



CIRP UNIFIED KEYWORD LIST

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The use of keywords in the abstract of papers is fundamental for the documentation of papers and articles in the international scientific world. The CIRP community has always been aware of this requirement and, to this aim, the working group on UNIFICATION has prepared and continuously updated CIRP UNIFIED KEYWORD LIST, which **must** be used by all the authors of papers in the CIRP Annals and in any other publication under the CIRP heading. While preparing the abstract of your paper you have to identify your paper with **three** keywords from the list in the following order:

- The first keyword identifying the general subject of the paper
- Two following keywords to detail particular aspects of the paper.

The keywords should be used in singular form, with the first letter in upper case, as they appear in the list. Because the keywords represent the dynamic working area of the CIRP, authors may use one keyword free, taking into account new emerging areas. The free keyword should always be **the last** one.

The Technical Secretary

Abrasion

Accuracy
Acoustic
Actuator
Adaptive control
Agent
Agile
Algorithm
Alignment
Alloy
Aluminium
Analysis
Anisotropy
Anomaly
Artificial intelligence
Assembly
Atomic force microscopy (AFM)
Augmented reality
Automation
Axiomatic

Ball

Bearing
Bending
Biomedical
Blanking
Blasting
Bonding
Boring
Burr

Calcium fluoride

Calibration

Carbide
Carbon
Casting
Centerless
Ceramic
Chatter
Chemical vapor deposition (CVD)
Chip
Classification
Coating
Cold forming
Compensation
Composite
Computer aided design (CAD)
Computer aided manufacturing (CAM)
Computer aided planning (CAP)
Computer automated process planning (CAPP)
Computer numerical control (CNC)
Conceptual design
Concurrent engineering
Condition
Constraint
Control
Cooling
Co-operative
Coordinate measuring machine (CMM)

Coordination

Cost
Cracking
Cubic boron nitride (CBN)
Customisation
Cutting

Damage

Damping
Decision making
Decomposition method
Deep drawing
Deep hole drilling
Defect
Deformation
Deposition
Design
Design method
Development
Diagnostics
Diamond
Die
Die forging
Digital
Dimensional
Disassembly
Distance
Distributed
Dressing
Drilling
Drive
Dynamic
3D printing

Ecology

Edge
 Electrical discharge machining (EDM)
 Electro chemical machining (ECM)
 Electrode
 Electron beam machining (EBM)
 Emergent synthesis
 Emission
 End milling
 Engineering
 Environmental
 Error
 Estimating
 Etching
 Evaluation
 Excimer laser
 Experimentation
 Extrusion

Face milling

Factory
 Failure
 Fatigue
 Feature
 Feed
 Feedback
 Fiber
 Finishing
 Finite element method (FEM)
 Fixture
 Flatness
 Flexibility
 Flexible manufacturing system (FMS)
 Flow
 Fluid
 Force
 Forging
 Form
 Formation
 Forming
 Fracture
 Friction
 Friction stir welding
 Fuzzy logic

Gear

Genetic
 Geometric modelling
 Geometry
 Glass
 Grinding
 Grooving

Group technology

Handling

Haptic device
 Hardening
 Hardness
 Heat treatment
 Hexapod
 Hole
 Holography
 Holonic
 Honing
 Hot stamping
 Human
 Hydroforming
 Hydrostatic

Identification

Image
 Impact
 Improvement
 In-process measurement
 Information
 Injection
 Inspection
 Integration
 Integrity
 Intelligent
 Interferometry
 Investment casting
 Ion beam machining (IBM)

Joining**K**inematic

Knowledge management
 Knowledge based system

Lapping

Laser
 Laser beam machining (LBM)
 Laser cutting
 Laser micro machining
 Learning
 Lifecycle
 Linear
 Logistics
 Lubrication

Machinability

Machine
 Machining
 Magnesium
 Magnetic bearing
 Maintenance

Man-machine system

Management
 Management information system (MIS)
 Manipulator
 Manufacturing
 Material
 Measurement
 Measuring instrument
 Mechanical
 Mechanism
 Mechatronic
 Metal
 Methodology
 Metrology
 Micromachining
 Micromanipulator
 Microscope
 Microstructure
 Milling
 Miniaturization
 Model
 Modelling
 Module
 Mold (or Mould)
 Molding (or Moulding)
 Monitoring
 Motion
 Mounting

Nano manufacturing

Nano indentation
 Nano technology
 Nano tube
 Nd:YAG laser
 Neural network
 Nickel
 Nonlinear
 Numerical control (NC)

Object recognition

Observer
 Ontology
 Open architecture
 Operation
 Optical
 Optimisation
 Opto-electronic
 Oxidation

Parallel

Parameter
 Part
 Pattern recognition
 Performance
 Petri net
 Photonics

Photochemical machining
 Physical vapor deposition
 (PVD)
 Piercing
 Piezo-electric
 Planning
 Plastic
 Polishing
 Polymer
 Positioning
 Powder
 Precision
 Predictive
 Press
 Pressure
 Probe
 Process
 Processing
 Product
 Production
 Productivity
 Profile
 Programming
 Project
 Property
 Prototyping
 Punching

Quality
 Quality assurance

Radius
 Rapid
 Rate
 Reconfiguration
 Reconstruction
 Reliability
 Removal
 Requirement
 Residual stress
 Resistance
 Resolution
 Reuse
 Reverse
 Robot
 Roll
 Rolling
 Roughness
 Roundness

Safety
 Scanning
 Scanning electron
 microscope (SEM)
 Scanning probe microscope
 (SPM)

Scanning tunnelling
 microscope (STM)
 Scheduling
 Selective laser sintering
 (SLS)
 Selective laser melting
 (SLM)
 Sensor
 Sequencing
 Service
 Servosystem
 Shape memory alloy
 Sheet metal
 Shotpeening
 Silicon
 Simulation
 Single crystal
 Sinking
 Sintering
 Soldering
 Speed
 Spindle
 Spline
 Springback
 Stability
 Stamping
 Standardization
 Steel
 Stereolithography
 Stiffness
 Straightness
 Strain
 Strength
 Stress
 Structural analysis
 Structure
 Super abrasive
 Super finishing
 Support
 Surface
 Sustainable development
 Synthesis
 System

Table
 Tailored blank
 Tapping
 Technology
 Temperature
 Tensile
 Test
 Texture
 Thermal conductivity
 Thermal error
 Titanium
 Tolerancing
 Tool
 Tooling

Topography
 Transfer
 Transformation
 Tribology
 Turbine blade
 Turning

Ultra-precision
 Ultrasonic
 Uncertainty

Vacuum
 Vibration
 Virtual reality
 Visco-plasticity
 Visual inspection

Wafer
 Waterjet machining
 Wear
 Welding
 What-if design
 White layer
 Wire EDM
 Workpiece
 Wrinkling

X-ray

Yield

Z