### LIST OF SYMBOLS ANDABBREVIATIONS

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
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<tbody>
<tr>
<td>A356/SiC-T6</td>
<td>A359 reinforced with SiC and Tempered</td>
</tr>
<tr>
<td>AC</td>
<td>Alternate Current</td>
</tr>
<tr>
<td>Al</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Al2024/SiC</td>
<td>Aluminium Alloy 2024 reinforced with SiC</td>
</tr>
<tr>
<td>A359</td>
<td>Aluminium Alloy 359</td>
</tr>
<tr>
<td>A413</td>
<td>Aluminium alloy 413</td>
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<tr>
<td>Al5052</td>
<td>Aluminium alloy 5052</td>
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<tr>
<td>AA6061</td>
<td>Aluminium Alloy 6061</td>
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<tr>
<td>Al6061</td>
<td>Aluminium Alloy 6061</td>
</tr>
<tr>
<td>Al2O3/6061Al</td>
<td>Aluminium Alloy 6061 reinforced with Al2O3</td>
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<tr>
<td>Al–B4C</td>
<td>Aluminium Alloy 6061 reinforced with B4C</td>
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<tr>
<td>AA6061/SiC</td>
<td>Aluminium Alloy 6061 reinforced with SiC</td>
</tr>
<tr>
<td>Al7075-TiB2</td>
<td>Aluminium Alloy 6061 reinforced with TiB2</td>
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<tr>
<td>AA6063</td>
<td>Aluminium Alloy 6063</td>
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<tr>
<td>Al6063</td>
<td>Aluminium alloy 6063</td>
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<tr>
<td>AA6063/SiC</td>
<td>Aluminium Alloy 6063 reinforced with SiC</td>
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<tr>
<td>Al6063/SiC</td>
<td>Aluminium Alloy 6063 reinforced with SiC</td>
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<tr>
<td>Al6082</td>
<td>Aluminium Alloy 6082</td>
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<tr>
<td>AA6351</td>
<td>Aluminium alloy 6351</td>
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<td>AA7075</td>
<td>Aluminium Alloy 7075</td>
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<td>Al7075</td>
<td>Aluminium alloy 7075</td>
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<tr>
<td>AA7075/SiC</td>
<td>Aluminium Alloy 7075 reinforced with SiC</td>
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<tr>
<td>Al7075/SiC</td>
<td>Aluminium Alloy 7075 reinforced with SiC</td>
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<tr>
<td>SiC/6025Al</td>
<td>Aluminium alloy Al6025 reinforced with SiC</td>
</tr>
<tr>
<td>SiC/6061</td>
<td>Aluminium alloy Al6061 reinforced with SiC</td>
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</tbody>
</table>
Al₂O₃ - Aluminium Oxide
Al-Cu - Aluminium reinforced with copper
Al-Cu/SiC - Aluminium reinforced with Cu and SiC
Al/Gr - Aluminium reinforced with Graphite
Al₆061/SiC - Aluminium reinforced with SiC
Al/SiC - Aluminium reinforced with Silicon Carbide
Al₂Zr - Aluminium reinforced with Zirconium
Al₂Cu - Aluminium with Copper
Al-Mg-Si - Aluminium-Magnesium-Silicon
ASTM - American Society for Testing and Materials
ANOVA - Analysis of Variance
d - Arithmetic mean of diagonal value d₁ and d₂
μA[i] - Average performance value at iᵗʰ level of A
μB[i] - Average performance value at iᵗʰ level of B
μC[i] - Average performance value at iᵗʰ level of C
μIP[i] - Average performance value at iᵗʰ level of IP
μT_OFF[i] - Average performance value at iᵗʰ level of T_OFF
μT_ON[i] - Average performance value at iᵗʰ level of T_ON
μWC[i] - Average performance value at iᵗʰ level of WC
μD [i] - Average response value at iᵗʰ level of D
B₄C - Boron Carbide
Ca - Calcium
CCD - Central Composite Design
Cr - Chromium
CNC - Computer Numerical Control
CNC-WEDM - Computer Numerically Controlled-WEDM
CI - Confidence Interval
CI_Kerf - Confidence Interval for cutting width
CI_MRR - Confidence Interval for material removal rate
CI<sub>Ra</sub> - Confidence Interval for surface roughness
CMM - Co-ordinate Measuring Machine
Cu - Copper
A - Cross sectional area of work span in mm<sup>2</sup>
Kerf - Cutting Width
D<sub>w</sub> - Density of the work piece (gm/cm<sup>3</sup>)
DC - Direct Current
EDM - Electro Discharge Machining
EBM - Electron Beam machining
f<sub>e</sub> - Error degree of freedom
V<sub>eKerf</sub> - Error variance for cutting width
V<sub>eMRR</sub> - Error variance for material removal rate
V<sub>eRa</sub> - Error variance for surface roughness
V<sub>e</sub> - Error variance of performance measure
h<sub>f</sub> - Final height of the specimen in micrometer
W<sub>f</sub> - Final weight of work piece (gm)
FSP - Friction Stir Processing
GA - Genetic Algorithm
Gr - Graphite
ZL205A - High Strength Zinc Based Aluminum Alloy
h<sub>i</sub> - Initial height of the specimen in micrometer
W<sub>i</sub> - Initial weight of work piece (gm)
IADS - International Alloy Development System
KN - Kilo Newton
LJM - Laser Jet Machining
i - level of factors
Lm13Alloy - Lightweight metal “Grade 13”
Lm13/SiC - Lightweight metal “Grade 13” reinforced with SiC
f - load in kgf
Mg - Magnesium
AZ91 - Magnesium Alloy 91
Mn - Manganese
MRR - Material removal rate
H - Mean value
MPa - Mega Pascal
MMCs - Metal Matrix Composites
ASTM: E8 - Micro hardness standard
µm - Micro meters
µs - Micro seconds
mm - Mille meter
MoS₂ - Molybdenum disulfide
N - Newton
Ni - Nickel
L9 - Nine balanced experiments
n_eff - Number of Effective Parameter
N - Number of Experiments
η_opt - Optimal mean value
η_opt(Kerf) - Optimum predicted mean value of cutting width
η_opt(MRR) - Optimum predicted mean value of material removal rate
η_opt(Rₐ) - Optimum predicted mean value of surface roughness
OA - Orthogonal Array
T - Over all Mean Value of the Performance
IP - Peak Current
t - Period of trial in minutes
PCD - Polycrystalline Diamond
T_OFF - Pulse off time
T\textsubscript{ON} - Pulse on time
T\textsubscript{OFF} \[i\] - Pulse on time for \(i\)\textsuperscript{th} level
T\textsubscript{ON} \[i\] - Pulse on time for \(i\)\textsuperscript{th} level
ROC - Radial Over Cut
RSM - Response Surface Methodology
Rpm - Revolutions per minute
SEM - Scanning Electron Microscope
\(r\) - Semi circle radius of removed piece
R - Semi circle radius of workpiece
S/N - Signal to Noise
Si - Silicon
SiC - Silicon carbide
\(R_a\) - Surface Roughness
F - Tensile force in Newton
\(\sigma\) - Tensile Strength
ASTM: E92 - Tensile test standard
\(\alpha\) - The Confidence Level
\(F_{1-\alpha}\) - The F ratio at a confidence level of 1-\(\alpha\)
Sn - Tin
Ti - Titanium
TiB\textsubscript{2} - Titanium Boride
TiC - Titanium Carbide
TWR - Tool Wear Rate
L27 - Twenty seven balanced experiments
VHN - Vickers Hardness Number
V - Voltage
T - Voltage Cycle Time
Vol. % - Volume percentage
ASTM: G995. - Wear test standard
W - Weight
WC - Weight Mix of composites
WC\[^{[i]}\] - Weight mix value for \(^{i}\)th level
Wm - Weight of Matrix material
Wr - Weight of reinforcement material
Wt. % - Weight percentage
K\(_2\)TiF\(_6\) - Wetting Agent
WEDC - Wire Electrical Discharge Cutting
WEDM - Wire Electrical Discharge Machining
WF - Wire electrode speed / Wire feed
Zn - Zinc
ZA-27/SiC - Zinc Aluminium Alloy reinforced with SiC
Zr - Zirconium
ZrB\(_2\) - Zirconium Boride
ZrO\(_2\) - Zirconium Oxide