



| Joined Document for Comments on Draft Recommendation | | | Country: All Countries | |
|--|--|--|------------------------|--|
| Participating Member comments on: OIML TC17/SC5 | Draft Document: 2CD “ <i>Newtonian viscosity standard liquids for the calibration and verification of viscometers</i> ” | Project: p2; This recommendation specifies requirements for the preparation and calibration of Newtonian viscosity standard specimens of the first and second order according to the OIML DI No 17, “Hierarchy scheme for instruments measuring the viscosity of liquids”. | | |
| Circulation date: | 21 January 2007 | Closing date for comments: | 21 April 2007 | |
| Secretariat: | Russia | | | |

| Country Code | Clause/ paragraph/ table | gen./ edit./ techn. | COMMENTS | PROPOSED CHANGE | OBSERVATIONS OF THE SECRETARIAT on each comment submitted |
|----------------------|-------------------------------------|---------------------|---|--|--|
| US | 2 Definitions | gen. | More definitions are needed. It might be helpful for clarity to add some terminology definitions from OIML D17. | | Rejected. Definitions given the draft appear sufficient. In addition, there are references to the documents in section 10. |
| US PL | 4 Metrological requirements | edit. | | It should be “– 40 °C” instead “...-minus 40”. | Accepted. |
| SK | 4 Metrological requirements | edit. | | There is stated “ $4 \cdot 10^{-1}$ to 10^5 mPa*s” and should be “ $4 \cdot 10^{-1}$ mPa*s to 10^5 mPa*s”. | Accepted. |
| DE JP US | 4 Metrological requirements | edit. | End the 2 nd paragraph: Following sentence is missing: “From the viscosity values v_1 and v_2 determined with two standard viscometers the arithmetic mean value v is calculated”. | We added sentence: “From the viscosity values v_1 and v_2 determined with two standard viscometers the arithmetic mean value v is calculated”. | Accepted. |
| DE | 4 Metrological requirements | edit. | 3 rd paragraph | Replace “is” by “shall meet the conditions”. | Accepted. |
| PL | 4 Metrological requirements | edit. | For decimal values, please use everywhere the same sign “dot” or “comma”. | For decimal values accepted to use " dot ". | Accepted. Checked. |
| SK JP US DE | 4 Metrological requirements table 1 | edit. | 2nd row and 2nd column | - % should be deleted, % are already stated in the 1st row (heading). | Accepted. |

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| US | 5 Technical requirements for reference liquids | edit. | | Change “several months” to “6 months”. (See section 8.1.). | Accepted. |
| US | 5 Technical requirements for reference liquids | gen. | Requirements should listed here, perhaps a table and referred to in the test procedures, i.e. long-term stability - $< 4 \cdot 10^{-3}$ What are the units? This is true for all requirements in this section. | Technical requirements are specified in this section. With regards to long-term stability, it affects the metrological characteristics, so described in the relevant section. Long-term stability of the liquid - it is a dimensionless relative value | Partially accepted. |
| US DE | 5 Technical requirements for reference liquids | edit. | | Replace “irreversible” by “reversible”. | Accepted. |
| PL US JP SK | 5 Technical requirements for reference liquids | edit. | | It should be “agents” instead of “agem”. | Accepted. |
| JP US | 6 Storage | edit. | | Replace “proved” by “proven”. | Accepted. |
| PL | 7 Viscosity gradation of reference liquids, preparation of mixtures | edit. | | It should be “50 °C or 80 °C” instead of “50 or 80 °C”. | Accepted. |
| DE | 7 Viscosity gradation of reference liquids, preparation of mixtures | edit. | 3 rd paragraph, line 4 | Replace “preparing” by “preparing”. | Accepted. |
| US JP | 7 Viscosity gradation of reference liquids, preparation of mixtures | edit. | | Replace “24” by “24 h”. | Accepted. |
| JP DE | 8.1 Long-term stability | edit. | | Replace “clause 8.1” by “clause 9.1” in the forth line. | Accepted. |

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| JP | 8.1 Long-term stability | edit. | | Replace “reference” by “working” in the eleventh line. Replace “(<i>u</i> in Table 1)” by “(<i>u</i> _{cert} in Table 2)”. | Accepted. |
| DE | 8.1 Long-term stability | gen. | 2 nd and 3 rd paragraph: The values for the aging coefficients have been changed (see 1 st Draft). Now, the does not make sense. | The sentence is removed. | Accepted. |
| US | 8.1 Long-term stability | gen. | It is unclear if four samples are taken at each time period or four time periods etc. How are the calculations performed to arrive at aging coefficient? What are the units? | Four samples of the liquid are taken in intervals of approximately 3 months. The factor of aging - it is a relative dimensionless coefficient. The value of this coefficient is adopted in accordance with the resulting uncertainty. | Accepted. |
| US | 8.1 Long-term stability | gen. | This sentence is confusing: If the liquid is to be used for reference viscosity standard specimens only, the ageing coefficient may be higher, but shall not exceed $4 \cdot 10^{-3}$ | Fixed a bug in the sentence: « If the liquid is to be used for reference viscosity standard specimens only, the ageing coefficient may be higher, but shall not exceed $4 \cdot 10^{-3}$ » on « If the liquid is to be used for reference viscosity standard specimens only, the ageing coefficient shall not exceed $4 \cdot 10^{-3}$ » | Accepted. |
| SK | 8.2 Thermal stability | edit. | | There is stated correct: ... 20 °C or 23 °C. | Accepted. |
| PL | 8.2 Thermal stability | edit. | | It should be “20 °C or 23 °C” instead of “20°C or 23 °C”, “-40 °C, +100 °C” instead of “-40°C, +100°C”. | Accepted. |
| US | 8.2 Thermal stability | gen. | This procedure does not examine stability of viscosity at all certified temperatures, which would be of interest. We would suggest that viscosity be measured on the standard sample at reference temperature (T_{ref1}), then temperature raised or lowered to T_{max} or T_{min} , once the temperature and viscosity is stabilized at T_{max} or T_{min} (usually about 30 min) then viscosity is measured (V_1), maintain temperature for 3 hr and measure viscosity again (V_2), finally lower temperature back to reference temperature and measure viscosity again (T_{ref2}). Aging coefficient calculated between V_1 and V_2 and T_{ref1} and T_{ref2} shall not exceed $4 \cdot 10^{-3}$. | | Rejected. We believe that the investigation of the thermal stability is described adequately. |
| US | 8.2 Thermal stability | edit. | To 1, To2 <i>To1, To2</i> - minimum and maximum temperature to which a VSS may be exposed before use. Variables should be in italics. | <i>To1, To2</i> - minimum and maximum temperature to which a VSS may be exposed before use. | Accepted. |
| PL | 8.2 Thermal stability | edit. | | It should be “to T_{max} for 1 hour” instead of “to T_{max} tor 1 hour”. | Accepted. |
| PL | 8.2 Thermal | edit. | | It should be “the viscosity ..” instead of “he viscosity”. | Accepted. |

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| DE SK | stability | | | | |
| JP DE PL | 8.2 Thermal stability | edit. | | Replace “ $4 \cdot 10^{-3} \text{ yr}^{-1}$ ” by “ $4 \cdot 10^{-3}$ ”. | Accepted. |
| JP PL | 8.2 Thermal stability | edit. | | Replace “SSp” by “VSS”. | Accepted. |
| JP | 8.2 Thermal stability | edit. | | Replace “1 hour” by “1 h”. Meaning of “(step a) to c)” is uncertain. Replace “one hour” by “1 h”. | Accepted. |
| JP | 9.1 Measurement of kinematic viscosity | gen. | About the primary or secondary, reference and working standard viscometers, the capillary tube length requirements should be described in accordance with OIML-DI No.17. | The uncertainty of permanent viscometers are given in accordance with OIML-D 17. | Accepted. |
| PL | 9.1 Measurement of kinematic viscosity | edit. | | lease change “k=2” into “ $k = 2$ ”. | Accepted. |
| US | 9.1 Measurement of kinematic viscosity | | Temperature measurement and devices for temperature control Use suitable thermometers with a 0.005°C scale interval. It may be necessary to apply corrections according to the calibration certificate. The depth of immersion shall be the same during calibration and use. The highlighted text would exclude a SPRT. Lets just state the minimum temperature accuracy (k=2). | Changed on: «The temperature measurement (k=2) error shall not exceed 0.005 °C. It may be necessary to apply corrections according to the calibration certificate. The depth of immersion shall be the same during calibration and use». | Accepted. |
| SK | 9.1 Measurement of kinematic viscosity | edit. | | 3150 should be stated with name of the standard: <i>ISO 3150</i> . | Accepted. |
| PL | 9.1 Measurement of kinematic viscosity | edit. | | It should be “the shortest and the longest” instead of ““the shortest and longest” | Accepted. |

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| PL SK | 9.2 Calculation of kinematic viscosity | edit. | | It should be “minimum 200 s flow time” instead of “minimum 200-s slow time”, recording “200-s” is not clear | Accepted. |
| JP DE | 9.2 Calculation of kinematic viscosity | edit. | | Replace “slow time” by “flow time”. | |
| JP | 9.2 Calculation of kinematic viscosity | gen. | Meaning of “For standard size capillary viscometer” is uncertain. | The phrase « For standard size capillary viscometer » is replaced by «For capillary viscometers whose constants» | Accepted. |
| JP | 9.2 Calculation of kinematic viscosity | edit. | | Replace “3” by “(3)”. | Accepted. |
| US | 9.2 Calculation of kinematic viscosity | gen. | What is C in equation 2? | Added on transcript changes C in Equation 2. | Accepted. |
| PL JP | 9.4 Determination of the temperature coefficient of viscosity | edit. | | Replace “SSp” by “VSS”. | Accepted. |
| JP | 9.4 Determination of the temperature coefficient of viscosity | edit. | | Replace “(4)” by “(5)”. | Accepted. |
| NL | 9.4 Determination of the temperature coefficient of viscosity | gen. | It is prescribed that the temperature coefficient of the viscosity at each calibration temperature shall be stated in the calibration certificate. | It have in mind. | Accepted. |
| PL | 9.5 | edit. | | For decimal values please use everywhere the same sign | Accepted. |

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| | Measurement uncertainty | | | "dot" or "comma". Please change " $k=2$ " into " $k = 2$ ". | |
| DE SK JP US | 9.5 Measurement uncertainty | edit. | There is a reference missing. Convenient summaries can be found in <i>/ /</i> . | A reference has been added. | Accepted. |
| JP | 9.5 Measurement uncertainty | edit. | | Replace "Table 1" by "Table 2". Replace "(see clause 1)" by "(see clause 4)". | Accepted. |
| SK | 9.5 Measurement uncertainty | edit. | Table 1 | Uncertainties should be stated to 2 valid digits, instead of $1,24 \cdot 10^{-3}$ should be $1,2 \cdot 10^{-3}$ | Accepted. |
| SK | 9.5 Measurement uncertainty | gen. | ... contribution of 20% from remaining sources of error. Why 20%, where is this value coming from? This seems not to be supported without an explanation. | According to ISO 3105 the contribution of these sources of error of 20% in this case. | Accepted. |
| NL | 9.6 Calibration certificate | gen. | It is prescribed that the calibration certificate shall cover the temperature coefficient of viscosity at one or more temperatures. | It have in mind. | Accepted. |
| DE | 10. References | edit. | | References 1 to 3 are in complete. | Accepted. |
| JP | Appendix 4 | edit. | | Replace "0.10" by "0.06" in the Table 2. Replace " S_C " by " S_C " in the Table 2. Replace " S_i " by " S_T " in the Table 2. Replace " S_{ft} " by " S_R " in the Table2. Replace " S_W " by " S_W " in the Table2. Replace "specification of clause 8.1" by "specification of clause 9.5". Replace " $3 \cdot 10^{-4} \cdot 1,4^2$ " by " $(3 \cdot 10^{-4} \cdot 1,4)^2$ " in the equation. Replace " $S_v'^2 = S_C'^2 + S_W'^2 + S_R'^2 + S_T'^2$ " by " $S_v'^2 = S_C'^2 + S_W'^2 + S_R'^2 + S_T'^2$ " in the equation. | Accepted. |
| PL | Appendix 4 | edit. | For decimal values please use everywhere the same sign "dot" or "comma". | For decimal values accepted to use " dot ". | Accepted. |
| SK | Appendix 4 | edit. | | Lower limit is stated as " a_l ", thus should be $U = 1/2(a_u - a_l)$. | Accepted. |
| SK JP PL | Appendix 5 | edit. | | Replace "g/sm ³ " by "g/cm ³ ". | Accepted. |