

# High rise inventory 2021: summary report

November 2021

## High rise inventory 2021: summary report

### Background

1. The [Ministerial Working Group on Building and Fire Safety](#) was established in 2017 to oversee a review of building and fire safety regulatory frameworks, and any other relevant matters, to help ensure that people are safe in Scotland's buildings, and make any recommendations for improvement as required. As part of the Group's work plan, the development of a central source of information on key aspects of the construction and fire safety features of high rise domestic blocks was agreed.
2. The High Rise Inventory (HRI) provides information on the construction and fire safety of high rise domestic buildings. A high rise domestic building is defined in building regulations as a domestic building with any storey at a height of more than 18 metres above the ground, and the HRI therefore includes data for both larger tenemental style buildings as well as those that might be more commonly understood as traditional high rise flatted accommodation. The HRI data collection has been delivered through the Scottish Government's ScotXed Unit. It has been completed by Local Authority Building Standards departments for all relevant buildings, with data provided or verified to the best of the respondents' knowledge at the time of completing the inventory, and should be treated as a snapshot in time.
3. This summary report is based on information held in the HRI in August 2021. The HRI exercise is to be an annual undertaking, following an iterative process of improvement. While there is a small amount of missing data (see paragraph 6), it is intended that this shall be addressed in future exercises. Some information however may simply not be available due to e.g. missing building warrant information from paper files of a significant age.
4. The completion of the HRI in 2021 was a less intensive exercise than previously since Local Authority Building Standards are now only required to review the existing information in the inventory and make any necessary updates where changes have occurred to a building, where there are new buildings, where a building has been demolished or to complete information previously missing. Nonetheless their efforts in keeping the inventory up to date are acknowledged.

### Completion rates

5. The HRI data collection has been delivered through the Scottish Government's ScotXed Unit with analysis of the data submitted undertaken by Communities Analytical Services. The HRI contained a maximum of 27 questions (Annex A). These were the same questions as the [2020 HRI](#) allowing for pre-population and respondents' subsequent verification and update as required. Guidance was also issued with the questionnaire to further aid the entering of responses.

6. Completion rates for each question are also included at Annex A. Questions which dropped below a 90% completion rate included:<sup>1</sup>
  - Question 2.2. – What is the estimated lifespan of the building (79% complete)
  - Question 3.1.1 – If this is a Large Panel System type building, does it have a mains gas supply? (87% complete)
  - Question 3.5.1 – If yes, please identify type (of insulation materials exposed in the external wall cavity). (86% complete).

### **Data Returned: Key Findings<sup>2</sup>**

7. A total of 780 high rise building records were submitted to the HRI, up from 774 in 2020, with locations across 15 Local Authorities. 49% of these, representing 378 buildings, are in Glasgow. Where building information was provided, Registered Social Landlords are the most common building owners (35%, 275 buildings). Although this is an increase of 6, this reflects an increase of 2 in Edinburgh, 6 in Glasgow City, 1 in Renfrewshire and a decrease of 3 in North Lanarkshire.
8. The most common completion date for domestic high rise buildings in Scotland is the 1960s (45%, 351 buildings), with the oldest two buildings reported as being completed pre-1950s.
9. Reported building heights range from 18m to 71.5m, with a median height of 31.25m. The tallest reported buildings are located in Glasgow.
10. There are a reported 46,619 flats in high rise buildings in Scotland a slight increase of 89 flats from the previous year.
11. The most common construction type reported for high rise buildings in Scotland is concrete frame (60%, 464 buildings – an increase from 457), with the majority of buildings a single construction type (57%, 437 buildings).
12. Aluminium Composite Material (ACM) panels are identified in a small number of buildings (5%, 38 buildings) where information was provided, representing a decrease of 13 from the previous inventory. ACM is a generic name for a type of flat panel that consists of two thin aluminium sheets (0.5mm) held together with a core filler, typically between 3 and 7mm thick, see table below. Category 3 is the highest risk most combustible panel, whilst category 1 is limited combustibility and largely mineral filler that meets the Euro-classification A2.

---

<sup>1</sup> These completion rates exclude buildings for which the question does not apply, but include buildings which may need responses should earlier missing questions be completed. For example, if the building's construction type is not identified, then the mains gas question, which relates only to Large Panel System buildings, may need a response, and is therefore included as a missing response. The completion rates may therefore be viewed as a "worst-case" scenario.

<sup>2</sup> Percentages in this section, unless otherwise stated, are a proportion of completed answers and not the full inventory dataset.

13. The overall decrease from the 2020 inventory is due to a re-analysis of the information on panels used across 13 buildings, which were composite panels as opposed to ACM types.
14. Of the 38 buildings reporting ACM panels, 23 reported Category 3 ACM panels with a combustible polyethylene core (ACM-PE).
15. The remaining 15 buildings have ACM panels Category 1 (Euroclassification A2). The table below shows the differences between the three categories of ACM materials in terms of their calorific value. The higher the calorific value of the ACM the poorer the fire performance.

**Table 1: Breakdown of ACM types<sup>3</sup>**

Category	Common core composition	Calorific Value MJ/Kg <sup>[1]</sup>
1 <sup>[2]</sup> (non-combustible or will not significantly contribute to fire load and fire growth)	Largely of mineral composition affording a high standard of fire performance	≤ 3
2 (fire retardant - FR)	A mixture of polyethylene and other, inorganic additives to enhance fire performance	>3 and ≤ 35
3 (non-FR)	Unmodified polyethylene (PE);	> 35

[1] Screen test based on BS EN ISO 1716 'Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)'.

[2] European Classification A1 (non-combustible) or A2 (will not significantly contribute to fire load and fire growth) as defined in BS EN 13501-1: 2018

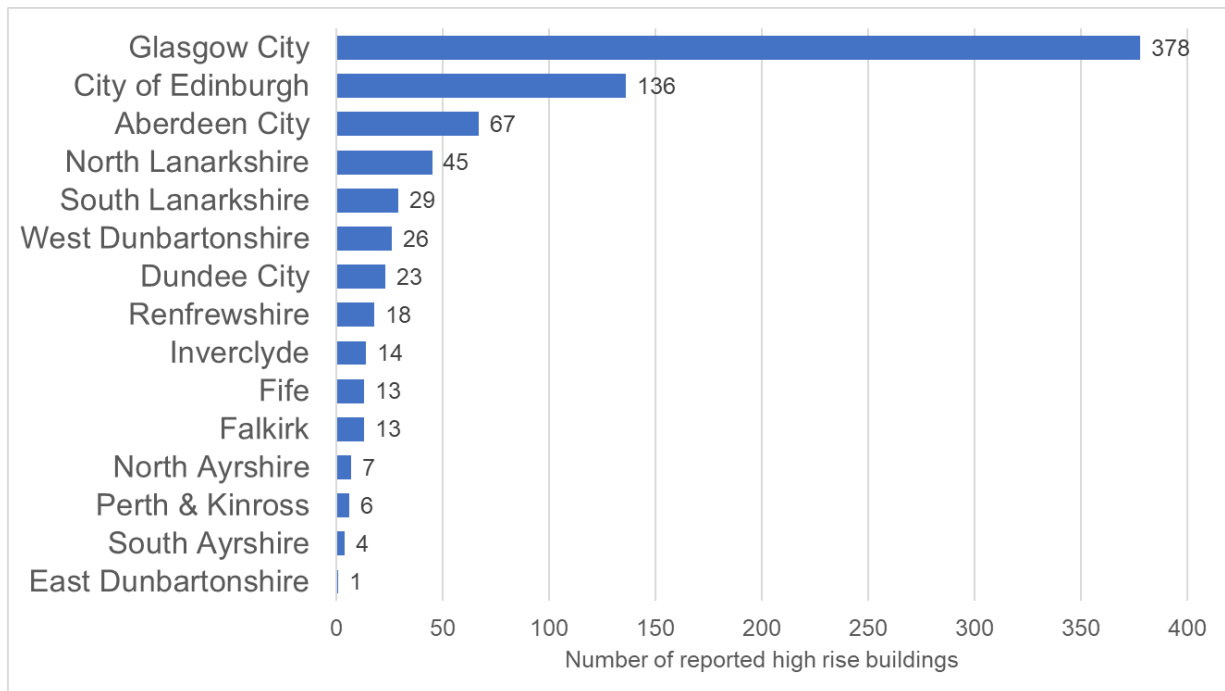
16. Sprinklers or other forms of automatic fire suppression equipment are reported in 307 buildings (40%, an increase of 7 from 2020) where information provided. Fire doors are fitted to all flat doors for 85% (647) of buildings. Similarly, fire doors are fitted to all escape stairs for 92% (718) of buildings.

#### **Data Returns: General Information**

17. A total of 780 high rise building records were submitted to the HRI, with locations across 15 Local Authorities. 49% of these, representing 378 buildings, are in Glasgow (Figure 1).

<sup>3</sup> Scottish Advice Note: Determining the fire risk posed by external wall systems in existing multi-storey residential buildings, 2021: [Scottish Advice Note: Determining the fire risk posed by external wall systems in existing multi-storey residential buildings - gov.scot \(www.gov.scot\)](http://www.gov.scot/resources/documents/2021/04/Scottish-Advice-Note-Determining-the-fire-risk-posed-by-external-wall-systems-in-existing-multi-storey-residential-buildings-2021.pdf)

**Figure 1: Reported Domestic High Rise Buildings by Local Authority, HRI 2021.**



18. Registered Social Landlords (RSLs) are the most common building owners, where information was provided (35%, 275 buildings), followed by private owners Local Authorities (32%, 253 buildings) and local authorities (32%, 252 buildings).<sup>4</sup>
19. The majority of all RSL and privately owned high rises are in Glasgow (84% and 58% respectively). 34% of privately owned high rises are in Edinburgh. Over half of the 252 LA owned high rises are in Aberdeen City (59 buildings), North Lanarkshire (45 buildings) and City of Edinburgh (42 buildings) (see Table 2).

<sup>4</sup> Private ownership covers those buildings not owned by LAs or RSLs. These may include buildings with flats solely in owner occupation, or of mixed tenure with socially rented tenants (LA and RSL), privately rented tenants and owner occupiers.

**Table 2 Building Owners by Local Authority**

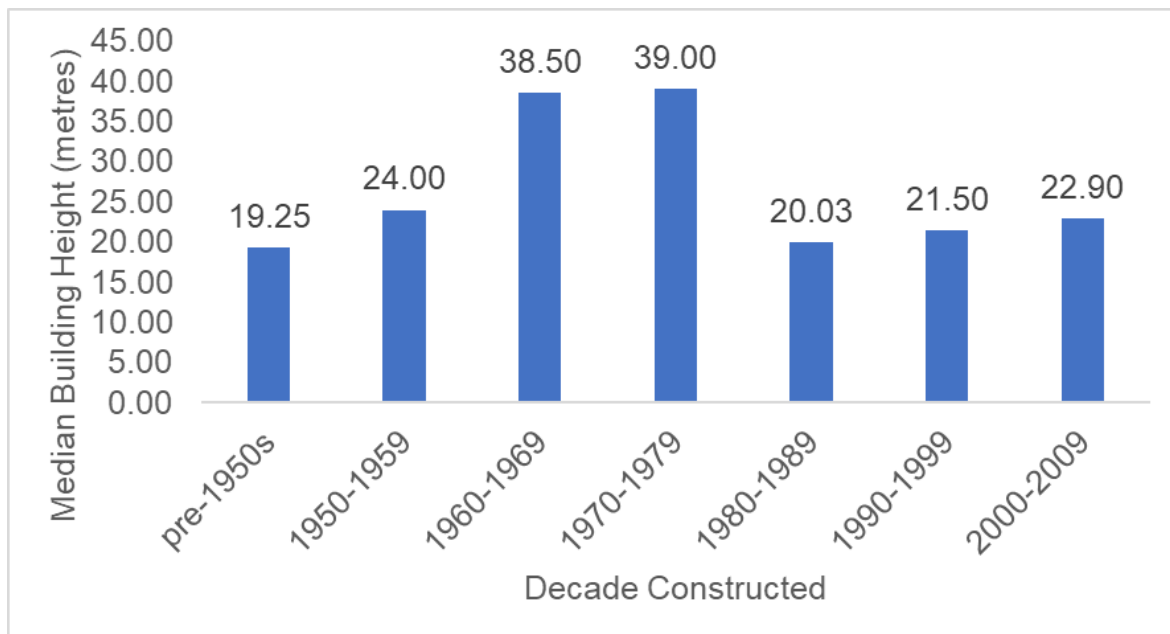
Building Location	Local Authority	RSL	Private	Total
Aberdeen City	59	0	8	67
Dundee City	11	6	6	23
East Dunbartonshire	0	0	1	1
City of Edinburgh	42	9	85	136
Falkirk	13	0	0	13
Fife	12	0	1	13
Glasgow City	0	231	147	378
Inverclyde	0	13	1	14
North Ayrshire	7	0	0	7
North Lanarkshire	45	0	0	45
Perth & Kinross	6	0	0	6
Renfrewshire	14	3	1	18
South Ayrshire	3	0	1	4
South Lanarkshire	21	6	2	29
West Dunbartonshire	19	7	0	26
<b>Total</b>	<b>252</b>	<b>275</b>	<b>253</b>	<b>780</b>

**Data Returns: Building Information**

20. Data returns submitted to the HRI indicate that the most common completion date for domestic high rise buildings in Scotland is the 1960s (45%, 351 buildings), followed by the 2000s (207 buildings) and 1970s (138 buildings). The oldest two buildings were completed before the 1950s. The estimated remaining lifespan of high rise buildings ranges from 5 years (4 buildings) to 100 years (4 buildings), where this information is available. The most commonly reported remaining lifespan was 30 years (326 buildings), although a low question completion rate (79%) means that the true lifespan distribution may be different to that collected. Information on the projected lifespan of a building is not included in Building Warrants or Building Standards certification, and feedback received through the HRI data collection indicated that this was subjective and sometimes challenging data to provide, involving economic as well as structural considerations.
21. Reported building heights range from 18m to 71.5m, with a median height of 31.25m. The tallest reported high rises are in Glasgow. On average, Renfrewshire and North Lanarkshire have the tallest high rise building estates, with a median height of 44m. The tallest buildings were constructed in the 1960s and 1970s, with a median height of 38.5m and 39m respectively (see Figure 2). The reported number of storeys ranges from 4 to 26, with a median of 11.

22. There are a reported 46,619 flats in high rise buildings in Scotland an increase of 89 from 2020.

**Figure 2: Median Building Height by Decade Constructed**



#### Data Returns: Construction

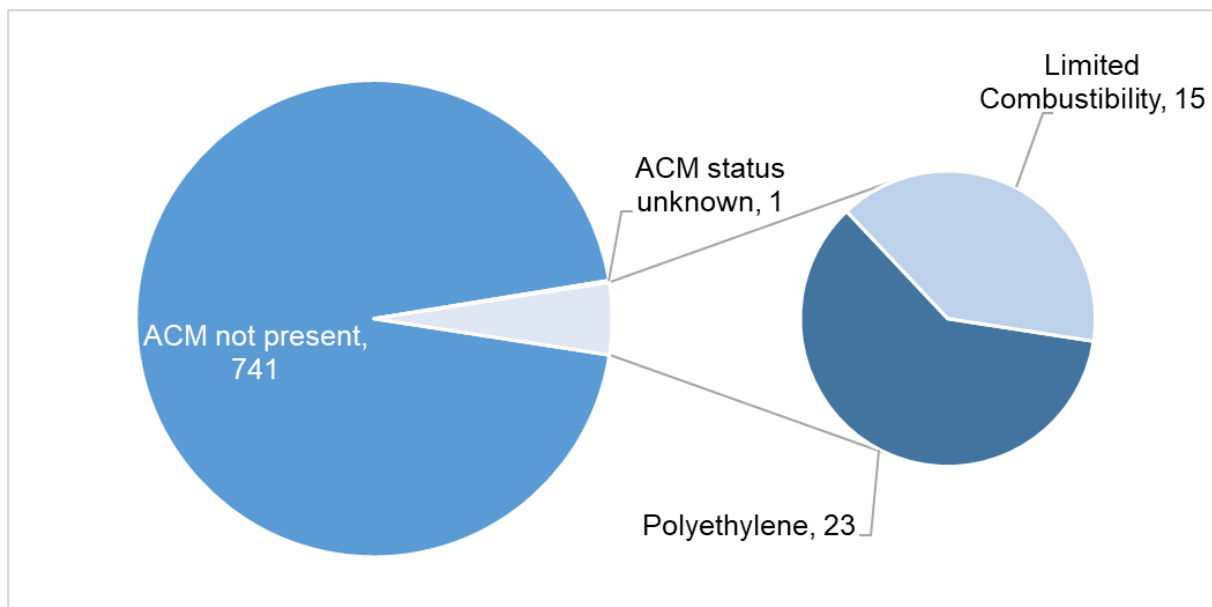
23. Data returns submitted to the HRI indicate that concrete frame (reported in 464 buildings, 60% of all records) is the most common construction type.<sup>5</sup> A range of other construction types were identified as follows, with more than one construction type per building possible: Large Panel System (LPS) – concrete (25%, 192 buildings); steel frame (22%, 169 buildings); LPS – cassette (4%, 28 buildings); and LPS – structural insulated panels (1%, 11 buildings). An alternative construction type, highlighted through free text response, was reported in 302 buildings, 39% of returns. However, these may overlap with the other categories listed. Where a multiple construction type was identified, 273 buildings had two construction types (35% of all buildings); and 61 buildings had three construction types (8% of all buildings).
24. Of those buildings reporting an LPS-type construction, 59 have a mains gas supply. 22 LPS-type buildings are missing mains gas information.<sup>6</sup>

<sup>5</sup> Large panel system building (LPS), involves casting large concrete prefabricated sections off-site and bolting them together to construct the building.

<sup>6</sup> LPS is the type of construction used in Ronan Point, a dwelling block in London which, following an internal gas explosion in 1968, suffered significant collapse of a section of the building. Since then these types of buildings should have been structurally strengthened to avoid any further incidents, but investigations in England post Grenfell have shown that this work has not always taken place. As a result the [Department of Communities and Government wrote](#) to all Local Authorities and Housing Associations in the UK to highlight this and outline actions they may want to consider.

25. Rendered External Wall Insulation (EWI) is reported on 435 buildings (56% of all buildings).<sup>7</sup>
26. Returns submitted to the HRI indicate that Aluminium Composite Material (ACM) panels are present in a small number of buildings (5% where ACM questions answered, 38 buildings, a decrease from 51 in 2020). Of these, 23 buildings reported polyethylene type ACM panels (ACM-PE), a combustible material. A further 15 buildings reported Euro-class A2 ACM (Figure 3). The reduction in numbers of buildings with ACM is due to re-analysis of information by local authorities of 13 buildings. The relevant panels are a composite panel with insulation rather than a filler between thicker aluminium sheets.
27. ACM is a generic name for a type of flat panel that consists of two thin aluminium sheets (0.5mm) held together with a core filler, typically between 3 and 7mm thick, see table 1 in key findings. As noted in table 1 in the key findings above Category 3 is the highest risk most combustible panel, whilst category 1 is limited combustibility and largely mineral filler that meets the Euro-classification A2.
28. Work is currently underway to carry out remediation on 11 buildings with ACM-PE (category 3) material. This work will improve the safety of 321 flats. The work will take around two years to complete.

**Figure 3: Number of reported high-rise buildings with ACM panels and type where present**



<sup>7</sup> External wall insulation (EWI) is the application of thermal insulation to the external walls of buildings - generally referring to the application of thermal insulation material and a finish system to the outside face of the external walls of an existing building to improve its thermal performance.



29. Other types of external wall panels are reported in 491 buildings (63% of all buildings). Where the type of external wall panels is identified, types include: masonry infill (35%, 167 buildings); zinc (11%, 55 buildings); high pressure laminate (20%, 95 buildings)<sup>8</sup>; terracotta tiles (8%, 37 buildings); stone (7%, 33 buildings); solid metal panels (7%, 33 buildings); rainscreen insulation board (6%, 27 buildings); other metal composite (5%, 23 buildings); granite (3%, 14 buildings); slate (1%, seven buildings); and concrete panels (<1%, two buildings). In 71% of buildings where external wall panels were reported, other types of external wall panel are identified using free text responses. The return for one building was limited and did not include details on external walls.
30. In total, 239 buildings are reported with insulation materials exposed in the external wall cavity (31% of all buildings). Where the type of exposed insulation is identified, stone wool is the most commonly reported (84 buildings), representing 35% of buildings where exposed insulation is reported, and 11% of all buildings overall. However, 54% of buildings where exposed insulation is reported returned free text responses, which may overlap with other categories. Phenolic foam is reported for 29 buildings, polyisocyanurate in five buildings, and four buildings are reported with exposed expanded polystyrene insulation.

#### **Data Returns: Fire Safety**

31. Data returns submitted to the HRI indicate 83% of buildings have one escape stair and 17% have two escape stairs or more.
32. Fire doors are fitted to all flat entrances in 647 buildings (83% of all buildings), down from 670 and a partial number of flat entrances in 87 buildings (11% of all buildings) up from 48. This appears to reflect a change in reporting in City of Edinburgh where some buildings which were previously reported as fully fitted are now recorded as partial due to being unable to assess the standard of door to private dwellings or where doors were replaced during maintenance. There were 26 buildings (3% of all buildings) where fire doors are not fitted to flat entrances, down from 36 and mainly driven by changes in North Lanarkshire. Further details were provided for 24 of the 26 buildings.
33. Fire doors are fitted to all escape stairs, or a partial number of escape stairs, in 720 buildings (92% of all buildings). Of the 58 buildings (7% of all buildings) where fire doors are not fitted to escape stairs, further details are provided for 55 buildings. A small number detail planned installations, but the majority clarify new fire doors are being fitted to individual flat entrances rather than escape stairs.

---

<sup>8</sup> HPL figures have been cross referenced with the HPL publication (<https://www.gov.scot/publications/high-pressure-laminate-cladding-data-collection-summary-report/>) to ensure they reflect the most up to date information available.

34. Sprinklers or other forms of automatic fire suppression systems (AFSS)<sup>9</sup> are reported as present in 307 buildings (39% of all buildings). Information is missing for eight buildings (1%). The most common type of system is sprinkler (269 buildings, 88% of those with AFSS), then mist (35 buildings, or 11% of buildings with AFSS), with other forms of system present in nine buildings (3% of those with AFSS). For those buildings where sprinklers or other forms of AFSS have been identified, they are most commonly found in bin stores (247 buildings) (an increase of 7)], flats (28 buildings, an increase of 5), and common corridors or stairwells (26 buildings, an increase of three). For 42 buildings, alternative AFSS locations were provided by free text response – of these, 31 buildings have AFSS located in car parks.

### **Conclusions and next steps**

35. This summary report is based on information held in the HRI collection in August 2021 and should be treated as a snapshot in time. The HRI exercise has been a comprehensive undertaking and the efforts of those involved in its compilation are acknowledged.
36. Realising the objective of the Ministerial Working Group on Building and Fire Safety for a central source of information on key aspects of the construction and fire safety features of high rise domestic blocks. It is also central to related work of the Ministerial Working Group e.g. in helping to establish the extent of the use of external High Pressure Laminate (HPL) cladding, and in the development of fire safety guidance for high rise buildings.
37. Beyond the fundamental information collated in the HRI (e.g. on building location or completion date), unknown data remains and the collection has also identified a number of potential issues which have been or are being addressed with relevant bodies. These include:
- ACM – in the period following the Grenfell Tower fire, data was collected on buildings with ACM-PE installed. This data collection was coordinated through Local Authority Building Standards departments. The Scottish Government has since continued to engage with relevant Local Authorities on plans for replacement and management of ACM-PE cladding on buildings.
  - Fire doors – requirements for fire doors in high rise housing have changed over time. Prior to 1 May 2005 requirements were for doors providing 30 minutes fire separation, with the requirement thereafter for 60 minutes fire separation. Older fire doors should still provide resistance and even non-fire rated doors should provide some resistance to fire.

---

<sup>9</sup> The most common form of automatic fire suppression in residential buildings is water sprinkler systems to BS 9251 however some systems may include water mist systems to BS 8458. Partial AFSS is common in communal bin stores. The Scottish Government intend to legislate for automatic fire suppression systems in all new build social housing, new build flats and certain new build houses in multiple occupation by April 2021.

38. SFRS have provided updates for all buildings in respect of questions 4.4 and 4.4.1 based on information highlighted during their operational assurance visits. SFRS undertake operational assurance visits to high rise domestic buildings in Scotland, with a procedure in place for these to be undertaken on a quarterly basis. The purpose of these inspections is to obtain information for operational purposes and to ensure compliance with Regulatory requirements relating to the common areas of private dwellings.
39. As the HRI is to be an annual undertaking, it may be expected that any outstanding defects identified through the 2021 exercise shall be addressed as required in future iterations. Given the HRI's scale and scope, and the challenges of delivering a complete inventory, it can be further expected that data collection processes will be refined and improved for future exercises. There will also be an iterative process of improvement while questions are considered and improved where necessary for future data collections.

## ANNEX A

### HRI Questionnaire

#### Disclaimer:

Where the provision of data highlights an issue with the building then it is the responsibility of the building owner to undertake remedial action. If, through analysis of this data, the Scottish Government becomes aware of the building issues which may be of interest to the relevant enforcement authorities then we may pass this on.

Updates are provided to the best awareness of those completing the ProcXed system.

#### Section 1 General Information

Question number			Completion rate (percentage) <sup>10</sup>
1.1	In what local authority is the building located?	Drop down 32 local authorities	100%
1.2	Who is the building owner?	Drop down options: LA; RSL; private	100%
1.3	What is the building address?	Split by Address line, city, post code	100% (where at least a building name, first line of address or post code was given)

---

<sup>10</sup> Completion rates exclude records where an answer is not required due to a previous response, but include those cases which are unknown if missing, due to a non-response to a previous question.

## Section 2 Building Information

Question number			Completion rate (percentage)
2.1	When was the building completed?	Drop down: options by decade from 1950s-2010s (this format matches the original inventory)	99%
2.2	What is the estimated remaining lifespan of the building?	Drop down, 5 year increments from 0 to 100+. i.e. 0,5,10,...100+	79%
2.3	What is the height of the floor of the topmost storey above ground level in metres?	Field for direct entry, limited to whole values from 18+.	98%
2.4	How many storeys above ground level are in the building?	Field for direct entry, limited to whole values	100%
2.5	What is the total number of flats in the building?	Field for direct entry, limited to whole values	100%

### Section 3 Construction

Question number			Completion rate (percentage)
3.1	What is the construction type of the building?	Multiple responses checkbox, with notes option where specified:	99%
3.1.1	If this is an LPS-type building, does it have a mains gas supply??	Yes / No	87%
3.2	Does the building have rendered External Wall Insulation (EWI)?	Yes / No	99%
3.3	Does the building have any Aluminium Composite Panels	Yes / No	100%
3.3.1	If yes, please identify type	Multiple response checkbox options, with notes option where specified: 1. Polyethylene (PE) 2. Fire retardant (FR) 3. A2 Limited combustibility 4. Other (specify in notes)	98%
3.4	Does the building have any other type of external wall panels?	Yes / No	98%
3.4.1	If yes, please identify type <sup>11</sup>	Multiple response checkbox options, with notes option where specified: 1. Masonry infill panels 2. Other metal composite panels 3. High pressure laminate boards 4. Stone 5. Slate 6. Granite	97%

<sup>11</sup> HPL figures have been cross referenced with the HPL publication to ensure they reflect the most up to date information available (<https://www.gov.scot/publications/high-pressure-laminate-cladding-data-collection-summary-report/>).

		<ul style="list-style-type: none"> <li>7. Terracotta Tiles</li> <li>8. Solid Metal Panels</li> <li>9. Rainscreen Insulation Board</li> <li>10. Zinc</li> <li>11. Concrete Panel</li> <li>12. Other (specify in notes)</li> </ul>	
3.5	Are there any insulation materials exposed in the external wall cavity?	Yes / No	97%
3.5.1	If yes, please identify type	<p>Multiple response checkbox options, with notes option where specified:</p> <ul style="list-style-type: none"> <li>1. Expanded polystyrene</li> <li>2. Polyisocyanurate foam</li> <li>3. Stone Wool</li> <li>4. Phenolic foam</li> <li>5. Other (specify in notes)</li> </ul>	86%

#### Section 4: Fire Safety

Question number			Completion rate (percentage)
4.1	How many escape stairs does the building have?	Enter whole number	100%
4.2	Are fire doors fitted to flat entrances?	Yes - all / Yes - partial / No	97%
4.2.1	If no, please provide more details		92%
4.3	Are fire doors fitted to escape stairs?	Yes - all / Yes - partial / No	100%
4.4	Are there any outstanding defects that have been highlighted by SFRS through their operational assurance visits?*	Yes / No *This information will also be requested from SFRS	100%
4.4.1	If yes, please provide more details	Free text	99%
4.5	Is the building fitted with sprinklers or another form of automatic fire suppression? (note this does not include portable/ personal automatic fire suppression equipment)	Yes / No	99%
4.5.1	If yes, please indicate type of system	Multiple response checkbox options, with notes option where specified:	100%
4.5.2	If yes, please indicate locations where this suppression is installed.	Multiple response checkbox options, with notes option where specified:	100%





Scottish Government  
Riaghaltas na h-Alba  
gov.scot

© Crown copyright 2021

**OGL**

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit [nationalarchives.gov.uk/doc/open-government-licence/version/3](https://nationalarchives.gov.uk/doc/open-government-licence/version/3) or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: [psi@nationalarchives.gsi.gov.uk](mailto:psi@nationalarchives.gsi.gov.uk).

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is available at [www.gov.scot](http://www.gov.scot)

Any enquiries regarding this publication should be sent to us at

The Scottish Government  
St Andrew's House  
Edinburgh  
EH1 3DG

ISBN: 978-1-80201-469-3 (web only)

Published by The Scottish Government, November 2021

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA  
PPDAS882488 (11/21)

W W W . g o v . s c o t