

Revision No. 2	Page 1 of 4	<div>Technical Definition</div> <div>Micro-hardness and Depth of Carburisation – 16NCD13</div>
<div>ptp.</div>		
<div>Kit 6-3-2021 PTP Metallic</div>		

You shall respect the HSE policy of your laboratory for each performed test.

Instructions to participant laboratories

Please read these instructions carefully BEFORE starting the tests.

- One specimen (\varnothing 20 x 10 mm) is supplied to each participant. This sample can be used for **both micro-hardness** test and **depth of carburisation** measurement.
Each laboratory can participate in the micro-hardness test **and/or** the depth of carburisation measurement test.
3 results must be provided for the depth of carburisation measurement.
4 results must be provided for the micro-hardness test.
If one result is missing, your test will be considered as an outlier. A RCA shall be completed.
- Each participant is required to prepare the specimen according to its own process.
- The **Effective depth of carburisation** shall be determined using 3 Vickers micro hardness series of measurements (depth corresponding to **550 HV measurement**).

The **4 single** measurements for micro-hardness shall be performed in the **centre** of the specimen.

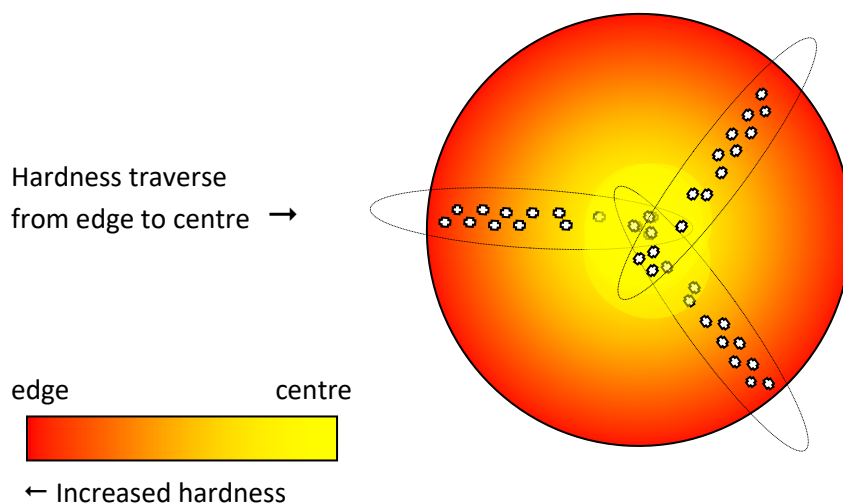
Micro hardness analyses must be performed on the machined face.

Correspondence tables are not allowed for a PTP participation.

- All tests are to be performed at room temperature in accordance with the following requirements:
 - ISO 18203:2016**
 - ASTM E1077-14**
 - ASTM E384-17**
 - EN ISO 6507-1:2018**

For the depth of carburisation measurement, the distance from the edge of the first micro hardness measure is at **0,1 mm**.

A typical approach would be to perform a hardness survey as shown in the following figure:



Force to be applied: 500 gf advised

Revision No. 2	Page 2 of 4	<div>Technical Definition</div> <div>Micro-hardness and Depth of Carburisation – 16NCD13</div>
<div>ptp.</div>		
<div>Kit 6-3-2021 PTP Metallic</div>		

5. The following information is to be reported:

Characteristic	Unit	Significant digits	Mandatory / Not mandatory	Evaluated Yes/no
Room temperature	°C	XX,X	Mandatory	No
Force applied	gf	XXX	Mandatory	No
Test force application time	s	XX	Mandatory	No
Spacing of indentations	mm	X,X	Mandatory	No
Maximum hardness values for each of the 3 series	HV	XXX	Mandatory for depth of carburisation participation	Yes
Minimum hardness values for each of the 3 series (minimum should be measured in the centre of the specimen (yellow area))	HV	XXX	Mandatory for depth of carburisation participation	Yes
Effective Depth of carburisation for each of the 3 series	mm	X,XX	Mandatory for depth of carburisation participation	Yes
Vickers micro-hardness measurement – in the centre of the specimen	HV	XXX	Mandatory for Vickers micro-hardness participation	Yes
Knoop micro-hardness measurement – in the centre of the specimen	HK	XXX	Mandatory for Knoop micro-hardness participation	Yes

Results for depth of carburisation measurement will be analysed according to the algorithm A (ISO 13528 – 2015) and evaluated using z-score.

Results for micro-hardness measurement will be analysed according to the algorithm A and S (ISO 13528 – 2015) and evaluated using z-score.

Please be aware that laboratories who obtained a standard deviation equal to zero for micro-hardness (i.e. who provided 4 times the same result) **will not be included** in the statistical population.

Revision No. 2	Page 3 of 4	<div>Technical Definition</div> <div>Micro-hardness and Depth of Carburisation – 16NCD13</div>
<div>ptp.</div>		
<div>Kit 6-3-2021 PTP Metallic</div>		

6. Testing shall start **as soon as test specimens are received**. Please contact the following e-mail address for any technical or administrative query.

Submission date :	July 1st, 2021
Technical and administrative support :	info@ptpscheme.com

7. Instructions for submission of results are detailed on the website:

<https://ptpscheme.com>

8. To ensure the confidential treatment of your results in the final report, you will be allocated a unique identity number when you register for the program.
9. Collusion and falsification of your PTP results are totally forbidden. In case of identification or suspicion of collusion or falsification, the laboratory will be excluded from the program and the sponsors will be immediately informed. The sponsors could ask you proofs of your records and analyses, so be sure to conserve data, curves and specimens.
10. The tested specimen does not need to be sent back to the PTP office.

Revision No. 2	Page 4 of 4	<div>Technical Definition</div> <div>Micro-hardness and Depth of Carburisation – 16NCD13</div>
<div>ptp.</div>		
<div>Kit 6-3-2021 PTP Metallic</div>		

APPENDIX: Instructions for IRR participation

The Internal Round Robin participation (IRR) is **optional** and **independent** from your PTP participation. Confidentiality: The IRR results and reports are confidential and only accessible by your laboratory. They are not shared with the scheme sponsors or any other accreditation or certification bodies.

The extra samples shall be tested according to the following table:

	Operator 1	Operator 2	Operator 3	Operator 4	Operator X
Test machine 1	PTP kit (1 sample)	1 sample	1 sample	1 sample	1 sample
Test machine 2	1 sample				
Test machine 3	1 sample				
Test machine Y	1 sample				

Operator 1 (OP1) is to be the most experienced operator currently conducting tests on a regular basis and shall perform tests on all machines (TM1, TM2, TM3...)

Test Machine 1 (TM 1) is to be the most utilised machine for this test in your laboratory and shall be tested by all operators (OP1, OP2, OP3...)

Example: A laboratory has 2 operators and 3 test machines. They receive a PTP kit and 3 extra specimens.

Operator 1 shall test the PTP kit on TM1, 1 specimen on TM2 and 1 specimen on TM3.

Operator 2 shall test 1 specimen on TM1.

The IRR results have to be submitted on a separate results form available on the PTP website. The identification of operators and test machines you provide will appear on the IRR final report. These identifications will not be seen by other laboratories.

The IRR results will be classified against the acceptance classes of the kit 6-3-2021.

Reminder: Laboratories are not permitted to switch specimens between the PTP kit and IRR samples. The traceability of the samples will be checked during the evaluation. Laboratories found to have switched samples will invalidate their PTP participation.

REVISION HISTORY

Issue Date	Issue N°	Changes
01/12/2020	1	Document creation
07/05/2021	2	Update face for micro hardness