

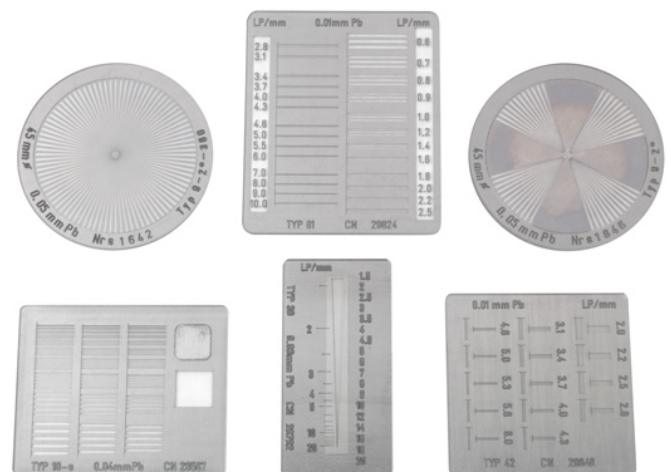
Spatial Resolution Line Pair Patterns & Focal Spot Star Patterns

Spatial Resolution Line Pair Patterns

These test patterns are designed for quick quantitative assessments of the limiting spatial resolution of an x-ray system. The line pair patterns consist of a thin foil of Lead sandwiched between plastic plates. In the foil, linear slits are cut with a range of widths, these alternate with linear bars of the foil of equal width. One slit and one bar is referred to as a line pair, and the width of each group of lines is specified in terms of the number of line pairs per mm (LP/mm). The observer counts the number of groups in which he can resolve the slits from the bars and as such can determine the resolving capability of the x-ray system in terms of LP/mm. A wide range of pattern designs is available with varying ranges of LP/mm and foil thicknesses.

Focal Spot Star Patterns

These test patterns are designed for quick quantitative assessments of the focal spot size of an x-ray system. The star pattern comprises a thin foil of Lead into which are cut a pattern of slits diverging from a central point which can be used to measure the X-ray focal spot size. The separation between slits increases linearly with distance from the centre. When imaged with an X-ray source, the finite size of the X-ray source will cause the lines to blur together within a certain distance of the centre. The radius of the blur will be directly proportional to the size of the focal spot.



Nomenclature

Test patterns are described by a standard nomenclature.

Line Pair

Type XX-YYY

Sector Star Pattern

Type 9/ZZ-YYY

360° Star Pattern

Type 9/ZZ/360-YYY

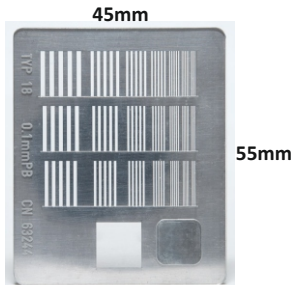
Rulers

Type 33-LLL/Wmm

(where there is no 'W' value the standard is 2mm divisions)

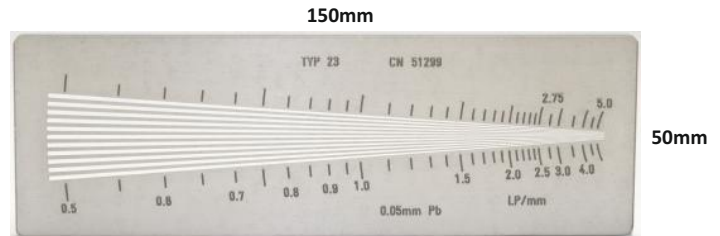
LLL	=	Ruler length i.e. 020 = 20cm, 075 = 75cm, 120 = 120cm
W	=	Pitch of the divisions on a ruler i.e. 1mm, 2mm etc.
XX	=	Test pattern type i.e. 9, 18, 39, 42, 43 etc.
YYY	=	Lead (Pb) foil thickness i.e. 010 = 0.10mm, 004 = 0.04mm etc.
ZZZ	=	Spoke angle i.e. 05 = 0.5°, 10 = 1.0°, 15 = 1.5°, 20 = 2.0°

Spatial Resolution (Line Pairs)



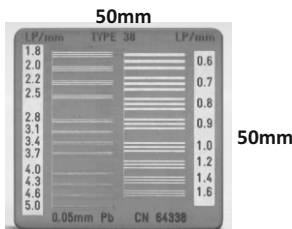
Type 18

NB - no text showing
line pair values



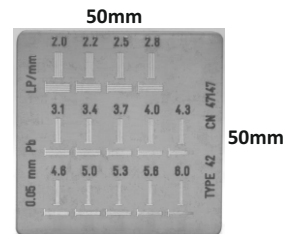
Type 23

NB - broom test (lines are not parallel)
line pair values marked by text



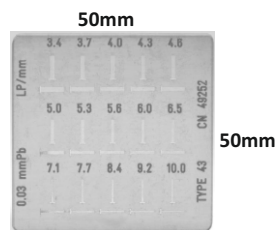
Type 38

NB - text showing
line pair values



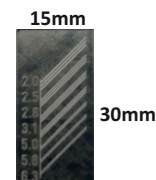
Type 42

NB - 2x line pair groups (perpendicular)
Text showing line pair values



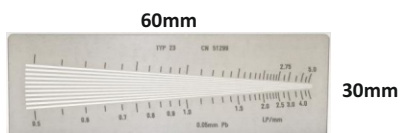
Type 43

NB - 2x line pair groups (perpendicular)
Text showing line pair values



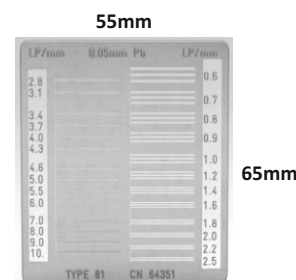
Type 70123

NB - line pair groups at 45° angle
Text showing line pair values



Type 39

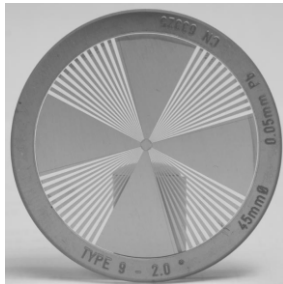
NB - broom test (lines are not parallel)
line pair values marked by text



Type 81

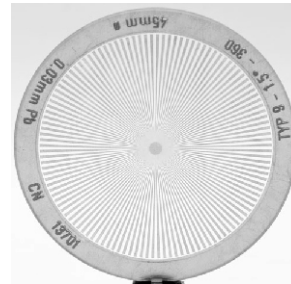
NB - text showing
line pair values

Star Patterns (Focal Spot Size)



Diameter
55mm

Type 9
4 sector pattern



Diameter
55mm

Type 9
360° pattern

The minimum focal spot size measurable with the 2,0° star is 0.5mm.

For smaller focal spots a 1,5°, 1,0° or a 0,5° star should be used.

Radiographic Rulers



Type 33

This ruler is 15cm long, it has 2mm pitch divisions. Its part number is therefore Type 33-15

Below we have shown the most popular test patterns by modality

Fluoroscopy

Line Pair Type 18-010, Type 38-010

Focal Spot Assuming the system focal spot size is in excess of 0.5mm use
Type 9/20-005 or 9/20/360-005.

Digital Radiography

Line Pair Type 18e-004, Type 38-005, Type 43-005

Focal Spot Assuming the system focal spot size is in excess of 0.5mm use
Type 9/20-005 or 9/20/360-005.

Mammography

Line Pair Type 18ul-003, Type 18e-004

Focal Spot Assuming the system focal spot size is 0.3mm use Type 9/05-003
Assuming the system focal spot size is 0.6mm use Type 9/10-003

Dental (Intra-oral)

Line Pair Type 70123(LTO) (2-6.3 LP/mm)
Type 70123(PLUS) (8-24 LP/mm)

Dental (OPG)

Line Pair Type 70123(LTO) (2-6.3 LP/mm)