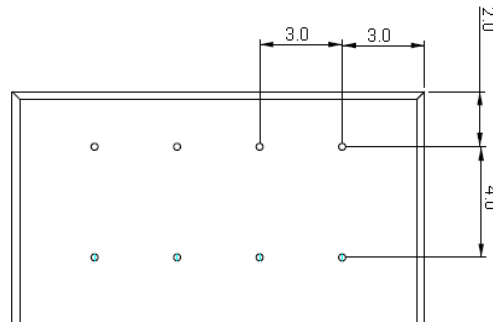


To be discussed:

- 1) Area reserved for clamping
- 2) Tolerances dimension holes
- 3) Tolerances all other dimensions including thickness chip

# Next step

- The presented proposal for standard chip layouts for high temperature and high pressure interconnects (CI-001/4, CI-001/8 and CI-001/12) should be extended with double and triple row versions: CI-002/8 and CI-003/12.



# CI-001 Open Questions

(When we are comfortable amongst ourselves with the drawings and what we are prepared to share)

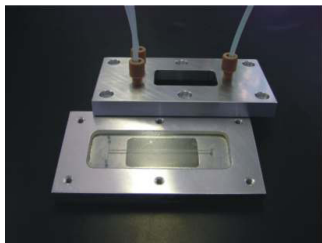
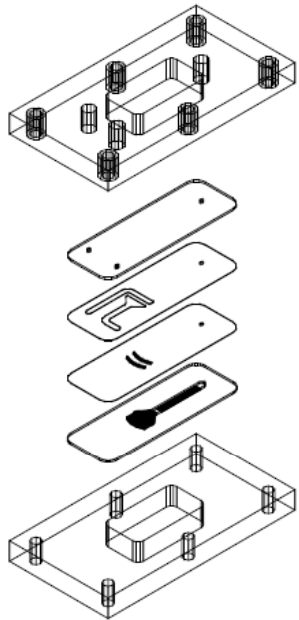
- How do we describe this arrangement to 3<sup>rd</sup> parties (short-code / Trade mark etc)?
- How do we encourage other component players to engage in this proposed standard? Publish Technical Paper? News items to talk up who is compatible?
- Is there a model here for encouraging groups of component players to step forward with other mutually compatible systems for 'approval'

# Next Step?

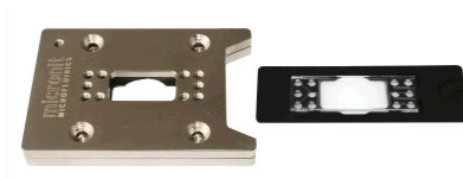
A microfluidic holder with standard outer dimensions for use in lab equipment (CH-001)

..too ambitious or worth further investigation?

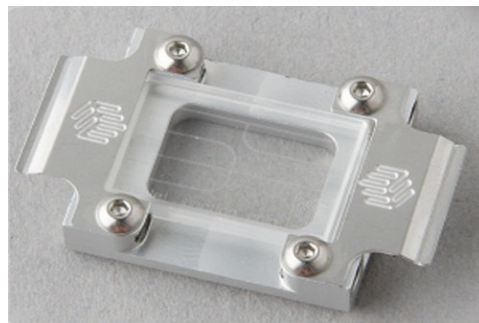
# Examples Chip holders



Mikroglas

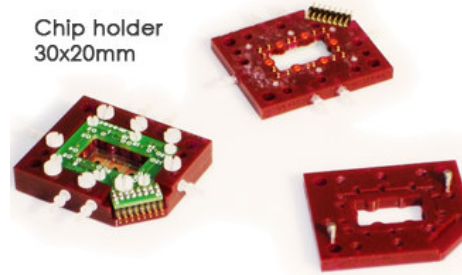


Micronit

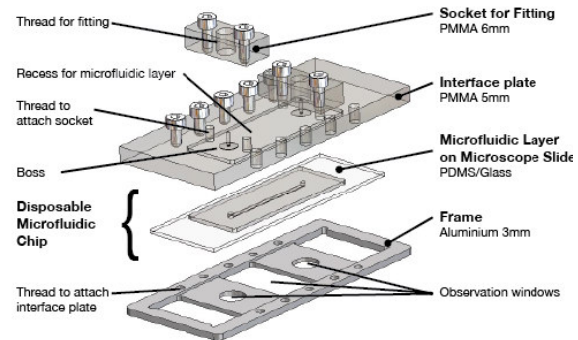


Dolomite

Chip holder  
30x20mm



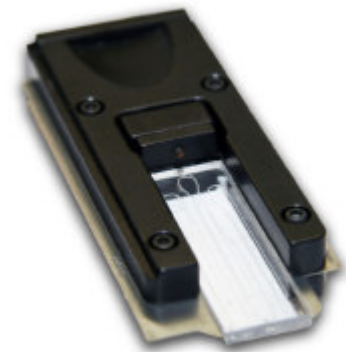
microLIQUID







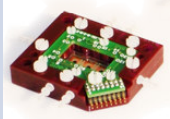

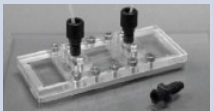

UCL



micrux



Eksigent

Company	Product		Chip layout	Specs	
<a href="#">Micronit</a>	Fluidic Connect 4515	Inserted chip, , 10 ports (also electrical contacts)	15*45 mm	Up to 100 bar/ 80 C	
<a href="#">Dolomite</a>	Mitos Chip Holder H	Used in connection with one or two clamped 4 port interconnects	22.5 x 15.0 x 4.0 mm	30 bar, -15 to 150 C	
	Mitos Chip Holder C	Used in connection with one clamped 4 port interconnect	7 x 15.0 x 4 mm	30 bar, -15 to 150 C	
<a href="#">Mikroglass</a>	Several holders to clamp chip stacks. Major application: (bio) chemical processing				
<a href="#">microLIQUID</a>		(see next pages), up to 6 fluidic and 16 electrical ports	Several chip layouts		
<a href="#">Micrux</a>	ENC-SUB-801	Integrated contacts on PCB and integrated wells, no fluidic ports	38x13 x0,75 mm		
UCL	(R&D activity)	2 ports	25*75 mm ?		
<a href="#">Microfluidic Chipshop</a>	MicCell	4 ports	25*75 mm or 22*22 mm		



# CH-001 Next Steps?

- Articulate the need / benefit (who are the potential winners? Will there be losers?)
- What type of player would drive this forward?
- Road Map
  - Consultation phase?
  - How much/little should we seek to standardize?
  - Alliances of leaders?
  - Proposals?
- Roll out

# Low cost disposable interconnects

- Those interconnects should:
  - have the simplicity of Luer interfaces,
  - be multi connect,
  - be self aligned,
  - having no dead volume, and
  - be low cost ( $\ll 1$  \$).
- The temperature regime is (near) room temperature and the pressure can be  $< 1$ bar or even negative pressure.

# Needle concept

## Abstract of WO 2004071660 (A1)

[Translate this text](#)

The invention relates to a method and a device for contacting a microfluid structure (12). Said device comprises a receptacle (16) for the microfluid structure (12) and a contact unit (18). According to one aspect of the invention, the contact unit (18) encompasses at least one hollow needle (22, 24, 26) which is embodied so as to break through a layer (14) of elastic material that is provided on the microfluid structure (12).

