INTERNATIONAL STANDARD 1641/I

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

End mills and slot drills — Part I : Milling cutters with parallel shanks

Fraises cylindriques 2 tailles et fraises à rainurer — Partie I : Fraises à queue cylindrique

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1641/I was developed by Technical Committee ISO/TC 29, *Small tools*, and was circulated to the member bodies in June 1977.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Romania
Austria	India	Spain
Belgium	Israel	Switzerland
Brazil	Italy	Turkey
Chile	Japan	United Kingdom
France	Korea, Rep. of	U.S.S.R.
Germany	Mexico	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Czechoslovakia
Poland
South Africa, Rep. of
Sweden

This International Standard, together with International Standard ISO 1641/II, cancels and replaces ISO Recommendation R 1641-1970.

Printed in Switzerland

End mills and slot drills — Part I : Milling cutters with parallel shanks

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the general dimensions of the following milling cutters with plain parallel and flatted parallel shanks :

- End mills, flat-ended or ball-nosed — Standard series and long series.
- Slot drills — Short series and standard series.

Characteristics of parallel shanks are in accordance with ISO 3338/I and ISO 3338/II.

These same milling cutters with Morse taper shanks having a tapped hole are dealt with in part II, those with 7/24 taper shanks, in part III.

2 REFERENCES

ISO 523, *Milling cutters — Recommended range of outside diameters.*

ISO 3338/I, *Parallel shanks for milling cutters — Part I : Dimensional characteristics of plain parallel shanks.*

ISO 3338/II, *Parallel shanks for milling cutters — Part II : Dimensional characteristics of flatted parallel shanks.*

ISO 3855, *Milling cutters — Nomenclature.*

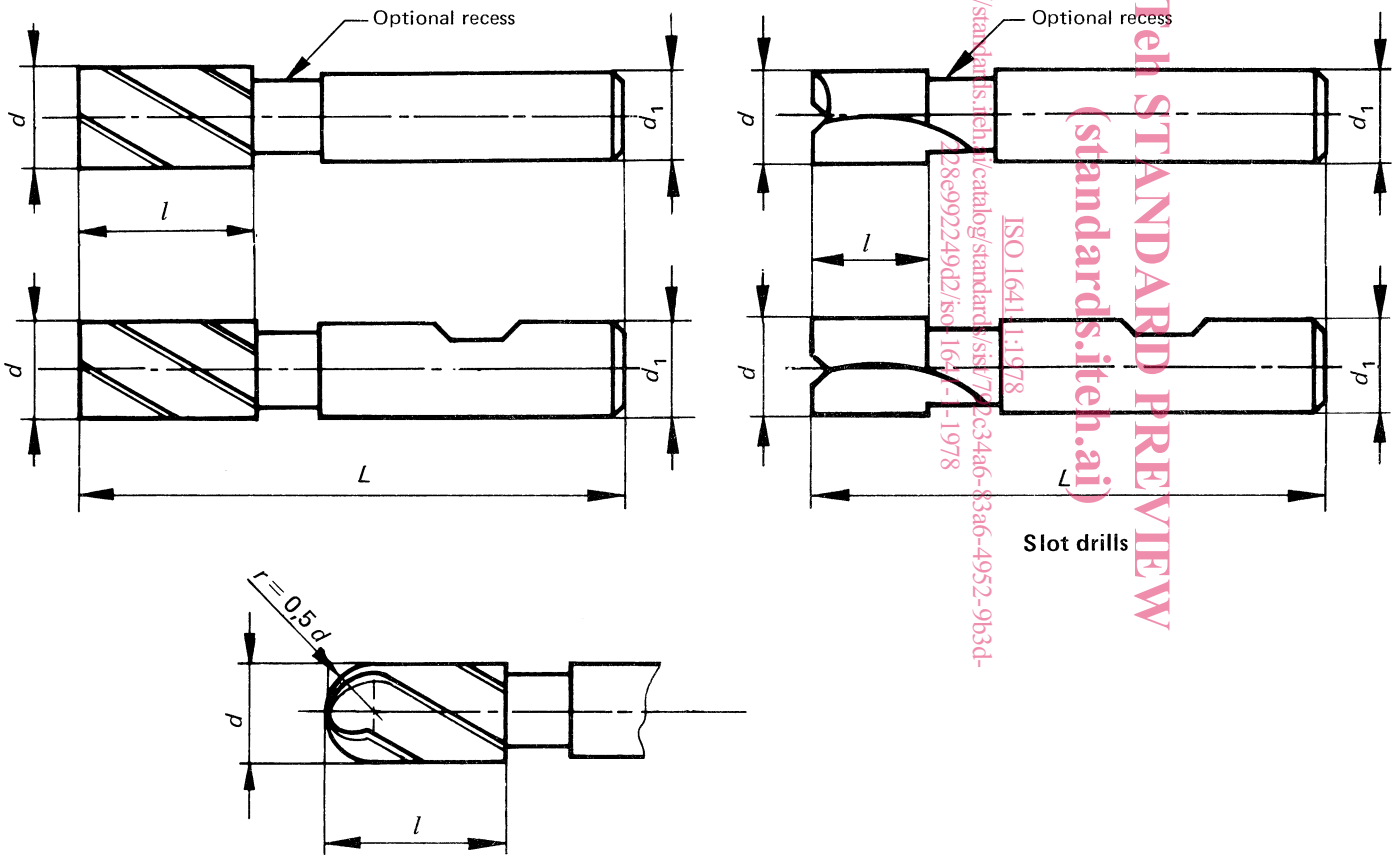
3 DIMENSIONS

Flat-ended end mills and ball-nosed parallel-end mills

Two series — standard and long, according to the cutting length l.

Slot drills

Two series — short and standard, according to the cutting length l.



Slot drills

End mills

Designation : Milling cutters are designated by their type and their cutting diameter *d* together with their shank diameter in the case where the diameter is different from the cutting diameter.

Tolerances on cutting diameters *d* :

End mills : $j_s 14$

Slot drills : e8.

NOTE – In the case of double-ended end milling cutters having a cutting diameter nominally equal to the shank diameter, the maximum cutting diameter should be slightly smaller than the minimum shank diameter.

Dimensions in millimetres

<table>
<tr><th colspan="2">Ranges of diameters
d</th><th colspan="2" rowspan="2">Recommended diameters
d</th><th colspan="2">Shank
d [1)]</th><th colspan="3">Short series</th><th colspan="3">Standard series</th><th colspan="3">Long series</th></tr>
<tr><th rowspan="2">over</th><th rowspan="2">up to (including)</th><th colspan="2">Alternative</th><th rowspan="2">l</th><th colspan="2">L [3)]
Alternative</th><th rowspan="2">l</th><th colspan="2">L [3)]
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Alternative</th></tr>
<tr><th></th><th></th><th>I</th><th>II</th><th>I</th><th>II</th><th>I</th><th>II</th><th>I</th><th>II</th></tr>
<tr><td>1,9</td><td>2,36</td><td>2</td><td>–</td><td rowspan="5">4 [2)]</td><td rowspan="5">6</td><td>4</td><td>36</td><td>48</td><td>7</td><td>39</td><td>51</td><td>10</td><td>42</td><td>54</td></tr>
<tr><td rowspan="2">2,36</td><td rowspan="2">3</td><td>2,5</td><td rowspan="2">–</td><td rowspan="2">5</td><td rowspan="2">37</td><td rowspan="2">49</td><td rowspan="2">8</td><td rowspan="2">40</td><td rowspan="2">52</td><td rowspan="2">12</td><td rowspan="2">44</td><td rowspan="2">56</td></tr>
<tr><td>3</td></tr>
<tr><td>3</td><td>3,75</td><td>–</td><td>3,5</td><td>6</td><td>38</td><td>50</td><td>10</td><td>42</td><td>54</td><td>15</td><td>47</td><td>59</td></tr>
<tr><td>3,75</td><td>4</td><td>4</td><td rowspan="2">–</td><td rowspan="2">7</td><td>39</td><td>51</td><td rowspan="2">11</td><td>43</td><td>55</td><td rowspan="2">19</td><td>51</td><td>63</td></tr>
<tr><td>4</td><td>4,75</td><td>–</td><td rowspan="2">5 [2)]</td><td rowspan="2">6</td><td>41</td><td>51</td><td>45</td><td>55</td><td>53</td><td>63</td></tr>
<tr><td>4,75</td><td>5</td><td>5</td><td>–</td><td rowspan="2">8</td><td>42</td><td>52</td><td rowspan="2">13</td><td>47</td><td>57</td><td rowspan="2">24</td><td>58</td><td>68</td></tr>
<tr><td>5</td><td>6</td><td>6</td><td>–</td><td colspan="2">6</td><td colspan="2">52</td><td colspan="2">57</td><td colspan="2">68</td></tr>
<tr><td>6</td><td>7,5</td><td>–</td><td>7</td><td rowspan="2">8</td><td rowspan="2">10</td><td>10</td><td>54</td><td>60</td><td>16</td><td>60</td><td>66</td><td>30</td><td>74</td><td>80</td></tr>
<tr><td>7,5</td><td>8</td><td>8</td><td>–</td><td rowspan="2">11</td><td>55</td><td>61</td><td rowspan="2">19</td><td>63</td><td>69</td><td rowspan="2">38</td><td>82</td><td>88</td></tr>
<tr><td>8</td><td>9,5</td><td>–</td><td>9</td><td colspan="2" rowspan="2">10</td><td colspan="2">61</td><td colspan="2">69</td><td colspan="2">88</td></tr>
<tr><td>9,5</td><td>10</td><td>10</td><td>–</td><td rowspan="2">13</td><td colspan="2">63</td><td rowspan="2">22</td><td colspan="2">72</td><td rowspan="2">45</td><td colspan="2">95</td></tr>
<tr><td>10</td><td>11,8</td><td>–</td><td>11</td><td colspan="2" rowspan="2">12</td><td colspan="2">70</td><td colspan="2">79</td><td colspan="2">102</td></tr>
<tr><td>11,8</td><td>15</td><td>12</td><td>14</td><td>16</td><td colspan="2">73</td><td>26</td><td colspan="2">83</td><td>53</td><td colspan="2">110</td></tr>
<tr><td>15</td><td>19</td><td>16</td><td>18</td><td colspan="2">16</td><td>19</td><td colspan="2">79</td><td>32</td><td colspan="2">92</td><td>63</td><td colspan="2">123</td></tr>
<tr><td>19</td><td>23,6</td><td>20</td><td>22</td><td colspan="2">20</td><td>22</td><td colspan="2">88</td><td>38</td><td colspan="2">104</td><td>75</td><td colspan="2">141</td></tr>
<tr><td>23,6</td><td>30</td><td>25</td><td>28</td><td colspan="2">25</td><td>26</td><td colspan="2">102</td><td>45</td><td colspan="2">121</td><td>90</td><td colspan="2">166</td></tr>
<tr><td>30</td><td>37,5</td><td>32</td><td>36</td><td colspan="2">32</td><td>32</td><td colspan="2">112</td><td>53</td><td colspan="2">133</td><td>106</td><td colspan="2">186</td></tr>
<tr><td>37,5</td><td>47,5</td><td>40</td><td>45</td><td colspan="2">40</td><td>38</td><td colspan="2">130</td><td>63</td><td colspan="2">155</td><td>125</td><td colspan="2">217</td></tr>
<tr><td>47,5</td><td>60</td><td>50</td><td>56</td><td colspan="2">50</td><td>45</td><td colspan="2">147</td><td>75</td><td colspan="2">177</td><td>150</td><td colspan="2">252</td></tr>
<tr><td>60</td><td>67</td><td>63</td><td>–</td><td>50</td><td>63</td><td rowspan="2">53</td><td>155</td><td>165</td><td rowspan="2">90</td><td>192</td><td>202</td><td rowspan="2">180</td><td>282</td><td>292</td></tr>
<tr><td>67</td><td>75</td><td>–</td><td>71</td><td colspan="2">63</td><td colspan="2">165</td><td colspan="2">202</td><td colspan="2">292</td></tr>
</table>

1) Tolerances on d_1 (according to ISO 3338/I and II) :

h8 for plain parallel shanks;

h6 for flatted parallel shanks.

2) Only for plain parallel shanks.

3) The two alternatives for the total length result from the two alternatives for the shanks.

The values L and l have been so chosen that the length difference ($L - l$) remains constant whatever the series, short, standard or long.

<table>
<tr><th rowspan="2">Ranges of diameters
d</th><td>over</td><td>1,9</td><td>4</td><td>5</td><td>6</td><td>8</td><td>10</td><td>15</td><td>19</td><td>23,6</td><td>30</td><td>37,5</td><td>47,5</td><td>60</td><td>67</td></tr>
<tr><td>up to (including)</td><td>4</td><td>5</td><td>6</td><td>8</td><td>10</td><td>15</td><td>19</td><td>23,6</td><td>30</td><td>37,5</td><td>47,5</td><td>60</td><td>67</td><td>75</td></tr>
<tr><td rowspan="2">$L - l$</td><td>alternative I</td><td>32</td><td>34</td><td rowspan="2">44</td><td>44</td><td rowspan="2">50</td><td rowspan="2">57</td><td rowspan="2">60</td><td rowspan="2">66</td><td rowspan="2">76</td><td rowspan="2">80</td><td rowspan="2">92</td><td rowspan="2">102</td><td>102</td><td rowspan="2">112</td></tr>
<tr><td>alternative II</td><td>44</td><td>44</td><td>50</td><td>112</td></tr>
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