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Quyosh radiatsiyasi oqimi zichligi etalonini
sotib olish bo'yicha texnik topshiriq.

Technical Specifications for the Procurement of the National Standard for
Solar Radiation Flux Density.

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BO'LIM 1. UMUMIY MA'LUMOTLAR / SECTION 1. GENERAL INFORMATION

Kichik bo'lim 1.1 Nomlanishi	Subsection 1.1 Title
Quyosh radiatsiyasi oqimi zichligi etaloni	National Standard for Solar Radiation Flux Density
Kichik bo'lim 1.2 Etalonni sotib olishning asosi va maqsadi	Subsection 1.2 Basis and purpose of acquisition of the standard
O'zbekiston Respublikasi Prezidentining 2026-yil 16-fevrladagi PF-25-sonli Farmoniga muvofiq: - Quyosh nurlanish radiatsiyasi zichligini (W/m^2) kattalik birligini 0 dan $2500 W/m^2$ gacha bo'lgan diapazonda saqlash; laboratoriyalararo solishtirishlarda ishtirok etish; quyosh energetikasi (PV va CSP Stansiyalari), qurilish va arxitektura (energiya tejamkor binolar), aviatsiya va kosmik tadqiqotlar, gidrometeorologiya va atrof-muhit monitoringi, sun'iy yo'ldosh ma'lumotlarini yerda tekshirish, neft-gaz, oziq-ovqat, kimyo, yoqilg'i sanoati, quyosh nuri orqali energiya olish, tibbiyot, mashinasozlik, va sanoatning boshqa tarmoqlarida qo'llaniladigan barcha turdagi quyosh nuri radiatsiyasini o'lchagich, manba va etalonlarini, shu jumladan etalonlarini ham kalibrlash amalga oshiriladi; - Mazkur etalon quyosh nuri radiatsiyasi kattaligini o'lchovchi birlamchi etaloni sifatida ishlatiladi va barcha turdagi global quyosh radiatsiyasini o'lchovchi piranometrlar (Ochiq havoda va laboratoriya sharoitida), diffuz radiatsiya piranometrlari, fotovoltaiik monitoring tizimlari sensorlari o'lchagichlarini qiyoslash va kalibrlash, shuningdek, xorijiy mamlakatlarning milliy metrologiya institutlari bilan laboratoriyalararo solishtirishlarni o'tkazishda ishtirok etish uchun qo'llaniladi. Ushbu texnik topshiriqda kattalik birliklari O'zbekiston Respublikasi Vazirlar Mahkamasining 2018-yil 10-yanvardagi 21-sonli qaroriga muvofiq keltirilgan.	In accordance with the Decree of the President of the Republic of Uzbekistan No. PF-25 dated February 16, 2026: - Maintaining the unit of solar radiation (W/m^2) in the range from 0 to $2500 W/m^2$; participating in interlaboratory comparisons; calibration of all types of solar radiation meters, sources and standards used in solar energy (PV and CSP Stations), construction and architecture (energy-efficient buildings), aviation and space research, hydrometeorology and environmental monitoring, ground verification of satellite data, oil and gas, food, chemical, fuel industries, solar energy, medicine, mechanical engineering, and other industries, including their standards; - This standard is used as a primary standard for measuring the magnitude of solar radiation and is used for comparison and calibration of all types of pyranometers, diffuse radiation pyranometers, sensors of photovoltaic monitoring systems measuring global solar radiation, as well as for participation in interlaboratory comparisons with national metrology institutes of foreign countries. The units of magnitude in this technical specification are given in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 21 dated January 10, 2018.
Kichik bo'lim 1.3 Yangiligi (ishlab chiqarilgan yili) haqida ma'lumot	Subsection 1.3 Information on novelty (year of production/issue of the standard)
Yetkazib beriladigan etalon yangi bo'lishi, ishlab chiqarilgan yili 2026-yildan avval bo'lmasligi lozim (ishlatilmagan, ta'mirlanmagan, tiklangan uzellar va elementlardan yig'ilmagan, tarkibiy qismlari almashtirilmagan, iste'mol xususiyatlari tiklanmagan bo'lishi kerak). Shuningdek, u ishlab chiqarish yoki yetkazib berish sifati bilan bog'liq nuqsonlarga ega bo'lmasligi, Buyurtmachiga yetkazib berilgan paytdan boshlab foydalanishga (ekspluatatsiyaga) yaroqli bo'lishi, uchinchi shaxslarning huquqlaridan xoli bo'lishi shart,	The supplied standard must be new, not earlier than 2026 (not previously used, repaired, not assembled from refurbished units and components, which has not had its components replaced, consumer properties have not been restored, and must not have defects related to the quality of manufacture or delivery (delivery), must be fit for use from the moment of delivery to the Customer and free from the rights of third parties; delivery of an exhibition sample is not permitted).

ko'rgazma na'munasi yetkazib berilishiga yo'l qo'yilmaydi.	
Kichik bo'lim 1.4 Ishlab chiqish / tayyorlash bosqichlari	<i>Subsection 1.4 Development/Manufacturing Stages</i>
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.	In accordance with the manufacturer's regulatory and technical documentation.
Kichik bo'lim 1.5 Ishlab chiqish / tayyorlash uchun hujjatlar	<i>Subsection 1.5 Documents for development/manufacturing</i>
Etalon ushbu texnik topshiriq talablariga, ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga hamda GOCT 8.129, GOCT 23512, GOCT 24297 standartlari talablari muvofiq tayyorlanishi (yasalishi) lozim. Shu bilan birga yetkazib beriladigan etalon O'zbekistonning metrologiya qonunchiligiga zid bo'lmasligi, uning birliklar uzatish sxemasi milliy tizimga integratsiya bo'la olishi shart, shu munosabat bilan etalon O'zbekiston Respublikasining 2020-yil 7-apreldagi "Metrologiya to'g'risida"gi O'RQ-614-son qonuni talablariga mos bo'lishi kerak. Shu bilan birga etalon O'zbekiston Respublikasining 2023-yil 27-fevraldagi "Texnik jihatdan tartibga solish to'g'risida"gi O'RQ-819-son qonuni talablariga ham to'laqonli mos kelishi kerak bo'ladi.	The measurement standard must be manufactured in accordance with the requirements of this technical specification, the manufacturer's regulatory and technical documentation, and the requirements of GOST 8.129, GOST 23512, and GOST 24297 standards. Furthermore, the delivered measurement standard must comply with the metrological legislation of Uzbekistan, and its traceability chain must be capable of integrating into the national system. In this regard, the measurement standard must comply with the requirements of the Law of the Republic of Uzbekistan No. ZRU-614 "On Metrology" dated April 7, 2020. At the same time, the measurement standard must also fully comply with the requirements of the Law of the Republic of Uzbekistan No. ZRU-819 "On Technical Regulation" dated February 27, 2023.
Etalon ushbu texnik topshiriq talablariga hamda ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq tayyorlanishi (yasalishi) lozim.	The standard must be manufactured in accordance with the requirements of this technical specification and the regulatory and technical documentation of the manufacturer.
Kichik bo'lim 1.6 TIF TN kodi va amalda qo'llaniladigan boshqa xalqaro kodlar	<i>Subsection 1.6 HS Code and other international codes, if applicable</i>
TIF TN kodlari shartnoma (kontrakt) tuzish vaqtida aniqlanadi.	HS codes will be determined upon conclusion of the contract
Kichik bo'lim 1.7 Ijrochiga qo'yiladigan talablar	<i>Subsection 1.7 Requirements for the Contractor</i>
Ijrochi ishlab chiqaruvchi zavoddan sifatli birlamchi etalonni yetkazib berishi shart. Ishlab chiqaruvchi zavod bunday turdagi Etalonlarni ishlab chiqarish bo'yicha tajribaga ega bo'lishi lozim. Ijrochi taklif etilayotgan etalonning ishlab chiqaruvchisi yoki uning vakolatli rasmiy yetkazib beruvchisi (distribyutori) bo'lishi kerak Ijrochi kamida 2 nafar ish stajiga ega bo'lgan diplomli mutaxassislarga (metrologlarga) ega bo'lishi lozim.	The contractor must supply a high-quality primary standard from the manufacturer. The manufacturer must have experience in producing similar Standards. The contractor must be the manufacturer of the proposed standard, or its authorized official supplier (distributor). The contractor must have at least 2 certified specialists (metrologists) with work experience.

BO'LIM 2. QO'LLASH SOHASI / SECTION 2. SCOPE OF APPLICATION

Quyosh radiatsiyasi oqimi zichligi etaloni (Quyosh nuri radiatsiyasi zichligini tekshirish qurilmasi) quyidagilar uchun mo'ljallangan: Piranometrlarning o'lchov diapazoni 0 dan 2500 W/m² gacha bo'lishi bu tizimning nafaqat standart sharoitlarda, balki ekstremal radiatsiya darajalarida ham ishlashini anglatadi. Bu doimiy ravishda yuqori nurlanish sharoitida ishlash qobiliyatini anglatadi. laboratoriyalararo solishtirishlarda ishtirok etish; quyosh nuri radiatsiyasi o'lchagichlarini (piranometr) ochiq havoda va laboratoriya sharoitida kalibrlash va qiyoslash. Etalon tizimi nurlanish zichligi birligini ISO 9847 va WMO-No.8 standartlari talablariga muvofiq saqlashi, shuningdek, o'lchash natijalarining Butunjahon radiometrik etaloniga (WRR) nisbatan metrologik kuzatuvchanligini ta'minlashi shart. Tizimning ekspluatatsion xavfsizligi GOCT 12.2.007.0 talablariga muvofiq bo'lishi lozim.	National Standard for Solar Radiation Flux Density (Solar Radiation Density Tester) is intended for: The measurement range of pyranometers from 0 to 2500 W/m² means that this system can operate not only under standard conditions, but also under extreme radiation levels. This means the ability to operate under conditions of constantly high radiation. participation in interlaboratory comparisons; calibration and comparison of solar radiation meters. The standard system must maintain the unit of irradiance density in accordance with the requirements of ISO 9847 and WMO-No.8 standards, and also ensure metrological traceability of measurement results to the World Radiometric Standard (WRR). The operational safety of the system must comply with the requirements of GOST 12.2.007.0.
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BO'LIM 3. EKSPLUATATSIYA (FOYDALANISH) SHARTLARI /
SECTION 3. OPERATING CONDITIONS

Kichik bo'lim 3.1 Umumiy ekspluatatsiya shartlari	<i>Subsection 3.1 General operating conditions</i>
Saqlash va foydalanish shartlari, IEC 60529 (GOCT 14254), GOCT 22261-94, va GOCT 15150, ga muvofiq "U4" (N) toifasiga mos bo'lishi kerak.	Storage and operating conditions must comply with category "U4" (N) in accordance with IEC 60529 (GOST 14254), GOST 22261-94, and GOST 15150.
Kichik bo'lim 3.2 Qo'shimcha/maxsus ekspluatatsiya talablari	<i>Subsection 3.2 Additional/Special Operational Requirements</i>
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga (MTH) muvofiq.	In accordance with the manufacturer's technical documentation.
Kichik bo'lim 3.3 Etalonni ekspluatatsiya qilish xarajatlariga qo'yiladigan talablar	<i>Subsection 3.3 Requirements for the costs of operating the standard</i>
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga (MTH) muvofiq.	In accordance with the manufacturer's technical documentation.

BO'LIM 4. TEXNIK TALABLAR / SECTION 4. TECHNICAL REQUIREMENTS

Etalon tizimining tarkibiy qurilmalariga qo'yiladigan texnik va metrologik talablar etalon tarkibiga kiruvchi har bir o'lchash qurilmasi va uning yordamchi vositalarining texnik hamda metrologik tavsiflari O'zbekiston Respublikasi hududida amalda bo'lgan O'z DSt ISO 9060, GOST P MEK 60904-4-2016, O'z DSt IEC 60529, O'zDSt IEC 61326-1 GOST 8.129 me'yoriy-texnik hujjatlari shuningdek O'zbekiston Respublikasi tomonidan tan olingan xalqaro WMO-No. 8, ISO 9059:1990, O'zMSt ISO 9846:2026 (ISO 9846:1993), O'zMSt ISO 9847:2026 (ISO 9847:2023), O'zMSt ISO/TR 9901:2026 (ISO/TR 9901:2021) xalqaro standartlar talablariga muvofiq bo'lishi kerak.

Technical and metrological requirements for the constituent devices of the standard system
Technical and metrological characteristics of each measuring device and its auxiliary means included in the standard are established in the regulatory and technical documents Uz DSt ISO 9060, GOST R MEK 60904-4-2016, Uz DSt IEC 60529, UzDSt IEC 61326-1 GOST 8.129, which are in force in the territory of the Republic of Uzbekistan, as well as in the international WMO-No. 8, ISO 9059:1990, UzMSt ISO 9846:2026 (ISO 9846:1993), UzMSt ISO 9847:2026 (ISO 9847:2023), UzMSt ISO/TR 9901:2026 (ISO/TR 9901:2021) must comply with the requirements of international standards.

Kichik bo'lim 4.1 Asosiy texnik talablar /
 Subsection 4.1 Main technical characteristics

	Nisbiy xatoliklar yoki Barqarorlik va o'lchash ko'lamini/ <i>Relative errors or Stability and measuring range</i>	
Quyosh radiatsiyasi oqimi zichligi etalon to'plami IEC 60904-4-2016 va boshqa xalqaro standartlarga muvofiq to'plamda* <i>Technical Specifications for the Procurement of the National Standard for Solar Radiation Flux Density (in a set) in accordance with MEC 60904-4- 2016 international standard.*</i>	Asosiy va yordamchi qurilmalar uchun / Texnik va metrologik xarakteristika <i>For main and auxiliary devices / Technical and metrological characteristics</i>	Umumiy (yakuniy) / <i>General (final)</i>

4.1	“O’zMMI” DM ning “Elektr va magnit kattaliklarini o’lchash” laboratoriyasi 0 dan 2500 W/m² da bo’lgan quyosh radiatsiyasi oqimi zichligi kattaligini qayta xosil qilish, saqlash va uzatish maqsadida IEC 60904-4-2016, O’zMS ISO 9846:2026 (ISO 9846:1993), O’zMS ISO 9847:2026 (ISO 9847:2023), O’z DSt ISO 9060 va boshqa xalqaro standartlardan foydalangan holda 1. Absolyut bo’shliq radiometri (Абсолютный полостной радиометр / Absolute Cavity Radiometer).. 2. ПНП — Pirgeliometr (Пиргелиометр нормального падения / Direct Solar Pyrheliometer). 3. Trap-detektor (Трэп-детектор / High Precision Optical Trap Detector). 4. Etalon nurlanish lampasi (Эталонная лампа / Spectral Irradiance Standard Lamp). 5. Etalon Piranometr (Эталонный пиранометр / Class A Spectrally Flat Pyranometer). 6. Spektroradiometr (Спектрорадиометр / Precision Spectroradiometer). 7. Etalon priyomnik (Эталонный приемник / Reference Photo- Detector) qurilmalaridan iborat etalon tizimini xarid qilishi kerak.		
4.1.1	1. Absolyut bo’shliq radiometri (Абсолютный полостной радиометр / Absolute Cavity Radiometer). Asos: ГОСТ Р МЭК 60904-4 (Табл. 1) / WMO-No. 8 (Sec. 7.2.5.2). Vazifasi: Milliy va hududiy darajadagi birlamchi (yoki ikkilamchi) etalon hisoblanadi. To’g’ri tushuvchi quyosh nurlanishini absolyut elektr-termik o’rin almashinish (Electrical Substitution Radiometry — ESR) usuli bilan o’lchaydi hamda o’lchash birligini quyosh radiatsiyasini o’lchovchi quyi pog’onadagi asboblarga (pirgeliometr va piranometrlarga) uzatish uchun xizmat qiladi. <i>1. Absolute Cavity Radiometer (Абсолютный полостной радиометр / Absolute Cavity Radiometer).</i> <i>Basis: GOST R IEC 60904-4 (Table 1) / WMO-No. 8 (Sec. 7.2.5.2).</i>	O’chash diapazoni: 0 W/m² – 2500 W/m² (600 W/m² – 2500 W/m² gacha ruxsat etiladi). Kengaytirilgan noaniqlik og’ish (k=2): 0,2 % - 0,3 % ga teng yoki ko’p emas, yoki chiziqlilikdan 200 ppmga teng yoki ko’p emas. O’lchashlarning davriyligi 90 soniyaga: teng yoki ko’p emas . Ko’rish burchagi (Field of view, FOV): 5.0° (tomonlarining nishablik burchagi teng yoki ko’p emas 1,0°)ga teng yoki ko’p emas. WRR (World Radiometric Reference) ga nisbatan uzoq muddatli barqarorligi: 0,1 % dan ko’p emas. <i>Switching range: 0 W/m² – 2500 W/m² (600 W/m² – 2500 W/m² is allowed).</i> <i>Extended uncertainty or deviation from linearity (k=2): equal to or not more than 0.2 % - 0.3 %, equal to or not more than 200 ppm.</i> <i>Measurement frequency: equal to or not more than 90 seconds.</i>	Umumiy o’lchash diapazoni: 0 dan 2500 W/m² gacha. Umumiy xatoligi: ± 0,1 % dan ± 0,5 % gacha. Umumiy kengaytirilgan noaniqligi: < 0,3 % gacha (ishonch ehtimolligi k=2 yoki P=95% bo’lganda). <i>Total measurement range: 0 to 2500 W/m².</i> <i>Total error: ± 0.1 % to ± 0.5 %.</i> <i>Total expanded uncertainty: to < 0.3 % (with confidence</i>

<i>Function: It is a primary (or secondary) standard at the national and regional levels. It measures the absolute direct solar radiation using the Electrical Substitution Radiometry (ESR) method and serves to transfer the unit of measurement to lower-level instruments (pyrheliometers and pyranometers) that measure solar radiation.</i>	<i>Field of view (FOV): equal to or not more than 5.0° (angle of inclination of the sides equal to or not more than 1.0°).</i> <i>Long-term stability relative to WRR (World Radiometric Reference): no more than 0.1%.</i>	<i>level k=2 or P=95%.</i>
2. ПНП — Pirgeliometr (Пиргелиометр нормального падения / Direct Solar Pyrheliometer). Asos: ГОСТ Р МЭК 60904-4 (Схема) / ISO 9060:2018 (Table 1). Vazifasi: To'g'ri tushuvchi quyosh nurlanishini (DNI) yuqori aniqlikda o'lchash hamda ochiq havoda (ISO 9846 va ISO 9847 bo'yicha) A, B va C sinfidagi piranometrlar va pirgeliometrlarni kalibrlash hamda qiyoslashda 1-darajali (yoki ikkilamchi) etalon sifatida qo'llash. ISO 9846 / ISO 9847. <i>2. PNP — Pyrheliometer (Пыргелиометр нормального падения / Direct Solar Pyrheliometer).</i> <i>Basis: GOST R МЭК 60904-4 (Схема) / ISO 9060:2018 (Table 1).</i> <i>Purpose: To measure direct solar radiation (DNI) with high accuracy and to use it as a level 1 (or secondary) standard</i>	KlassiSpectrally Flat Class A (O'ta yuqori aniqlikdagi va spektral yassi); ISO 9060:2018. Kengaytirilgan noaniqlik: 1,0% ga teng yoki ko'p emas . Javob berish vaqti: 2 s dan ko'p emas Yillik dreyf (Nobarqarorlik): $\pm 0,5$ % dan ko'p emas Spektral diapazoni: shu diapazon oraliqq'idan kam bo'lmasin 280 nm – 3000 nm. Yoritilganlik diapazoni: shu diapazon oraliqq'idan kam bo'lmasin 0 W/m² – 3500 W/m². Ishchi harorat diapazoni: shu diapazon oraliqq'idan kam bo'lmasin: -40...+80 °C. <i>ClassSpectrally Flat Class A (Very high resolution and spectral flatness); ISO 9060:2018.</i> <i>Extended uncertainty: equal to or not more than 1.0 %.</i> <i>Response time: not more than 2 s</i> <i>Annual drift (Unstability): not more than ± 0.5 %.</i> <i>Spectral range: not less than this range 280 nm – 3000 nm.</i>	

for the calibration and comparison of pyranometers and pyrhemometers of classes A, B and C in open air (according to ISO 9846 and ISO 9847). ISO 9846 / ISO 9847.	<i>Illumination range: not less than this range 0 W/m² – 3500 W/m².</i> <i>Operating temperature range: not less than this range: –40...+80 °C.</i>	
3. Trap-detektor / High Precision Optical Trap Detector): Optik nurlanish quvvatini o'ta yuqori aniqlikda qayd etuvchi yarimo'tkazgichli tizim. Asos: ГОСТ Р МЭК 60904-4 (Таблица 1, Схема). Vazifasi: ГОСТ Р МЭК 60904-4-2016 talablariga muvofiq, etalon quyosh elementlari va ikkilamchi etalon qabul qilgichlarni (Reference Photo-Detectors) yuqori aniqlikda kalibrlash hamda ularning spektral sezgirligini o'lchash. Optik nurlanish quvvatini o'ta yuqori aniqlikda qayd etuvchi, ichki qaytish (aks etish) yo'qotishlarini minimallashtiruvchi kremniy (Si) fotodiodlari asosidagi birlamchi optik etalon. <i>3. Trap detector (Трэн-демектор): A semiconductor system that records the power of optical radiation with extremely high accuracy.</i> <i>Task: High-precision calibration of reference solar cells and secondary reference photo-detectors and measurement of their spectral sensitivity in accordance with the</i>	Umumiy talabga mos keluvchi xarakteristikaga ega bo'lishi kerak. <i>It must have characteristics that meet the general requirement.</i>	

<i>requirements of GOST R IEC 60904-4-2016.</i> <i>Primary optical standard based on silicon (Si) photodiodes, which records optical radiation power with extremely high accuracy and minimizes internal return (reflection) losses.</i>		
4. Etalon nurlanish lampasi (Эталонная лампа) Asos: ГОСТ Р МЭК 60904-4 (Таблица 1, Схема). Manba turi: Optik kollimator, nurlanishni tekislovchi integratsiyalashgan diffuzor va reflektorlar bilan jihozlangan yuqori quvvatli galogen/ksenon nurlanish lampasi stendi.	Ishchi maydondagi nurlanish intensivligi: 0...1000 W/m² (600 – 1000 W/m² gacha ruxsat etiladi). Nurlanish maydonining bir jinsliligi (ishchi zona bo‘ylab): ± 2,0 % dan ko‘p emas.	

Vazifasi: ISO 9847 (Type IIa/IIb) va WMO-No. 8 standartlariga muvofiq, laboratoriya sharoitida (yopiq muhitda) piranometr va pirgeliometrlarni etalon qabul qilgichlarga nisbatan kalibrash hamda qiyoslash uchun quyosh nurlanishiga yaqin intensivlikdagi nurlanish maydonini hosil qilib berish. <i>4. Standard radiation lamp (Эталонная лампа</i> <i>Base: GOST R IEC 60904-4 (Table 1, Scheme). Source type: High-power halogen/xenon radiation lamp stand equipped with an optical collimator, an integrated diffuser for smoothing the radiation and reflectors. Function: To create a radiation field with an intensity close to solar radiation for calibration and comparison of pyranometers and pyrhemometers with reference to standard receivers in laboratory conditions (in a closed environment) in accordance with ISO 9847 (Type IIa/IIb) and WMO-No. 8 standards.</i>	<i>Radiation intensity in the working area: 0...1000 W/m² (600 – 1000 W/m² is allowed).</i> <i>Uniformity of the radiation field (across the working area): no more than $\pm 1.0\%$.</i>	
5. Etalon Piranometr (Эталонный пиранометр / Class A Spectrally Flat Pyranometer). Asos: ГОСТ Р МЭК 60904-4 (Схема) / O'zMS ISO 9847. Vazifasi: Yalpi (Global Horizontal Irradiance —	Kalibrash noaniqligi ($k=2$): 0,5 % dan ko'p emas Javob berish vaqti (95%): 3 soniyadan ko'p emas. Yillik dreyf: $\pm 0,5$ % dan ko'p emas. Kosinusoidal xatolik (Directional response at 80°): ± 10 W/m² dan ko'p emas.	

GHI) va diffuz (Diffuse Horizontal Irradiance — DHI) quyosh nurlanishini o'lchash hamda ochiq havoda (ISO 9846/9847) va laboratoriyada B hamda C sinfidagi piranometrlarni kalibrlashda etalon sifatida qo'llash. <i>5. Standard Pyranometer (Эталонный пиранометр / Class A Spectrally Flat Pyranometer).</i> <i>Basis: GOST R IEC 60904-4 (Схема) / UzMSt ISO 9847.</i> <i>Task: To measure global (Global Horizontal Irradiance — GHI) and diffuse (Diffuse Horizontal Irradiance — DHI) solar radiation and to use it as a standard for calibrating class B and C pyranometers in the open air (ISO 9846/9847) and in the laboratory.</i>	Spektral diapazoni: shu diapazon oralig'idan kam bo'lmasin 285 nm – 3000 nm. <i>Calibration uncertainty ($k=2$): not more than 0.5 %.</i> <i>Response time (95%): not more than 3 seconds.</i> <i>Annual drift: not more than ± 0.5 %.</i> <i>Cosinusoidal error (Directional response at 80°): not more than ± 10 W/m².</i> <i>Spectral range: not less than the range 285 nm – 3000 nm.</i>	
6. Spektroradiometr / Precision Spectroradiometer: Ko'p kanalli spektral detektorlar majmuasi — Kremniy (Si) hamda termoelektr sovutiluvchi Indiy-Galliy-Arsenid (TE-Cooled InGaAs array). Asos: ГОСТ Р МЭК 60904-4 (Таблица 1, Схема). Vazifasi: Tabiiy quyosh nurlanishi hamda sun'iy manbalarning (quyosh simulyatorlari, etalon va kalibrlash lampalari) spektral tarkibini va spektral energetik yoritilganligini absolyut	Umumiy talabga mos keluvchi xarakteristikaga ega bo'lishi kerak.	

hamda nisbiy birliklarda yuqori aniqlikda o'lchash. IEC 60904-9 va ASTM E927 standartlariga muvofiq quyosh simulyatorlarining spektral moslik sinfini (Class A/AA/AAA) aniqlash hamda piranometrlar va quyosh elementlarini kalibrlashda spektral og'ish ko'effitsientini (Spectral Mismatch Factor) hisoblash uchun xizmat qiladi. 6. <i>Spectroradiometer</i> (Спектро радиауометр / Precision Spectroradiometer): Multi-channel spectral detector array — Silicon (Si) and thermoelectrically cooled Indium-Gallium-Arsenide (TE-Cooled InGaAs array). Basis: GOST R MЭК 60904-4 (Table 1, Scheme). Function: High-precision measurement of the spectral composition and spectral energy irradiance of natural solar radiation and artificial sources (solar simulators, standard and calibration lamps) in absolute and relative units. It serves to determine the spectral compatibility class (Class A/AA/AAA) of solar simulators in accordance with IEC 60904-9 and ASTM E927 standards and to calculate the spectral mismatch factor (Spectral Mismatch Factor) when calibrating pyranometers and solar cells.	<i>It must have characteristics that meet the general requirement.</i>	
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7. Etalon qabul qilgich. Reference Photo-Detector): Metrologik o'lash-nazorat tizimi. Asos: ГОСТ Р МЭК 60904-4 (Таблица 1, Схема). Vazifasi: Laboratoriya sharoitida quyosh simulyatorlari va optik manbalar nurlanish intensivligining vaqtinchalik barqarorligini (Temporal Stability) va bir jinsliligini (Spatial Uniformity) uzluksiz monitoring qilish hamda IEC 60904-2 bo'yicha quyosh elementlari, piranometrlar va optik sensorlarni kalibrlash va qiyoslashda optik nurlanish quvvatini yuqori anqlikda qayd etuvchi ikkilamchi etalon hisoblanadi. <i>7. Reference Photo-Detector. (Эталонный прибор / Reference Photo-Detector):</i> <i>Base: GOST R IEC 60904-4 (Table 1, Scheme).</i> <i>Function: In laboratory conditions, it is a secondary standard that records optical radiation power with high accuracy for continuous monitoring of the temporal stability and uniformity of radiation intensity of solar simulators and optical sources, as well as for calibrating and comparing solar cells, pyranometers and optical sensors according to IEC 60904-2.</i>	Kanallar soni: kamida 8 ta. Qo'shimcha tavsiflari umumiy talabga mos keluvchi xarakteristikalarda bo'lishi kerak. <i>Number of channels: At least 8 differential channels.</i> <i>It must have characteristics that meet general requirements.</i>	
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Tizimning konstruktiv va yordamchi qismlari
Structural and auxiliary parts of the system

1.Nurlanish manbai bo'lmasi (Light source compartment): Ichki qismda o'rnatilgan sun'iy nurlanish manbai (etalon lampa) uchun maxsus himoyalangan joy;

Ichki qismga o'rnatilgan etalon lampani tashqi muhit havo oqimi va yorug'lik xalaqitlaridan himoya qiladi hamda xavfsiz issiqlik izolatsiyasini ta'minlaydi.

Light source compartment: A specially protected space for an artificial light source (standard lamp) installed in the interior;

Task: It protects the internally mounted reference lamp from external airflow and ambient light interference, while providing safe thermal insulation.

2.Diafragma va avtomatik zaslonka bo'lmasi (Apertures and automatic shutter): Nurlanish oqimini aniq vaqt oralig'ida kesib turish (shade) va piranometrning "nol" ko'rsatkichini (dark offset) tekshirish uchun zarur;

Nurlanish oqimini dastur orqali aniq vaqt intervallarida to'sib turadi (shade). Bu piranometrlarning qorong'ulikdagi "nol" ko'rsatkichini (dark offset) avtomatik aniqlash va kompensatsiya qilish uchun o'ta zarur.

Apertures and automatic shutter: Necessary to shade the light flux at specific time intervals and check the "zero" reading (dark offset) of the pyranometer;

Blocks the light flux at specific time intervals via the program (shade). This is essential for automatically detecting and compensating for the "zero" reading (dark offset) of the pyranometers.

Task: It programmatically blocks (shades) the radiation flux at precise time intervals. This is essential for automatically determining and compensating for the "dark offset" (zero-point response) of pyranometers.

3. Etalon quyosh elementini o'rnatish uchun montaj platformasi (Mounting platform for installation of the reference solar cell): Bir vaqtning o'zida bir nechta piranometrni (etalon va tekshirilayotgan) mahkamlash va ularning o'zaro joylashuvini muvofiqlashtirish uchun;

Bir vaqtning o'zida bir nechta piranometrni (ham etalon, ham tekshirilayotgan asboblarni) geometrik jihatdan mukammal parallel tekislikda mahkamlash va muvofiqlashtirish uchun xizmat qiladi.

Mounting platform for installation of the reference solar cell: For simultaneously fixing several pyranometers (standard and tested) and coordinating their mutual location;

Serves for simultaneously fixing and coordinating several pyranometers (both standard and tested devices) in a geometrically perfectly parallel plane.

4.O'lchash va boshqaruv bloki (Measurement & Control unit): Datchiklardan kelayotgan mikrovoltli signallarni qabul qiluvchi va tizimni avtomatlashtirilgan holda boshqaruvchi elektron blok;

Datchiklardan kelayotgan o'ta past mikrovoltli signallarni birlamchi filtrlash, kuchaytirish va tizimning mexanik qismlarini (shutter, datchik joylashuvi)

avtomatlashtirilgan dasturiy boshqarish uchun mo'ljallangan elektronika bloki.

Measurement & Control unit: An electronic unit that receives microvolt signals from sensors and automatically controls the system;

Task: An electronics unit designed for the primary filtering and amplification of ultra-low microvolt signals coming from sensors, as well as for the automated software control of the system's mechanical components (shutter, sensor positioning).

5. Quvvat manbai (Power supply): Tizimning barcha elektron qismlarini barqaror kuchlanish 220 V (kuchlanish), 50 Hz (chastota) da va elektr energiyada uzilish bo'lganda uzluksiz 30 daqiqalik aloqa taminotini ta'minlash talabi bo'lishi lozim.

Tizimning barcha nozik o'lchov elektronikasini, kontrollerlarini va ayniqsa etalon lampani tarmoqdagi kuchlanish tebranishlaridan himoyalangan o'ta barqaror kuchlanish (stabilizatsiyalangan DC) bilan ta'minlaydi.

Power supply: To provide a stable voltage to all electronic components of the system;

Task: It provides all the sensitive measurement electronics, controllers, and especially the reference lamp of the system with an ultra-stable voltage (stabilized DC) that is protected from grid voltage fluctuations.

6. Tizimdagi qurilmalarni tashqi ta'sirdan himoyalash korpusi: Barcha yuqoridagi qismlarni yagona blokda jamlovchi himoya korpusi; Yuqorida sanab o'tilgan barcha tizim qismlarini yagona vertikal yoki gorizontaal blokda mustahkam jamlovchi, ularni tashqi chang, mexanik va elektromagnit ta'sirlardan himoya qiluvchi asosiy himoya g'ilofi.

Enclosure for protecting system devices from external influences: A protective enclosure that combines all of the above components in a single unit;

The main protective casing that securely combines all of the above system components in a single vertical or horizontal unit and protects them from external dust, mechanical, and electromagnetic influences.

4.1.2	Yetkazib berish komplekti va unga qo'yiladigan talablar Absolyut bo'shliq radiometri (Абсолютный полостной радиометр / Absolute Cavity Radiometer). ПНП — Pirgeliometr (Пиргелиометр нормального падения / Direct Solar Pyrheliometer). Trap-detektor (Трэп-детектор / High Precision Optical Trap Detector); Etalon nurlanish lampasi (Эталонная лампа) Etalon Piranometr (Эталонный пиранометр / Class A Spectrally Flat Pyranometer). Spektroradiometr (Спектрорадиометр / Precision Spectroradiometer) Etalon priyomnik (Эталонный приемник / Reference Photo-Detector): Tizimning konstruktiv va yordamchi qismlari; Nurlanish manbai bo'lmasi (Light source compartment): Ichki qismda o'rnatilgan sun'iy nurlanish manbai (etalon lamp) uchun maxsus himoyalangan joy; Diafragma va avtomatik zatvor bo'lmasi (Apertures and automatic shutter): Nurlanish oqimini aniq vaqt oralig'ida kesib turish (shade) va piranometrning "nol" ko'rsatkichini (dark offset) tekshirish uchun zarur; Sensorlar o'rnatish bo'lmasi (Sensor compartment): Bir vaqtning o'zida bir nechta piranometrni (etalon va tekshirilayotgan) mahkamlash va ularning o'zaro joylashuvini muvofiqlashtirish uchun; O'lchash va boshqaruv bloki (Measurement & Control unit): Datchiklardan kelayotgan mikrovoltli signallarni qabul qiluvchi va tizimni	Scope of delivery and its requirements <i>Absolute Cavity Radiometer.</i> <i>PNP — Pyrheliometer (Pyrheliomet normalo padenia / Direct Solar Pyrheliometer).</i> <i>Trap-detector (Trap-detector / High Precision Optical Trap Detector);</i> <i>Reference radiation source (Etalon lamp):</i> <i>Etalon Pyranometer (Etalonnyy pyranometr / Class A Spectrally Flat Pyranometer).</i> <i>Spectroradiometer (Spectroradiometer / Precision Spectroradiometer)</i> <i>Standard receiver (Etalonnyy priemnik / Reference Photo-Detector):</i> <i>Structural and auxiliary parts of the system;</i> <i>Light source compartment (Light source compartment): A specially protected place for an artificial radiation source (etalon lamp) installed in the interior;</i> <i>Apertures and automatic shutter compartment (Apertures and automatic shutter): Necessary to shade the radiation flux at a certain time interval and check the "zero" indicator (dark offset) of the pyranometer;</i> <i>Sensor compartment (Sensor compartment): For fixing several pyranometers (etalon and tested) at the same time and coordinating their mutual location;</i> <i>Measurement & Control unit: An electronic unit that receives microvolt signals from sensors and automatically controls the system;</i>
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avtomatlashtirilgan holda boshqaruvchi elektron blok; Quvvat manbai (Power supply): Tizimning barcha elektron qismlarini barqaror kuchlanish 220 V (kuchlanish), 50 Hz (chastota) da va elektr energiyada uzilish bo'lganda uzluksiz 30 daqiqalik aloqa taminotini ta'minlash talabi bo'lishi lozim. Tizimni tashqi ta'sirdan ximoyalash korpusi: Barcha yuqoridagi qismlarni yagona blokda jamlash va tashqi ta'sir etuvchi omillardan himoya qiluvchi korpusi. Barcha qurilmalar uchun CIPM-MRA logotipi tushirilgan kalibrlash sertifikatlari; O'lchashlarni avtomatlashtirish uchun dasturiy ta'minot; Etalon tarkibidagi qurilmalar xalqaro solishtirish loyihalarida qatnashish va BIPM ma'lumotlar bazasiga CMC yozuvlarini taqdim etish talablariga mos bo'lishi kerak. To'plamdagi barcha qurilmalar uchun ekspluatatsiya (foydalanish) bo'yicha qo'llanmalar. Yuqorida sanab o'tilgan barcha etalon o'lchash asboblari va manbalari o'zaro mos kelishi (compatible bo'lishi) kerak. Shuningdek, ushbu etalonda ko'rsatilgan asboblarning barchasi birgalikda, ushbu etalonning asosiy vazifasi bo'lgan kattalikni ta'minlashi kerak va bir vaqtning o'zida hosil qilish (generatsiyalash), o'lchash hamda boshqa asboblarni, qiyoslash yoki solishtirish imkonini berishi kerak. Talab qilingan o'lchash ko'lami, xatolik va kengaytirilgan noaniqliklarni xosil qilish uchun kerak bo'ladigan barcha asosiy va yordamchi qurilmalar to'liq komplektda hech qanday kamchiliklarsiz (full) holatda va texnik topshiriqdagi barcha talablar to'liq bajarilgan holatda bo'lishi shart. Tender vaqtida 4.1.1-bandda ko'rsatilgan diapazonlargacha, eng yaxshi aniqlikka yoki eng kam xatolikka	<i>Power supply: All electronic components of the system must be powered by a stable voltage of 220 V (voltage), 50 Hz (frequency), and must be able to provide uninterrupted communication for 30 minutes in the event of a power outage.</i> <i>System case (Cabinet): A protective case that collects all the above parts in a single vertical or horizontal block;</i> <i>Calibration certificates with the CIPM-MRA logo for all devices;</i> <i>Software for automating measurements;</i> <i>The devices included in the standard must comply with the requirements for participation in international comparison projects and submission of CMC records to the BIPM database.</i> <i>Operation manuals for all devices in the set.</i> <i>All reference measuring instruments and sources listed above must be compatible with each other.</i> <i>Also, the instruments specified in this standard must all together provide the magnitude that is the main function of this standard and must simultaneously generate, measure, and compare or compare other instruments.</i> <i>The required measurement range, error, and expanded uncertainty must be complete with all the main and auxiliary devices necessary to produce them, in a complete set, without any defects (full), and all the requirements of the technical specifications must be fully met.</i> <i>At the time of tender, the devices with the best accuracy or the lowest error (uncertainty) up to the ranges specified in clause 4.1.1 will be</i>
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	(noaniqlikka) ega bo'lgan qurilmalarga eng yuqori ball beriladi. Yuqorida zikr etilgan etalonning har bir qurilmasi uchun, ko'rsatilgan diapazon bo'yicha aniq diapazon hamda o'lchash/o'zgartirish/generatsiyalash xatoliklari (noaniqliklari) aniq ko'rsatilishi kerak. Bunda aniqlik har qanday ikkilanishli yoki chalg'ituvchi qiymatlarsiz ppm yoki % da ko'rsatilishi lozim.	<i>awarded the highest score. For each device of the above-mentioned standard, the exact range and the measurement/conversion/generation errors (uncertainties) within the specified range must be clearly indicated. The accuracy must be indicated in ppm or % without any ambiguous or misleading values.</i>
	<i>* Mazkur texnik topshiriqda keltirilgan texnik va metrologik yechimlar ishtirokchining talab etilgan funksional, metrologik, ekspluatatsion xususiyatlar hamda xavfsizlik talablariga muvofiqligi hujjatlar bilan tasdiqlangan taqdirda, ekvivalent yoki yanada takomillashtirilgan uskunani taklif etish huquqini cheklamaydi.</i> <i>Agar taklif etilayotgan yechim texnik topshiriqda belgilangan barcha maqsad va talablarning bajarilishini, belgilangan ko'rsatkichlarni yomonlashtirmagan holda ta'minlasa, etalon, o'lchash va yordamchi uskunalar, adapterlar, interfeyslar, dasturiy ta'minot hamda butlovchi qismlarning boshqa tarkibini taklif etishga yo'l qo'yiladi.</i> <i>Yetkazib beriladigan etalon kompleksi to'liq butlangan, texnik jihatdan soz, ishga yaroqli va foydalanishga tayyor bo'lishi hamda uning tarkibiga barcha zarur o'lchash vositalari, datchiklar, modullar, kuchaytirgichlar, adapterlar, kabellar, interfeyslar, dasturiy ta'minot, litsenziyalar, texnik va metrologik hujjatlar, shuningdek, belgilangan maqsadda to'laqonli foydalanish uchun zarur bo'lgan boshqa komponentlar kirishi lozim.</i> <i>Kompleksga qo'yiladigan talablar, agar talab etilgan xususiyatlar boshqa ishlab chiqaruvchilarning texnik jihatdan mos ekvivalentlari orqali ta'minlanishi mumkin bo'lsa, muayyan bir ishlab chiqaruvchining uskunolari, dasturiy ta'minoti, butlovchi qismlari yoki texnik yechimlariga asossiz bog'liqlikni nazarda tutmasligi lozim. Buyurtmachining muayyan uskunolari bilan moslik talabi faqat tegishli texnik va metrologik asoslar mavjud bo'lgan taqdirda belgilanishi mumkin.</i>	<i>* The technical and metrological solutions provided in this technical specification do not limit the participant's right to offer equivalent or more advanced equipment, provided that its compliance with the required functional, metrological, operational characteristics and safety requirements is confirmed by documents.</i> <i>If the proposed solution ensures the fulfillment of all the goals and requirements set forth in the technical specification without deteriorating the specified indicators, it is allowed to offer a different set of standard, measuring and auxiliary equipment, adapters, interfaces, software and components.</i> <i>The supplied standard complex must be fully complete, technically sound, operational and ready for use and must include all necessary measuring instruments, sensors, modules, amplifiers, adapters, cables, interfaces, software, licenses, technical and metrological documentation, as well as other components necessary for full use for the intended purpose.</i> <i>The requirements for the complex should not imply unreasonable dependence on the equipment, software, components or technical solutions of a particular manufacturer, if the required characteristics can be provided by technically equivalent products from other manufacturers. The requirement for compatibility with specific equipment of the customer can be established only if there are appropriate technical and metrological grounds.</i>
4.1.3	O'lchash jarayonini avtomatlashtirish uchun dasturiy ta'minot Barcha signallarni qabul qilish, ularni qayta ishlash va talab qilinadigan natijani berish uchun maxsus dasturiy ta'minotni	Software for measurement process automation <i>Specialized software must be configured to receive all signals, process them, and provide the required result. All signals must be processed</i>

sozlash kerak. Barcha signallar dasturiy ta'minot yordamida qayta ishlanishi va yakunida talab qilingan yagona qiymat olinishi lozim. Maxsus dasturiy ta'minot quyidagilarni ta'minlashi kerak: Etalon tarkibiga kiruvchi barcha birlamchi o'zgartirgichlar (preobrazovatellar) va nazorat vositalaridan o'lchov va nazorat ma'lumotlarini yig'ish va birlamchi qayta ishlashni, shuningdek, kalibrlash uchun Etalonni qiyoslash (kalibrlash) jarayonini avtomatik tartibga solish va boshqarishni. 1. Etalonda quyidagi funksional imkoniyatlar nazarda tutilishi (ko'zda tutilishi) kerak: – Qiyoslanayotgan (kalibrlanayotgan) asboblarni (O'V) kalibrlash (qiyoslash) jarayonini vizuallashtirish – Asboblarni kalibrlash (qiyoslash) usulini tanlash – O'lchash tartibi (uslubiyati) ni belgilash – natijalarni qayta ishlash va zarur bo'lganda kalibrlash va qiyoslash bayonnomalarini chop etish (nashrga chiqarish); 2. Etalonning ishlashi uchun jarayonlarni vizuallashtirish, ma'lumotlarni baholash va arxivlash, shuningdek, sinov hisobotlarini chop etish imkonini beruvchi dasturiy ta'minot (DT). DT natijalarni statistik baholash bilan, shuningdek, ma'lumotlar jurnallari (loglari) va shunga o'xshash boshqa funksiyalar bilan jihozlangan bo'lishi mumkin. Sinov natijalari, tarmoqda parallel saqlash, zaxira nusxasini olish yoki bayonnoma shaklida avtomatik chop etish imkoniyati bilan kompyuter ma'lumotlar bazasida saqlanishi kerak. Taklif etilayotgan operatsion tizim etalon sotib olingan paytdagi dolzarb (aktual) versiya bo'lishi lozim. – Dasturiy ta'minot buyurtmachi resurslariga joriy qilingan sanadagi dolzarb (aktual) versiya bo'lishi va etalon ishga tushirilgan (ekspluatatsiyaga kiritilgan) paytdan boshlab kamida 3 yil muddatga kafolatli va texnik qo'llab-quvvatlashga ega bo'lishi kerak.	<i>using the software to ultimately obtain a single required value.</i> <i>The specialized software must ensure: the collection and primary processing of measurement and control data from all primary converters and control instruments included in the standard, as well as the automatic regulation and management of the standard's verification (calibration) process.</i> <i>1. The standard must provide the following functional capabilities:</i> <i>– Visualization of the calibration (verification) process of the instruments under test (IUT);</i> <i>– Selection of the instrument calibration (verification) method;</i> <i>– Specification of the measurement procedure (methodology);</i> <i>– Processing of results and, if necessary, printing (publishing) calibration and verification protocols;</i> <i>2. Software (DT) for the operation of the standard, which allows visualization of processes, evaluation and archiving of data, as well as printing of test reports. DT can be equipped with statistical evaluation of results, as well as data logs and other similar functions.</i> <i>Test results must be stored in a computer database with the possibility of parallel network storage, backup, or automatic printing in the form of a protocol. The proposed operating system must be the current version at the time of the standard's purchase.</i> <i>The software must be the current version as of the date of implementation into the customer's resources and must have warranty and technical support for a period of at least 3 years from the moment the standard is put into operation (commissioned).</i>
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4.1.4	Etalonni montaj qilish, ishga tushirish-sozlash ishlari va xodimlarni o'qitish Ijrochi yetkazib berilgan Etalonning shefmontajini O'zMMI laboratoriyasida o'tkazishga majbur. Ijrochi yetkazib berilgan Etalonni ekspluatatsiya qilish va unga xizmat ko'rsatish bo'yicha 2 nafar xodimni etalon o'rnatilganidan so'ng O'zMMI laboratoriyasida o'qitish sharoitini yaratishi zarur. Xodimlarni o'qitish va tayyorlash muddatlari etalonlarning ekspluatatsiya bo'yicha qo'llanmasiga muvofiq bo'lishi kerak.	Installation, commissioning, and personnel training of the standard <i>The Contractor is obliged to perform the supervision of installation (shef-montage) of the delivered standard at the UzNIM laboratory.</i> <i>The Contractor shall provide training in the UzNIM laboratory for 2 employees on the operation and maintenance of the delivered Reference Standard after its installation. The duration of employee training and preparation must comply with the operation manual of the reference standards.</i>
4.1.5	Dasturiy ta'minotni o'rnatish (Installatsiya) Ijrochi dasturiy ta'minotni O'zMMI tomonidan taqdim etilgan kompyuterga o'rnatishni (installatsiyasini) Etalon komplektining fizik ulanishi bilan birga amalga oshirishi, dasturiy ta'minot va Etalonning to'liq o'zaro ishlashini (o'zaro ta'sirini) ta'minlashi shart.	Software Installation <i>The Contractor must perform the installation of the software on the computer provided by UzNIM, along with the physical connection of the standard set, and must ensure the full interoperability (interaction) between the software and the standard.</i>
Kichik bo'lim 4.2 Asosiy texnik-iqtisodiy va ekspluatatsion ko'rsatkichlar /		Subsection 4.2 Main technical-economic and operational indicators
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.		<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>
Kichik bo'lim 4.3 Ishonchlilikka qo'yiladigan talablar		Subsection 4.3 Reliability requirements
Etalon birligini aks ettirish (generatsiyalash) aniqligi va uning kattaligini bo'ysunuvchi o'lchov vositalariga uzatish xatoligi (noaniqligi) ushbu TZ talablariga mos kelishi kerak. Ishlab chiqaruvchi/Ijrochi etalonning xizmat muddati to'g'risida ma'lumot taqdim etishi shart.		<i>The accuracy of representing (generating) the unit of the standard and the error (uncertainty) of transferring its value to subordinate measuring instruments must comply with the requirements of this TS. The Manufacturer/Contractor is obliged to provide information regarding the service life of the standard.</i>
Kichik bo'lim 4.4 Konstruksiyaga, montaj-texnik talablar		Subsection 4.4 Construction and installation-technical requirements
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.		<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>
Kichik bo'lim 4.5 Tashqi muhit omillari ta'sirida barqarorlik va parametrlarga qo'yiladigan talablar		Subsection 4.5 Requirements for stability and parameters under the influence of environmental factors
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.		<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>

Kichik bo'lim 4.6 Elektr/energiya ta'minotiga qo'yiladigan talablar: Elektr/energiya ta'minoti 220 V kuchlanish, 50 Hz chastotada, elektr energiyada uzilish bo'lganda uzluksiz 30 daqiqalik aloqa taminotini ta'minlash talabi bo'lishi lozim.	<i>Subsection 4.6 Requirements for electrical/power supply: The electrical/power supply must be 220 V, 50 Hz, and must be capable of providing uninterrupted communication for 30 minutes in the event of a power outage.</i>
Etalon elektr ta'minoti bo'yicha O'zbekiston Respublikasi hududida amalda bo'lgan me'yoriy hujjatlar talablariga va ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq bo'lishi kerak.	<i>The power supply of the standard must comply with the requirements of the regulatory documents in force in the Republic of Uzbekistan and the regulatory and technical documentation of the manufacturing plant.</i>
Kichik bo'lim 4.7 Nazorat-o'lchov asboblari va avtomatikaga qo'yiladigan talablar	<i>Subsection 4.7 Requirements for instrumentation and automation</i>
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.	<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>
Kichik bo'lim 4.8 Tarkibiy qismlarga, boshlang'ich va ekspluatatsion xomashyo va materiallarga, shuningdek tayyor mahsulotga qo'yiladigan talablar	<i>Subsection 4.8 Requirements for components, raw materials, and operational materials, as well as the finished product</i>
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.	<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>
Kichik bo'lim 4.9 Markirovkaga (belgilashga) qo'yiladigan talablar	<i>Subsection 4.9 Marking requirements</i>
Markirovka (belgilash) ГОСТ 22261-94 ning 4.16-bandi talablariga va/yoki unga zid kelmaydigan hamda undan qolishmaydigan boshqa xalqaro standartlar talablariga mos kelishi kerak.	<i>Marking must comply with the requirements of clause 4.16 of GOST 22261-94 and/or other international standards that do not contradict it and are not inferior to it.</i>
Kichik bo'lim 4.10 O'lchamlar va o'rashga qo'yiladigan talablar	<i>Subsection 4.10 Requirements for dimensions and packaging</i>
Qadoqlash (Upakovka) Etalonning tashish, yuklash-tushirish ishlarida va o'rnatish joyiga ko'chirishda butunligini ta'minlashi kerak. Qadoqlash O'zbekiston Respublikasi davlat standartlari va xalqaro umume'tirof etilgan standartlar talablariga mos kelishi lozim. Qadoqlash Etalonning markirovkasiga (belgilashiga) qat'iy mos kelishi kerak. Qadoqlashda mexanik shikastlanishlar va noqulay iqlim sharoitlari ta'siri izlari bo'lmasligi lozim. Tashish vaqtida ishlab chiqaruvchi zavodning MTHda ko'rsatilgan Etalonn qadoqlash va tashish talablariga rioya qilish zarur.	<i>Packaging must ensure the integrity of the standard during transportation, loading and unloading operations, and movement to the installation site. Packaging must comply with the requirements of the state standards of the Republic of Uzbekistan and generally recognized international standards. Packaging must strictly correspond to the marking of the standard. Packaging must show no signs of mechanical damage or the effects of unfavorable climatic conditions. During transportation, it is necessary to comply with the requirements for packaging and transporting the standard specified in the manufacturer's regulatory and technical documentation.</i>
Kichik bo'lim 4.11 Ehtiyot qismlar, asboblari va anjomlar (ЗИП) ga va tez eskiradigan qismlarga qo'yiladigan talablar	<i>Subsection 4.11 Requirements for spare parts, tools, and accessories (SPTA) and wear parts</i>

Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.	<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>
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BO'LIM 5. Topshirish va qabul qilish qoidalariga qo'yiladigan talablar /
SECTION 5. Requirements for delivery and acceptance rules

Kichik bo'lim 5.1 Topshirish va qabul qilish tartibi	<i>Subsection 5.1 Delivery and acceptance procedure</i>
Etalon, montaj va ishga tushirish-sozlash ishlari tugallangandan so'ng, metrologik attestatsiya o'tkazilgandan, tajriba ekspluatatsiyasi amalga oshirilgandan, Buyurtmachi xodimlari o'qitilgandan va Qurilma sanoat ekspluatatsiyasiga topshirilgandan keyin imzolangan Qabul qilish-topshirish Akti imzolangan paytdan boshlab lozim darajada yetkazib berilgan va qabul qilingan hisoblanadi. Mahsulotni miqdori va sifati bo'yicha qabul qilish (shu jumladan, mahsulotning transport hujjatlarida ko'rsatilgan ma'lumotlarga mosligini tekshirish va qadoq/o'ramning shikastlanmaganligini tekshirish) tegishli qabul qilish akti rasmiylashtirilgan holda amalga oshiriladi. Buyurtmachi mahsulotni qabul qilishda texnik va ekspluatatsion xususiyatlarning Shartnoma va Texnik topshiriqda ko'rsatilgan talablarga mosligini tekshiradi. Mahsulot yetkazib berilganda va kafolat muddati davomida aniqlangan nuqsonlar bo'yicha da'volar ular Buyurtmachi tomonidan aniqlangan kundan boshlab 45 ish kuni ichida bildirilishi mumkin. Sifatsiz, to'liq komplekt bo'lmagan mahsulot aniqlangan taqdirda, Akt tuzish uchun Ijrochi vakilining kelishi majburiydir. Sifat bo'yicha qabul qilinmagan mahsulot javobgar saqlovga o'tkaziladi. Ijrochi Buyurtmachidan bu haqda xabarnoma olgan paytdan boshlab 20 ish kuni ichida javobgar saqlovga olingan mahsulotni olib chiqib ketishga yoki u bilan bog'liq farmoyish berishga majbur. Buyurtmachi tomonidan mahsulotni javobgar saqlovga qabul qilish bilan bog'liq qilingan xarajatlar, xarajatlar kalkulyatsiyasi olingan va to'lov hisob-fakturasini taqdim etilgan sanadan boshlab 10 ish kuni ichida Ijrochi tomonidan qoplab berilishi lozim. Sifatsiz mahsulotni qaytarish yoki uni lozim darajadagi sifatli mahsulotga almashtirish bilan bog'liq xarajatlarni Ijrochi o'z zimmasiga oladi.	<i>The Standard shall be considered properly delivered and accepted upon the signing of the Acceptance Act, which is to be signed after the completion of installation and commissioning works, metrological certification, trial operation, training of the Customer's personnel, and the handover of the Device into industrial operation.</i> <i>Acceptance of the product in terms of quantity and quality (including verification of the product's compliance with the data specified in the transport documents and inspection of the packaging for damage) shall be carried out with the formalization of a corresponding acceptance act. Upon acceptance of the product, the Customer shall verify the compliance of technical and operational characteristics with the requirements specified in the Contract and the Technical Specification. Claims regarding defects identified during delivery and the warranty period may be submitted within 45 working days from the date of their discovery by the Customer. In the event that poor-quality or incomplete products are identified, the presence of the Contractor's representative is mandatory for the drawing up of the Act. Products not accepted for quality shall be placed in fiduciary storage. The Contractor is obliged to remove the products held in fiduciary storage or provide instructions regarding them within 20 working days from the moment of receiving notification from the Customer. Costs incurred by the Customer related to the fiduciary storage of the product must be reimbursed by the Contractor within 10 working days from the date of receipt of the cost calculation and the submission of the payment invoice. The Contractor shall bear all costs associated with the return of poor-quality products or their replacement with products of proper quality.</i>

Kichik bo'lim 5.2 Etalonlar yetkazib berilganda buyurtmachiga texnik va boshqa hujjatlarni topshirishga qo'yiladigan talablar	<i>Subsection 5.2 Requirements for the submission of technical and other documentation to the customer upon delivery of the Standards</i>
5.2.1 Buyurtmachiga Etalonning ekspluatatsion hujjatlari quyidagi tarkibda topshiriladi: – Barcha asboblarni uchun CIPM-MRA logotipi tushirilgan kalibrlash sertifikatlari; – Invoysning (hisob-fakturaning) originali; – Nomlanishi, etalonning og'irligi, o'rindosh soni va qadoqlash turi, shuningdek, TIF TN kodi ko'rsatilgan qadoqlash varaqasi; – Etalonga pasport; – Etalonning kelib chiqqan mamlakati haqidagi sertifikat; – Muvofiqlik va sifat sertifikati; – Etalon tizimini montaj qilish va sozlash bo'yicha yo'riqnoma (instruksiya); – Etalonni ekspluatatsiya qilish, texnik xizmat ko'rsatish va ta'mirlash bo'yicha qo'llanma; – Texnik vositalarni texnik xizmat ko'rsatish va ta'mirlash bo'yicha tavsiyalar; – Ta'mirlash va texnik xizmat ko'rsatishni o'tkazishning davriyligi, hajmi va jadvali (grafigi); – Etalonni kalibrlash uslubiyoti (metodikasi); – Ijrochi yetkazib beriladigan Etalonni montaj qilish uchun laboratoriya xonasini tayyorlash bo'yicha, shu jumladan montaj sxemasi, kommunikatsiyalar va yetkazib beriladigan Etalonni montaj qilish uchun zarur bo'lgan boshqa har qanday texnik ma'lumotlarni o'z ichiga olgan barcha zaruriy texnik ma'lumotlar va talablarni Buyurtmachiga taqdim etishi shart. Yuqorida ko'rsatilgan hujjatlar yakuniy qabul qilish chog'ida Buyurtmachiga topshiriladi. Barcha hujjatlar o'zbek yoki inglis tilidagi tarjimasi bilan bo'lishi kerak. 5.2.2. Buyurtmachiga Ijrochi tomonidan to'liq ekspluatatsion hujjatlar va barcha komplektlovchi buyumlarga sertifikatlar nusxalari topshiriladi. 5.2.3 Ekspluatatsion hujjatlar komplektlovchi buyumlar ijrochisidan olingan hajmda topshiriladi.	5.2.1 <i>The operational documentation of the Standard shall be submitted to the Customer in the following composition:</i> – <i>Calibration certificates with the CIPM-MRA logo for all instruments;</i> – <i>Original invoice;</i> – <i>Packing list indicating the name, weight of the standard, number of units, and type of packaging, as well as the HS (TIF TN) code;</i> – <i>Passport for the Standard;</i> – <i>Certificate of origin of the Standard;</i> – <i>Certificate of conformity and quality;</i> – <i>Instructions for the installation and setup of the Standard system;</i> – <i>Manual for the operation, maintenance, and repair of the Standard;</i> – <i>Recommendations for the maintenance and repair of technical equipment;</i> – <i>Periodicity, scope, and schedule for repair and maintenance;</i> – <i>Calibration methodology for the Standard;</i> – <i>The Contractor must provide the Customer with all necessary technical data and requirements for the preparation of the laboratory room for the installation of the delivered Standard, including installation diagrams, communications, and any other technical information necessary for the installation of the delivered Standard.</i> <i>The documents mentioned above shall be submitted to the Customer during the final acceptance. All documents must be provided with a translation into Uzbek or English.</i> 5.2.2. <i>The Contractor shall submit full operational documentation and copies of certificates for all component parts to the Customer.</i> 5.2.3 <i>Operational documentation shall be submitted in the volume received from the manufacturer of the component parts.</i> 5.2.4 <i>The Contractor shall submit all the documents described above in both hard copy and electronic versions.</i>

5.2.4 Ijrochi yuqorida bayon etilgan barcha hujjatlarni qog'ozli va elektron nusxalarda topshiradi.	
Kichik bo'lim 5.3 Etalonni sug'urtalashga qo'yiladigan talablar	<i>Subsection 5.3 Requirements for the insurance of the Standard</i>
Etalon ijrochi tomonidan sug'urtalangan bo'lishi kerak	<i>The Standard must be insured by the Contractor.</i>

BO'LIM 6. TASHISHGA (TRANSPORTIROVKA) QO'YILADIGAN TALABLAR /
SECTION 6. REQUIREMENTS FOR TRANSPORTATION

Etalon tizimi va uning tarkibiy qismlarini tashish ishlab chiqaruvchining yopiq transport vositalarida (konteynerlarda, yopiq avtomobillarda yoki havo transportida) amalga oshirilishi lozim. Tashish jarayonida tashqi muhit iqlim omillarining ta'siriga chidamliligi va boshqa ta'sir qiluvchi omillar GOCT 15150 standarti (5-shart) va GOCT 22261, O'z DSt ISO 9001:2015 standartlari talablariga muvofiq bo'lishi shart:	<i>The standard system and its components must be transported in the manufacturer's closed vehicles (containers, closed cars or air transport). During transportation, the resistance to the effects of external climatic factors and other influencing factors must comply with the requirements of GOST 15150 (condition 5) and GOST 22261, Uzbek DSt ISO 9001:2015 standards:</i>
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BO'LIM 7. SAQLASHGA QO'YILADIGAN TALABLAR /
SECTION 7. REQUIREMENTS FOR STORAGE

Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.	<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>
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BO'LIM 8. KAFOLATLAR HAJMIGA VA/YOKI MUDDATIGA QO'YILADIGAN TALABLAR
SECTION 8. REQUIREMENTS FOR THE SCOPE AND/OR DURATION OF WARRANTIES

Etalonni ekspluatatsiya qilish boshlangan kundan boshlab kamida 12 oy yoki buyurtmachiga yetkazib berilgan kundan boshlab kamida 18 oy kafolat muddati belgilansin. Kafolat muddati davomida Ijrochi Buyurtmachining yozma xabarnomasini olgan sanadan boshlab 20 kalendar kundan oshmagan muddatda ishdan chiqqan etalonni ta'mirlash/almashtirishni amalga oshirishga majbur.	<i>A warranty period shall be established for at least 12 months from the date the Standard is put into operation, or at least 18 months from the date of delivery to the Customer.</i> <i>During the warranty period, the Contractor is obliged to repair/replace a failed standard within a period not exceeding 20 calendar days from the date of receipt of the Customer's written notification.</i>
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BO'LIM 9. TA'MIRLASHGA YAROQLILIKKA QO'YILADIGAN TALABLAR
SECTION 9. REQUIREMENTS FOR MAINTAINABILITY

Etalonning barcha asboblari va komplektlovchi qismlari ekspluatatsiya sharoitlarida ta'mirlashga yaroqli (remontoprigradnii) bo'lishi kerak.	<i>All instruments and component parts of the standard must be maintainable (repairable) under operational conditions.</i>
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BO'LIM 10. XIZMAT KO'RSATISHGA QO'YILADIGAN TALABLAR
SECTION 10. REQUIREMENTS FOR SERVICE

Kichik bo'lim 10.1 Xizmat ko'rsatishga qo'yiladigan talablar	<i>Subsection 10.1 Requirements for maintenance</i>
Ishlab chiqaruvchi zavodning me'yoriy-texnik hujjatlariga muvofiq.	<i>In accordance with the regulatory and technical documentation of the manufacturing plant.</i>
Kichik bo'lim 10.2 Servis xizmatiga qo'yiladigan talablar	<i>Subsection 10.2 Requirements for service maintenance</i>
Kafolatli va servis xizmati O'zbekiston Respublikasi hududidagi rasmiy servis markazi yoki ishlab chiqaruvchi/ijrochining vakili tomonidan amalga oshirilishi lozim.	<i>Warranty and maintenance services must be carried out by an official service center within the Republic of Uzbekistan or by a representative of the manufacturer/contractor.</i>

BO'LIM 11. EKOLOGIK VA SANITARIYA TALABLARI
SECTION 11. ENVIRONMENTAL AND SANITARY REQUIREMENTS

O'zbekiston Respublikasida amalda bo'lgan qonunlar va normalarga muvofiq.	<i>In accordance with the laws and norms in force in the Republic of Uzbekistan.</i>
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BO'LIM 12. XAVFSIZLIKKA QO'YILADIGAN TALABLAR
SECTION 12. SAFETY REQUIREMENTS

Asosiy texnika xavfsizligi bo'yicha himoya tadbirlari: - himoya yerlashtirishi va potentsiallarni tenglashtirish; O'zbekiston Respublikasi hududida amalda bo'lgan me'yorlar va qoidalar (Iste'molchilarning elektr qurilmalarini ekspluatatsiya qilishda texnika xavfsizligi qoidalari – TXQ, GOCT 12.2.0070) muvofiq.	<i>Main technical safety protective measures: - Protective grounding and potential equalization; In accordance with the norms and rules in force in the Republic of Uzbekistan (Safety Rules for the Operation of Consumer Electrical Installations – SRCEI, GOST 12.2.0070).</i>
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BO'LIM 13. SIFAT VA TASNIFLASHGA (KLASSIFIKATSIYAGA) QO'YILADIGAN TALABLAR

SECTION 13. REQUIREMENTS FOR QUALITY AND CLASSIFICATION

Etalonning sifati ishlab chiqaruvchi zavod tomonidan berilgan sifat sertifikati bilan tasdiqlanishi kerak.	<i>The quality of the standard must be confirmed by a quality certificate issued by the manufacturing plant.</i>
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BO'LIM 14. SONI, BUTLILIGI (KOMPLEKTATSIYASI), JOYI VA YETKAZIB BERISH MUDDATI (DAVRIYLIGI) GA QO'YILADIGAN TALABLAR

SECTION 14. REQUIREMENTS FOR QUANTITY, COMPLETENESS (CONFIGURATION), LOCATION, AND DELIVERY TIME (PERIODICITY)

Yetkazib berishga ushbu texnik topshiriqning 4-bo'limida tavsiflangan komplektatsiyaga ega bo'lgan to'liq komplekt Etalon tizimi kiritilgan. Etalonni yetkazib berish quyidagi manzil bo'yicha amalga oshirilishi kerak: Toshkent sh., Olmazor tum. Farobiy ko'chasi, 333A-uy. Yetkazib berish shartlari: DDP - Toshkent sh.	<i>The delivery includes a complete set of Etalon systems with the equipment described in Section 4 of these Terms of Reference.. The delivery of the Standard must be carried out at the following address: 333A Farobiy Street, Almazar dis. Tashkent city. Delivery terms: DDP - Tashkent.</i>
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Yetkazib berish muddatlari: shartnomaga muvofiq oldindan to'lov amalga oshirilgandan so'ng 480 kalendar kundan oshmasligi kerak.	<i>Delivery lead time: Must not exceed 480 calendar days after the advance payment is made in accordance with the contract.</i>
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BO'LIM 15. ETALONNI YETKAZIB BERISHDA QO'SHMA XIZMATLARGA QO'YILADIGAN TALABLAR

SECTION 15. REQUIREMENTS FOR RELATED SERVICES UPON DELIVERY OF THE STANDARD

Kichik bo'lim 15.1 Shefmontajga qo'yiladigan talablar	Subsection 15.1 Supervision of installation (Shef-montaj) requirements
Ushbu turdagi ishlarni amalga oshirish uchun tegishli malakaga ega bo'lgan Ijrochi mutaxassislari tomonidan shef-montaj ishlarini o'tkazish.	<i>Supervision of installation works shall be carried out by the Contractor's specialists who possess the appropriate qualifications to perform such types of work.</i>
Kichik bo'lim 15.2 Ishga tushirish-sozlashga qo'yiladigan talablar	Subsection 15.2 Commissioning requirements
Etalonni ishga tushirish-sozlash ishlari Ijrochi kuchlari tomonidan va uning hisobidan bajariladi. Ishga tushirish-sozlash ishlari Ijrochi Etalonni o'rnatish (installyatsiya), sozlash, ishga tushirish va uning normal faoliyat ko'rsatishi uchun zarur bo'lgan, shu jumladan texnik topshiriqda sanab o'tilmagan barcha zarur materiallar, asbob-uskunalar, sarflash materiallari va yordamchi etalonlarni ta'minlashini nazarda tutadi.	<i>Commissioning of the Standard shall be performed by the Contractor's forces and at their expense. Commissioning works imply that the Contractor provides installation, adjustment, startup, and all necessary materials, equipment, consumables, and auxiliary standards required for the normal functioning of the Standard, including those not explicitly listed in the technical specification.</i>
Kichik bo'lim 15.3 Buyurtmachi xodimlarini o'qitishga qo'yiladigan talablar	Subsection 15.3 Training requirements for the Customer's personnel
Ijrochi xodimlarni 2 kishi miqdorida o'lchash asboblari kalibrlash uchun mo'ljallangan dasturiy ta'minot bilan qo'lda (manual) rejimda, avtomatlashtirilgan rejimda ishlash, shuningdek, bayonnomalarni chop etish, O'zMMI tomonidan taqdim etilgan shablonlar (andozalar) asosida kalibrlash va qiyoslash sertifikatlarini yaratish bo'yicha o'qitishga majbur. Xodimlarni tizim, Etalonning ekspluatatsiya qoidalari, texnik xizmat ko'rsatish va ishlash prinsiplari bo'yicha o'qitish nazarda tutilishi lozim. O'qish yakunida nazorat ishlari, amaliy mashg'ulotlar va suhbatlar o'tkazish asosida o'qitiluvchilar o'qishdan o'tganliklari hamda Etalonni ekspluatatsiya qilish va texnik xizmat ko'rsatish imkoniyatlari haqidagi sertifikatlarni olishlari kerak. Xodimlarni o'qitishda o'zaro o'rinbosarlik (vzaimozamenyayemost)	<i>The executive staff is obliged to train 2 people to work with the software designed for calibrating measuring instruments in manual and automated modes, as well as to print reports, create calibration and comparison certificates based on templates (templates) provided by the UzMMI. It is necessary to provide for training of employees on the system, the rules of operation of the Standard, maintenance and principles of operation. At the end of the training, based on control work, practical training and interviews, the trainees must receive certificates of completion of the training and the ability to operate and maintain the Standard. It is necessary to provide for the possibility of interchangeability in the training of employees. The training should include theoretical and practical training on the installed standard,</i>

imkoniyatini nazarda tutish zarur. O'qitish montaj qilingan etalonga doir nazariy va amaliy mashg'ulotlarni, shu jumladan ishga tushirish-sozlash davridagi mashg'ulotlarni o'z ichiga olishi kerak. Apparat va dasturiy ta'minot bo'yicha o'qitish quyidagi masalalarni yoritishi lozim: - Konstruksiya va tarkib, ishlash prinsipi; - Nazoratchi (kontroller) va operator stansiyasining apparat va dasturiy ta'minotining tavsifi, ishlash prinsipi, konfiguratsiyasi; - Asboblarni va Etalonni texnik xizmat ko'rsatish, ta'mirlash va ekspluatatsiya qilish; - Metrologik xizmat ko'rsatish. - O'qitish Ijrochi tomonidan ishlab chiqilgan va Buyurtmachi tomonidan tasdiqlangan o'quv dasturi bo'yicha amalga oshirilishi kerak. O'qitishning davomiyligi va dasturi Buyurtmachi xodimlarining etalondan mustaqil foydalanishni o'zlashtirishi uchun yetarli bo'lishi hamda yetkazib berilayotgan etalonning hajmiga, o'qitish dasturiga hamda etalondan foydalanish qo'llanmasi va ishlab chiqaruvchi zavodning texnik hujjatlari talablariga muvofiq bo'lishi lozim.	<i>including training during the commissioning and adjustment period.</i> <i>Training on hardware and software should cover the following issues:</i> - <i>Design and composition, principle of operation;</i> - <i>Description, principle of operation, configuration of the hardware and software of the controller and operator station;</i> - <i>Maintenance, repair and operation of instruments and the Standard;</i> - <i>Metrological service.</i> - <i>Training should be carried out according to the training program developed by the Contractor and approved by the Customer.</i> - <i>The duration and program of the training should be sufficient for the Customer's employees to master the independent use of the standard and comply with the volume of the supplied standard, the training program, the requirements of the standard operating manual and the technical documentation of the manufacturer.</i>
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BO'LIM 16. TAQDIM ETILADIGAN AXBOROTNING SHAKLIGA QO'YILADIGAN TALAB
SECTION 16. REQUIREMENTS FOR THE FORM OF PROVIDED INFORMATION

Matnli ma'lumotlar o'zbek, rus va/yoki ingliz tillarida, qog'ozli va elektron variantlarda (2 nusxada) taqdim etilishi kerak.	<i>Textual information must be provided in Uzbek, Russian and/or English, in both hard copy and electronic formats (in 2 copies).</i>
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BO'LIM 17. QABUL QILINGAN QISQARTMALARNING RO'YXATI
SECTION 17. LIST OF ACCEPTED ABBREVIATIONS

T/r No.	Qisqartma Abbreviation	Qisqartmaning kengaytmasi	Definition of Abbreviation
1	CIPM	Xalqaro o'lchov va tarozilar qo'mitasi (XO'TQ)	<i>International Committee for Weights and Measures</i>
2	ILAC	Laboratoriyalarni akkreditatsiya qilish bo'yicha Xalqaro tashkilot (International Laboratory Accreditation Cooperation)	<i>International Laboratory Accreditation Cooperation</i>
3	MRA	O'zaro tan olish to'g'risidagi kelishuv (Mutual Recognition Arrangement)	<i>Mutual Recognition Arrangement</i>
4	CIPM-MRA	Milliy etalonlarni hamda Milliy metrologiya institutlari tomonidan beriladigan kalibrlash va o'lchovlar to'g'risidagi guvohnomalarni o'zaro tan olish	<i>Mutual Recognition Arrangement for national measurement standards and for calibration and measurement certificates issued by National Metrology Institutes (an</i>

		to'g'risidagi kelishuv (bu milliy metrologiya institutlari o'rtasidagi kelishuvdir)	<i>agreement between national metrology institutes)</i>
5	CMC	CMC (Calibration and Measurement Capabilities) – Kalibrlash va o'lchov imkoniyatlari bo'lib, mijoz uchun normal sharoitlarda quyidagi shaklda mavjud bo'ladi: - CIPM MRA ning Asosiy taqqoslashlar ma'lumotlar bazasida (KCDB) e'lon qilinganidek; yoki - ILAC Kelishuvi imzolovchisi tomonidan taqdim etilgan laboratoriyaning akkreditatsiya doirasida tavsiflanganidek	<i>CMC (Calibration and Measurement Capabilities) – Calibration and measurement capabilities available to a customer under normal conditions in the following forms:</i> - <i>As published in the CIPM MRA Key Comparison Database (KCDB); or</i> - <i>As described in the laboratory's scope of accreditation provided by a signatory to the ILAC Arrangement</i>
6	MTH RTD	Me'yoriy-texnik hujjatlar	<i>Regulatory and Technical Documentation</i>
7	TT TS	Texnik topshiriq	<i>Technical Specification</i>
8	O'V MI	O'lchash vositalari	<i>Measuring Instruments</i>
9	ZIP SPTA	Zaxira qismlar, asboblari va anjomlar (Akkessuarlar)	<i>Spare parts, tools, and accessories</i>

BO'LIM 18. ILOVALARNING RO'YXATI
SECTION 18. LIST OF APPENDICES

T/r No.	Ilovaning nomi / Name of the appendix	Sahifa raqami / Page number
	-	

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