# Pottery from Late Saxon Chichester 

A REASSESSMENT OF THE EVIDENCE

by Ben Jervis

## PETROLOGICAL DESCRIPTIONS OF THE CHICHESTER FABRICS

Sherds were studied in hand specimen using a $\times 10$ binocular microscope. The terminology used is that defined by Orton et al. (1993). Three thin sections of each fabric were produced by the author at the university of Southampton and examined under a polarising microscope. Thin sections have been deposited at Chichester Museum. Duplicates can be found at the University of Southampton and in the possession of the author. Petrological descriptions are in italics.

## GROUP I: MIXED-GRIT WARES

## Fabric 1: Chapel Street kiln product

The core of this fabric is grey with brown/grey margins with bright orange surfaces. This suggests a degree of oxidation during firing. The fabric is hard and slightly rough. Many sherds have an almost soapy texture. The sherds break with irregular fracture. Visible inclusions are of abundant subangular flint and moderate sub-rounded chalk. Some of the flint is patinated suggesting it is derived from gravels or has been burnt. The flint appears well sorted however the chalk is more varied in size. All of the inclusions can be described as being of medium size.

Anisotropic ground mass of abundant silt sized quartz grains (30\%) with muscovite mica also present (5\%). There are some (10\%) larger sub-rounded quartz grains. The quartz is moderately sorted. Sub-angular flint of 20-30 microns in size is relatively abundant (10\%) as is sub-angular limestone in similar size and quantity. There are sparse anisotropic clay pellets of approximately 20 microns in size

## Fabric 9

The core of this fabric is grey with brown/grey margins. The exterior surface is a dull orange whilst the inner surface is a darker grey/brown. The fabric is hard and rough to touch. The fabric breaks with irregular fracture. The visible inclusions are of sub-rounded flint, sub-rounded chalk and sub-angular limestone all in moderate quantities. The internal surface is very vesicular, the irregular shape of these vesiculations implies they were once filled by limestone or chalk. The inclusions are all coarse-medium in size.

Similar groundmass to fabric 1. The flint and limestone inclusions are larger however (generally between 70-80 microns) and there are more abundant (10\%) iron rich anisotropic rounded clay pellets.

## Fabric 10

This fabric is grey throughout with the outer surface generally being darker than the core and interior. The fabric is soft and rough, abrasive in places. There are large, coarse visible inclusions of abundant angular flint, some is white and some is red, suggesting iron staining. Smaller moderatefine pieces of sub rounded chalk are also present in lesser quantities.

The groundmass is anisotropic and consists of very abundant (40\%) silt sized quartz grains and sparse (5\%) needles of muscovite mica. There are larger poorly sorted angular quartz grains of around 20 microns in size (20\%) and moderately sorted sub-angular flint fragments (20\%) ranging from 10-100 microns in size, the majority are around 30 microns. Moderately sorted limestone (chalk) is also present (10\%) and is around 50 microns in size.

## Fabric 15

The core is very dark grey/black in colour with orange margins and surfaces. The interior surface is considerably darker than the exterior. The surfaces are hard and rough however the break is particularly abrasive. The sherds break with irregular fracture. Angular inclusions of limestone and flint are both abundant and are poorly sorted in regards to size.

Similar groundmass to fabric 1. There are large inclusions of sub rounded limestone (10\%) and sub angular flint (10\%) and iron-rich anisotropic clay pellets (20\%). All are approximately 50 microns in size. Smaller pieces of limestone are less abundant (2\%) which are approximately 2-5 microns in size. Larger poorly sorted quartz grains of this size are also present in a small quantity (5\%).

## Fabric 20

The core is unevenly coloured in various shades of brown. The interior surface is a pinkish-grey whilst the exterior is dark grey to black in colour. The surfaces are hard and the feel is rough, abrasive in places. The fabric breaks with irregular fracture. Large sub-rounded white flint inclusions are present but sparse. There are abundant flecks of chalk and moderately sized fragments of limestone and flint.

Sparse anisotropic groundmass with abundant (15\%) small (2-5 micron) rounded quartz grains and a smaller amount (2\%) of larger moderately sorted rounded quartz grains of up to 20 microns in size. There are sparse (5\%) rounded flint fragments (10-20 microns in size) with occasional (2\%) larger pieces of up to 50 microns in size. Limestone is abundant (10-15\%) and is a mixture sub-rounded and sub-angular pieces which is moderately sorted (10-30 microns in size). Occasional (2\%) rounded anisotropic clay pellets are also present.

## Fabric 27

Very hard fabric with fairly smooth surfaces and irregular fracture. The colour varies from orange/ pink/brown. Inclusions of white flint are present in the surfaces but are fairly sparse. Chalk and ironrich clay pellets are visible in the break.

Sparse anisotropic matrix tempered with quartz sand (40\%). Other inclusions are sub-angular limestone (chalk) and flint (both moderately sorted, 10\%). There are occasional iron-rich clay pellets.

## Fabric 36

A hard, slightly soapy feeling oxidized fabric. Bright orange surfaces with large inclusions of black and white flint. The fracture is irregular.

This fabric was not examined in thin section.

## GROUP II: CHALKY WARES

## Fabric 6

This fabric is grey throughout, is very hard and breaks with irregular fracture. The texture varies greatly from smooth where the surface has been heavily wiped to abrasive, especially where there are vesiculations. There are abundant fine and medium sized sub-rounded chalk flecks as well as a moderate number of fine sub rounded flint fragments. There are rounded vesiculations on both surfaces.

Isotropic groundmass of silt sized quartz grains (10\%) and needles of muscovite mica ( $<2 \%$ ). Larger moderately sorted sub-angular quartz grains are sparse (2\%) and are no bigger than 5 microns in size. The principal inclusions are sub angular flint (20\%) of a approximately $10-30$ microns in size and poorly sorted (10-50 microns) sub-angular limestone (chalk) (30\%).

## Fabric 19

This hard, rough fabric is unevenly coloured in a variety of tones from greys to pinks. The fracture is irregular and the inclusions are of chalk and flint. The chalk is poorly sorted and is generally focused on the margin of the exterior surface. It is predominantly rounded. The flint is sparser and sub-rounded.

Anisotropic margins with a darker isotropic core. The groundmass is made up of silt sized quartz grains (10\%) and less (2\%) needles of muscovite mica. Larger moderately sorted sub-rounded quartz (20\%) is also abundant. There is poorly sorted (10-50 microns) sub-rounded limestone (chalk) (20\%). This is most abundant at the surfaces. Iron-rich clay pellets are sparse (5\%) and small (5-10 microns). Flint is present but sparse (2\%) and sub-angular. It is moderately sorted (10-30 microns). One piece of shell was present.

## Fabric 24

A hard, slightly soapy feeling fabric which is pink/ brown in colour. Fracture is irregular. The visible inclusions are large rounded pieces of chalk and smaller grits including iron-stained flint.

Isotropic matrix with abundant (20\%) silt sized quartz grains and muscovite mica (5\%). Plagioclase feldspar is present (<2\%). The main inclusion is poorly sorted limestone (chalk) (15\%) in a range of roundness classes. There are occasional (2\%) larger pieces of sub angular quartz and flint.

Fabric 33
A reduced fabric, black throughout. Very smooth surfaces and moderately soft. Breaks with irregular fracture. Inclusions of abundant rounded chalk are present and visible on the surfaces as well as in the break.

This fabric was not examined in thin section.

## GROUP III: FLINTY WARES

## Fabric 3

This fabric is coloured grey/black throughout although the outer surface is patchy and brown in places. The sherds are very hard and break with irregular fracture. The surface is quite smooth and the exterior is often wiped. Inclusions of fine angular white flint and chalk are moderately abundant in the hand specimen and a small number of sub-angular earthy specs indicate the presence of grog. Vesiculations on the interior surface imply that there was once limestone or larger pieces of chalk present.

Anisotropic groundmass of sparse (5\%) needles of muscovite mica and abundant (30\%) wellsorted sub-rounded and sub-angular quartz grains of approximately 3 microns in size. Sub-rounded limestone in varying sizes from 20-80 microns in size is moderately abundant (20\%) and there are occasional larger angular quartz grains of around 30 microns in size (5\%). Sub-rounded and sub-angular flint is present in similar quantities and sizes to the limestone. There is very sparse (<2\%) plagioclase feldspar. Grog or argillaceous clay pellets are present in the matrix (10\%). It is very fine-grained and slightly rounded. The largest piece is 100 microns in size. The groundmass is anisotropic and made up of silt-sized quartz and muscovite mica. It would be reasonable to suggest that the grog could be recycled Roman material.

## Fabric 8

This fabric is reduction fired and is black throughout. It is quite soft with a rough feel and irregular fracture. Visible inclusions are of angular flint, both black and white and are fairly abundant and
moderately sized. Surface treatment does not occur in any great quantity but there seems to be a small occurrence of wiping of surfaces.

Sparse anisotropic ground mass with moderately sorted sub-angular quartz of around 5 microns in size (5\%). The main inclusion is flint (30\%) which is subangular. Some could be described as tabular. It is poorly sorted and the average size is around 80 microns. There is also sparse (<5\%) sub-rounded limestone present with an average size of around 10 microns.

## Fabric 11

This smooth fabric is unevenly fired with a black interior and red exterior surface. It is very hard with irregular fracture. Large pieces of white sub-angular flint are moderately abundant and can be seen on the exterior surface. Finer pieces of angular flint are more abundant in the core of the fabric.

The groundmass is anisotropic and sparse. Moderately sorted sub-rounded quartz grains are present (5-10 microns) as well as less abundant larger (30 microns) grains. Large, moderately sorted (30-60) microns sub-angular flint is the most abundant inclusion. Moderately sorted (10-60 microns) subangular fine-grained sandstone or limestone is present, the majority is at the lower end of this size scale.

## Fabric 12

A hard grey/brown fabric with irregular fracture. The interior is abrasive however the exterior is smooth but has not been wiped. Sub-angular white flint is visible in both surfaces. The fracture is particularly abrasive and is made up of moderately sized sub-angular flint.

The groundmass is anisotropic and made up of relatively sparse (10\%) silt-sized quartz grains. There are occasional (5\%) moderately sorted sub-angular quartz which is moderately sorted (10-20 microns). Sub-angular flint is abundant (40\%) and well sorted, the pieces are generally 40 microns in size. Some of the voids suggest organic temper may have been present.

## Fabric 17

A very hard but smooth vesicular fabric. The core and interior surface are a fairly regular light grey colour however the exterior surface is orange. Vessels are generally thick walled and difficult to break creating quite a fine fracture. Both surfaces are very vesicular with very small pin-prick-sized holes. These suggest the presence of limestone. The
core is flecked with abundant rounded black flint and there is also a moderate amount of similarly sized sub-rounded limestone.

Isotropic matrix of silt sized quartz grains (5\%) and very sparse $(<2 \%)$ needles of muscovite mica. The dominant inclusion (20\%) is sub-rounded, moderately sorted flint between 50-80 microns in size. There is also sparse (5\%) sub-rounded limestone (10-20 microns) as well as some (5\%) larger moderately sorted quartz grains ranging from 10-40 microns in size. The roundedness of the limestone suggests it may have been naturally occurring in the clay.

Fabric 23
A very soft, crumbly fabric evenly coloured to a light brown/grey throughout. The fracture is extremely irregular. The matrix is profusely tempered with sub-rounded black flint of moderate size.

The matrix is made up of silt-sized quartz and muscovite mica and is perhaps, surprisingly, similar to fabric 1. There are larger (10-20) moderately sorted sub-angular quartz grains present (5\%). There is abundant (20\%) poorly sorted sub-angular flint ranging in size from 10-80 microns.

## Fabric 29

A hard, fabric with a rough interior and smoothed exterior. Colour ranges from pink/brown to black. The core is black. The sherds break with irregular fracture. Abundant small angular pieces of flint are visible in the break and a small quantity are visible on the surface.

The matrix is isotropic and fairly sparse however some silt-sized quartz grains are present (5\%). There are larger sub-rounded and sub-angular quartz grains (20\%) suggesting that sand may have been used as temper. Some of the quartz grains are polycrystalline. There are moderately sorted sub-angular flint pieces (15\%) as well as a small amount of sub-angular limestone (5\%).

## Fabric 34

A soft, smooth reduced fabric with very irregular fracture. The fabric is black throughout although the exterior is slightly mottled due to presence of darker flint inclusions. Inclusions of flint and chalk are present in the break.

The fabric has a sparse anisotropic matrix with silt sized quartz grains and muscovite mica. There are large sub-angular pieces of flint and smaller pieces of sub-rounded limestone (both 10-20\%).

## GROUP IV: IRON-RICH FABRICS

## Fabric 13

A hard rough fabric with a particularly abrasive break. The core is a pinkish-grey and the interior surface is the same colour. The exterior surface is pink/brown. Visible inclusions are of abundant fine angular flint and limestone with a smaller number of larger pieces of flint which are visible in the surfaces. Some orange specks of iron are present and a small amount of the flint appears to be iron-stained.

The groundmass is anisotropic and iron-rich. It is made up of silt-sized quartz grains with moderately sorted (10-30 microns) larger poorly sorted subrounded quartz (15\%). Large (20-50 microns) fragments of sub-angular limestone are fairly abundant (20-30\%). One piece of rounded flint is present in the thin section.

## Fabric 16

The core is yellowish-brown with darker brown interior and exterior surfaces. The fabric is rough with irregular fracture and exhibits no surface treatment. Visible inclusions are fine sub-angular limestone and flint both moderately abundant.

The matrix is sparse and anisotropic. There are abundant (40\%) small (2-5 microns) moderately sorted angular quartz grains and occasional (2\%) larger pieces (10-20 microns). Sub-rounded flint and limestone are present in approximately equal quantities (15\%) and are both poorly sorted (10-60 microns). There are moderately abundant (5-10\%) rounded iron rich clay pellets and very sparse (<2\%) needles of muscovite mica. Some of the iron-rich minerals may be glauconite. This perhaps suggests a Greensand source.

## Fabric 22

This fabric is rough with a grey/brown core and orange surfaces. It is quite soft with irregular fracture. The principal inclusion is made angular white (burnt) flint and specks of orange iron-rich minerals are visible.

The matrix is sparse and iron-rich. The groundmass is anisotropic with a number (2\%) of iron-rich clay pellets of up to 5 microns in size. Quartz is not abundant (5\%) and where it does occur it is subrounded, moderately sorted and up to 30 microns in size. Sub-angular limestone and flint is present (10\%) and is moderately sorted (15-50 microns). Some pieces appear iron-stained.

Fabric 25
This fabric is very rough and crumbles easily. It is orange/brown in colour. The primary inclusion is large pieces of angular white flint and some smaller iron-stained pieces. It is handmade and constitutes $0.14 \%$ of the assemblage by EVE.

The matrix is sparse and anisotropic with abundant (10\%) darker iron-rich clay pellets. There are abundant (10\%) poorly sorted pieces of sub-rounded limestone and sub-angular to angular flints. There are occasional (5\%) large sub-angular quartz grains.

## Fabric 31

A hard, rough reduced fabric with irregular fracture. The surfaces are black with a brown core. White flint inclusions are visible on the surfaces as well as in the break where chalk, angular black flint and iron-rich clay pellets are visible.

The matrix is anisotropic with abundant wellsorted quartz (40\%). There are large pieces of subrounded limestone and sub-angular flint (both 10\%). The matrix is very iron-rich and iron-rich minerals (glauconite?) are present.

## GROUP V: REDUCED SHELLY WARES Fabric 14

This fabric is black/dark grey throughout. It is hard and fairly smooth with irregular fracture. Inclusions are abundant fine angular limestone and flint, with some large pieces of shell present.

The groundmass is anisotropic and is made up of silt sized quartz grains (20\%) and needles of muscovite mica (2\%). There are abundant (30\%) poorly sorted larger quartz grains (5-40 microns) which are generally sub-rounded. There is abundant poorly sorted angular limestone and flint ( $20 \%$ each, $10-50$ microns) and moderately abundant (10-15\%) shell.

## Fabric 18

This fabric has a black core and exterior surface although the interior surface is brown. It is softer than fabric 14 and breaks with irregular fracture. Walls are generally thicker in this fabric than in fabric 14 . It is fairly smooth to touch. The same inclusions occur as in fabric 14 and are larger but similarly abundant. There are vesiculations on the interior surface which are suggestive of limestone and further shell both being present originally.

The groundmass is sparse and isotropic with needles of muscovite mica (2\%) and abundant (40\%) small (2-5 microns) moderately sorted angular quartz.

There are some (5\%) larger (up to 40 microns) pieces of rounded quartz. Poorly sorted, large (10-80 microns) sub-rounded and sub-angular limestone (15\%) is present along with moderately sorted (10-30 microns) sub-rounded flint (5\%). Shell is present (5\%).

## Fabric 32

A hard rough fabric with irregular fracture. Pink/ brown-black in colour. Inclusions of fine flint and chalk are visible in the break as well as pieces of shell.

The groundmass is isotropic with abundant silt sized quartz grains and muscovite mica (5\%). There are abundant (20\%) larger well-sorted sub-rounded and sub-angular quartz grains. Shell is moderately abundant (15\%) and sub-rounded and sub-angular flint and chalk are present in similar quantities (10\%). This fabric is similar to fabric 14, the key differences being in the firing and the sorting of the quartz sand temper.

## GROUP VI: MICACEOUS SAND-TEMPERED WARES Fabric 30

A hard and smooth reduced fabric, black throughout. The fracture is irregular. No inclusions are visible however the texture is sandy. The fabric is quite micaceous.

The matrix is anisotropic and micaceous (muscovite mica: 5\%). There is occasional orthoclase feldspar (2\%) and rounded polycrystalline quartz (5\%). There are abundant (30\%) sub angular well sorted quartz grains which are suggestive of the use of sand as temper. There are also a small amount (5\%) of moderately sorted small angular pieces of flint.

## GROUP VII: IMPORTED POTTERY <br> Fabric 26

This fabric is pink throughout with rough surfaces, it is quite hard. Inclusions of angular white flint are visible on the surfaces as well as in the break. The fracture is irregular. This could be related to Hamwic fabric 187 (Timby 1988, 101). Alternatively it may date from the twelfth century (Chris Jarrett, pers. comm.).

The groundmass is sparse and anisotropic however there are abundant (20\%) iron-rich clay pellets. Moderately sorted quartz is moderately abundant (15\%) and is sub-angular. Moderately sorted angular flint is present is similar abundance.

## Fabric 28: Portchester ware

Very hard, rough fabric with irregular fracture. The interior is vesicular. Colour ranges from black-
light brown. Visible inclusions are primarily small angular pieces of flint.

The matrix is isotropic with silt-sized quartz grains (10\%) and muscovite mica (2\%). There are moderately sorted sub-rounded limestone ( $15 \%$ ) and
flint (10\%) pieces as well as some moderately sorted larger sub-rounded quartz grains (10\%). The thin sections correspond with Hodges group 1 fabrics from Portchester Castle (Cunliffe 1976, 192).

## REFERENCE

Orton, C., Tyers, P. \& Vince, A. 1993. Pottery in
Archaeology. Cambridge: Cambridge University Press.

Table 3. Descriptions of Group I (mixed grit) fabrics.

|  | Flint | Chalk | Iron-rich minerals | Fracture | Texture | Colour |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 Chapel Street product | Abundant, subangular; medium size; some patinated. | Moderate, sub-rounded; medium size. | Iron-rich matrix visible in thin section | Irregular | Hard; slightly rough with soapy texture | Grey core with orange/brown margins |
| 9 | Moderate, subrounded; coarsemedium size | Moderate, sub-rounded; coarse-medium size |  | Irregular | Hard and rough | Grey core with grey/brown margins |
| 10 | Abundant, angular; coarse size; some patinated and ironstained | Moderate, subrounded; fine. |  | Irregular | Soft and rough, abrasive in places | Grey throughout |
| 15 | Abundant, angular and poorly sorted | Abundant, angular and poorly sorted |  | Irregular | Hard and rough; break is particularly abrasive | Dark grey/black core with orange surfaces |
| 20 | Sparse, subrounded; coarse size; patinated. | Abundant flecks |  | Irregular | Hard and roughabrasive | Uneven core, brown; pinkishgrey interior surface, black/grey exterior surface |
| 27 | Sparse, angular; medium size; patinated. | Sparse flecks | Sparse, rounded iron-rich clay pellets | Irregular | Very hard, smooth surfaces | Variable orange/ pink/brown. |
| 36 | Abundant, angular and coarse; some patinated; other angular, unidentified grits are also present |  |  | Irregular | Hard, slightly soapy | Dark core, bright orange surfaces |

Table 4. Group II (chalky) fabric descriptions.

|  | Flint | Chalk | Shell | Iron-rich <br> minerals | Fracture | Texture | Colour |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 6 | Moderate, sub- <br> rounded; fine <br> sized | Abundant, fine <br> and medium sized, <br> sub-rounded; further <br> vesiculations |  | Irregular | Hard, variable | Grey <br> throughout |  |
| 19 | Sparse, sub- <br> rounded; <br> medium in size | Poorly sorted, <br> moderate abundance <br> but focused on the <br> exterior surface | Sparse, only <br> visible in thin <br> section |  | Irregular | Hard, rough | Uneven grey- <br> pink |
| 24 | Moderate <br> fine-sized and <br> angular; some <br> iron-stained | Abundant, coarse <br> sized and rounded |  | Irregular | Hard, slightly <br> soapy. | Pink/brown |  |
| 33 | Sparse, medium- <br> sized sub-angular | Abundant, rounded; <br> poorly sorted |  | Irregular | Soft and <br> smooth | Reduced - black <br> throughout |  |

Table 5. Group III (flinty) fabric descriptions.

|  | Flint | Chalk | Organic | Clay <br> pellets/ <br> Grog | Fracture | Texture | Colour |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 3 | Abundant, <br> angular; fine <br> sized; patinated | Abundant, <br> angular; fine sized; <br> vesiculations suggest <br> presence of larger <br> pieces |  | Argillaceous <br> pellets, <br> possibly grog | Irregular | Hard and <br> rough | Grey/black <br> throughout |
| 8 | Abundant, <br> sub-angular; <br> moderately <br> sized, some is <br> patinated |  |  |  | Irregular | Soft and <br> rough |  |
| 11 | Moderate, sub- <br> angular; coarse <br> sized, some is <br> patinated; some <br> finer pieces in <br> the core |  |  |  | Black <br> throughout |  |  |
| 12 | Moderate, sub- <br> angular; medium <br> sized, patinated |  |  |  | Irregular | Hard and <br> smooth |  |

Table 6. Group V (shelly) fabric descriptions.

|  | Flint | Chalk | Shell | Sand | Iron-rich <br> minerals | Fracture | Texture | Colour |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 14 | Abundant, <br> angular; fine <br> sized | Abundant, angular; <br> fine sized | Moderate, <br> large pieces |  | Irregular | Hard <br> and <br> smooth | Black/grey <br> throughout |  |
| 18 | Abundant, <br> angular; medium <br> sized | Abundant, angular; <br> medium sized | Moderate, <br> large pieces |  |  | Irregular | Soft and <br> smooth | Black core <br> and exterior <br> surface; brown <br> interior surface |
| $\mathbf{3 2}$ | Moderate, <br> angular; fine <br> sized | Moderate, angular; <br> fine sized | Moderate, fine <br> pieces |  |  | Pink/brown |  |  |

Table 7. Group VI (micaceous sand tempered) fabric description.

|  | Sand | Fracture | Texture | Colour |
| :--- | :--- | :--- | :--- | :--- |
| 30 | Abundant, sand-sized quartz grains | Irregular | Hard and smooth | Black/grey throughout |

Table 10. Occurrence of jar rim forms using EVEs. Where the EVE figure is 0 rims existed but were too small to be measured.

Table 11. Occurrence of bowl rim forms using EVEs. R0 could not be assigned to a particular form.

|  | Jar | \%ge |
| :--- | :---: | :---: |
| R1 | 104.46 | 66 |
| R2 | 0.26 | $<1$ |
| R3 | 42.27 | 27 |
| R4 | 0.15 | $<1$ |
| R6 | 3.37 | 2 |
| R8 | 6.57 | 4 |
| R9 | 0.57 | $<1$ |
| R10 | 0.48 | $<1$ |
| R11 | 0 | $<1$ |
| R12 | 1.14 | $<1$ |
| R13 | 0.1 | $<1$ |
| Total | $\mathbf{1 5 9 . 3 7}$ |  |


|  | EVE | \%ge |
| :--- | :---: | :---: |
| R1 | 0.41 | 3 |
| R2 | 1.42 | 10 |
| R3 | 3.45 | 25 |
| R4 | 0.15 | 1 |
| R6 | 0.1 | $<1$ |
| R7 | 4.79 | 34 |
| R8 | 3.85 | 27 |
| R0 | 0.05 | $<1$ |
| Total | $\mathbf{1 4 . 2 2}$ |  |

Table 12. Group IV (iron-rich fabrics) fabric descriptions.

|  | Flint | Chalk | Iron-rich minerals | Fracture | Texture | Colour |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 13 | Abundant, angular; fine <br> sized; some iron-stained |  | Flecks of iron-rich <br> minerals/clay pellets | Irregular | Hard and rough | Pinkish- <br> grey-brown <br> throughout |
| 16 | Moderately abundant, <br> subangular; fine sized | Moderately <br> abundant, sub- <br> angular; fine <br> sized. | Sparse, moderately <br> abundant iron-rich <br> minerals visible in <br> thin-section | Irregular | Hard and rough | Yellowish-brown <br> core with darker <br> brown surfaces |
| 22 | Moderately abundant, <br> angular; medium sized; <br> patinated (probably <br> burnt) | Abundant specks | Irregular | Soft and rough | Grey/brown <br> core with orange <br> surfaces |  |
| 25 | Sparse, angular; coarse <br> sized; iron-stained |  | Abundant iron-rich <br> pellets visible in thin- <br> section |  | Orange/brown |  |
| 31 | Moderate, angular; <br> medium sized |  | Moderate, rounded <br> iron-rich clay pellets | Irregular | Hard and rough | Brown core, <br> black surfaces |

Table 13. Group VII (other non local wares) fabric descriptions.

|  | Flint | Chalk | Fracture | Texture | Colour |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 26 - Possibly related to <br> Hamwic fabric 187 | Moderate, angular.; <br> medium sized; patinated |  | Irregular | Hard and rough | Pink throughout |
| 28 - Portchester ware | Moderate, angular; fine <br> sized | Some <br> vesiculations | Irregular | Hard and rough | Black-light brown |

Table 14．Distribution of fabrics at selected sites in Chichester．

| ［E1OL $\mathbf{3 8 \%}$ | ¢ |  | $m$ |  | $\wedge$ |  | $m$ |  | H |  | $\bigcirc$ |  | $\bigcirc$ |  | $\checkmark$ |  | $\wedge$ |  | $\bigcirc$ |  | $-$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TVLOL |  |  | $\begin{aligned} & 0 \\ & \vdots \\ & \vdots \end{aligned}$ |  | $\begin{aligned} & \mathrm{O} \\ & \hat{\circ} \\ & \end{aligned}$ |  | $\begin{aligned} & 0 \\ & i \\ & 2 \end{aligned}$ |  | $\begin{aligned} & \vec{o}_{0} \\ & { }_{j}^{2} \end{aligned}$ |  | $\bigcirc$ |  | $\bigcirc$ |  | － |  | N N N |  | $\stackrel{8}{\infty}$ |  | 은 |  |
| ग1！ $38 \%$ | ¢ |  | $N$ |  | N |  | $\square$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $\varepsilon \operatorname{exsy~MN}$ | ¢ | $m$ | O | $\sim$ | $\begin{gathered} \mathrm{O} \\ \text { ה } \end{gathered}$ | $\pm$ | $\bigcirc$ | － |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| อ115 38\％ | $\stackrel{\sim}{2}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $n$ |  |  |  | 9 |  |
| иәр．гэ saseчо．nnd 9 שว．．र MN | $\begin{aligned} & 8 \\ & i n \\ & \hline \end{aligned}$ | $\bigcirc$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\infty$ | $\bigcirc$ |  |  | 악 | $\stackrel{\infty}{\sim}$ |
| 2بIs－8\％ | $\stackrel{+}{+}$ |  | $\infty$ |  | in |  | $\bigcirc$ |  | N |  |  |  |  |  | $\checkmark$ |  |  |  | $\sim$ |  |  |  |
| IIEH IOdson <br> s ea．ry MN | $\begin{aligned} & \text { ON} \\ & \text { N } \end{aligned}$ | N | $\begin{aligned} & \infty \\ & i \\ & i \end{aligned}$ | $\bigcirc$ | $\begin{aligned} & 0 \\ & \mathrm{~m} \\ & \hline \end{aligned}$ | $\sim$ | $\stackrel{\sim}{\sim}$ | $\bigcirc$ | $\underset{\sim}{\underset{G}{G}}$ | $\cdots$ |  |  |  |  | $8$ | $\bigcirc$ |  |  | 아 | in |  |  |
| ग115 38\％ | in |  | $\bigcirc$ |  | $\infty$ |  | $\bigcirc$ |  | H |  |  |  |  |  | $\bigcirc$ |  | の |  | $\rightarrow$ |  | $\rightarrow$ |  |
| р．ех suәшәว pue fooyos sןi！ <br>  | i | ন | 8 | － | $\begin{aligned} & \text { O} \\ & \text { సָ } \end{aligned}$ | N | $\bigcirc$ | $\sim$ | $\begin{aligned} & \infty \\ & \infty \\ & \stackrel{\circ}{N} \end{aligned}$ | $\stackrel{\square}{\sim}$ |  |  |  |  | $8$ | $\bigcirc$ | $\begin{gathered} \circ \\ \stackrel{\circ}{\sim} \end{gathered}$ | N | in | \＃＇ | $\stackrel{?}{\wedge}$ | $\stackrel{\sim}{\sim}$ |
| อบ！ $38 \%$ | $\bigcirc$ |  | $n$ |  |  |  | $N$ |  | $N$ |  |  |  |  |  |  |  | $\stackrel{\square}{-}$ |  | $\bigcirc$ |  | $-$ |  |
| $\begin{aligned} & \text { IS iədeчว } \\ & \text { I eә.रV MN } \end{aligned}$ | $\begin{aligned} & \text { N} \\ & \text { N్ర } \end{aligned}$ | H | $\begin{aligned} & \mathrm{O} \\ & \mathrm{~N} \end{aligned}$ | $\cdots$ |  |  | $\underset{\sim}{g}$ | － | $\stackrel{\sim}{N}$ | $\sim$ |  |  |  |  |  |  | $\begin{gathered} 0 \\ \underset{\sim}{7} \end{gathered}$ | $\wedge$ | $\stackrel{\sim}{\circ}$ | ＋ | 8 | N |
| ग1！ $38 \%$ | $\stackrel{\sim}{\sim}$ |  | $\checkmark$ |  | $\infty$ |  | $\infty$ |  | H |  |  |  | $\bigcirc$ |  | $\bigcirc$ |  | $\sim$ |  | $\bigcirc$ |  | $\sim$ |  |
| S．IU！yイอ．ı | $\begin{aligned} & \text { qu } \\ & \text { r } \end{aligned}$ | $m$ | $\underset{\sim}{\infty}$ | $\sim$ | $\begin{gathered} \underset{\sim}{\mathrm{N}} \\ \hline \end{gathered}$ | $\bar{\square}$ | $\begin{aligned} & 0 \\ & \text { y } \\ & \end{aligned}$ | $\stackrel{\sim}{\sim}$ | $\stackrel{\sim}{n}$ | $\wedge$ |  |  | $\bigcirc$ | $\bigcirc$ | q | $\sim$ | $\begin{aligned} & 0 \\ & \infty \\ & \infty \end{aligned}$ | $\stackrel{\infty}{\sim}$ | is | $\bigcirc$ | $\begin{aligned} & 0 \\ & \hline \\ & \text { in } \end{aligned}$ | $\stackrel{\sim}{\sim}$ |
| ग1！ $38 \%$ | $\sim$ |  | $\wedge$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 2 | $\bigcirc$ | $\underset{\sim}{0}$ | － |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0115 58\％ | $\stackrel{\sim}{*}$ |  | $\checkmark$ |  | $a$ |  | $\sim$ |  | $\bigcirc$ |  | $\bigcirc$ |  |  |  | $n$ |  | $a$ |  | $-$ |  | $\wedge$ |  |
|  | $\underset{m}{\underset{m}{m}}$ | $\sim$ | $\%$ | $\sim$ | $\begin{gathered} \underset{\sim}{\mathrm{N}} \\ \hline \end{gathered}$ | $\bigcirc$ | $\stackrel{\stackrel{\rightharpoonup}{N}}{ }$ | $\cdots$ | $\underset{\infty}{\underset{\infty}{0}}$ | $\bigcirc$ | ¢ | in |  |  | $\stackrel{\sim}{7}$ | $\stackrel{\sim}{\sim}$ | $\underset{\underset{\sim}{\mathrm{N}}}{\substack{0}}$ | $\bigcirc$ | $\bigcirc$ | $a$ | 名 | M |
| 0115 58\％ | \％ |  | $\bigcirc$ |  | $\checkmark$ |  | $\wedge$ |  | $\wedge$ |  |  |  |  |  | $\bigcirc$ |  | in |  | $\bigcirc$ |  |  |  |
| HS ЈэMOL | － | F | $\begin{aligned} & 0 \\ & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ | F | $\begin{aligned} & 0 \\ & i n \\ & i n \end{aligned}$ | m | $\left\|\begin{array}{c} 0 \\ 0 \\ \infty \\ N \end{array}\right\|$ | $\stackrel{\sim}{\text {－}}$ | $\begin{gathered} 0 \\ \stackrel{0}{0} \\ \cdots \end{gathered}$ | त |  |  |  |  | $0$ | a | $\stackrel{+}{1}$ | $\infty$ | $\stackrel{\sim}{\sim}$ | m |  |  |
| 21！5 $38 \%$ | $\pm$ |  | $\infty$ |  | $\checkmark$ |  | $\stackrel{\infty}{\sim}$ |  | $\bigcirc$ |  | － |  |  |  | $\sim$ |  | $m$ |  | $\sim$ |  |  |  |
| spuites IIV | \％ | $\bigcirc$ | $\begin{aligned} & 0 \\ & \mathrm{~N} \\ & \mathrm{~m} \end{aligned}$ | ＋ | 9 | $\bigcirc$ | $\left\|\begin{array}{l} \underset{+}{\circ} \\ \infty \end{array}\right\|$ | $a$ | $\bigcirc$ | $\bigcirc$ | － | \％ |  |  | $\infty$ | in | $\underset{\sim}{G}$ | － | $\bigcirc$ | $\bigcirc$ |  |  |
| อบ！ $38 \%$ | $\infty$ |  | $\sim$ |  | $\infty$ |  | $\wedge$ |  |  |  |  |  |  |  |  |  | $\wedge$ |  |  |  |  |  |
|  <br>  | $\infty$ | 0 | 은 | $\bigcirc$ | $\infty$ | $\bigcirc$ | $\stackrel{\text { ® }}{ }$ | $\sim$ |  |  |  |  |  |  |  |  | $\bigcirc$ | $\bigcirc$ |  |  |  |  |
| －115 58\％ | is |  | $m$ |  | $\bigcirc$ |  | N |  | $n$ |  |  |  |  |  | $\checkmark$ |  | $\bigcirc$ |  |  |  |  |  |
| 1S İdeYつ | 会 | in | $\begin{aligned} & 0 \\ & i \\ & i \end{aligned}$ | $\cdots$ | O | ブ | $\begin{aligned} & \mathrm{N} \\ & \text { N} \\ & \text { d } \end{aligned}$ | N | $\stackrel{0}{\underset{\sim}{7}}$ | ＋ |  |  |  |  | N | \％ | $\stackrel{\substack{\text { ¢ } \\ \sim \\ \sim}}{ }$ | ले |  |  |  |  |
|  | － |  | $a$ |  | O | $0$ | $\cdots$ | $\begin{gathered} 0 \\ 000 \\ 0 \\ 0 \\ 0 \end{gathered}$ | N |  | N |  | $\cdots$ | $\begin{aligned} & 8.0 \\ & 00 \\ & 0.0 \\ & 0.0 \end{aligned}$ | $\bigcirc$ | $\begin{gathered} 80.0 \\ 00 \\ 00 \\ 0.0 \\ 0 \end{gathered}$ | 9 | $\begin{gathered} 0.0 \\ 00 \\ 0.0 \\ 0.0 \\ 0 \end{gathered}$ | N | $\begin{gathered} 0_{0}^{0} \\ 00 \\ 00 \\ 0 \\ 0 \end{gathered}$ | m |  |


| ［E7OL 3 \％ | $-$ |  | $\rightarrow$ |  | $\bigcirc$ |  | 0 |  | ＊ |  | $\rightarrow$ |  | － |  | $\bigcirc$ |  | $\bigcirc$ |  | $\sim$ |  | $\bigcirc$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TVLOL | $\begin{aligned} & \stackrel{\infty}{N} \\ & \stackrel{y}{n} \end{aligned}$ |  | $\begin{gathered} o \\ \underset{e}{n} \\ \mathrm{~m} \end{gathered}$ |  | $\begin{aligned} & 0 \\ & \underset{7}{7} \end{aligned}$ |  | $\frac{0}{2}$ |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\dddot{3}} \\ & \vec{\exists} \end{aligned}$ |  | $\begin{aligned} & \text { O} \\ & \text { No } \end{aligned}$ |  | $\begin{gathered} o \\ \infty \\ \infty \\ n \end{gathered}$ |  | $\stackrel{8}{\circ}$ |  | $\underset{\infty}{\stackrel{0}{\infty}}$ |  | $\begin{gathered} 4 \\ \underset{\sim}{2} \end{gathered}$ |  | $\stackrel{0}{-}$ |  |
| 2115 58\％ |  |  |  |  |  |  |  |  | N |  | $\checkmark$ |  |  |  | in |  |  |  | $\checkmark$ |  |  |  |
| $\varepsilon$ eoriv MN |  |  |  |  |  |  |  |  | $2$ | N | $\stackrel{0}{n}$ | $\bigcirc$ |  |  | $\begin{aligned} & \circ \\ & \text { in } \end{aligned}$ | $\sim$ |  |  | © | $\rightarrow$ |  |  |
| 21！ $38 \%$ |  |  |  |  |  |  |  |  | N |  |  |  | $\stackrel{\square}{2}$ |  |  |  |  |  |  |  |  |  |
| иәр．геэ sәseчо．мnd 9 ש．．rV MN |  |  |  |  |  |  |  |  | $\stackrel{?}{\square}$ | N |  |  | $\stackrel{\otimes}{9}$ | $\cdots$ |  |  |  |  |  |  |  |  |
| －1！5 28\％ | $N$ |  |  |  |  |  | 0 |  |  |  |  |  | ＋ |  |  |  |  |  | $m$ |  |  |  |
| IIEH IOdson <br> s ea．ry MN | $\stackrel{\square}{7}$ | ＋ |  |  |  |  | $\stackrel{\sim}{2}$ | $\sim$ |  |  |  |  | $\begin{aligned} & 0 \\ & i \\ & n \end{aligned}$ | $\wedge$ |  |  |  |  | 쳅 | m |  |  |
| －${ }^{\text {P15 }}$ 28\％ | $\bigcirc$ |  | $\square$ |  | $\bigcirc$ |  | $\bigcirc$ |  | $\square$ |  |  |  | N |  | $\bigcirc$ |  |  |  | $\infty$ |  | $\bigcirc$ |  |
| р．ге pue Iooyss sirip <br>  | $\infty$ | m | $\stackrel{0}{n}$ | $\bigcirc$ | $\stackrel{8}{7}$ | $a$ | $0$ | $\sim$ | $\stackrel{\rightharpoonup}{i}$ | in |  |  | $\begin{aligned} & 8 \\ & 8 \\ & 0 \end{aligned}$ | $\stackrel{\sim}{\sim}$ | $\stackrel{\rightharpoonup}{n}$ | $\wedge$ |  |  | $\begin{aligned} & 0 \\ & 7 \end{aligned}$ | is | 아 | $\stackrel{\sim}{\sim}$ |
| 0บ！ $38 \%$ | $-$ |  |  |  | $-$ |  |  |  | $\bigcirc$ |  |  |  | $\bigcirc$ |  |  |  |  |  | $\sim$ |  |  |  |
| 1S IPdeчつ I ea．ry MN | $\infty$ | m |  |  | i | ＋ |  |  | 안 | $\bigcirc$ |  |  | $\bigcirc$ | $\bigcirc$ |  |  |  |  | $\begin{aligned} & \stackrel{0}{n} \\ & \stackrel{1}{2} \end{aligned}$ | $\sim$ |  |  |
| 2115 28\％ | $\sim$ |  | $m$ |  | $\bigcirc$ |  | 0 |  | $\sigma$ |  | $\bigcirc$ |  | $m$ |  | $\bigcirc$ |  |  |  | $\checkmark$ |  |  |  |
| S．IE！．， | প্子 | $\stackrel{\infty}{\sim}$ | $8$ | $\stackrel{\infty}{\sim}$ | \％ | H | q | ＋ | $\frac{P}{N}$ | 2 | O | in | $\left\|\begin{array}{c} 0 \\ \infty \\ \infty \end{array}\right\|$ | $\stackrel{\rightharpoonup}{N}$ | $\stackrel{\sim}{N}$ | m |  |  | f | $\sim$ |  |  |
| 0115 28\％ |  |  |  |  |  |  |  |  |  |  |  |  | の |  |  |  |  |  | $\cdots$ |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | $\bigcirc$ | $\sim$ |  |  |  |  | $8$ | $\checkmark$ |  |  |
| 27！5 $38 \%$ |  |  | $\square$ |  |  |  | 0 |  | $\sim$ |  | $\bigcirc$ |  | m |  | $\bigcirc$ |  |  |  | $\sim$ |  |  |  |
| 20yłO $\mathbf{1 S O}_{\text {S }} \mathbf{d}$ |  |  | $\stackrel{8}{2}$ | m |  |  | \％ | ＋ | $\begin{aligned} & 0 \\ & \stackrel{2}{2} \end{aligned}$ | $\pm$ | ¢ | N | $\begin{aligned} & 0 \\ & i \\ & m \end{aligned}$ | a | ¢ | in |  |  | $\underset{\text { O }}{\substack{\text { N }}}$ | $\cdots$ |  |  |
| गบ！ $28 \%$ | $-$ |  | $m$ |  |  |  | $\bigcirc$ |  | $m$ |  | $\sim$ |  | $\sim$ |  |  |  | $\bigcirc$ |  | $-$ |  |  |  |
| 1S JOMOL | \％ | $\cdots$ | $\begin{aligned} & \text { Q } \\ & \text { 合 } \end{aligned}$ | $\stackrel{\sim}{*}$ |  |  | $8$ | $\exists$ | $\begin{aligned} & 0 \\ & \underset{\sim}{\mathrm{O}} \end{aligned}$ | F | \％ | $\stackrel{\sim}{\sim}$ | $\left\lvert\, \begin{gathered} 0 \\ \infty \\ \infty \end{gathered}\right.$ | N |  |  | \％ | in | N | $\cdots$ |  |  |
| 21！ $38 \%$ |  |  | ＊ |  |  |  | $\checkmark$ |  | $\infty$ |  | in |  |  |  |  |  |  |  | ＊ |  |  |  |
| sluites IIV |  |  | $\stackrel{1}{2}$ | in |  |  | 8 | $\wedge$ | $\begin{aligned} & 0 \\ & 0 \\ & m \end{aligned}$ | $m$ | $\begin{gathered} \mathrm{O} \\ \text { N } \end{gathered}$ | $a$ |  |  |  |  |  |  | $\stackrel{\otimes}{\infty}$ | $\sim$ |  |  |
| 27！ $38 \%$ |  |  | $\stackrel{\sim}{2}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\sim$ |  |  |  |
|  <br>  |  |  | $\begin{aligned} & 8 \\ & \mathbf{N} \end{aligned}$ | in |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\stackrel{\sim}{2}$ | $\bigcirc$ |  |  |
| － | $\square$ |  | $\square$ |  | $\square$ |  | $\bigcirc$ |  | ＊ |  | $-$ |  |  |  |  |  | $\rightarrow$ |  | $-$ |  | $\bigcirc$ |  |
| 15 IPdeyO | $\begin{aligned} & 0 \\ & \stackrel{0}{7} \end{aligned}$ | $\stackrel{\circ}{\sim}$ | $\stackrel{\sim}{n}$ | $\stackrel{\sim}{\sim}$ | ô | $\infty$ | $\begin{gathered} 0 \\ \text { of } \\ \hline \end{gathered}$ | is | $\begin{gathered} \stackrel{\circ}{\circ} \\ \stackrel{\infty}{\infty} \end{gathered}$ | ＋ | $\stackrel{0}{7}$ | 出 |  |  |  |  | $\underset{\infty}{\infty}$ | $\sim$ | ？ | N | $\stackrel{\sim}{1}$ | $\cdots$ |
|  | － |  | $\infty$ |  | $=$ |  | N |  | $\stackrel{-}{-}$ |  | N | $0$ | N | 淢荮 | $\cdots$ |  | $\stackrel{1}{2}$ |  | $\stackrel{-}{-}$ |  | N |  |


| ［E1OL $\mathbf{~ 2 8 \%}$ | $\bigcirc$ |  | $\square$ |  | $\bigcirc$ |  | $\checkmark$ |  | － |  | $\bigcirc$ |  | $\bigcirc$ |  | $\bigcirc$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| TVLOL | I |  | $\begin{aligned} & 0 \\ & \stackrel{N}{3} \end{aligned}$ |  | $\begin{gathered} \hat{1} \\ i \\ 0 \\ e \end{gathered}$ |  | $$ |  | $\underset{m}{0}$ |  | $\stackrel{\infty}{\infty}$ |  | $\stackrel{0}{\mathrm{~N}}$ |  | 8） |  |  |  |
| 2115 28\％ | $\bigcirc$ |  | $m$ |  | $\wedge$ |  | $-$ |  |  |  |  |  |  |  |  |  |  |  |
| $\varepsilon \operatorname{exsy~MN}$ | \＆ | 3 | $\stackrel{\mathrm{c}}{\mathrm{~N}}$ | $\bigcirc$ | $\begin{gathered} o \\ \underset{N}{n} \end{gathered}$ | $\wedge$ | $0$ | $\wedge$ |  |  |  |  |  |  |  |  | O $\stackrel{1}{N}$ N | ＋ |
| 2115 58\％ | $\sim$ |  |  |  | $\vec{n}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| иәр．кед sәsечо．мnd 9 שว．．रV MN | 아 | ＋ |  |  | $\stackrel{\otimes}{\wedge}$ | m |  |  |  |  |  |  |  |  |  |  | $\left.\begin{array}{\|c} 0 \\ i \\ n \\ n \end{array} \right\rvert\,$ | － |
| ข1！ $38 \%$ |  |  |  |  | $\wedge$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| IIEH IOdsog <br> s ea．ry MN |  |  |  |  | in | $N$ |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \text { त } \\ & \text { R } \end{aligned}$ | N |
| 21！5 58\％ | $\bigcirc$ |  | $\bigcirc$ |  | ＋ |  | $\bigcirc$ |  | $\bigcirc$ |  |  |  | $\bigcirc$ |  | $\bigcirc$ |  |  |  |
| р．ге suәшәэ put Iooyss sIr！ <br>  | g | $\cdots$ | $\stackrel{\sim}{\sim}$ | － | $\left.\begin{gathered} \mathrm{N} \\ \mathrm{~N} \end{gathered} \right\rvert\,$ | $\wedge$ | $\stackrel{\sim}{m}$ | － | 夺 | ブ |  |  | 아 | $\stackrel{\square}{\sim}$ | q | $\bigcirc$ | $\begin{array}{\|c} \overrightarrow{\hat{b}} \\ \hat{n} \\ \mathbf{n}^{2} \end{array}$ | $\stackrel{\infty}{\sim}$ |
| 2115 98\％ |  |  |  |  |  |  | $-$ |  |  |  |  |  | $\bigcirc$ |  | $\sim$ |  |  |  |
| 1S Iədeчว I E．J．V MN |  |  |  |  |  |  | $\infty$ | ＋ |  |  |  |  | 안 | $\stackrel{\square}{\sim}$ | $\bigcirc$ | $\bigcirc$ | $\left\|\begin{array}{l} \infty \\ \infty \\ \infty \\ \infty \end{array}\right\|$ | m |
| 27！5 28\％ | $\bigcirc$ |  | $a$ |  | $\stackrel{\sim}{2}$ |  | $m$ |  | $\bigcirc$ |  | $\rightarrow$ |  | $\bigcirc$ |  | $-$ |  |  |  |
| S．IE！Hイ\％．IT | $\stackrel{\sim}{\sim}$ | $N$ | $\frac{0}{N}$ | ¢ | $\stackrel{8}{\stackrel{8}{n}}$ | $\underset{\sim}{\sim}$ | $\begin{aligned} & 0 \\ & \hline \end{aligned}$ | － | $\stackrel{\sim}{\sim}$ | $\bigcirc$ | g | $\stackrel{\infty}{\wedge}$ | q | $\stackrel{\square}{\sim}$ | $\begin{aligned} & \mathrm{O} \\ & \mathrm{~N} \end{aligned}$ | ลิ | 8 3 3 $n$ | $\infty$ |
| 2115 $98 \%$ |  |  |  |  | $\stackrel{\infty}{+}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （S ¢ W in iS lSeg |  |  |  |  | $\begin{aligned} & 0 \\ & 0 \\ & 0 \end{aligned}$ | $\rightarrow$ |  |  |  |  |  |  |  |  |  |  | in | $\bigcirc$ |
| 2115 28\％ | $\bigcirc$ |  | $\bigcirc$ |  | $\cdots$ |  | $\bigcirc$ |  | $-$ |  |  |  |  |  |  |  |  |  |
| ә－yృ ${ }^{\text {150d }}$ | i | in | is | $N$ | $\begin{aligned} & 9 \\ & \\ & \hline \end{aligned}$ | $\bigcirc$ | 8 | $m$ | $\stackrel{?}{1}$ | N |  |  |  |  |  |  | 8 8 N $\sim$ | ＋ |
| 2715 28\％ | $\bigcirc$ |  | $\sim$ |  | $\bigcirc$ |  | $m$ |  |  |  | － |  |  |  | $\bigcirc$ |  |  |  |
| 1S ¢OMOL | $\stackrel{\sim}{N}$ | $N$ | $\begin{aligned} & 0 \\ & 0 \end{aligned}$ | $\stackrel{ }{\sim}$ | $\stackrel{i}{N}$ | $\sim$ | $\begin{aligned} & \circ \\ & \hline 0 \\ & 0 \end{aligned}$ | \％ |  |  | G | N |  |  | $8$ | $\pm$ | $\infty$ $\infty$ $\infty$ $\infty$ $m$ | $\cdots$ |
| 2715 $28 \%$ | $m$ |  |  |  | $\stackrel{\infty}{\sim}$ |  | $m$ |  |  |  |  |  | $n$ |  | $m$ |  |  |  |
| sluites IIV | q | $\cdots$ |  |  | $\begin{gathered} 0 \\ \infty \\ \infty \end{gathered}$ | $m$ | $\stackrel{\sim}{n}$ | $\bigcirc$ |  |  |  |  | $\stackrel{\rightharpoonup}{n}$ | N | $\stackrel{\rightharpoonup}{\sim}$ | 2 | 0 <br> $\stackrel{3}{4}$ | N |
| 21！5 28\％ |  |  |  |  | $\cdots$ |  |  |  |  |  |  |  |  |  | $\sim$ |  |  |  |
|  <br>  |  |  |  |  | $\stackrel{\otimes}{\mathrm{N}}$ | － |  |  |  |  |  |  |  |  | $\begin{aligned} & 0 \\ & n \\ & \hline \end{aligned}$ | N | 응 | $\bigcirc$ |
| ग\＃15 28\％ |  |  |  |  | $=$ |  | $\bigcirc$ |  |  |  |  |  |  |  |  |  |  |  |
| 1S İdeyo |  |  |  |  | $\stackrel{\rightharpoonup}{\sim}$ | F | $\stackrel{8}{n}$ | $\wedge$ |  |  |  |  |  |  |  |  | N $\sim$ $\sim$ $\sim$ $\sim$ | 子 |
|  | $\cdots$ | $\begin{array}{\|c} 0_{0}^{0} \\ 000 \\ 0 \\ 0 \\ 0 \end{array}$ | m | $0$ | $\pm$ |  | $\stackrel{\infty}{\sim}$ | $0$ | N |  | M |  | $\stackrel{\sim}{\sim}$ |  | $\stackrel{\sim}{\sim}$ |  | $\stackrel{\text { ¢ }}{\substack{\text { ¢ }}}$ |  |

