



## Informe de prueba

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ZHEJIANG PUTIAN VIVIENDA INTEGRADA CO., LTD.

Carretera Beiliu, Zona Industrial de Binhai, Shaoxing, China

Nombre de muestra: PARED PARA CASA PREFABRICADA - SPDN.º de referencia SGS: IN-SH-CP-5627-23484

La(s) muestra(s) anterior(es) fue(ron) enviada(s) e identificada(s) en nombre del cliente. SGS no es responsable de

la autenticidad, integridad y resultados de los datos e información y/o la validez de la conclusión derivada

Los resultados de las pruebas se aplican a la muestra tal como se recibió.

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Prueba solicitada:

AS 1530.4:2014 Métodos para ensayos de fuego en materiales, componentes y estructuras de construcción Parte 4:

Ensayos de resistencia al fuego de elementos constructivos, Sección 3 Muros - Elementos separadores verticales.

Resultados de la prueba: -- Ver hoja adjunta --Conclusión: Los criterios de desempeño que alcanzó el ejemplar fueron:

Integridad, (E)	Aislamiento, (I)	Duración de la prueba
60 minutos	27 minutos	61 minutos

Periodo de prueba:

Fecha de recepción de la muestra: 23 de noviembre de 2023

Fecha de realización de la prueba : 23 DE NOVIEMBRE DE 2023 AL 29 DE NOVIEMBRE DE 2023

Firmado por y en nombre de

Sucursal de Anji de SGS-CSTC Standards Technical Services Co., Ltd.

Echo Li

Firmante aprobado

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### 1. Introducción

Para determinar el rendimiento de resistencia al fuego de una muestra de pared cuando se prueba de acuerdo con la sección 3 de AS 1530.4:2014: Métodos para ensayos de fuego en materiales, componentes y estructuras de construcción Parte 4: Ensayos de resistencia al fuego de elementos de construcción.

El lado especificado de la muestra presentada se expuso a una curva de tiempo-temperatura según lo dictado por la cláusula 2.11 de AS 1530.4 durante un período de 60 minutos en condiciones sin carga.

La prueba se realizó el 29 de noviembre de 2023.

### 2. Muestra de prueba

La muestra se recibió el 23 de noviembre de 2023 y se almacenó en el laboratorio hasta el 29 de noviembre de 2023. Durante Durante el almacenamiento de la muestra, se midieron y registraron la temperatura y la humedad del laboratorio.

Estando dentro de un rango de 12 °C a 19 °C y de 42 % a 67 %, respectivamente. La muestra se instaló en

29 de noviembre de 2023, y la prueba se realizó el 29 de noviembre de 2023.

Las dimensiones totales de la muestra fueron 1000 mm de largo por 1000 mm de ancho y 85 mm de espesor. La placa frontal...

Era de bambú y tablero de fibra de madera, la placa posterior era un rollo de chapa de acero coloreado, el material del núcleo era PU Tablero de espuma. La estructura principal de la muestra era un tablero de fibra de bambú y madera de 9 mm de espesor + poliuretano. Tablero de espuma + rollo de chapa de acero coloreada de 0,5 mm de espesor de la cara expuesta, el espesor total fue de 85 mm.

Para más detalles, consulte la Figura 1, el dibujo estructural de la muestra proporcionado por el cliente.

### 3. Equipos de instrumentación y medición

La instrumentación se proporciona de acuerdo con los requisitos de la Norma.

El horno tenía unas dimensiones interiores de 3,2 m de alto por 3,2 m de ancho por 1,0 m de profundidad y diecisésis termopares.

Distribuidos sobre un plano a 100 mm de la superficie de la construcción de prueba, se proporcionaron para monitorear la temperatura de la atmósfera del horno.

Se instalaron sensores de presión dentro del horno para monitorear la presión atmosférica del horno.

Se proporcionaron ocho termopares para monitorear la temperatura de la superficie no expuesta de la muestra,

La disposición de los termopares en la superficie no expuesta de la muestra se muestra en la Figura 2.

Se disponía de un termopar móvil para medir las temperaturas en la superficie no expuesta de la muestra.

cualquier posición que pueda parecer más caliente que las temperaturas indicadas por los termopares fijos.

Se disponía de calibres de separación y almohadillas de algodón para evaluar la integridad de la muestra.



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## 4. Procedimiento de prueba

La prueba se realizó de acuerdo con el procedimiento especificado en AS 1530.4:2014, sección 3.

El horno se controló de manera que la temperatura media del horno, la desviación de la temperatura media del horno

La temperatura y la uniformidad de la distribución de la temperatura cumplieron con el requisito de AS 1530.4:2014.

Se utilizaron diecisésis termopares de horno para determinar la temperatura media del horno.

La presión del horno se controló para cumplir con los requisitos de la norma AS 1530.4:2014, cláusula 2.11.3. La presión del horno se supervisará y controlará. 5 minutos después del inicio de la prueba, el horno...

La presión será de  $0 \pm 5$  Pa de la presión nominal especificada para el elemento particular bajo prueba; desde 10 min en adelante, será de  $0 \pm 3$  Pa de la presión nominal especificada para el elemento particular bajo prueba a una altura de aproximadamente 500 mm por encima del fondo de la muestra.

Se utilizaron discos de algodón y calibradores de separación para determinar la integridad. La llama sostenida en la parte no expuesta...

También se revisó la superficie para determinar su integridad. Se utilizaron los termopares especificados en la cláusula 2.2.3.1. para determinar el aislamiento de la muestra.

Durante la prueba, las temperaturas y presiones se monitorearon continuamente y se registraron con una precisión de un minuto. intervalos.

## 5. Datos e información de prueba

## 1) La temperatura media del horno junto con una comparación con la temperatura/tiempo especificado

La relación especificada en la Norma se muestra en la Figura 3. La temperatura promedio registrada dentro

El horno se muestra en la Tabla 1.

## 2) El aumento de temperatura promedio y máximo en la superficie no expuesta de la muestra se mostró en

Figura 4. Las temperaturas individuales registradas en la superficie no expuesta de la muestra se muestran en

Tabla 2.

## 3) Las presiones del horno relativas a la atmósfera del laboratorio a 500 mm por encima del fondo de la muestra.

Se muestra en la Figura 5.

## 4) Un resumen de las observaciones realizadas sobre el comportamiento general del ejemplar se presentó en la Tabla 3.

## 5) La temperatura ambiente en las proximidades de la muestra de prueba era de 15 °C al inicio de la prueba con

variación de +1 °C durante la prueba.



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## 6. Criterios de desempeño (AS 1530.4:2014, Cláusulas 2.13.2 y 2.13.3)

## Integridad

Se considerará que se ha producido una falla en relación con la integridad cuando se evalúe de la siguiente manera:

## 1) Disco de algodón

La almohadilla de algodón en su marco se aplicará contra la superficie de la muestra de prueba sobre la grieta, fisura o en llamas durante el examen, hasta la ignición del disco de algodón (definido como brillante o en llamas) o durante un máximo de

Años 30.

## 2) Calibres de separación

Los medidores de espacio se utilizan para evaluar el tamaño de cualquier abertura en la superficie de la muestra de prueba en intervalos de tiempo, que se determinará por la tasa aparente de deterioro de la muestra.

a) Se puede pasar un calibre de 6 mm a través de la muestra de modo que el calibre sobresalga hacia el interior del horno.

y el calibre se puede mover una distancia de 150 mm a lo largo del espacio; o

b) Se puede pasar un calibre de 25 mm a través de la muestra de modo que el calibre sobresalga hacia el interior del horno.

## 3) Flaming

La permanencia de llamas en la superficie no expuesta durante 10 segundos o más constituye una falla de integridad.

## Aislamiento

Se considerará que se ha producido una falla en relación con el aislamiento cuando se mida mediante termopares en el superficie no expuesta, se considera que la muestra ha fallado cuando:

1) la temperatura media de la cara no expuesta de la muestra de prueba excede la temperatura inicial en

más de 140 K; o

2) la temperatura en cualquier punto de la cara no expuesta de la muestra de prueba excede la inicial

la temperatura en más de 180 K; o

3) Cuando se produce un fallo de integridad.

## 7. Conclusión

Durante el período de calentamiento de 60 minutos, no hubo llamas ni aberturas en la cara no expuesta del muestra, el calibre de espacio de Ø6 mm no pudo penetrar la muestra, la almohadilla de algodón no se encendió durante el Prueba de almohadilla de algodón, la integridad de la muestra alcanzó los 60 min; al final de los 28 min, el aumento de temperatura promedio en la superficie no expuesta de la muestra fue de 180,5 K y el aumento de temperatura máximo fue de 207,3K, el aislamiento de la muestra logró 27min.

El ejemplar cumplió con los requisitos de rendimiento para el siguiente período:

Integridad, (E)	Aislamiento, (I)	Duración de la prueba
60 minutos	27 minutos	61 minutos



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## 8. Declaración

LOS RESULTADOS DE ESTAS PRUEBAS DE FUEGO PUEDEN USARSE PARA EVALUAR DIRECTAMENTE EL RIESGO DE INCENDIO, PERO DEBE RECONOCERSE QUE UN SOLO MÉTODO DE PRUEBA NO PROPORCIONARÁ UNA EVALUACIÓN COMPLETA DE PELIGRO DE INCENDIO BAJO TODAS LAS CONDICIONES DE INCENDIO.

ESTE INFORME DETALLA LOS MÉTODOS DE CONSTRUCCIÓN, LAS CONDICIONES DE PRUEBA Y LOS RESULTADOS OBTENIDO CUANDO SE PROBÓ EL ELEMENTO ESPECÍFICO DE CONSTRUCCIÓN DESCrito AQUÍ SIGUIENDO EL PROCEDIMIENTO DESCrito EN AS 1530.4. CUALQUIER VARIACIÓN SIGNIFICATIVA CON RESPECTO AL TAMAÑO, DETALLES DE CONSTRUCCIÓN, CARGAS, TENSIONES, CONDICIONES DE BORDE O EXTREMO, DISTINTO DE LO PERMITIDO EN EL CAMPO DE APLICACIÓN DIRECTA EN LA PRUEBA CORRESPONDIENTE MÉTODO, NO ESTÁ CUBIERTO EN ESTE INFORME.

DEBIDO A LA NATURALEZA DE LAS PRUEBAS DE RESISTENCIA AL FUEGO Y LA CONSECUENTE DIFICULTAD EN CUANTIFICAR LA INCERTIDUMBRE DE LA MEDICIÓN DE LA RESISTENCIA AL FUEGO, NO ES POSIBLE PARA PROPORCIONAR UN GRADO INDICADO DE PRECISIÓN DEL RESULTADO.

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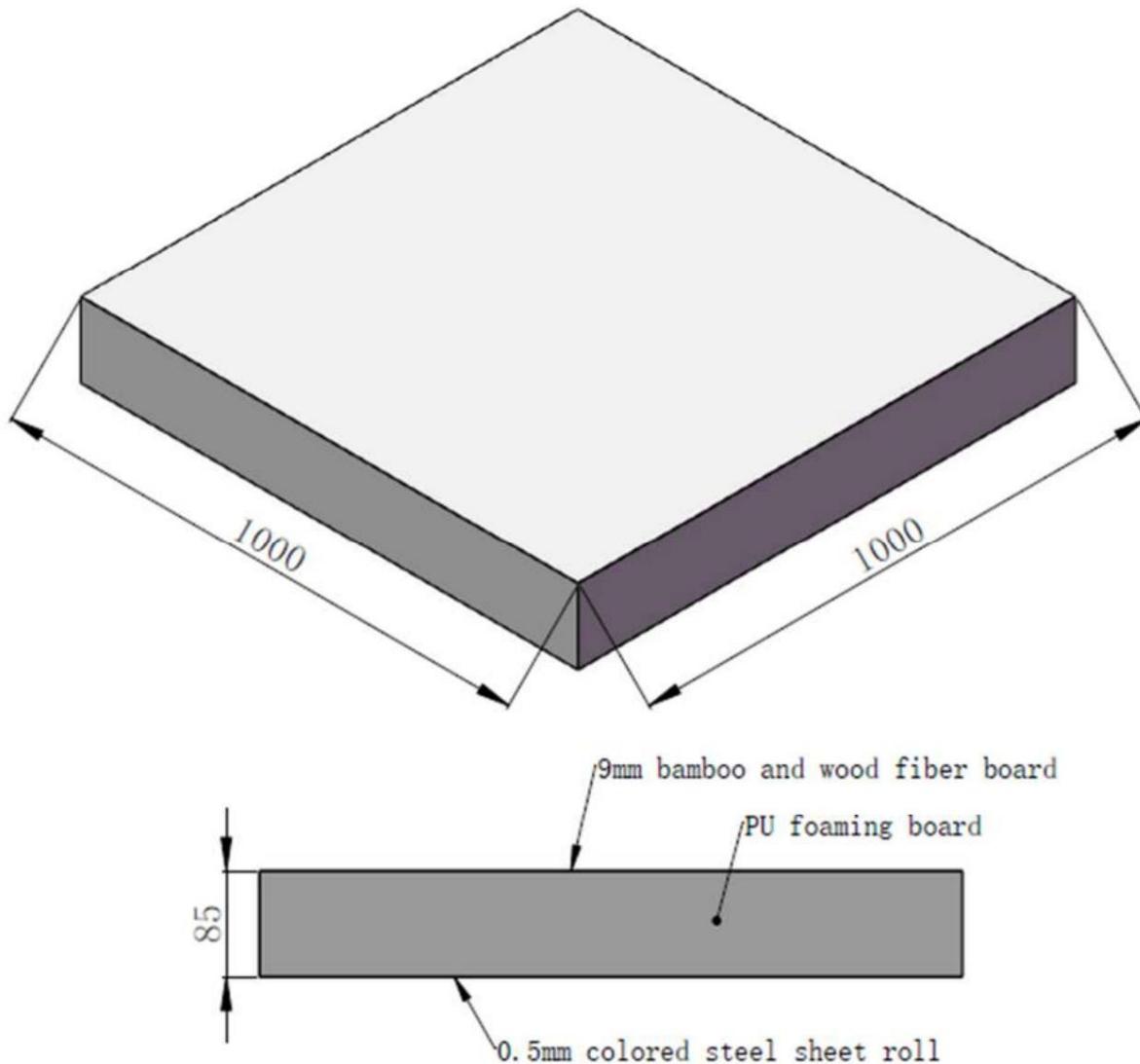


Figura 1, Estructura de la muestra



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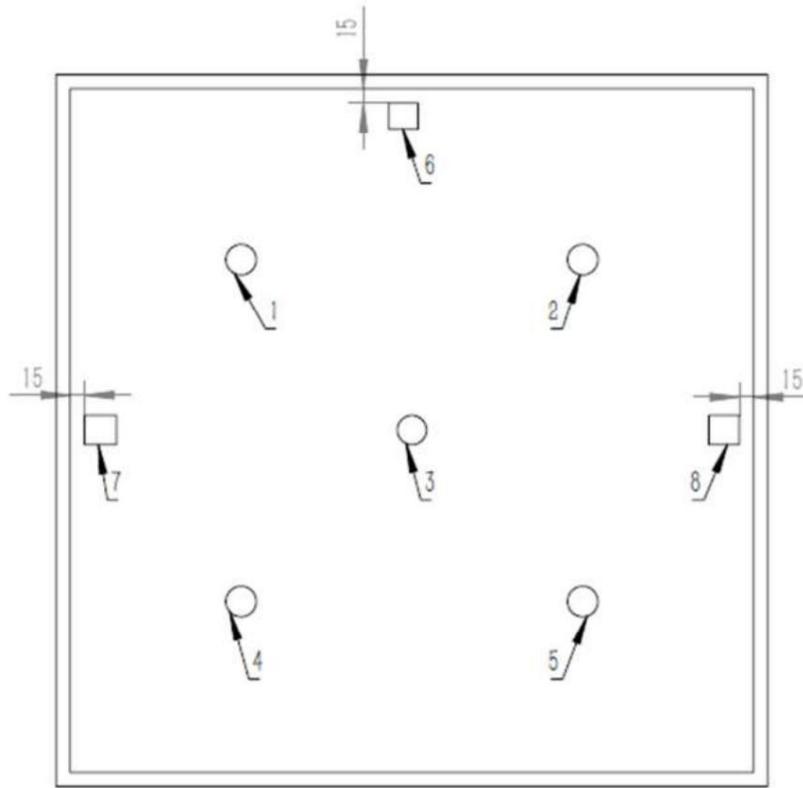
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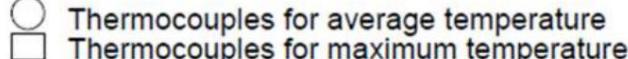


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Thermocouples for average temperature



Thermocouples for maximum temperature

No.1, 2, 4, 5 in the center of each quarter for specimen, No.3 in the center of the specimen.

Figura 2. Disposición del termopar en la superficie no expuesta de la muestra (Unidad: mm)

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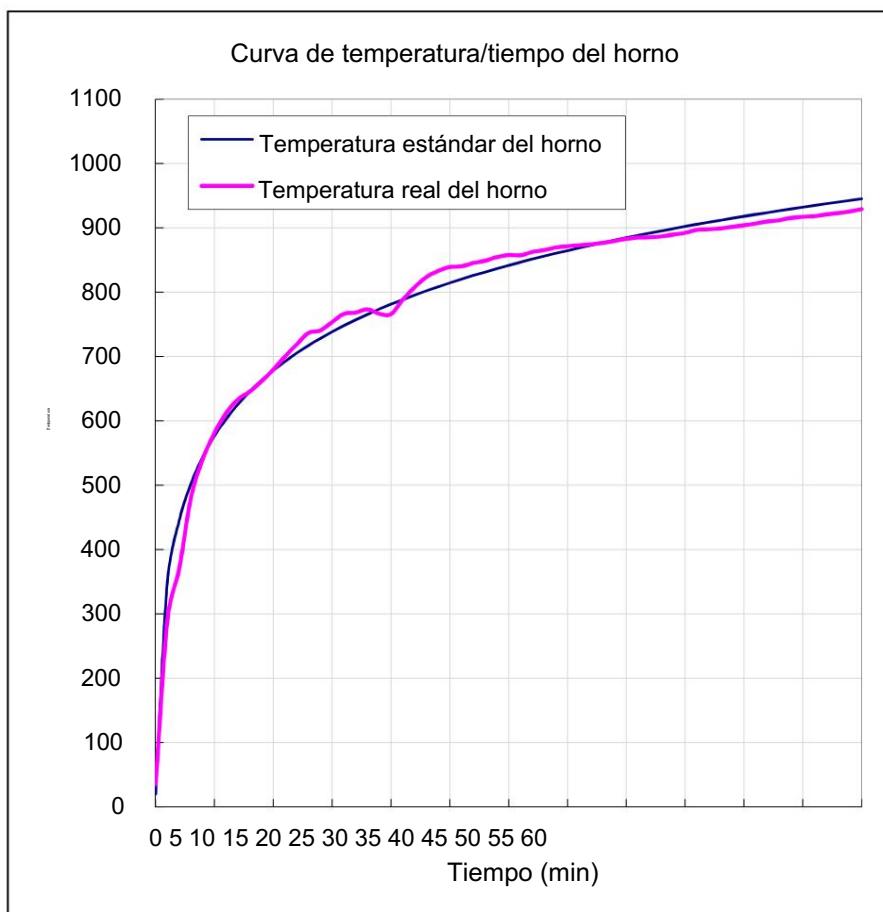


Figura 3. Curva de temperatura/tiempo del horno real frente a temperatura/tiempo del horno estándar



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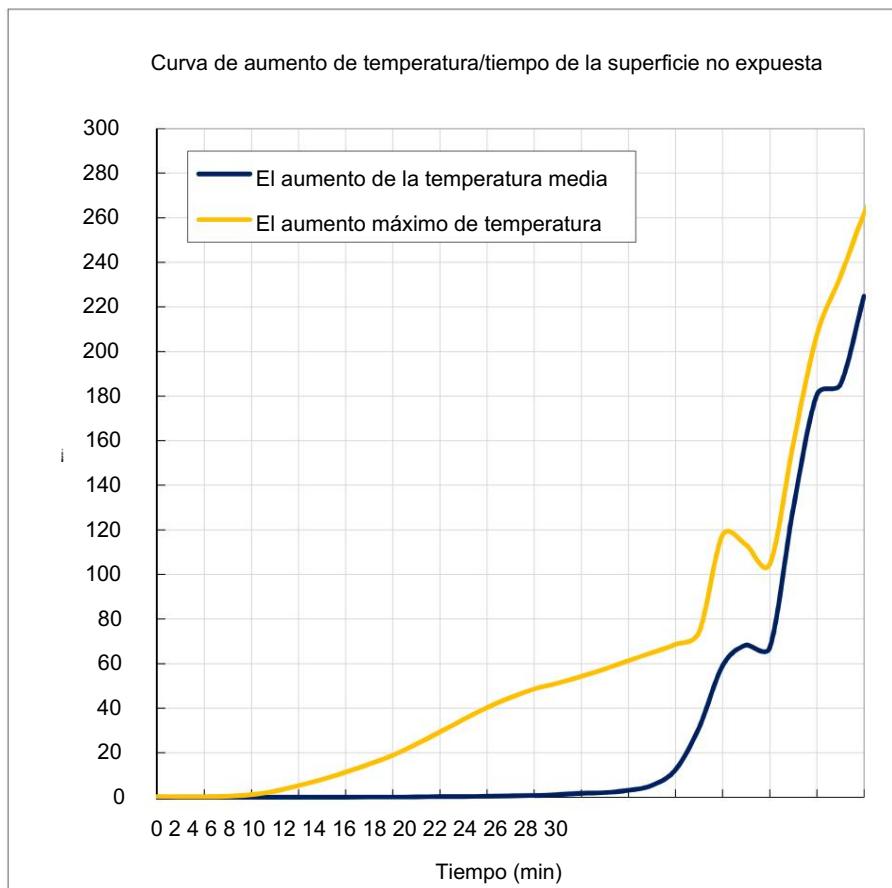


Figura 4. Aumento de temperatura promedio y máximo en la superficie no expuesta de la muestra.



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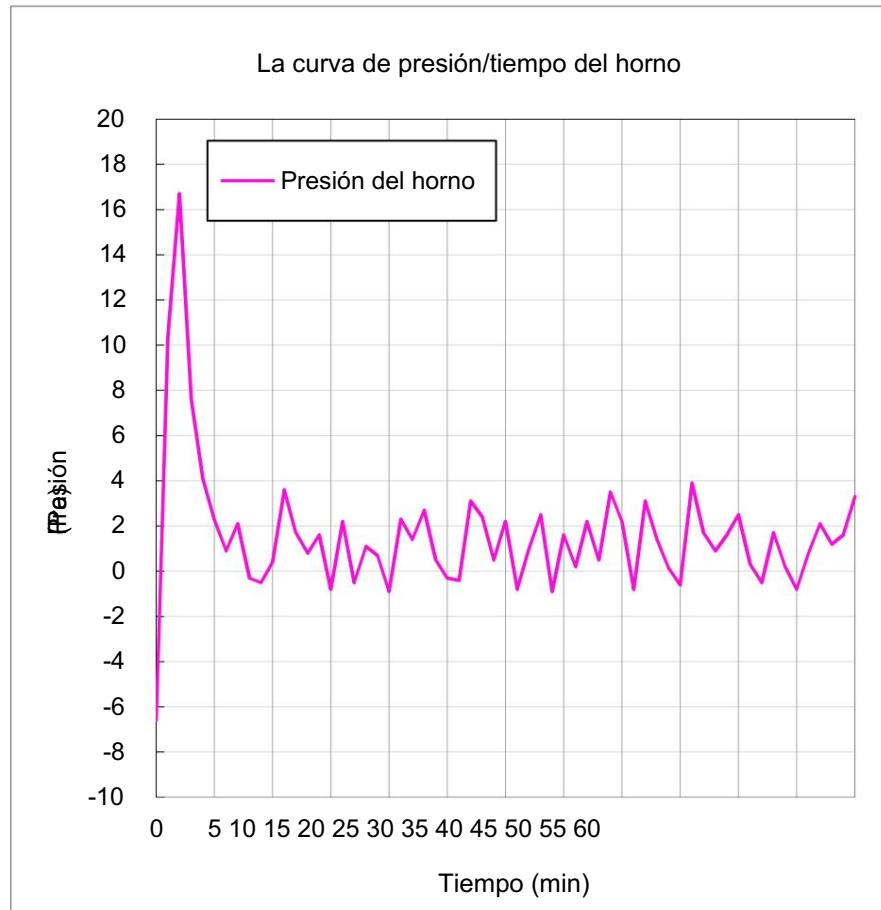


Figura 5, Curva de presión/tiempo del horno



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Tabla 1. Temperaturas promedio registradas dentro del horno

Tiempo (min)	AS1530.4 Promedio estándar	Horno ( Promedio ( ) )	Desviación (%)	Tiempo (min)	AS1530.4 Promedio estándar	Horno ( Promedio ( ) )	Desviación (%)
0	20.0	35.5		31	846.7	857.5	0,6%
1	349.2	289.4	-12.0%	32	851.4	862.6	0,6%
2	444.5	369.4	-15,4%	33	856.0	865.6	0,7%
3	502.3	480.2	-13,1%	34	860.5	869.5	0,7%
4	543.9	540.0	-9,6%	35	864.8	871.7	0,7%
5	576.4	581.2	-7,0%	36	869.0	873.1	0,7%
6	603.1	612.6	-5,3%	37	873.1	874.6	0,7%
7	625.8	633.6	-4,0%	38	877.1	876.8	0,6%
8	645.5	645.6	-3,3%	39	881.0	879.6	0,6%
9	662.8	661.7	-2,8%	40	884.7	883.1	0,6%
10	678.4	679.9	-2,5%	41	888.4	885.2	0,6%
11	692.5	700.2	-2,1%	42	892.0	885.5	0,5%
12	705.4	719.4	-1,7%	43	895.5	887.0	0,5%
13	717.3	736.8	-1,3%	44	899.0	889.8	0,5%
14	728.3	740.7	-1,0%	45	902.3	892.3	0,4%
15	738.6	753.6	-0,8%	46	905.6	896.9	0,4%
16	748.2	766.4	-0,6%	47	908.8	897.9	0,3%
17	757.2	768.5	-0,4%	48	912.0	899.2	0,3%
18	765.7	773.4	-0,3%	49	915.1	901.6	0,3%
19	773.7	766.7	-0,2%	50	918.1	904.3	0,2%
20	781.4	766.0	-0,3%	51	921.0	906.9	0,2%
21	788.6	788.4	-0,4%	52	923.9	910.1	0,1%
22	795.6	807.8	-0,3%	53	926.8	911.9	0,1%
23	802.2	823.5	-0,2%	54	929.6	915.6	0,1%
24	808.5	833.2	0,0%	55	932.3	917.3	0,0%
25	814.6	839.1	0,1%	56	935.0	918.4	0,0%
26	820.5	840.4	0,3%	57	937.7	921.0	0,0%
27	826.1	845.5	0,4%	58	940.3	923.1	-0,1%
28	831.5	848.9	0,4%	59	942.8	925.5	-0,1%
29	836.7	854.8	0,5%	60	945.3	929.1	-0,1%
30	841.8	857.9	0,6%				

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Tabla 2. Temperaturas individuales registradas en la superficie no expuesta de la muestra (unidad: °C)

Tiempo (min) 0	CT 1	CT 2	CT 3	CT 4	CT 5	CT 6	CT 7	CT 8				
	15.0	14.9	15.2	15.1	15.6	15.3	15.1	15.5				
1	15.0	14.9	15.1	15.2	15.5	15.0	15.1	15.3				
2	15.0	14.9	15.1	15.3	15.5	14.9	15.2	15.2				
3	14.8	14.8	15.0	15.3	15.4	15.3	15.6	15.5				
4	14.9	14.8	15.0	15.3	15.5	15.7	16.3	15.9				
5	14.9	14.8	15.1	15.3	15.4	16.3	17.9	16.6				
6	14.8	14.7	15.0	15.2	15.4	17.4	20.4	17.6				
7	14.8	14.7	14.9	15.2	15.4	18.9	23.1	19.2				
8	14.9	14.8	15.0	15.3	15.5	20.6	26.4	20.9				
9	15.0	15.0	15.1	15.4	15.6	22.6	30.0	23.0				
10	15.0	15.1	15.1	15.3	15.7	24.7	34.0	25.1				
11	15.0	15.1	15.0	15.4	15.7	26.7	39.0	27.3				
12	15.2	15.4	15.2	15.5	16.0	28.9	44.4	29.5				
13	15.3	15.4	15.2	15.5	16.0	31.2	50.0	31.9				
14	15.4	15.5	15.3	15.7	16.2	33.5	55.4	34.4				
15	15.5	15.6	15.3	15.7	16.6	35.7	59.9	36.6				
16	15.6	15.9	15.3	15.9	17.0	38.1	63.7	39.0				
17	16.0	16.3	15.6	16.2	17.4	40.4	66.3	41.4				
18	16.5	16.5	15.8	18.0	17.8	39.6	69.4	43.0				
19	17.2	16.9	16.2	17.2	18.6	44.5	72.7	45.6				
20	19.0	17.9	17.0	17.8	19.5	44.9	76.4	45.9				
21	23.5	19.9	19.4	19.0	20.5	44.6	80.0	45.3				
22	39.7	29.0	26.3	20.8	21.9	45.9	83.7	46.7				
23	81.5	57.0	44.4	25.1	24.1	52.1	89.2	52.6				
24	132.8	96.2	76.3	37.0	28.7	68.4	96.6	68.7				
25	*	128.3	98.7	64.7	42.1	93.9	107.3	94.0				
26	*	*	67.8	107.4	71.5	92.1	119.7	91.0				
27	*	*	173.8	145.0	116.1	119.9	136.4	115.5				
28	*	*	222.5	171.8	192.7	170.5	177.7	170.6				
29	*	*	*	177.7	223.0	178.4	248.7	178.9				
30	*	*	*	*	240.0	204.3	276.8	203.3				

Observación: \* - El termopar se cayó.



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Tabla 3, Observaciones de prueba

Tiempo (min:seg)	Las siguientes observaciones se realizaron durante la prueba; todas las observaciones se realizaron desde la cara no expuesta a menos que se indique lo contrario.
00:00	Se encendió el horno de pruebas y se inició la prueba.
05:20	Una pequeña cantidad de humo se libera de los espacios entre la muestra y la pared.
20:00	No se observaron otros cambios significativos en la muestra.
24:00	Varios termopares se cayeron uno tras otro.
25:00	La parte superior del ejemplar comenzó a decolorarse.
28:00	El aumento de temperatura promedio y máximo de la superficie no expuesta excedió los valores límite especificados en la norma, considerándose que se produjo un fallo del aislamiento.
30:00	La superficie no expuesta estaba significativamente deformada y coloreada.
50:00	El área de decoloración se hizo más grande y el color se oscureció gradualmente.
60:00	No se observaron grietas ni llamas en la cara no expuesta del espécimen.
61:00	La prueba fue interrumpida.

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Apéndice, Fotos



Cara no expuesta de la muestra antes de la prueba



Cara expuesta de la muestra antes de la prueba



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Cara no expuesta de la muestra (Prueba iniciada)



Cara no expuesta de la muestra (después de una duración de prueba de 20 minutos)

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Cara no expuesta de la muestra (después de una duración de prueba de 40 minutos)



Cara no expuesta de la muestra (después de una duración de prueba de 60 minutos)

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Cara no expuesta de la muestra después de la prueba



Cara expuesta de la muestra después de la prueba

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