Visual Quality Standards

The performance, visual & quality standards for Masterframe Windows Ltd manufactured products.

Introduction.

This document sets out the performance, visual & quality standards for Masterframe Windows Ltd (MFW) manufactured products. Wherever possible it will reference, in order of hierarchy European Standards, British Standards, Code of Practice, Glass and Glazing Federation guidance, British Board of Agrement quality plan or, if no other recognised standard or guidance exists, supplier tolerances, or our own standards.

This document does not give guidance on specification or compliance to building regulations. Further advice and guidance can be found in the Masterframe Survey & Installation guidance document.

The standards referred to in this document are based upon the window being correctly specified by the installation company; any adverse conditions must be notified to MFW as detailed in the terms and conditions of sale at the time of order.

PVC-U

1. PVC-U should be inspected from a distance of 1m, in 45° north sky light, or equivalent artificial light and perpendicular to the profile surface by normal, or corrected vision in accordance to EN ISO 105-A01:2010.
2. When viewed in accordance with Clause 1. The surface of any extruded length shall be smooth, flat and free from pitting, impurities, cavities, excessive extrusion die lines. All edges of the extrusion shall be clean and burr free. (EN12608)
3. Extrusion die lines are unavoidable but should not be visually intrusive when viewed in accordance with Clause 1. (EN12608)
4. All extrusion lengths shall be straight within 1mm / m (EN12608)
5. All profiles should be extruded within cross sectional tolerances set out by Veka.
6. The end of the extruded profile will be deformed slightly from the manufacture; these pieces should be cut off of the length as waste, and not used for manufacture.
7. The colour of the profile is $\Delta L\ 71 \leq 1{,}0$, $\Delta a\ 3 \leq 0{,}5$, $\Delta b\ -3 \leq 0.8$. (EN12608) This scientific approach to measuring colour is not easy to do without specialised equipment, as a rough rule of thumb the colour shall be a closest match to RAL 9003.
8. All main profiles should be protected with a low tack tape.

9. GRP should be inspected from a distance of 400m – 500mm by normal (Corrected) vision. (EN 13706-2)
10. No defects which will adversely affect the mechanical performance of the pulltruded profile are permitted. (EN 13706-2)
11. No blisters or bubbles are permitted in the pulltrusion which are over 10mm in size in any direction, or greater than 15% of the pulltrusion width. There must be no more than 1 in any 5m linear length of material. (EN13706-2)
12. A crater is a small indentation greater than 1mm in diameter. No crater larger than 5mm in diameter or 1mm in depth is acceptable. There shall be no more than 2 per linear metre. (EN13706-2)
13. No cracks of any size are acceptable. (EN13706-2)
14. There shall be no visual evidence of pulltrusion delaminating. (EN13706-2)
15. Pulltrusion die lines are unavoidable, especially where the tool has connecting sections. All die parting lines shall not project from the pulltrusion face more than 0.2mm and shall not have any sharp edges or exposed fibres. Grooving in the face of the material is also allowed providing the depth of the groove is no greater than 10% of the wall thickness and no greater than 3mm in width.(EN13706-2)
16. Dry fibres are acceptable providing the cross section area is not greater than 0.5mm in diameter and that the volume of dry fibres does not exceed 2% of the pulltrusion material. (EN13706-2)
17. Visible reinforcing pattern is acceptable providing the fibres have been encapsulated by resin. (EN13706-2)
18. Internal Shrinkage cracks are permitted providing they do not penetrate from one reinforcing layer to another, reach the pulltrusion surface or affect clause 10. (EN13706-2)
19. All profiles should be pulltruded within cross sectional tolerances set out by Vello.
20. All pulltrusions shall not deviate from straight greater than 1mm / m (EN13706-2)
21. All pulltrusions shall have twist which is no greater than 1.5° / m for material thickness <5mm & 1° / m for material thickness ≥5mm. (EN13706-2)
22. The end of the extruded profile could suffer from saw burn from the manufacturing process; these pieces should be cut off of the length as waste, and not used for manufacture.
23. The colour of the profile is not critical as all GRP surfaces will either be covered in Renolit foil or sprayed.

24. All main profiles should be protected with a low tack tape.

Foiled Profiles

25. Foiled covered surfaces should be inspected from a distance of 1m, in 45° north sky light, or equivalent artificial light and perpendicular to the profile surface by normal, or corrected vision in accordance to EN ISO 105-A01:2010.
26. The surface shall display no defect such as foreign bodies, sink marks, cracks, bubbles, ripples when viewed in accordance with clause 25. (BS 7722:2010)
27. The colour of the foil shall be within the tolerance of the supplier when measured either as a L A B reading, or RAL colour. (BS7722:2010)
28. Non-uniform colours and texture should be uniform in textured and pattern within the foil design and viewed in accordance with clause 25. (BS7722:2010)
29. The end of the extruded length will have evidence of the foil not being adhered properly to the extrusion, this should be cut from the bar as waste.
30. All main profiles should be protected with a low tack tape.

Glass

31. The IGU will conform to the product standard BS EN 1279:1 & BS EN 1279:5
32. Each sealed unit shall be viewed at normal incidence (90° to the glass surface; for clear glass this is the quality of the through vision, for patterned glass the quality of the textured surface) from the inner pane in normal daylight or simulated normal daylight conditions, in accordance with clauses 33,34 & 35 (GGF 4.10)
33. The IGU should be clean and free from visible moisture which could impair the inspection.
34. The whole IGU shall be inspected with the exception to a 50mm wide band around the perimeter of the IGU from a distance of no less than 2 metres for annealed float glass and 3metres for all other types. (GGF 4.10)
35. The assessment of the visual quality of the IGU shall be done by standing the correct distance and looking through, not at the IGU for a period of 10 seconds.
36. The primary seal (PIB) of the unit shall be continuous without any visual breaks in the material. The secondary seal shall also be continuous without any gaps where the spacer bar is visible. Small bubbles or shallow hollows in the secondary seal are acceptable.
37. The spacer bar of the IGU shall be nominally 12mm (+/- 1mm) from edge of glass.

38. The following defects or phenomenon should be rejected if visually obtrusive when viewed in accordance with clauses 33, 34 & 35.

    1. Loose debris inside the cavity
    2. Visible marks or scratches over 1.5mm on the inner surface of the sealed unit and multiple marks or scratches in the IGU where they are closer together than 2 in any 300mm radius or a maximum of 4 per IGU.
    3. Visible glass imperfections, such as open glass seeds greater than 1.5 mm or if more than 2 in any 300mm radius or a maximum of 4 per IGU.
    4. Damage or linear scratches to the spacer or integral bars
    5. Ingress of sealant into the cavity of the sealed unit, with the exception of the gas plug which is visible beyond the line of the sash or bead (15mm from edge of IGU)
    6. Visible scratches over 1.5mm in length on the surface of the glass
    7. Units in excess of 2mm over or under size
    8. Units with a in excess of a 2mm step
    9. Units in excess of 2mm out of square
    10. Newton rings, a rainbow effect in the centre of the glass
    11. Obvious Roller Wave
    12. Roller Pluck

39. The following phenomenon is to be expected with a modern IGU.

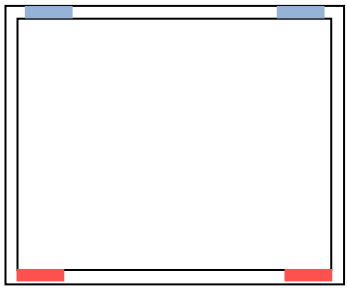
    1. Brewster Fringe, similar in appearance to Newton rings but around the periphery of the sealed unit is acceptable.
    2. In certain low angled sunlight low emissivity coatings can produce a coloured tint, this is normal and unavoidable.
    3. Double reflections
    4. Condensation appearing on the exterior of the IGU. This is caused by atmospheric conditions.
    5. Condensation on the internal or the IGU. Caused by the same reason as external condensation, this is because the relative humidity in the property has reached saturation, the dew point.
    6. Any external scratch that can be polished out to a degree, which it then passes clauses 33, 34 & 35.

7. Due to the nature of Flemish glass, buff marks may be present if the glass has been toughened.

Glazing

40. The Insulated Glass Unit (IGU) shall be positioned in the sash so that the spacer bar and edge seal is concealed behind the sash and not open to UV attack.
41. The IGU shall be suitably sized so that a minimum clearance of 5mm underneath the IGU and 3mm along the sides and head of the IGU.
42. Where possible the IGU will be central in the sash and a uniform 5mm clearance all around the IGU will be adopted.
43. All glass units shall be packed in accordance with BS 6262 and the GGF datasheet 4.2.
44. The location of the Setting blocks (red) centreline position shall be no greater than 75mm from the inside rebate. See figure 1
45. Locating blocks (Blue) are not distance specific as long as sufficient quantities are used to hold the IGU firmly within the sash. On large sashes there may be a need for more locating blocks than illustrated, especially on the sides of tall sashes and along the head of wide sashes. See figure 1

Figure 1



Georgian Bar

46. Any Georgian bar within the cavity of the sealed unit shall be free from scratches, swarf or damage and be no more than 2mm from the desired position.
47. All Georgian bars shall be within ± 2mm from parallel or straight.
48. Surface applied bars shall be positioned over the integral bars and shall be within +/- 1mm per 400mm length to a maximum of ± 2mm from either, straight, parallel, or the desired position. Multiple grid designs shall not have a cumulative tolerance.
49. Surface applied bar shall be no shorter than 1mm from the rebate length, and shall be no longer than 1mm of the rebate length, so not to bow the sash bars by more than the +/- 1mm tolerance.

50. Surface applied bars shall be machined at the ends to a maximum of 1mm deeper than the corresponding sash. The cross over cuts outs shall be no deeper than + 1mm than the corresponding bar. All surface applied bar shall fit snug to the glass surface.
51. No integral bar shall be visible from behind the surface applied bar, when viewed at 90 degrees to the glass.
52. The external SOG and the Internal SOG shall line through to within a maximum of 1mm to each other.
53. The surface applied bar shall have sufficient wet out of the double sided tape to assist the cross over construction method and permanently adhere the Georgian Bar to the glass surface for the lifetime of the IGU. (BBA 03/4304)

Balances

54. Not dependent upon the style or make of balance, all balances shall be straight and free from any visual sign of damage prior to use
55. Once fitted the sash shall be fully supported and of equal effort to both open and close the sash. The amount of effort to initially move the sash and then maintain movement shall not exceed BS6375:2
56. The fitted balance, with exception of the running noise of the balance, shall be free from any significant rattling noises or grinding, other than the expected balance operating noise.

Hardware

57. All hardware shall be fitted within ± 1mm for desired position using the correct approved screws; Self tapping machine screws for retention into steel and either hi-low or spaced thread for retention into PVC-U or GRP

Cams

58. The cam and keep shall be fitted in accordance to the fabrication requirements and parameters.
59. All cams and keeps shall engage without the need of excessive force being applied to the meeting rails. Some resistance and compression should be felt during the operation of the cam to make the seal; engagement of the cam into the keep shall require no more force than stated in BS6375:2
60. On Bygone & Vintage windows one of each handed cam shall be fitted in accordance to the fabrication instructions.
61. All cams and keeps should be free from visible damage or un-plated areas.

62. All cams shall be smooth in operation and without any excess play or movement.

Limit Stops

63. All limit stops shall fitted level, ± 1mm from the desired position, so that the bottom sash strikes both limit stops at a similar time.
64. The limit stops shall be free from visual damage, with no areas of un-plated material.
65. All limit stops shall be of equal shade in appearance and to the agreed sample.

Continuous Horn

66. The continuous horn shall be a tight fit to the profile as per the agreed sample.
67. There shall be no evidence of any super glue on either the face of the continuous horns moulding, or on the faces of the sash profile itself.
68. The meeting rail shall line through with the top of the continuous horn with a maximum misalignment of 1mm above the horn and 0mm below the horn.
69. Where it has been specified that the joint between the horn end cap and the sash style is filled, no filler material shall overspill onto either the horn end cap or sash style. All excess material will be suitable removed and the joint shall be penned in to hide the joint. It is impossible though to completely eliminate any traces of this joint.

Welds

70. The feature grooved weld shall be to a consistent depth and central to the weld.
71. The depth of the saw cut shall be no wider that the width of the feature groove.
72. The knife welded joint shall be a consistent height above the surface of the sash, and shall be smooth without any sharp edges.
73. All welds shall be clean of dirt or grease.
74. All welds when tested shall be able to withstand a 20Mpa (BS7412:2010, figure D1)
75. No two welds on a product are ever exactly the same. The Ovolo or Chamfered profile details shall have the sprue cut away in the best uniform manner as possible. No sharp burrs or protruding edges shall be left, or no indentations that are visible when observing the product in accordance with clause 1.
    a. On WWF profile the foil material will be softened during the weld process, the cleaning of the weld sprue can on occasions roughen the foiled finish.

b. Welds on colour foiled profiles will have the sprue coloured in with the appropriate RAL colour paint pen.

76. On P10156 some foil will be removed in the process of cleaning the weld sprue from the staff bead detail, due to the shape of the profile. Although this foil has been removed the edges will be neat and the weld will not be discoloured in any way.

Mechanical Joints

77. All mechanical jointed rails shall be within ± 1mm from the end of the sash styles in their natural position.
78. When tested for movement in accordance with BS7412, the joint shall remain within the accepted tolerance. (BS7412:2010)
79. The rail of the joint shall not protrude internally from the sash styles.
80. The appearance of the left and right joint shall be similar.

Beads

81. All fitted beads shall be cut +1mm or - 0.5mm from the theoretical length.
82. All beads shall fit into the sash correctly with no steps in the corners where the beads meet.

Reinforcing

83. All reinforcing, where required shall be cut shorter than the PVC-U length so not to effect the weld and shall be held in place using the correct approved screws at a maximum of 400mm centres (BBA 03/4054)

Draught Excluders

84. All fitted draught excluders shall be fully gripped within each chamber, not overstretched at any corner and glued into place.

Window Size

85. Measured externally at the corners of the frame, the overall width and height of the window shall be within ± 1mm of the desired size in width, and ± 1mm in height. (BBA 03/4054)
86. The internal and external size shall be within ± 1mm of each other. (MFW)

87. Measured externally at the corners of the sashes; individual sashes of the window shall be within ± 1mm of the desired size, in width or height. (BBA 03/4054)

Arches

88. All arches shall be manufactured to within an overall ± 5mm width and height to the required size. All sash sizes shall be within ± 1mm from theoretical size in the width and ± 5mm in the height, to match the frame dimension.
89. The sash to frame bend relationship shall be uniform, as well as the cover strip which shall follow the shape of the arch at all locations and silicone fixed firmly tight to the frame.
90. The welds to form the bend to the straight lengths shall be equal in height to each other from side to side. The width of the sprue shall be no wider than 1.5mm.
91. PVC-U welds shall be sanded and polished smooth. WWF welds shall be knifed off evenly with no sharp edges.
92. Some distortion of the profile is unavoidable during the bending process, however the faces of joining material should step be no more than 1mm. The internal rebate of the sash or frame should also step no more than 0.5mm.
93. It is unavoidable that during the bending process and dependant on the radius of the arch, some bubbles may appear in the foil, especially on detailed areas and edges. This bubbling will be limited to a maximum 2mm in diameter. This special ruling on arches 41overrideseclauses 25 & 26.
94. During the bending process the PVC-U or Foiled material is likely to experience a change in gloss finish and as such, a colour shading difference which is unavoidable.

Deflection

95. The lower sash rails of both the top and bottom sash shall be manufactured in such a way not to bow or deform them by more than 2mm from straight and level.
96. The upper sash rails and the sash styles shall not bow or deform more than 1mm from straight.
97. The wind loading deflection shall be no greater than L/150. (BS 6375:1)

Weather Performance

98. Windows are manufactured to weather ratings of:
    a. Class 3, 600pa Air tightness. (BS EN 12207 : 2000)
    b. Class 5A, 200pa Water penetration. (BS EN 12208 : 2000)
    c. Class A5, 2000pa resistance to wind load. (BS EN 12210 : 2000)

99. As with all fenestration products, there is an amount of allowable air infiltration allowed within the BS EN 12207:2000 test and, BS6375:1 weather performance specification. This air infiltration on any sash window is more noticeable at the meeting rail; this is normal and unavoidable.

100. The weather performance of the window is influenced by the installation of the product; bowing the frames or fitting the frame out of square, will adversely affect the performance of the window which is outside of the manufacturer's control.

Trickle Vents

101. Where trickle ventilators have been specified by the installation company the trickle vent will be fabricated within ± 1mm from the desired position.

102. Where vent is routed through the top rail of the top ash the reinforcing is unavoidable removed from the area of the slot. This negates clause 96