The Tips and Tricks: Using Greek Font and Hexadecimal code to get Special Characters in SAS/Graph Output in RTF
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ABSTRACT
Both Greek font and Hexadecimal code can be used to produce special characters. However, sometimes you may see unexpected results when using Greek font to get special characters with the default font type – Swiss. This paper discusses the tips and tricks of using the Greek font and Hexadecimal code to produce special characters in SAS® graphic output.

INTRODUCTION
The default font type in SAS/Graph is Swiss. Some special characters such as “µ” are not directly available in this type of font. Both Greek character symbols [4] and Hexadecimal code can be used to produce special characters in SAS graph output, but the results they produce are slightly different in terms of font darkness. This paper discusses the two methods and the pros and cons of each. All programs presented in this paper were developed in PC SAS 8.2 in the Windows environment.

USING GREEK FONT TO PRODUCE SPECIAL CHARACTERS IN SAS/GRAPH
The following LEGEND statement illustrates how to use the Greek font to get special characters in the legend. Appendix 1 shows the output. The special character “µ” is much lighter than the other characters in the same font size.

DATA xyz;
  INPUT treatment visit $ mean ;
  CARDS:
  1 visit1 147
  2 visit1 251
  1 visit2 166
  2 visit2 515
  1 visit3 165
  2 visit3 595
  1 visit4 195
  2 visit4 1045
  1 visit5 426
  2 visit5 267
  1 visit6 212
  2 visit6 780
; /* generate graph */
OPTIONS nodate orientation=landscape;
GOPTIONS reset=all
  device=png target = png
gunit=pct cback=white colors=(black)
  ftext=swiss rotate=landscape
  xmax=8in ymax=6in xpixels=5400 ypixels=3600 ;
TITLE1 j=l h=2 " ";
TITLE2 j=c a=90 r=0 h=4 "ABC Count (/mm" move=\(0.75, +0\) h=3 '3' move=\(+0.75, +0\) h=4 ')';
TITLE3 j=c h=5 "Figure 123: ABC Count" ;
TITLE4 j=l h=2 " "; /* customize Axis */
AXIS1 MAJOR=(h=1) MINOR=none OFFSET=(2,2)
  LABEL= (h=4 j=c "Visit") width=3 VALUE = (h=2.5);  
AXIS2 MAJOR=(h=1) MINOR=(number=5 h=.5 OFFSET=(0,0)
  ORDER=(0 to 1200 by 100) LABEL=none width=3 VALUE=(h=2.5);
LEGEND1 LABEL=(h=4 "Dose (" f=greek "m" f=swiss "g/kg) ")
VALUE = (h=4 j=c tick=1 "75" f=greek "m" f=swiss "g/kg"
    tick=2 "100" f=greek "m" f=swiss "g/kg")
ACROSS=2 SHAPE = symbol (3,1.5);

SYMBOL1 i=j c=black v=dot line=1 w=6 h=2;
SYMBOL2 i=j c=black v=triangle line=2 w=6 h=2;

PROC GPLOT DATAT = xyz;
   PLOT Mean*visit = treatment / HAXIS = axis1 VAXIS=axis2 LEGEND=legend1;
RUN;
QUIT;

In order to make the darkness consistent, slightly modify the GOPTIONS and the LEGEND statement by choosing
the simplex font instead of Swiss as follows:
GOPTIONS reset=all
   device=png target = png
   gunit=pct cback=white colors=(black)
   ftext= simplex rotate=landscape
   xmax=8in ymax=6in xpixels=5400 ypixels=3600;

LEGEND1 LABEL=(h=4 "Dose (" f=greek "m" f= simplex "g/kg")
VALUE = (h=4 j=c tick=1 "75" f=greek "m" f= simplex "g/kg"
    tick=2 "100" f=greek "m" f= simplex "g/kg")
ACROSS=2 SHAPE = symbol (3,1.5);

The resulting plot is in Appendix 2.

USING HEXADECIMAL CODE TO PRODUCE SPECIAL CHARACTERS IN SAS/GRAPH
Since the special character “μ” is not available in the Swiss font, it can be obtained by using the hexadecimal code without
the darkness issue with the Greek font discussed above. The following LEGEND statement illustrates how to do so.
The special character “μ” has the same darkness as other characters as shown in the Appendix 3 output. However, this
hexadecimal code cannot be used to get other special characters that are also not available in Swiss font, such as “α”, “λ”, and “π”. In this case, using the Greek font will be the choice.

LEGEND1 LABEL=(h=4 "Dose (" "E4"x "g/kg")
VALUE = (h=4 j=c tick=1 "75" "E4"x "g/kg"
    tick=2 "100" "E4"x "g/kg")
ACROSS=2 SHAPE = symbol (3,1.5);

CONCLUSION
Special characters are sometimes necessary in SAS output and SAS/Graph output. If special characters are
available in Swiss font, the easiest and most convenient way to get them is to use the hexadecimal code. Otherwise,
the Greek font mixed with the simplex font is effective.

ACKNOWLEDGEMENTS
A Special thanks to Bari Lawhorn of SAS and Thomas Kinghorn for their help.

REFERENCES

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Appendix 1 – Using Greek Symbol with Swiss Font

Figure 123: ABC Count

![Graph showing ABC Count over visits with dose levels of 75 g/kg and 100 g/kg]
Appendix 2 – Using Greek Symbol with Simplex Font

Figure 123: ABC Count

Visit

Dose (μg/kg)  75μg/kg  100μg/kg
Appendix 3 – Using Hexadecimal Code

Figure 123: ABC Count

![Graph showing ABC Count over visits with different dose levels of 75μg/kg and 100μg/kg.](image-url)