

# USE OF ISOLATOR SYSTEMS FOR BIO-MEDICAL RESEARCH

51st Annual Biological Safety Conference  
October 19-22, 2008 - Reno, NV



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# ISOLATOR SYSTEMS FOR BIO-MEDICAL RESEARCH

## Introduction

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Research on critical viruses and toxic agents require high level of containment to protect the environment, the operators and the animals.

Furthermore, simultaneous studies on different viruses in the same facility command a flawless protection against cross-contamination.

Each transfer of animals and materials during quarantine, holding and procedures represents a high risk of contamination that ought to be addressed.

With common used methods, the processes safety relies mainly on scientists and operators' skills. The reproducibility throughout the research procedures depends on the proper observance of the protocols, with the related un-certainties.

This presentation proposes to explore one alternative method using techniques developed originally for handling critical materials in nuclear and pharmaceutical industries.

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## containment considerations

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The challenges facing the designer are:

- How to mitigate the contamination risks to protect personnel, the environment & the science
- How to maintain the highest possible productivity
- Achieve both of the statements above in a cost effective manner.

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## containment considerations

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- Especially when working with high consequence pathogens, The containment strategy consists on transferring the role of the containment barrier function from the room to the localized isolation technology, much like reversing the personnel protective equipment (PPE) from the operator on to the machine, which represents several benefits:
  - Though the lab is still classified a hazardous space, the lab can be constructed with less performance requirement, resulting in cost saving.
  - The lab classification being lower, the HVAC is downgraded with cost saving associated in both procurement and operation.
  - Expansion and process change are facilitated within a micro-environment with, once again, minimal involvement in the building.

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containment considerations

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VS.



Reversing the PPE from the operator on to the process

# ISOLATOR SYSTEMS

## Definition

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Isolator system consists on 3 key elements:

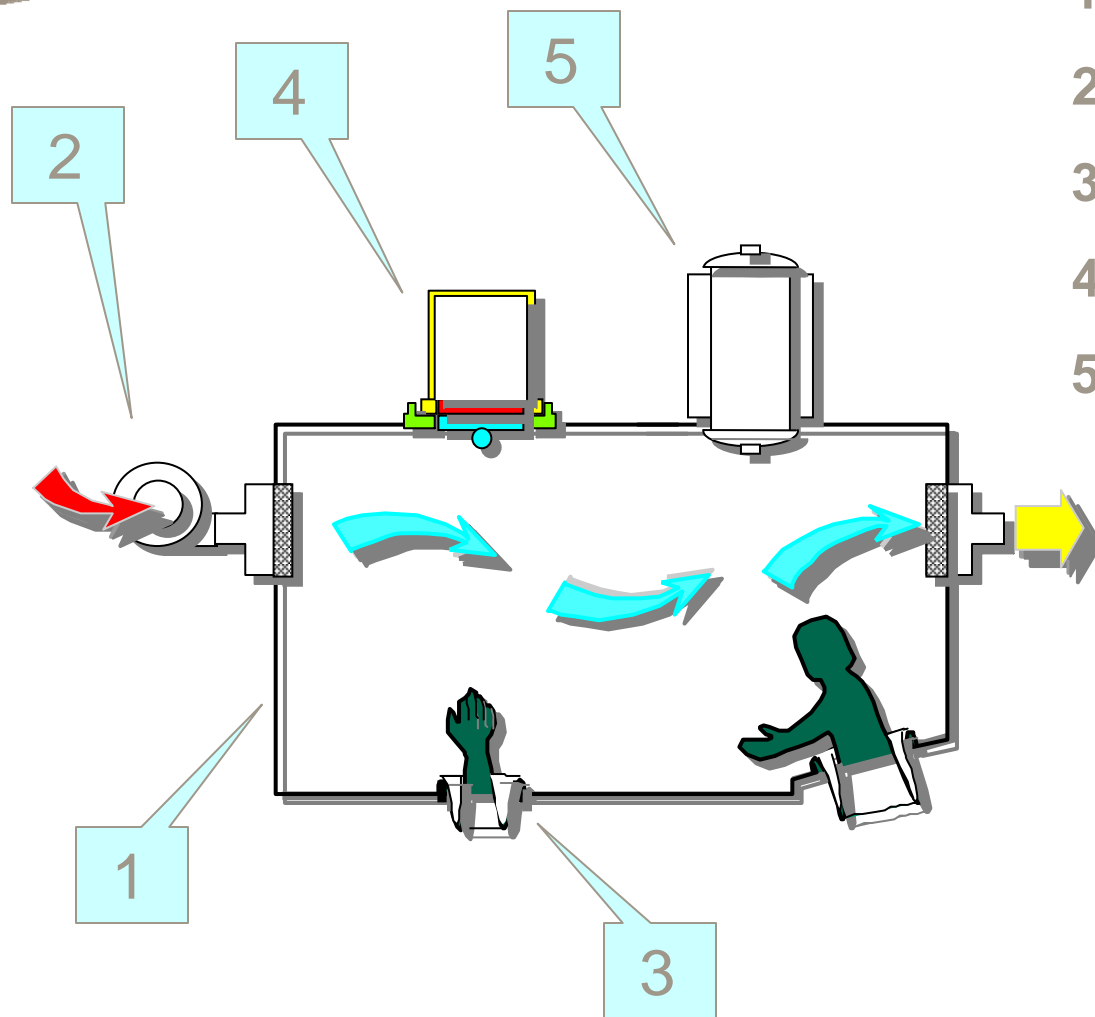
- Class III Bio-Safety Cabinet
- Rapid transfer Port
- Bio-decontamination system; before and/or after process

Rationale (What does it do?):

- ✓ Operator never in direct contact with the animal
- ✓ Total access to animal at anytime
- ✓ Controlled transfer of animal and material
- ✓ Reproducible bio-decontamination of the materials and of the environment where the animal is kept.

# ISOLATOR SYSTEMS

## The 5 Elements

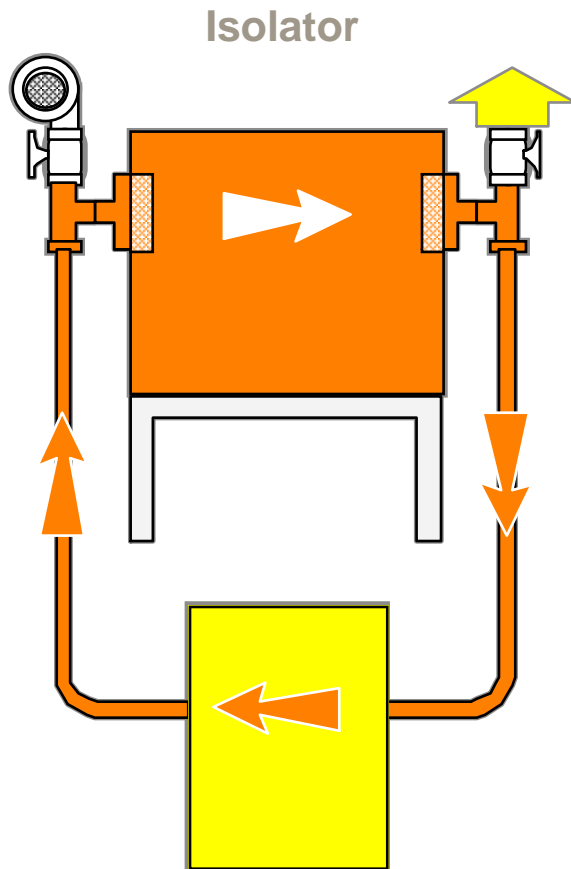


- 1- Shell
- 2- Environment
- 3- Ergonomic
- 4- Transfer
- 5- Process integration

# ISOLATOR SYSTEMS

## Reproducible bio-decontamination

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Decontamination agent generator





# ISOLATOR SYSTEMS

## Rapid Transfer Port

The RTP is a bi-directional transfer system permitting:

- Keeping the animal and material in the same environment at all time
- Cage/animal transfer from lab to lab
- Cage/animal transfer from isolator to isolator, or isolator to lab
- Diet/bedding management
- Holding or experimentation articles and tools transfer
- Waste removal and decontamination

The RTP is an efficient alternative to:

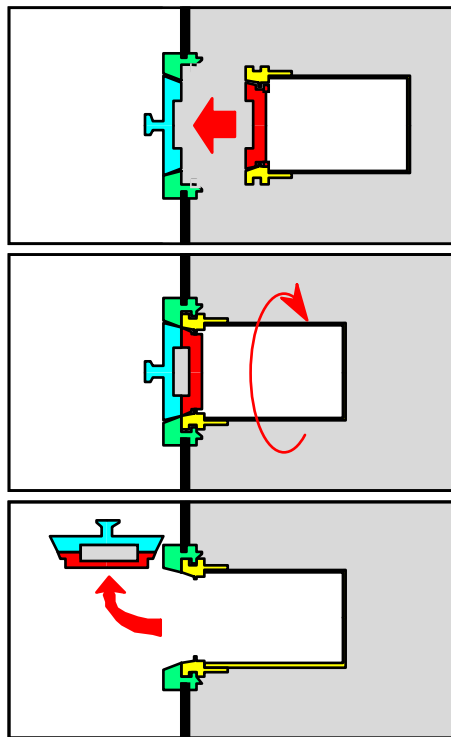
- Intermediate bio-decontamination between process.
- Class II BSC for diet/bedding management
- Dunk bath



# ISOLATOR SYSTEMS

## Rapid Transfer Port

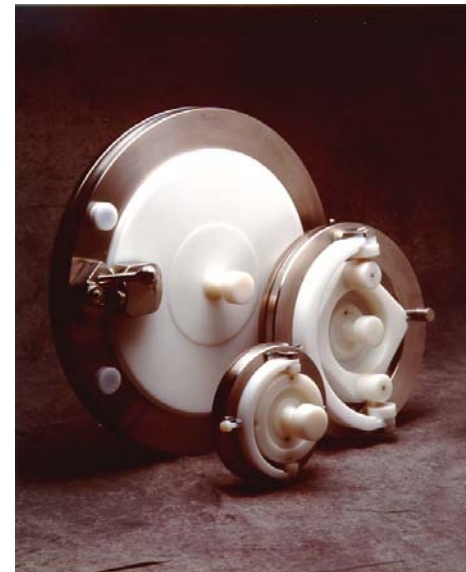
DPTE®



*1-Approach*

*2-Connection*

*3-Opening*





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# Rapid Transfer Port

## DPTE® - Main Types of Beta Flanges



**PE containers**



**Autoclavable  
containers**



**Transfer cart**

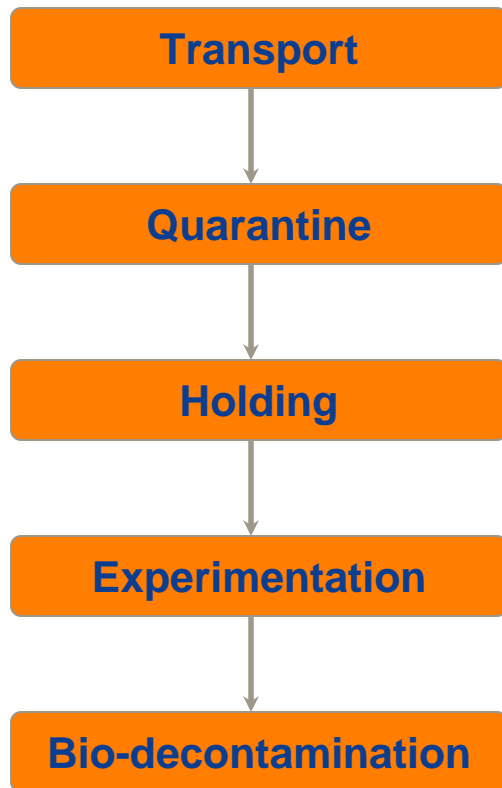


**Disposable bags**

# ISOLATOR SYSTEMS

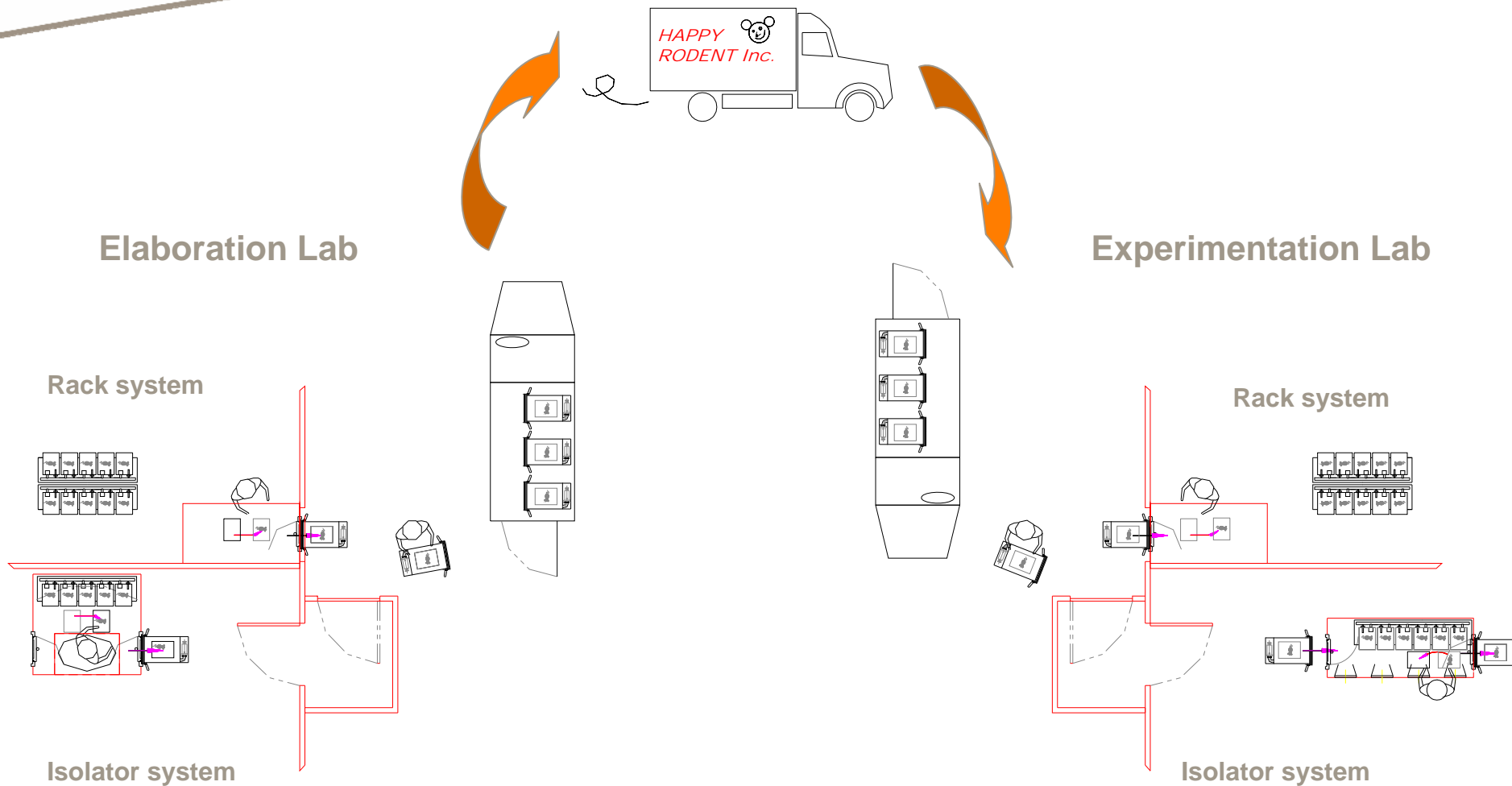
## Typical Research Lab Process

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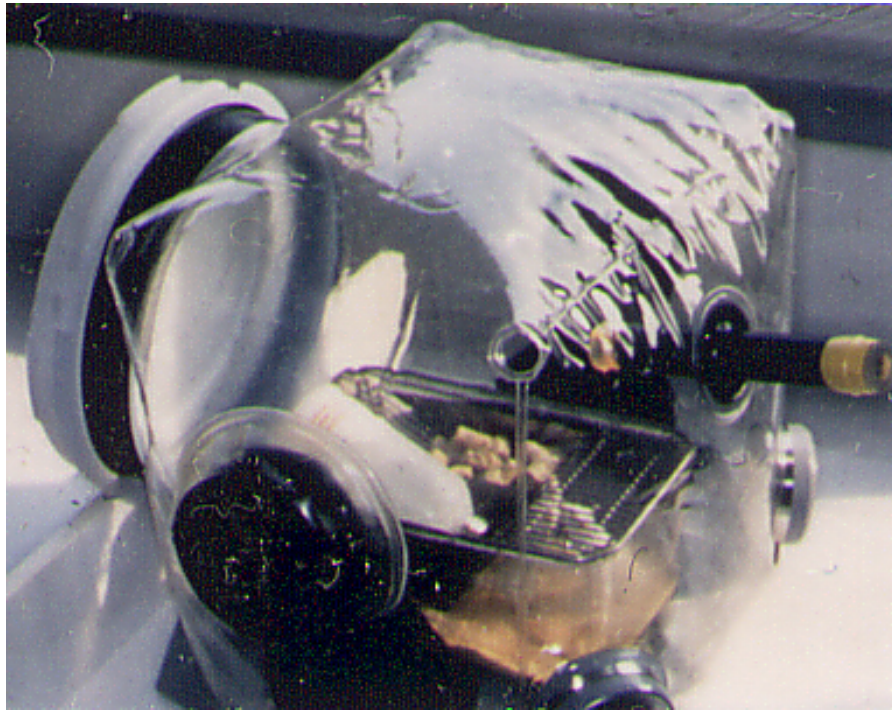
# TRANSPORT Process

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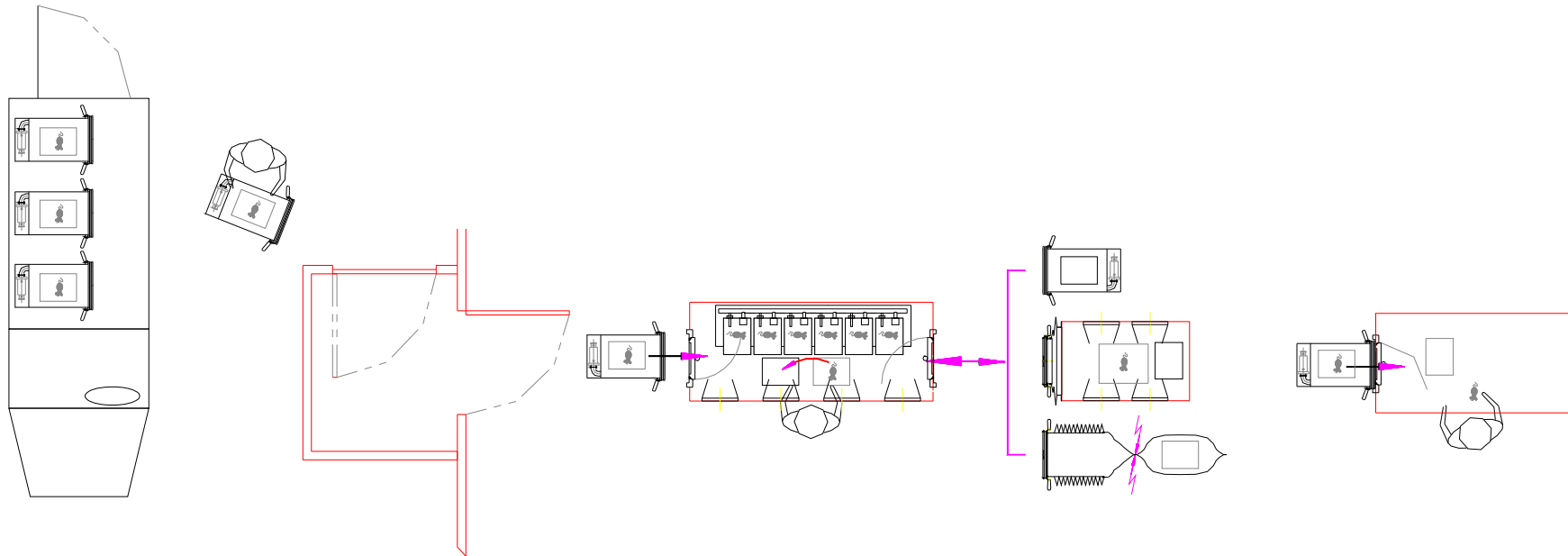
# TRANSPORT Process

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# QUARANTINE Process

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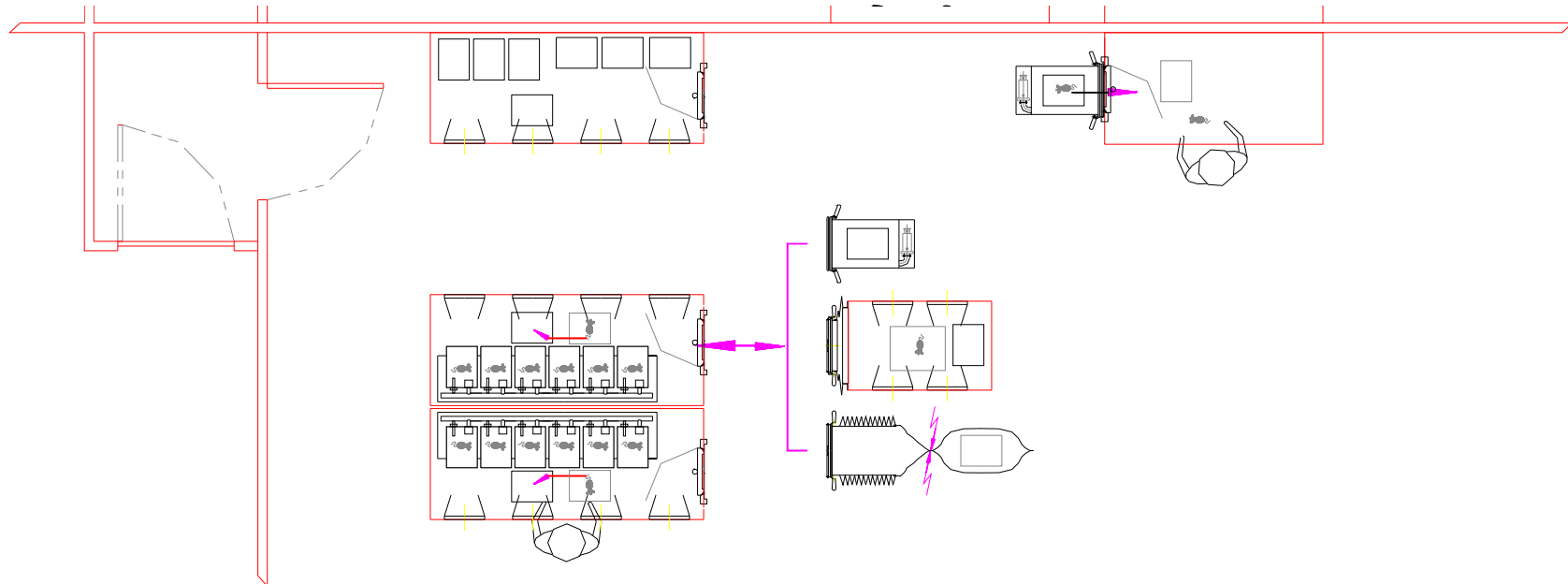
# QUARANTINE Process

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# HOLDING Process

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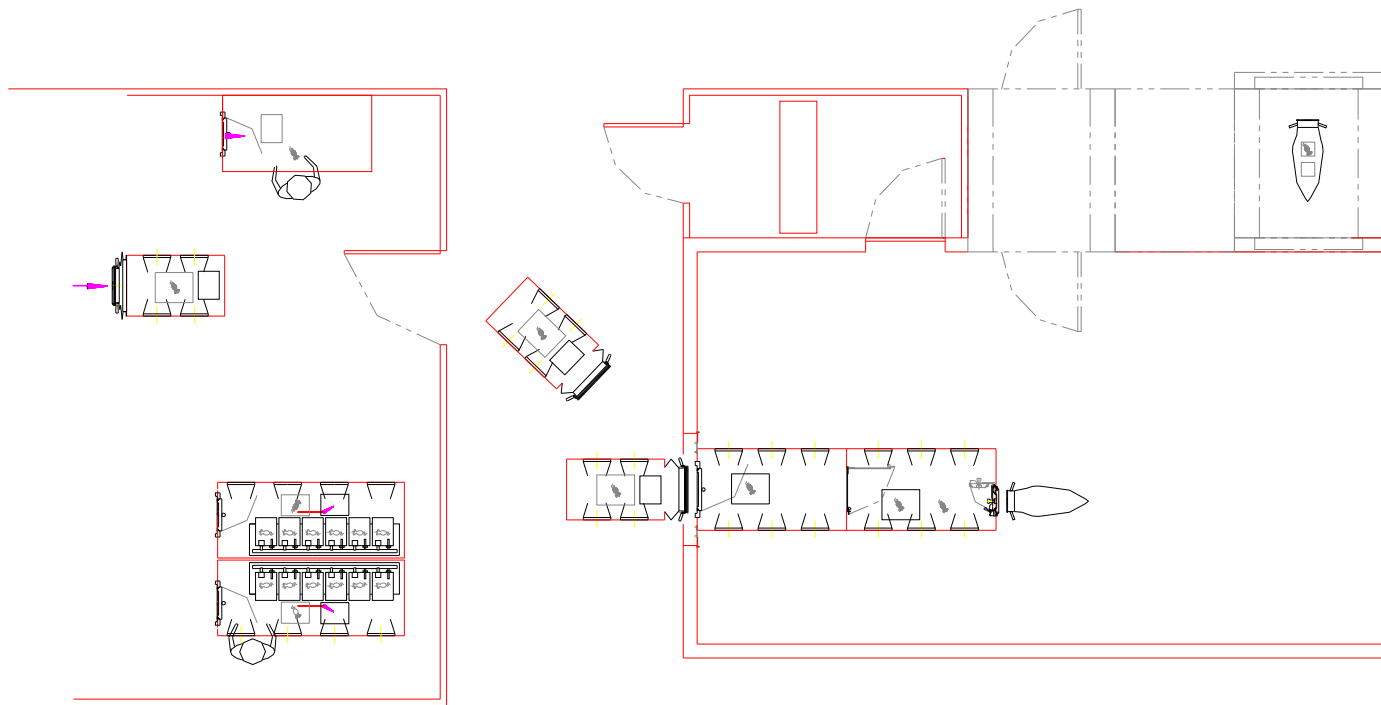
# HOLDING Process

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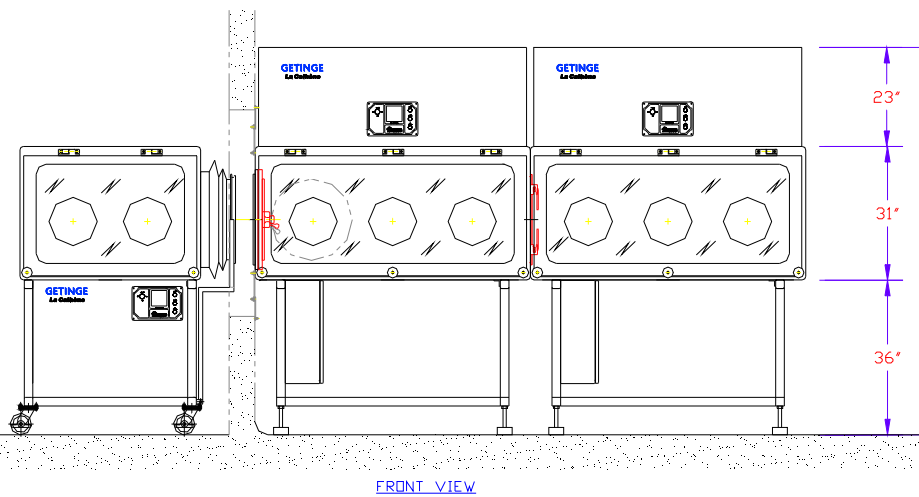
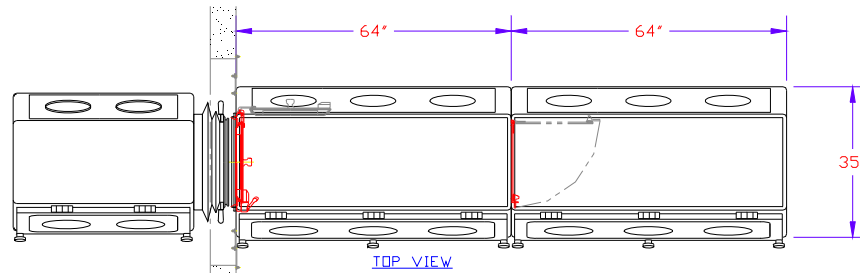
# EXPERIMENTATION Process

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# EXPERIMENTATION Process

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## Conclusion

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Although they could represent financial and training investment and require more space for equal population density, the isolator systems are an elegant and efficient solution for bio-medical experimentation, considering:

- Taking scientists and operator out of the containment scope
- Providing a permanent physical barrier between the process and the facility
- Improving containment
- Simplifying the facility design
- Providing flexibility on future process change and development
- Limiting significantly the facility operating cost

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**THANK YOU FOR YOUR ATTENTION  
ANY QUESTIONS?**