

ISO/TR 20278:2015-12 (E)

Unwanted reflections from the active and inactive areas of display surfaces visible during use

| Contents | | Page |
|-----------------|---|-------------|
| Foreword | | v |
| 1 | Scope | 1 |
| 2 | Terms and definitions | 1 |
| 3 | Unwanted reflections within the context of the ISO 9241-3xx series | 2 |
| 3.1 | Glare and unwanted reflections | 2 |
| 3.2 | Direct glare in the context of the ISO 9241-3xx standards series | 2 |
| 3.3 | Glare by reflection | 3 |
| 4 | Visual discomfort and glare while using computer displays | 3 |
| 4.1 | Asthenopia | 3 |
| 5 | Unwanted reflections from displays | 3 |
| 5.1 | General | 3 |
| 5.2 | Glare and unwanted reflections on screens in the ISO 9241-3xx series | 4 |
| 6 | Pertinent regulations regarding glare and unwanted reflections | 4 |
| 6.1 | European Directive 90-270 -- On the minimum safety and health requirements for work with display screen equipment | 4 |
| 6.2 | The meaning of disturbing glare within the ISO 9241-3xx series | 4 |
| 6.2.1 | General | 4 |
| 6.2.2 | CIE definitions of discomfort glare and disability glare | 4 |
| 6.2.3 | Unwanted reflections as currently specified and limited in ISO 9241-303, 9241-305 and 9241-307 for the active area of displays (screens) | 5 |
| 6.3 | Interaction between specular, diffuse and haze reflection components | 6 |
| 6.3.1 | General | 6 |
| 6.3.2 | Recognition of the interaction of unwanted reflection components in the ISO 9241-3xx series | 6 |
| 7 | Luminance balance | 6 |
| 8 | Glare and the ambient illumination in the office-working environment | 6 |
| 8.1 | Ambient illuminance | 6 |
| 8.2 | Arrangement of the computer work area | 7 |
| 8.3 | Surface finishes (reflectivity) | 7 |
| 8.3.1 | General | 7 |
| 8.3.2 | Conversion of specular gloss values to specular reflectance values | 8 |
| 9 | Literature review of research regarding unwanted reflections from the bezel, screen housing, or other inactive areas of the display visible during use | 8 |
| 9.1 | General | 8 |
| 9.2 | Bezel gloss | 8 |
| 9.2.1 | Howarth and Hodder, 2004 | 8 |
| 9.2.2 | Béland and Andr n | 8 |
| 9.2.3 | Howarth and Hodder, 2013 | 8 |
| 9.3 | Bezel reflectance | 9 |
| 9.3.1 | General | 9 |
| 9.3.2 | Hunter, et al | 9 |
| 9.3.3 | Soderston, et al | 9 |

| | | |
|-------|---|----|
| 9.3.4 | Béland and Andrén | 10 |
| 9.3.5 | Howarth and Hodder | 11 |
| 9.3.6 | Conclusions from the literature regarding bezel gloss and reflectance | 11 |
| 10 | A review of the literature regarding eyestrain due to vergence and accommodative demands of glare reflections | 11 |
| 10.1 | Accommodative stress | 11 |
| 10.2 | Vergence stress | 12 |
| 11 | Summary and conclusions | 12 |
| | Bibliography | 14 |