Standards for machine tools, an update

ISO/TC 39, machine tools

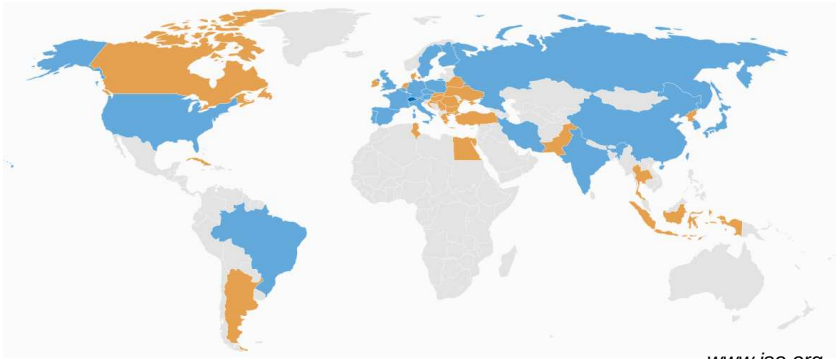
Changes since LAMDAMAP 2015

Standards under development

www.starrag.com STC 800

Members of ISO/TC 39 machine tools

- 21 participating countries (AT, BE, BR, CN, CZ, FI, FR, DE, IN, IR, IT, JP, KR, PL, PT, RU, ES, SE, CH, UK, US)
- 23 observing countries (AR, BY, BG, CA, HR, CU, DK, EG, GR, HK, HU, ID, IL, KP, NL, PK, RO, RS, SK, TH, TN, TR, UA)



www.iso.org

ISO/TC 39, machine tools

152 published standards, plus 39 standards in development

SC 2	SC 4	SC 6	SC 8	SC 10	TC
test conditions (metal cutting)	wood-working machines	noise	spindles, chucks	safety	TC, WGs
AT/NL J. Fornather G. Florussen	IT P. Visintin I. Betti	DE K. Mack H. Schmischke	DE K. Mack J.-C. Laurent	CH R.Widmer W.Knapp	CH R.Widmer W.Knapp
81 documents	35 documents	6 documents	11 documents	12 documents	46 documents

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ISO/TC 39 Machine tools

components (tables, centres, lubrication, etc.)

symbols

presses, testing

modular units

ball screws, ball splines

production equipment for microsystems

environmental evaluation

ISO series14955

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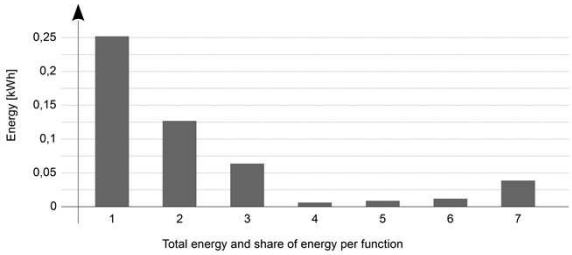
ISO/TC 39 Machine tools, environmental evaluation

ISO 14955-1:2014, energy-efficient machine tools
revised version to be published in 2017 (updated energy efficiency improvements)
know the relevant users of energy



ISO 14955-1:2014

1 total energy
2 machine tool operation
3 process conditioning
4 workpiece handling
5 tool handling
6 recyclables and waste handling
7 machine tool cooling

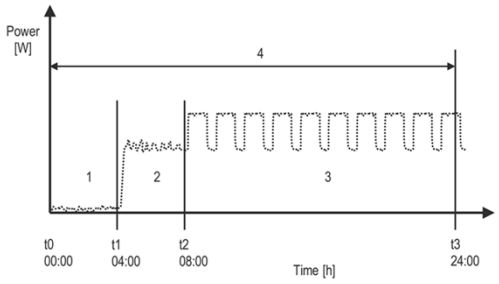
ISO/TC 39 Machine tools, environmental evaluation

ISO 14955-2:2017, measuring energy supplied
correct and repeatable measurement of energy supplied
sample shift regime

1 OFF
2 READY FOR PROCESSING
3 PROCESSING
4 evaluation period

defined operating states
defined machine tool activities

specific shift regimes
task based test scenarios



ISO 14955-2:2017

ISO/TC 39 Machine tools, environmental evaluation

ISO 14955-2:2017, measuring energy supplied
correct and repeatable measurement of energy supplied
results presented in kWh (Wh)
electrical energy equivalent

example for 1 m^3 (ANR)

nominal supply gauge pressure	Theoretical value for isothermic compression [11]	Theoretical value for adiabatic compression [11]	Best available technology with heat recovery [12]	Average industrial supply [9]
300 kPa	0,030 kWh	0,035 kWh	0,060 kWh	0,11 kWh – 0,13 kWh
600 kPa	0,050 kWh	0,067 kWh	0,085 kWh	
1 000 kPa	0,064 kWh	0,093 kWh	0,105 kWh	
1 600 kPa	0,077 kWh	0,120 kWh	0,145 kWh	

ISO 14955-2:2017

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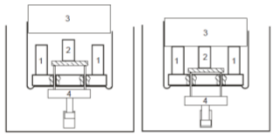
ISO/TC 39 Machine tools, environmental evaluation

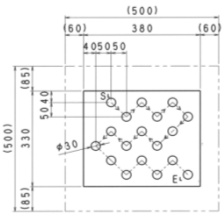
ISO/WD 14955-3:2017, Testing metal-cutting machine tools with respect to energy efficiency
definition of a reference process (process, material, tools, tolerances)

ISO/DIS 14955-4:2017, Measuring metal-forming machine tools and laser processing machine tools with respect to energy efficiency
idle cycling

spacers for force simulation



ISO/DIS 14955-4:2017



test pieces for punch presses and for laser cutting machines

ISO/WD 14955-5:2017, Testing woodworking machine tools in respect to energy supplied
test pieces (including process parameters) for a wide range of woodworking machine tools

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ISO/TC 39/SC 2, test conditions for metal cutting m.t.

basic standards

series 230

machine specific standards

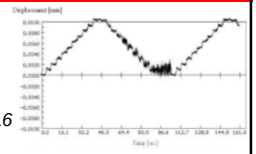
machining centres, series 10791
turning centres, series 13041
milling machines
grinding machines
drilling machines
EDM
broaching machines

general standards

short time machine tool capability, ISO 26303:2012
vibration of spindles, series 17243
accessory spindle heads, ISO 17543-1
numerical compensation, ISO/TR 16907:2015

ISO/TC 39/SC 2, basic standards, series 230

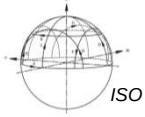
ISO 230-2:2014/Amd 1:2016 Positioning of NC axes
least increment step



ISO 230-2:2014/Amd 1:2016

ISO 230-7:2015 Geometric accuracy of axes of rotation
application for rotary axes and several sensitive directions

ISO 230-10:2016 Measuring performance of probing systems on NC machine tool
repeatability of touch trigger probes and scanning probes



ISO 230-10:2016

ISO/TC 39/SC 2, revision of machine specific stds

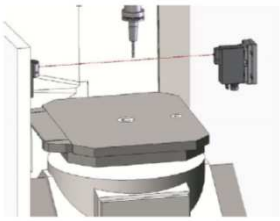
Revision of machine specific standard on machine tool accuracy

ISO 1985:2015 Surface grinding machines
ISO 2407:1997/Amd 1:2016 Internal cylindrical grinding machines
ISO 3070-2:2016 Boring and milling machines
ISO 13041-5:2015 Turning centres, Accuracy of speeds and interpolation
ISO 14137:2015 Wire EDM

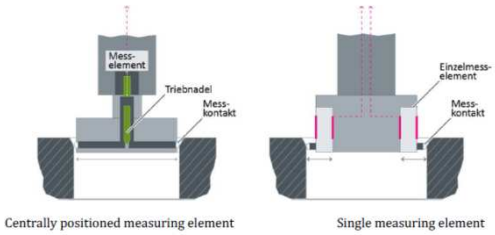
ISO/TC 39/SC 2, future work

basic standards

ISO 230-10, Measuring performance of probing systems
including laser light barrier systems, bore gauges



ISO/NP 230-10:2017



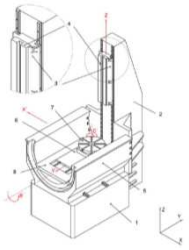
ISO/DTR 230-11 Measuring instruments for geometry tests
publication 2017

ISO/TC 39/SC 2, future work

basic standards

ISO 230-10, Measuring performance of probing systems
including laser light barrier systems, bore gauges
ISO/DTR 230-11 Measuring instruments for geometry tests
publication 2017

machine specific standards



ISO/NP 19744-1:2017

ISO 10791-7:2014/DAmd 1, MC, S-shaped test piece
ISO/NP 10791-10, MC, thermal distortion, machining tests
ISO/DIS 6480, broaching machines, horizontal, internal, rev.
ISO/DIS 6481, broaching machines, vertical, surface, rev.
ISO/DIS 6779, broaching machines, vertical internal, revision
ISO/NP 19744-1, broaching machines, NC, vertical surface

general standards

ISO/DTR 17243-2 Spindle vibrations, direct and belt driven
ISO 17543-1 Accessory spindle heads, under publication

ISO/TC 39/SC 4, woodworking machines

active since about 3 years

Safety of woodworking machines

ISO 18217:2015, edge-banding machines
ISO 19085-1, common requirements, under publication
ISO 19085-2, horizontal beam panel circular sawing, u. publ.
ISO 19085-3, NC boring and routing machines, under publ.
ISO/FDIS 19085-4, vertical panel circular sawing machines
ISO 19085-5, dimension saws, under publication
ISO/DIS 19085-6, single spindle vertical moulding machines
ISO/FDIS 19085-7, planing machines
ISO/DIS 19085-8, wide-belt calibrating and sanding machines
ISO/DIS 19085-9, circular saw benches
ISO/DIS 19085-10, building site saws
ISO/CD 19085-12, tenoning and/or profiling machines
ISO/CD 19085-13, multiblade rip sawing machines

ISO/TC 39/SC 6, noise of machine tools

ISO 230-5, determination of noise emission, revision

ISO/NP 7960, airborne noise, operating conditions for woodworking machines

ISO 8525, airborne noise, operating conditions for metal-cutting machines, revision

ISO/TC 39/SC 10, safety of machine tools

revision of EN safety standards for metal working machine tools

safety of presses
- ISO/DIS 16092-1 Safety of presses, general requirements
- ISO/CD 16092-2, Safety of mechanical presses
- ISO/DIS 16092-3 Safety of hydraulic presses
- ISO/CD 16092-4, Safety of pneumatic presses

safety of grinding machines
- ISO 16089:2015, Safety of stationary grinding machines

safety of turning machines
- ISO 23125:2015 Safety of turning machines

safety of milling machines
- ISO/FDIS 16090-1 Safety of MC, milling, transfer machines

safety of EDM
- ISO 28881:2013 Safety of EDM + Cor 1:2013
- ISO/TR 17529:2014 Guidance, example of risk assessment

safety of sawing machines
- ISO 16093 Safety of sawing machines for cold metal, u. publ.

Standards for machine tools, summary

Environmental evaluation of machine tools, ISO series 14955
relevant users of energy / measuring energy supplied / reference process / simulated force / test pieces

Probes on machine tools, ISO 230-10
touch trigger probes / scanning probes / laser beam systems / boring gauges

Instruments for machine tool testing, ISO/TR 230-11
typical ranges / applications / uncertainties

broaching machines
NC broaching machines

D.1 Uncertainty contributors table for mechanical artefacts

	D1: Mechanical artefacts	Reference straightedge	Reference test mandrel	Reference square	Reference cube	Surface plate	Reference sphere	1D ball array	2D ball array	Step gauge	Gauge block
Environmental conditions	Absolute temperature	Y		y	y	y		y	y	y	y
	Temperature gradient/variance	Y	y	y	y	Y		y	y	y	y
	Vibration/noise										
	Humidity										
	Contamination	Y	y	y	y	y	y	y	y	y	y

ISO/DTR 230-11:2016

Standards for machine tools, participation

Join via national standards organisation (BSI, DIN, JISC, …)

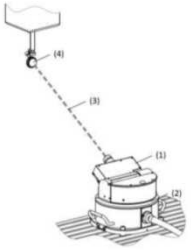
Influencing standards
projects, comments, planning

Information
project proposals, drafts, standards
comments, ISO browsing platform, www.iso.org/obp/ui/

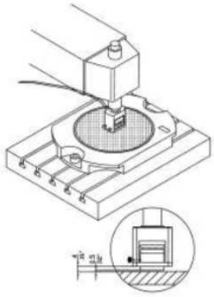
education
worked off know-how, actual problems, up-to-date solutions
different points of view, discussion

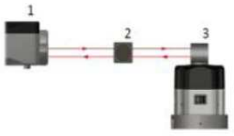
presentation
manufacturer/supplier and user show commitment
manufacturer/supplier and user show performance

Standards for machine tools, an update



Key:
1: Interferometer
2: Tracking drives
3: Measuring beam
4: Reflector





Key
1. Laser head
2. Interferometer
3. Reflector
4. Angle indexing device

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