

Indenters and Reference Samples



Micro Materials

Excellence in Nanomechanics

Indenters

Specifying an indenter

Indenters for room temperature use are normally described in terms of their tip geometry and the design of their metal holder which attaches to your NanoTest loading head(s).

There are three different kinds of holder and the one which is right for you will depend on whether the indenter is for the **low load (nano)** or **high load (micro)** loading head.

The age of your instrument will have a bearing on your choice as the fitting for the micro head was changed a few years ago to facilitate a more versatile indenter design. **Note** that there is an adapter available to allow newer micro indenters to be used with older micro loading heads.



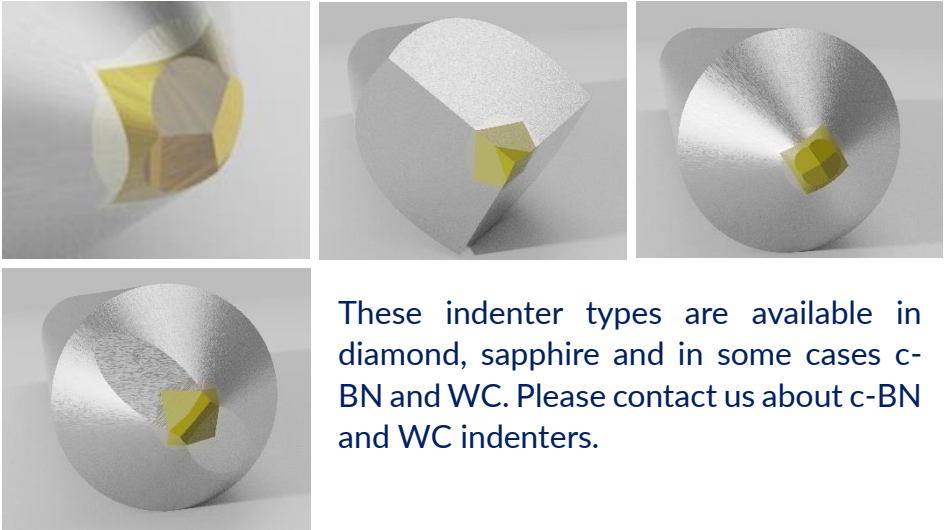
ML indenters have a 1 mm long, 6.5 mm long shaft and are for use in the **low load (nano)** loading head.

MH indenters have an 8 mm thread and a hole for a fixing bar. These are the older design for the **high load (micro)** load head, and we suggest ordering 2.5 parts instead.

2.5 indenters have a 2.5 mm diameter parallel shaft and are used with the **high load (micro)** head in conjunction with the high load 2.5 mm adapter (X00198) detailed on page 6.

Pyramidal indenters

Pyramidal indenters include Berkovich, Cube Corner, Vickers and Knoop. The majority of instrumented indentation work is performed with Berkovich indenters.



These indenter types are available in diamond, sapphire and in some cases c-BN and WC. Please contact us about c-BN and WC indenters.

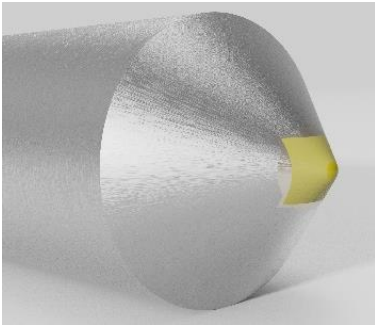
	ML	2.5
Berkovich (Diamond)	IND-NT001	IND-MT001
Berkovich (Sapphire)	IND-NT005	IND-MT002
Cube Corner (Diamond)	IND-NT007	IND-MT003
Vickers (Diamond)	IND-NT009	IND-MT005
Knoop (Diamond)	IND-NT011	IND-MT004
Berkovich (cBN)	Contact us	Contact us
Berkovich (WC)	Contact us	Contact us

Note 1: All diamond indenters are available in electrically conductive form, please contact us if required

Note 2: Items in red are usually for high temperature work, they are normally supplied with a fitted heater and mounted in a heat shield. Please contact us to specify exactly your requirements

Sphero-conical indenters

Sphero-conical indenters have a specified cone angle (normally 60° or 90°) which terminates in a spherical end of a specific radius. A very wide range of sizes is available, part numbers for common sizes are in the table below. For other sizes please contact us. All are available in diamond or sapphire, some in c-BN and WC, again, please contact us.

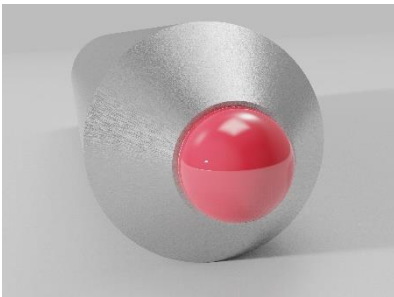


Available with tip radii from 0.7 μm to 500 μm . If required, cone angles other than 60° and 90° may be supplied. Please contact us for details.

	ML	2.5
5 μm radius, 60°. (Diamond)	IND-NT026	IND-MT014
5 μm radius, 90°. (Diamond)	IND-NT040	IND-MT023
10 μm radius, 60°. (Diamond)	IND-NT027	IND-MT015
10 μm radius, 90°. (Diamond)	IND-NT042	IND-MT024
25 μm radius, 60°. (Diamond)	IND-NT030	IND-MT017
25 μm radius, 90°. (Diamond)	IND-NT045	IND-MT026
50 μm radius, 90°. (Diamond)	IND-NT048	IND-MT027
100 μm radius, 90°. (Diamond)	IND-NT052	IND-MT028
200 μm radius, 120°. (Diamond)	IND-NT057	IND-MT029

Ball indenters

At a certain size it becomes impractical and very expensive to make spherical indenters by grinding and polishing diamond. Ruby and sapphire ball indenters are a much more cost-effective alternative and they offer extremely high degrees of dimensional accuracy. Ruby and sapphire are both corundum, and ruby owes its red colour to the presence of trace quantities of chromium. Ruby and sapphire both offer the same mechanical and chemical inertness properties.



Ball indenters are often used in testing of soft, very low stiffness materials such as soft polymers, bio-tissues, hydrogels etc.

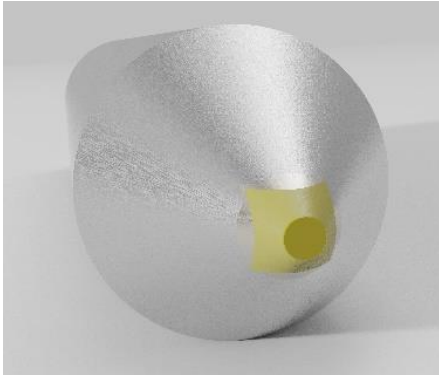
Other applications include Field and Swain Stress-Strain measurements and tribological testing.

	ML	2.5
200 µm diameter	IND-NT067	IND-MT041
500 µm diameter	IND-NT066	IND-MT042
1000 µm diameter	IND-NT063	IND-MT043
1500 µm diameter	IND-NT064	IND-MT034
2000 µm diameter	IND-NT065	IND-MT044

Note: Ruby is used as standard, if sapphire is required then please contact us

Flat Punch indenters

Flat punch indenters take the form of a truncated cone. Cone angles are 40°, 60° or 90°, and the flat end may be specified between 2 µm and 2 mm diameter. These indenters are typically used for applications such as micro-pillar compression or fibre push-out tests.



Note that a 40 ° cone angle can be preferable for fibre push-out tests as the fibre can be pushed further before the indenter contacts the matrix.

Standard flat punch diameters are 2 µm, 5 µm, 10 µm, 25 µm, 50 µm 100 µm. When ordering please select the right part number depending on high or low load and add the required diameter at the end of the code, e.g. IND-NT012-25. Please contact us about other sizes

ML	2.5
IND-NT012	IND-MT008

High load indenter adapter

In recent years the design of indenters for use with the high load (micro) load head was modified.

This allows quicker sourcing of indenters and a better-quality adaptation of parts for high temperature use.

These newer 2.5 mm diameter shaft indenters fit in to the load head using the below adapter. The adapter itself fits in to the load head the same way as the older 8 mm thread design indenters.

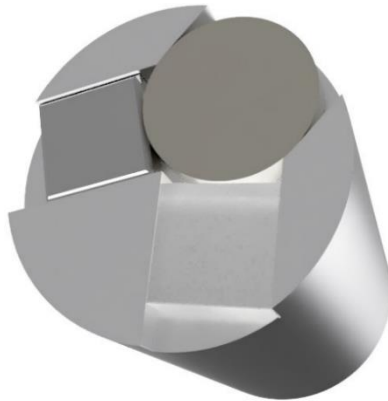
When ordering “2.5” type indenters, you should first check that you have this adapter. If you do not, these are held in stock and are normally available for immediate dispatch.



X00198 allows 2.5 mm diameter parallel shaft indenters to be fitted to the high load head. It may be used with both room and high temperature indenters.

Reference Samples

Pre-mounted set of three reference samples - fused silica, polycrystalline tungsten, and aluminium. The fused silica and tungsten sample collectively satisfy the requirements of ISO-14577 and allow full verification of instrument performance and indenter area function calibration. Samples are cross validated against the official ISO Datasure samples.



The aluminium sample is an ideal softer material for indenter to microscope crosshair calibration.

Part reference: Standard Sample Set

Contact us directly or visit our web-shop at:

www.micromaterials.co.uk

email: info@micromaterials.co.uk

**Micro Materials Ltd, Willow House, Yale Business Village, Ellice Way, Wrexham
LL13 7YL, UK**

Registered in England and Wales No. 2332065
Registered Office: Willow House, Yale Business Village, Ellice Way, Wrexham LL13 7YL
info@micromaterials.co.uk