

Annual Meeting of the Division of Particles and Fields of the Mexican Physical Society

## Readiness and Potential of the bakelite RPC Lab at Ecocampus Valsequillo, BUAP

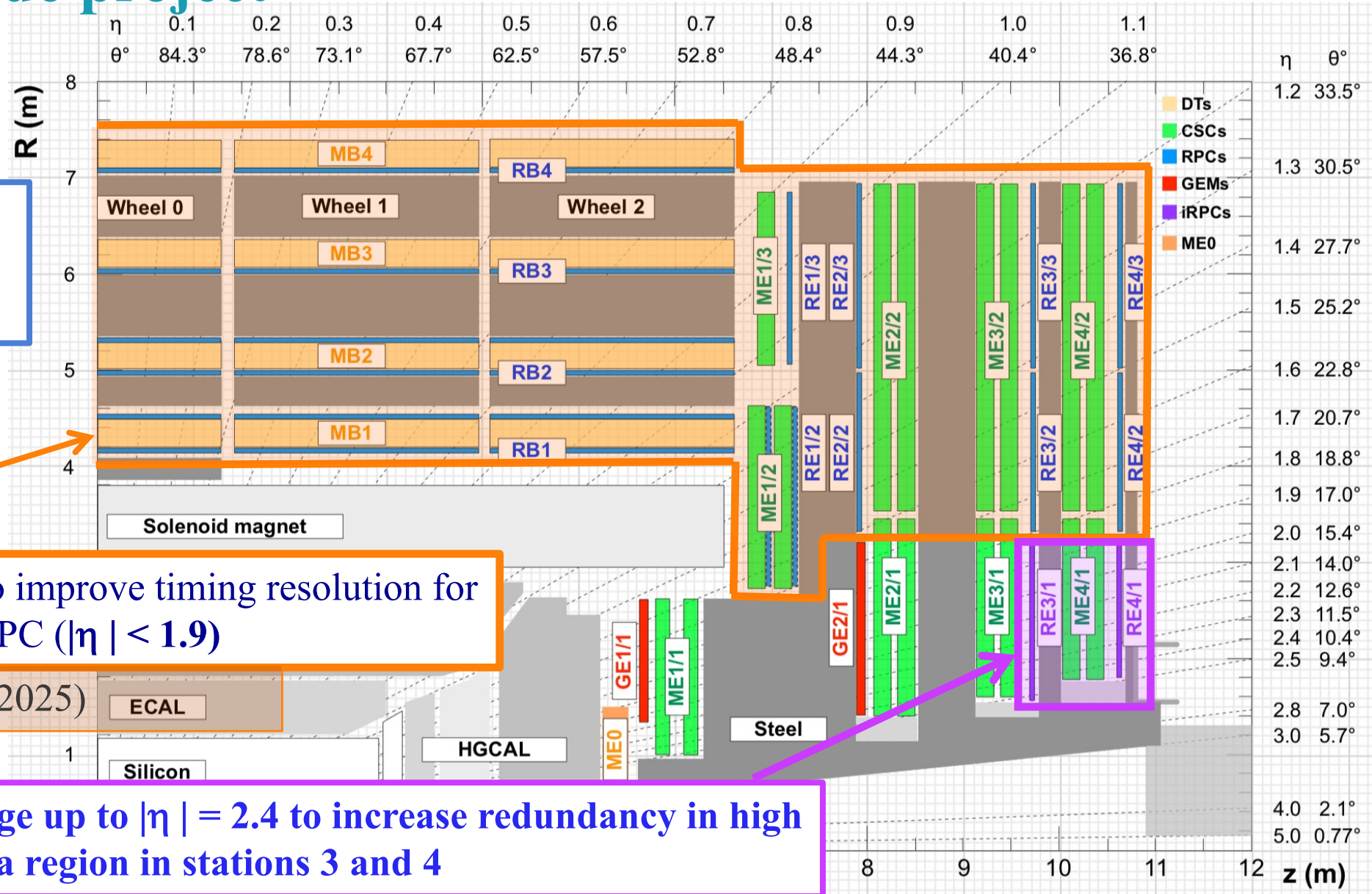
Isabel Pedraza, Humberto Salazar, Irais Bautista, Epifanio Ponce,  
Néstor Mancilla, Fernando Neri, Juan Cid, Carolina Aguilar

Universidad Autónoma de Puebla

June 12th, 2023



# The RPC upgrade project



Eco-gas studies to reduce the Global Warming Potential (GWP)

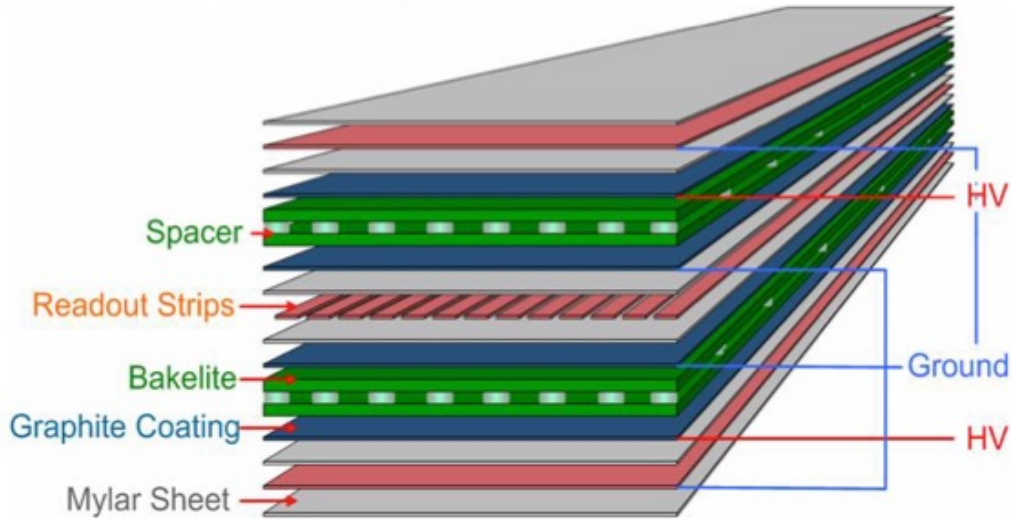
Upgrade of Link System to improve timing resolution for existing RPC ( $|\eta| < 1.9$ )

Installation in LS3 (2024-2025)

Extend the RPC coverage up to  $|\eta| = 2.4$  to increase redundancy in high eta region in stations 3 and 4

Installation in YETS 2022-23

# Aim to work with bakelite RPCs



## CMS RPCs

### ➤ Double-gap Chambers

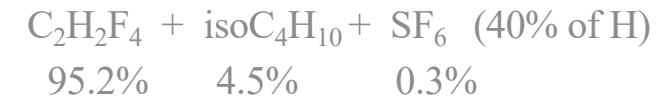
2 mm de ancho (gas)

### ➤ Bakelite resistivity

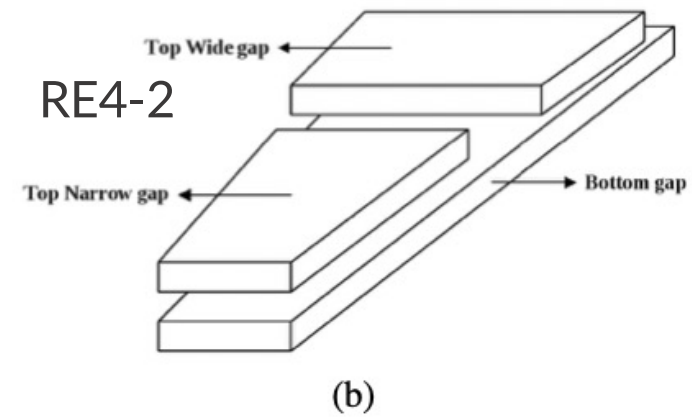
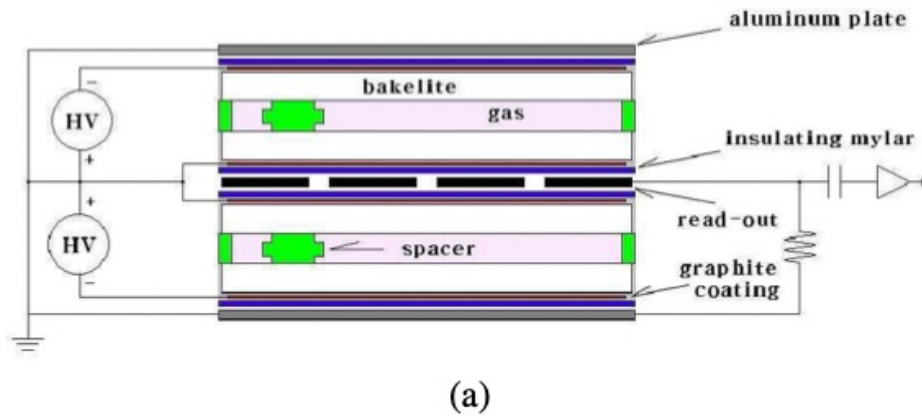
$$\rho = 1 - 6 \times 10^{10} \Omega\text{cm}$$

### ➤ Strip Width: 1 - 4 cm.

### ➤ Gas mixture:



### ➤ Operan en **modo avalancha**



Schematic representation of the double-layer layout of the endcap chambers (a). Configuration of the gas gaps of the endcap chambers (b).



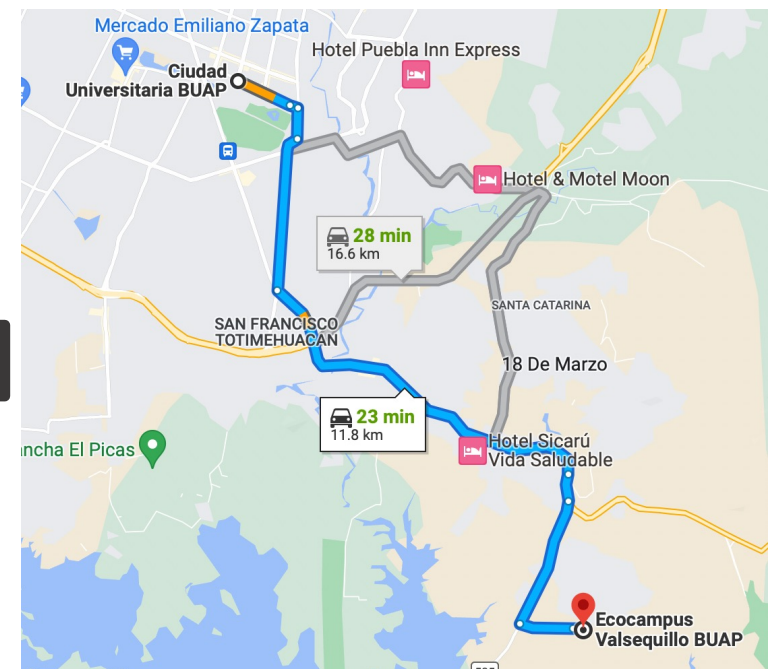
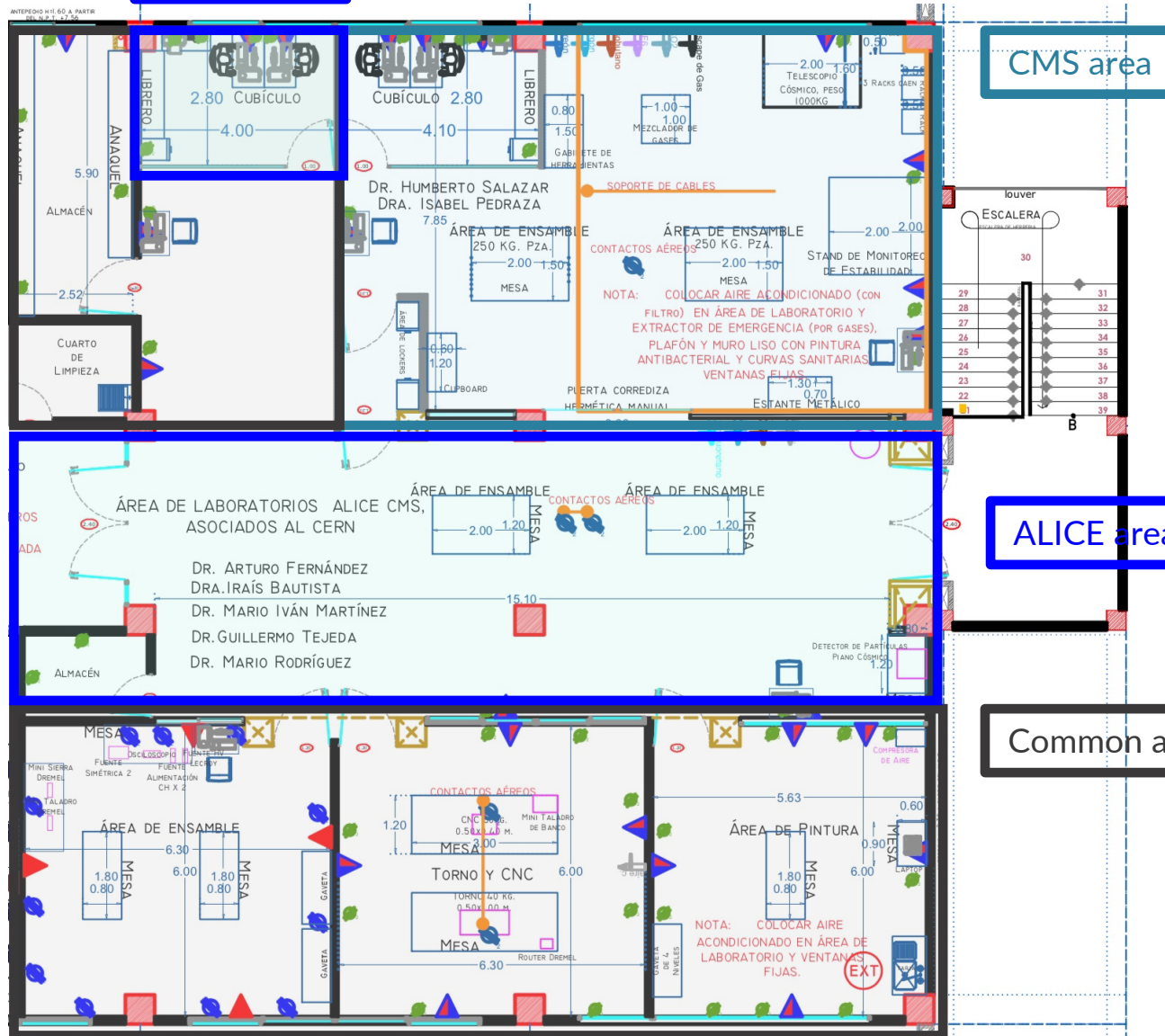
# RPCBUAP lab area

ALICE area

Total area :  $18.52 \times 22.6 = 418.5 \text{ m}^3$

CMS area

Common area







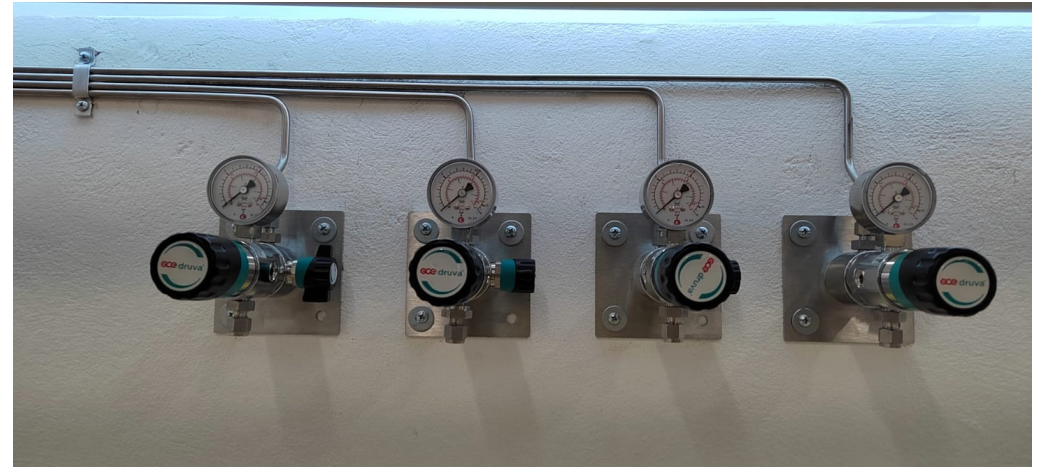
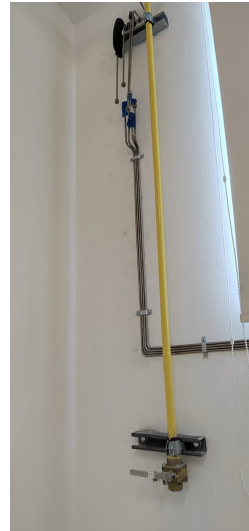


On the 3<sup>rd</sup> floor

AC installation



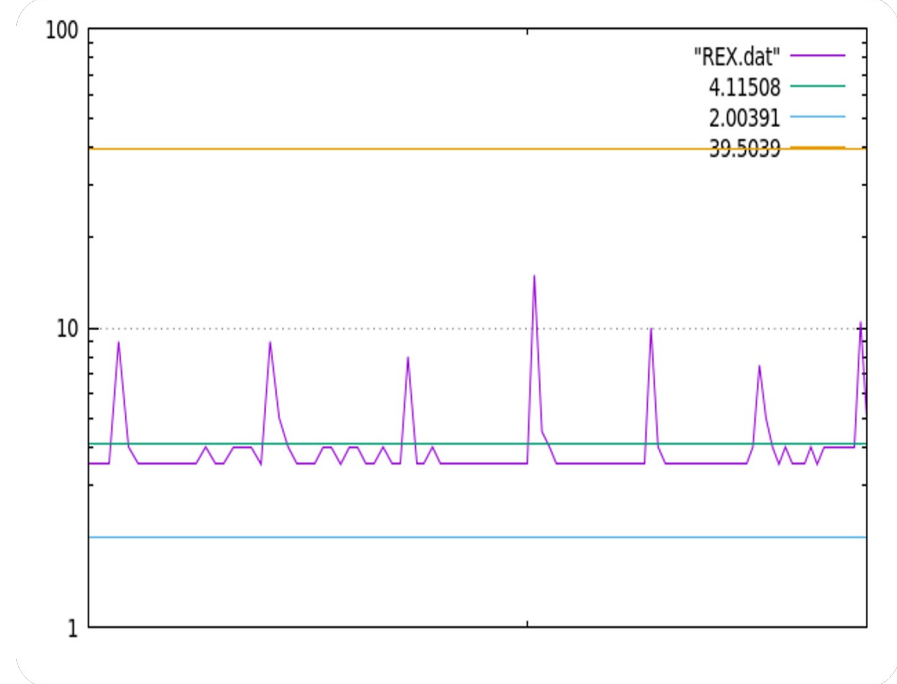
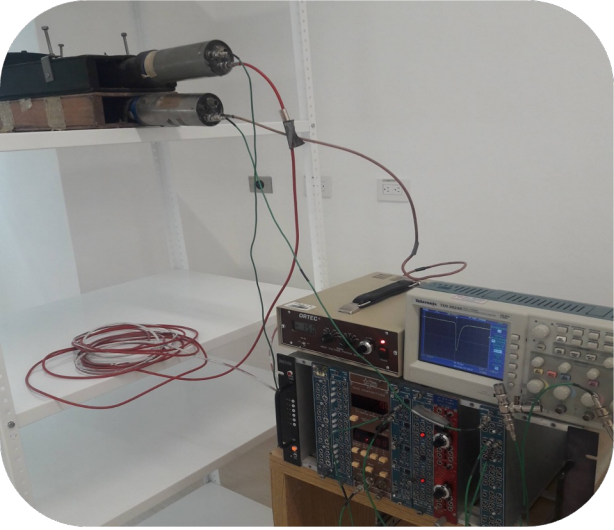
Gas installation ongoing





# Trigger

DAQ for the trigger System developed in BUAP





# Real size RE4-2 chambers from CERN in the RPC BUAP Lab







Ready to start the first tests!



Back up



# Successful first trial shipment to BUAP- PUEBLA



## Result Summary

<input checked="" type="checkbox"/> Waybill: 6537455805 Signed for by: ALEJANDRO NAVA <a href="#">Get Signature Proof of Delivery</a>	Monday, January 07, 2019 at 14:51 Origin Service Area: GENEVA - GENEVA 23 - SWITZERLAND Destination Service Area: PUEBLA - PUEBLA - MEXICO	<input type="checkbox"/> 1 Piece
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Monday, January 07, 2019	Location	Time	Piece
33 Delivered - Signed for by: ALEJANDRO NAVA	PUEBLA	14:51	<input type="checkbox"/> 1 Piece
32 With delivery courier	PUEBLA - MEXICO	08:43	<input type="checkbox"/> 1 Piece
Thursday, January 03, 2019	Location	Time	Piece
31 Delivery attempted - consignee premises closed	PUEBLA - MEXICO	16:20	<input type="checkbox"/> 1 Piece
30 With delivery courier	PUEBLA - MEXICO	16:19	<input type="checkbox"/> 1 Piece
29 Arrived at Delivery Facility in PUEBLA - MEXICO	PUEBLA - MEXICO	07:22	<input type="checkbox"/> 1 Piece
28 Departed Facility in MEXICO CITY HUB - MEXICO	MEXICO CITY HUB - MEXICO	05:48	<input type="checkbox"/> 1 Piece
27 Processed at MEXICO CITY HUB - MEXICO	MEXICO CITY HUB - MEXICO	05:22	<input type="checkbox"/> 1 Piece
26 Arrived at Sort Facility MEXICO CITY HUB - MEXICO	MEXICO CITY HUB - MEXICO	03:31	<input type="checkbox"/> 1 Piece
25 Departed Facility in HANGARES - MEXICO	HANGARES - MEXICO	02:15	<input type="checkbox"/> 1 Piece
24 Processed at HANGARES - MEXICO	HANGARES - MEXICO	01:17	<input type="checkbox"/> 1 Piece
Wednesday, January 02, 2019	Location	Time	Piece
23 Arrived at Sort Facility HANGARES - MEXICO	HANGARES - MEXICO	21:15	<input type="checkbox"/> 1 Piece
22 Departed Facility in MEXICO CITY - MEXICO	MEXICO CITY - MEXICO	17:21	<input type="checkbox"/> 1 Piece
21 Processed at MEXICO CITY - MEXICO	MEXICO CITY - MEXICO	17:21	<input type="checkbox"/> 1 Piece
20 Clearance processing complete at MEXICO CITY - MEXICO	MEXICO CITY - MEXICO	15:52	<input type="checkbox"/> 1 Piece
19 Customs status updated	MEXICO CITY - MEXICO	15:52	
Friday, December 28, 2018	Location	Time	Piece
18 Clearance event	MEXICO CITY - MEXICO	16:52	
Wednesday, December 26, 2018	Location	Time	Piece
17 Customs status updated	MEXICO CITY - MEXICO	22:42	
Sunday, December 23, 2018	Location	Time	Piece
16 Clearance event	MEXICO CITY - MEXICO	08:42	<input type="checkbox"/> 1 Piece
15 Processed for clearance at MEXICO CITY - MEXICO	MEXICO CITY - MEXICO	08:42	<input type="checkbox"/> 1 Piece
Friday, December 21, 2018	Location	Time	Piece
14 Departed Facility in MADRID - SPAIN	MADRID - SPAIN	11:13	<input type="checkbox"/> 1 Piece
13 Processed at MADRID - SPAIN	MADRID - SPAIN	08:11	<input type="checkbox"/> 1 Piece
12 Arrived at Sort Facility MADRID - SPAIN	MADRID - SPAIN	07:48	<input type="checkbox"/> 1 Piece
11 Departed Facility in LEIPZIG - GERMANY	LEIPZIG - GERMANY	04:19	<input type="checkbox"/> 1 Piece
Thursday, December 20, 2018	Location	Time	Piece
10 Processed at LEIPZIG - GERMANY	LEIPZIG - GERMANY	01:51	<input type="checkbox"/> 1 Piece
9 Arrived at Sort Facility LEIPZIG - GERMANY	LEIPZIG - GERMANY	01:16	<input type="checkbox"/> 1 Piece
Wednesday, December 19, 2018	Location	Time	Piece
8 Departed Facility in VITORIA - SPAIN	VITORIA - SPAIN	22:10	<input type="checkbox"/> 1 Piece
7 Processed at VITORIA - SPAIN	VITORIA - SPAIN	19:08	<input type="checkbox"/> 1 Piece
6 Departed Facility in LEIPZIG - GERMANY	LEIPZIG - GERMANY	03:14	<input type="checkbox"/> 1 Piece
5 Processed at LEIPZIG - GERMANY	LEIPZIG - GERMANY	00:22	<input type="checkbox"/> 1 Piece
Tuesday, December 18, 2018	Location	Time	Piece
4 Arrived at Sort Facility LEIPZIG - GERMANY	LEIPZIG - GERMANY	23:54	<input type="checkbox"/> 1 Piece
3 Departed Facility in GENEVA - SWITZERLAND	GENEVA - SWITZERLAND	22:11	<input type="checkbox"/> 1 Piece
2 Processed at GENEVA - SWITZERLAND	GENEVA - SWITZERLAND	22:06	<input type="checkbox"/> 1 Piece
1 Shipment picked up	GENEVA - SWITZERLAND	10:12	<input type="checkbox"/> 1 Piece



thickness iRPC chamber is 25 mm;  
 thicknesses honeycomb panel is 5 mm.

PP under work

**Double gap iRPC chamber**

