



BRAND IDENTITY STANDARDS

DESIGNER'S GUIDE

APRIL 2006





TABLE OF CONTENTS

INTRODUCTION

- 1.1 The Freedom to Thrive Digitally
- 1.2 Seagate Brand Identity
- 1.3 Seagate Active Storage
Our Seagate Personality

IDENTITY ELEMENTS

- 2.0 Seagate Signature
- 3.0 Seagate Colors
- 4.0 Seagate Typography

VISUAL SYSTEM

- 5.0 Grid System
- 6.0 Active Circles
- 7.0 Focus Window

BRAND LITERATURE

- 8.0 Seagate Collateral

THE FREEDOM TO THRIVE DIGITALLY

It's a decisive moment in Seagate's history. Already a successful company in the business world, we have the opportunity to literally become a household name. The digital world is exploding for both businesses and consumers. Storage has come of age, and Seagate's mission will be to give people the freedom to truly experience the power and potential of their digital content and information. This is the promise of Seagate Active Storage.

In the enterprise, our continued expertise and innovation is of critical relevance in an on demand world. For example, our tiered storage approach allows businesses to interact fluidly with their information and data resources. Businesses will be truly free to unleash the power of their information, helping them to more readily provide insight, competitive advantage and a stronger sense of identity in the marketplace.

Around the world we've heard consumers express their amazement at the seemingly infinite choices and possibilities presented by their digital lives. They love having the personal control over what they watch, listen to, create, share and collect. The taste they have had so far has only made them hungry for more, and Seagate will provide the products that will help make their digital world more immediate, and more captivating than ever before.

As we embrace this opportunity, Seagate's stature and importance will rise considerably. More eyes will be upon us, more demands will be placed on us. We will have to think about how we present ourselves, how we look, how we should talk to our different audiences and how we should make them feel – all while remaining true to our heritage and who we believe we are.

The purpose of this document is to provide guidelines for how we present the Seagate brand and the impression we want to make on the world. These guidelines will help us build a cohesive identity in an increasingly crowded and transparent communications environment. They will help us interpret and convey our personality, our voice and our ideas as one powerful Seagate brand to all our audiences around the globe.

SEAGATE BRAND IDENTITY

Our brand identity platform is a succinct summary of who we are. It acts as a lens or filter for creating and communicating the Seagateness in everything we do. The heart of the platform is the brand promise that should come through to our customers as a single, compelling and relevant idea. The platform also tells us what high level benefits our brand delivers and what personality traits best accompany everything we say and do. Used consistently, they will lead to important realities in the marketplace, strengthening dimensions of consideration, preference and loyalty among customers.

SEAGATE BRAND IDENTITY PLATFORM

Category frame-of-reference: Seagate Active Storage

Brand promise: Your digital content is more powerful with Seagate

Brand essence (B2C): Freedom to thrive in your digital world

Brand essence (B2B): Freedom to unleash the power of your business information

Rational benefit: No limits to personal choice and control

Emotional benefit: A feeling of can-do

Personality: Innovative, Dynamic, Human/Approachable, Expert, Intelligent sense of humor

SEAGATE ACTIVE STORAGE

We already mentioned that storage has come of age. Now, we have taken the lead in redefining the category by calling it Active Storage. Both business and retail customers have told us that they relate to storage in a very different way than in the past. Storage is no longer seen as simply a repository or archive. It is now about accessing digital content and information on demand; it's about spontaneity, choice and control. There are aspects to the customer's experience and expectations that the word storage itself fails to convey. Active Storage provides a more dynamic reference point that will allow us to forge ahead with our true brand differentiation and promise.

OUR SEAGATE PERSONALITY

Our traditional audiences know us for our expertise and longevity in the marketplace. We are trusted and have a well-deserved reputation for reliability. This equity provides the foundation for instilling additional brand attributes and associations in order to create loyalty and preference among customers in this dynamic new environment. For this purpose, the personality traits listed in the brand platform will be essential. They will help the Seagate brand evolve to a place that is more modern and charismatic.

As the Seagate brand identity evolves, customers will embrace our core attributes of expertise and innovation as the reasons to believe our promise. Where our heritage and current image tend to be more conservative and technical in nature, our evolving personality will present a warmth and approachability to audiences. This will be more in keeping with the brand that gives them the freedom to thrive in their digital world.

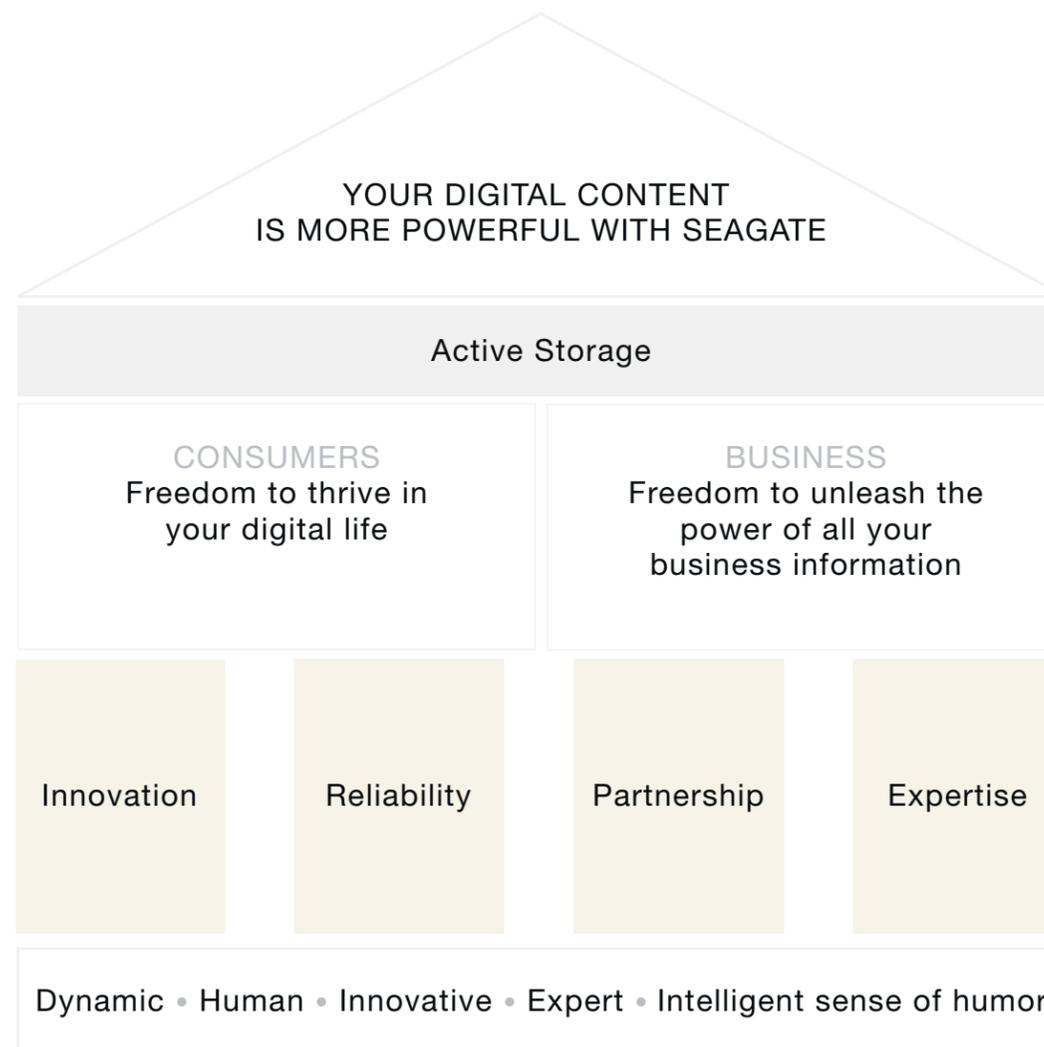
BRAND PROMISE

CATEGORY FRAME-OF-REFERENCE

BENEFITS

BRAND PILLARS

BRAND PERSONALITY



2.0 SEAGATE SIGNATURE

- 2.1 Primary and Alternate
- 2.2 Misuses
- 2.3 Clear Space
- 2.4 Minimum Size
- 2.5 Color Variations
- 2.6 Background Control

3.0 SEAGATE COLORS

- 3.1 Primary Palette
- 3.2 Expanded Palette
- 3.3 Specifications
- 3.4 Emotional Values

4.0 SEAGATE TYPOGRAPHY

- 4.1 Primary Typefaces
- 4.2 Secondary Typefaces

The Seagate signature is the most fundamental part of our brand, and it represents our entire company, externally and internally. From product packaging and ads to datasheets and presentations, it functions as a personal sign-off on the ideas we're presenting and sharing. The signature consists of two elements that work together as a whole.



WAVE SYMBOL

The Wave is the defining feature of our design system, and the starting point for many graphic elements you'll see later in this document. Inspired by rotating media, the Wave represents ideas and information in motion. It places Seagate at the center of innovation, with ripples of ideas emanating outwards.

WORDMARK

Our wordmark is in Helvetica Neue. With no gratuitous ornamentation, this typeface is strong yet friendly, self-assured yet down-to-earth; qualities we're happy to associate with our brand.

The relationship between the signature elements is pre-determined and fixed. Do not, under any circumstances, alter the proportions or placement of any of the signature elements independently.

Please note that we are not using a tagline any longer, and none will be associated with the signature.

There are only two configurations of the signature: the primary and the alternate. The primary signature should always be considered first, except for the following three situations where the alternate primary configuration may be used:

- For online usage where the alternate primary's four-line wave symbol reads better
- For small-size applications where the logo is under 1 inch wide
- For very large applications where the logo is over 17 inches wide.

PRIMARY



ALTERNATE (FOUR-LINE SYMBOL)



A lot of thought and effort has gone into determining the perfect relationship between the elements that make up our signature; do not attempt to re-create these elements. Always use the approved artwork, and always follow these rules when using it. Note that these rules also apply to the alternate 4-line signature.



Do not resize the signature elements



Do not resize the signature elements



Do not rearrange the signature elements



Do not stack the signature elements



Do not associate the signature with a tagline



Do not flip the wave symbol



Do not use the wordmark alone



Do not re-create the signature with any other typeface or any other weight of the same typeface

2.3 CLEAR SPACE

SEAGATE SIGNATURE

Clear space is the area surrounding the signature that must be kept free of other graphic elements. The minimum required clear space is defined by the measurement “X”, as shown. This measurement is equal to the height of the lowercase letters in our wordmark.

PRIMARY



ALTERNATE (FOUR-LINE SYMBOL)



2.4 MINIMUM SIZE

SEAGATE SIGNATURE

We have established various minimum sizes for our signature to help it stand out as much as possible. While the minimum sizes shown here should accommodate most applications and reproduction techniques, make sure that our signature is never smaller than what can be clearly executed. Applications such as the Web, signage or merchandise may require larger sizes.

PRIMARY



ALTERNATE (FOUR-LINE SYMBOL)



TWO-COLOR

When placed on a white background, the two-color signature uses 100% black for the wordmark and Pantone 7475 for the wave symbol. When placed on a black background, the two-color signature uses 100% white for the wordmark and Pantone 7475 for the wave symbol. No other variation may be used. Note that Pantone 7475 is strictly for use in our signature — which is why you won't find it in our color palette. The preferred backgrounds for the two-color signature are white and black.

(Refer to section 3.1 for color specifications.)



Two-color positive



Two-color negative

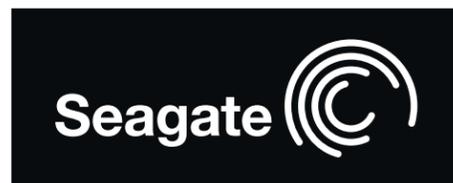


ONE-COLOR

The one-color version of our signature is used for applications and collateral where the layout needs to be simple and focused without too many color variations. The one-color version may also be used to enhance particular design concepts.



One-color positive



One-color negative



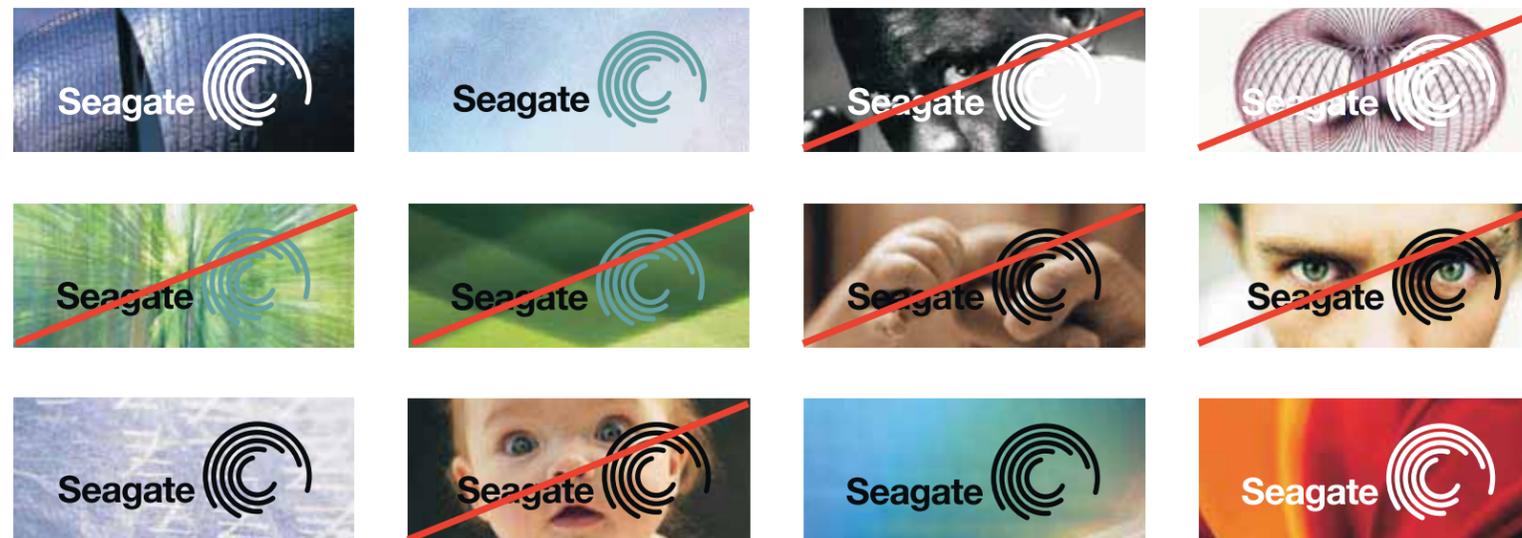
COLORS

Although it's always preferable to place the signature on a black or white background, there are times when it will need to appear over a color. In these cases, make sure that the signature elements are as visible as possible. The exhibits show which signatures to use over various colors to enhance visibility. Note that although the black signature may be visible on many mid-range backgrounds, it is preferred that white be used in those cases.



IMAGES

On the rare occasion when the signature needs to appear over a photograph or illustration, special care must be taken to ensure visibility of the signature elements. The signature should be reproduced in black or white when possible. The two-color signature is only permissible when there is sufficient contrast between all the elements. Remember, visibility is the goal here. Often, adjusting the position of a photograph or retouching the area where the signature resides will help you achieve that goal.



3.1 PRIMARY PALETTE

SEAGATE COLORS

Our primary colors are strong and straightforward. They represent the Seagate brand at its most basic level—our signature. In fact, these are the only colors that may be used to reproduce our signature.

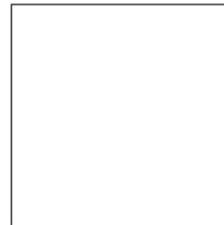
Conversely, Seagate Green may not be used for anything besides the signature. This is why you will not find it in our expanded color palette.



Seagate Green



Black



White

SEAGATE COLOR	PANTONE® EQUIVALENT	CMYK	RGB	HEX
 Seagate Green	PANTONE 7475 C	C50 M0 Y25 K30	R102 G153 B153	Web 669999

Our expanded color palette allows flexibility in brand communications where either regional, cultural or product distinction is warranted. Each color has a dark, intermediate and light value, but the intermediate value should always be your starting point.

While any of these colors can be combined, the palette has been expressly designed to help you easily pick successful combinations—any two adjacent colors will work together perfectly well.

Unlike the primary palette, colors from the expanded palette can be used as tints. You may use multiple values of any color. The following misuses of color should be avoided:

- Do not introduce any colors into Seagate communications other than those specified.
- Do not calculate CMYK/RGB breakdowns by converting Pantone® colors in software such as Adobe Illustrator®.
- Do not use four-color breakdowns recommended by Pantone®. Use the breakdowns supplied in these guidelines instead.
- Do not take ownership of a single color to identify your business unit.
- Do not use more than 2 colors in addition to black and gray.

(Note: The color shown throughout this guide has not been evaluated by Pantone, Inc. for accuracy and may not match the PANTONE Color Standards. Consult current PANTONE Publications for accurate color. PANTONE® is the property of Pantone, Inc.)

3.2.1 EXPANDED PALETTE

SEAGATE COLORS

EXPANDED

LIGHT



Seagate
Active Rose Lt



Seagate
Active Red Lt



Seagate
Active Orange Lt



Seagate
Active Lemon Lt



Seagate
Active Green Lt



Seagate
Active Sapphire Lt



Seagate
Active Blue Lt



Seagate
Active Violet Lt



Seagate
Active Gray Lt

INTERMEDIATE



Seagate
Active Rose



Seagate
Active Red



Seagate
Active Orange



Seagate
Active Lemon



Seagate
Active Green



Seagate
Active Sapphire



Seagate
Active Blue



Seagate
Active Violet



Seagate
Active Gray

DARK



Seagate
Active Rose Dk



Seagate
Active Red Dk



Seagate
Active Orange Dk



Seagate
Active Lemon Dk



Seagate
Active Green Dk



Seagate
Active Sapphire Dk



Seagate
Active Blue Dk



Seagate
Active Violet Dk



Seagate
Active Gray Dk

3.3 SPECIFICATIONS

SEAGATE COLORS

SEAGATE COLOR	PANTONE® EQUIVALENT	CMYK	RGB	HEX
 Seagate Active Rose Lt	PANTONE 226 C	C0 M100 Y0 K0	R209 G03 B115	Web D10373
 Seagate Active Rose	PANTONE 234 C	C6 M100 Y0 K26	R166 G0 B102	Web A60066
 Seagate Active Rose Dk	PANTONE 229 C	C0 M100 Y15 K60	R107 G28 B58	Web 6B1C3A
 Seagate Active Red Lt	PANTONE 1788 C	C0 M84 Y88 K0	R235 G38 B41	Web EB2629
 Seagate Active Red	PANTONE 1795 C	C0 M94 Y100 K0	R209 G36 B33	Web D12421
 Seagate Active Red Dk	PANTONE 1805 C	C0 M91 Y100 K23	R173 G38 B36	Web AD2624
 Seagate Active Orange Lt	PANTONE 1495 C	C0 M33 Y67 K0	R255 G153 B59	Web FF993B
 Seagate Active Orange	PANTONE 165 C	C0 M59 Y96 K0	R245 G102 B0	Web F56600
 Seagate Active Orange Dk	PANTONE 173 C	C0 M69 Y100 K4	R212 G71 B15	Web D4470F
 Seagate Active Lemon Lt	PANTONE 135 C	C0 M19 Y60 K0	R252 G201 B84	Web FCC954
 Seagate Active Lemon	PANTONE 1235 C	C0 M29 Y91 K0	R247 G181 B18	Web F7B512
 Seagate Active Lemon Dk	PANTONE 137 C	C0 M35 Y90 K0	R247 G163 B10	Web F7A30A
 Seagate Active Green Lt	PANTONE 376 C	C50 M0 Y100 K0	R125 G186 B0	Web 7DBA00
 Seagate Active Green	PANTONE 369 C	C59 M0 Y100 K7	R79 G168 B0	Web 4FA800
 Seagate Active Green Dk	PANTONE 364 C	C65 M0 Y100 K42	R51 G115 B33	Web 337321

3.3.1 SPECIFICATIONS

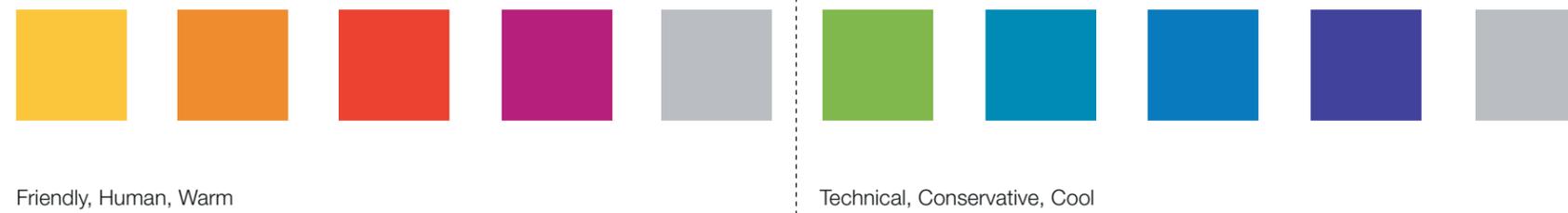
SEAGATE COLORS

SEAGATE COLOR	PANTONE® EQUIVALENT	CMYK	RGB	HEX
 Seagate Active Sapphire Lt	PANTONE 3125C	C83 M0 Y21 K0	R0 G176 B199	Web 00B0C7
 Seagate Active Sapphire	PANTONE 314 C	C100 M0 Y9 K30	R0 G133 B161	Web 0085A1
 Seagate Active Sapphire Dk	PANTONE 3155 C	C100 M0 Y24 K38	R0 G105 B115	Web 006973
 Seagate Active Blue Lt	PANTONE 2925 C	C85 M24 Y0 K0	R10 G148 B214	Web 0A94D6
 Seagate Active Blue	PANTONE 2935 C	C100 M46 Y0 K0	R0 G94 B196	Web 005EC4
 Seagate Active Blue Dk	PANTONE 294 C	C100 M58 Y0 K21	R0 G56 B130	Web 003882
 Seagate Active Violet Lt	PANTONE 2587 C	C59 M66 Y0 K0	R144 G66 B173	Web 8C42AD
 Seagate Active Violet	PANTONE 267 C	C89 M100 Y0 K0	R89 G23 B138	Web 59178A
 Seagate Active Violet Dk	PANTONE 2627C	C77 M100 Y0 K31	R71 G10 B89	Web 470A59
 Seagate Active Gray Lt	PANTONE 429 C	C3 M0 Y0 K32	R173 G173 B173	Web ADADAD
 Seagate Active Gray	PANTONE 430 C	C5 M0 Y0 K45	R140 G143 B145	Web 8C8F91
 Seagate Active Gray Dk	PANTONE 431 C	C11 M1 Y0 K64	R106 G115 B123	Web 6A737B

3.4 EMOTIONAL VALUES

SEAGATE COLORS

The emotional values attached to colors can help communicate specific messages to individual audiences. Certain applications may require a warmer or cooler value. Use this chart as a guide when putting together your Seagate communications. Note that our active gray is versatile enough to be used in a warm or cool palette.



PRIMARY (GRAPHIC DESIGN USE ONLY)

There are several reasons why we've chosen Helvetica Neue for our primary typeface. Strong yet friendly, it helps us communicate ideas in a straightforward, confident manner. Its openness and geometry make it highly legible. And it's available in roman and italic, and in several weights, allowing maximum flexibility. So please refrain from using other versions of the font.

Note that Helvetica Neue is to be used mainly for print materials; for internal documents such as Microsoft® Office applications, we have specified alternate typefaces on the following page. (The Helvetica Neue font can be obtained through myfonts.com.)

HELVETICA NEUE

25 Ultra Light

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

45 Light

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

55 Roman

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

75 Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

85 Heavy

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

26 Ultra Light Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&?*

46 Light Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&?*

56 Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&?*

76 Bold Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

86 Heavy Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

ALTERNATE

Our alternate typefaces are Arial and Times New Roman and are strictly for internal use. Arial references the clean look of our primary typeface and should be used whenever possible within Microsoft Office applications such as Word, PowerPoint, Excel, etc. Times New Roman is an easy-to-read typeface that can be used for body copy in letters, memos and faxes.

ARIAL

Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&?*

Bold Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

TIMES NEW ROMAN

Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&?*

Bold Italic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 1234567890"!@#%\$&*?

5.0 GRID SYSTEM

- 5.1 Creating the Grid
- 5.2 Margins

6.0 ACTIVE CIRCLES

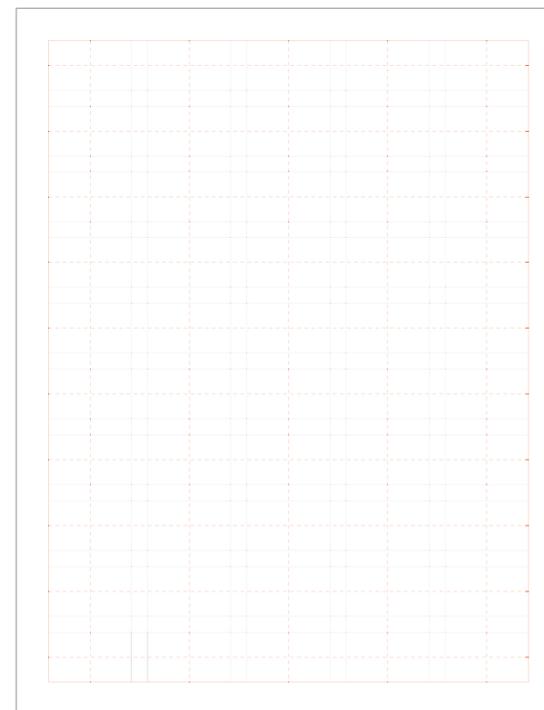
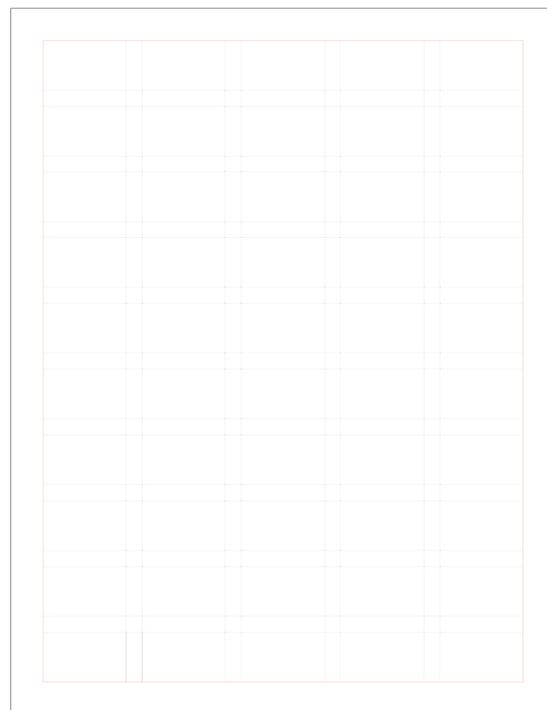
- 6.1 Core Elements
- 6.2 Construction
- 6.3 Misuses
- 6.4 Minimum Size
- 6.5 Colors
- 6.6 Colors-Misuses
- 6.7 Images
- 6.8 Images-Misuses

7.0 FOCUS WINDOW

- 7.1 Variations
- 7.2 Specifications
- 7.3 Placement
- 7.4 Placement-Misuses
- 7.5 Adding Active Circles
- 7.6 Colors
- 7.7 Colors-Misuses
- 7.8 Images
- 7.9 Images-Misuses

The grid system outlined here will help you establish the right size and placement for all your elements—configurations, type and photography—resulting in a powerful and cohesive design. The system is based on a 5 column by 10 row grid which was designed to be very versatile. For even more flexibility, we have divided each column and row in half, as shown below.

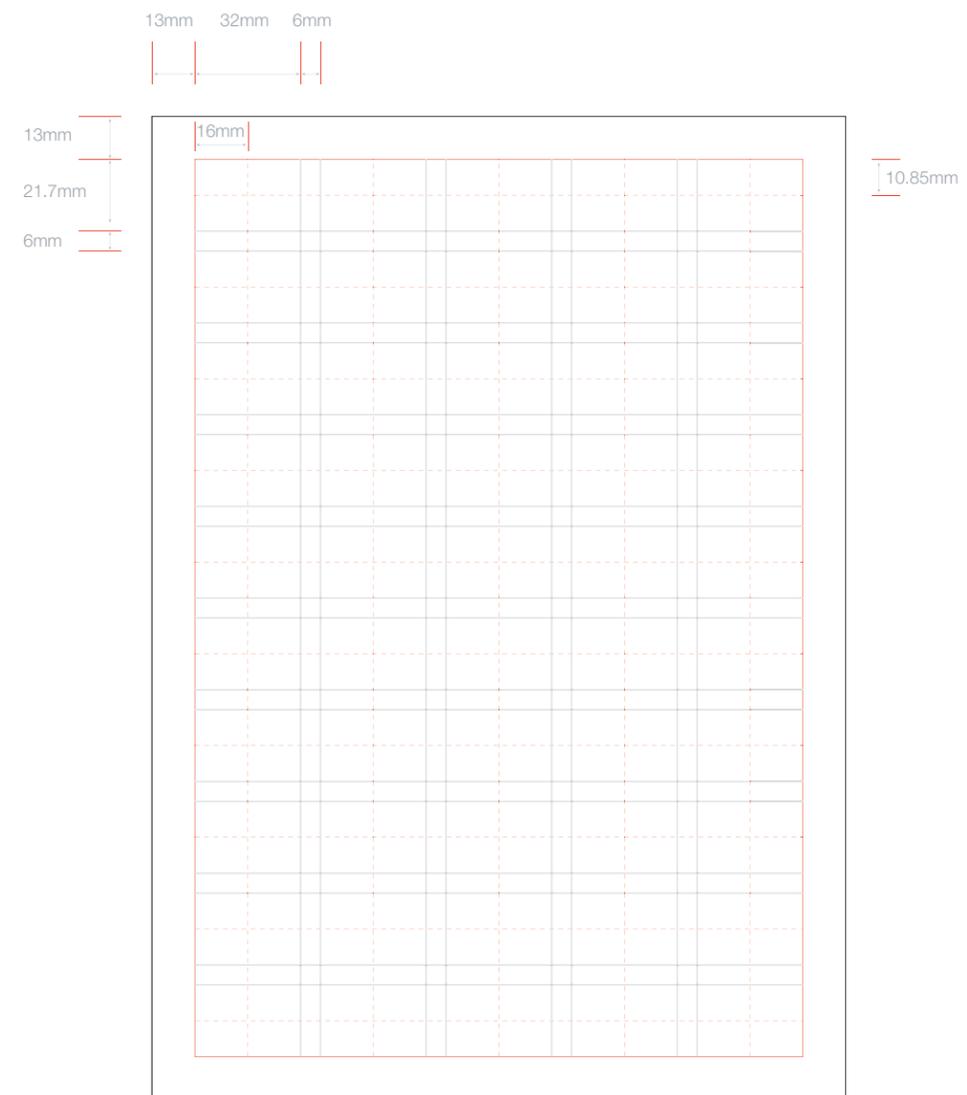
Occasionally, a design may require placement of certain elements off the grid—this is perfectly acceptable. Our grid is flexible; it's there to guide you through your alignments and placements and to help you create consistencies throughout your printed materials.



5.1.1 CREATING THE GRID

GRID SYSTEM

These measurements will help you create the grid on an A4 page.

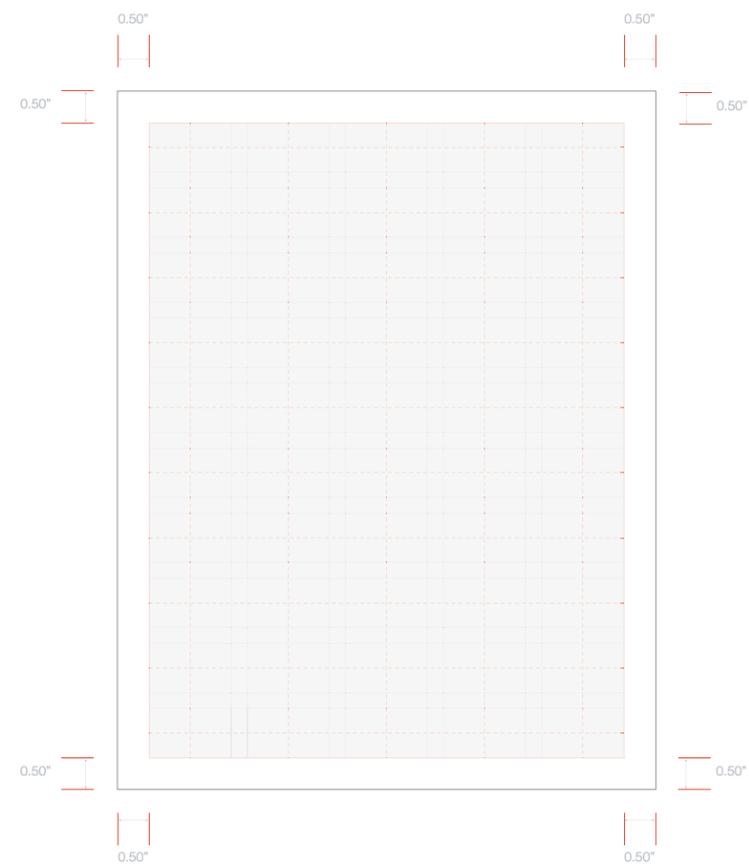


5.2 MARGINS

GRID SYSTEM

A margin all around the page helps create a second level of consistency for our printed materials. A margin also provides visual relief, especially when the page tends to be text-heavy or full of information.

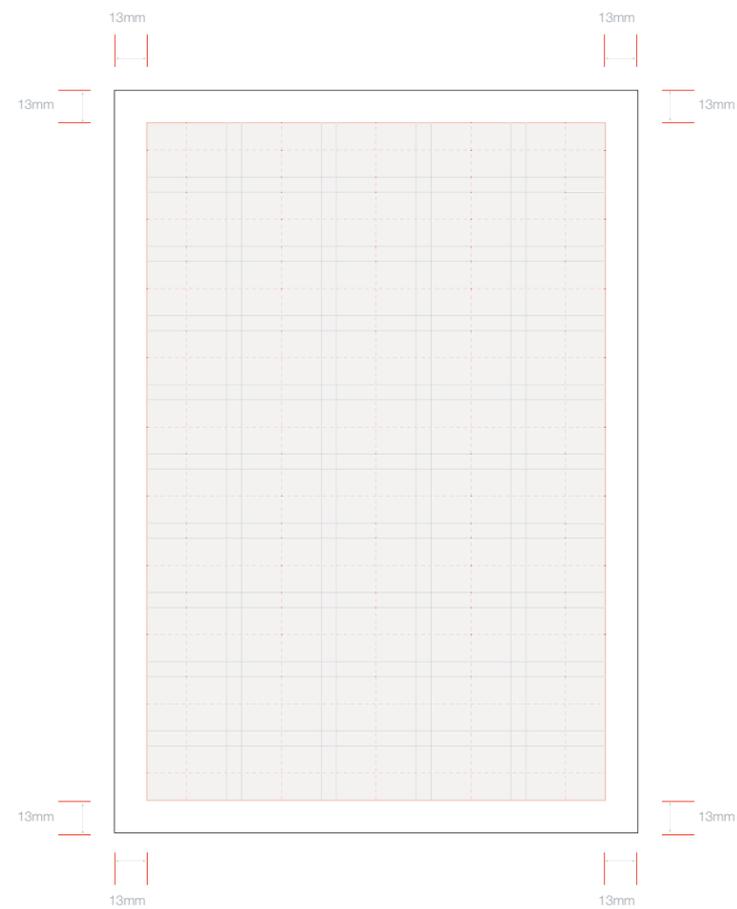
An 8.5" x 11" US Letter page requires a 0.5" margin all around. For smaller or larger applications, the margin should be proportionate to the size of the layout. Finally, never place anything in the margin.



5.2.1 MARGINS

GRID SYSTEM

An A4 layout requires a 13mm margin all around. For smaller or larger applications, the margin should be proportionate to the size of the layout. Never place anything in the margin.



Our signature, color and typography are the building blocks of our communications. They help ensure consistency across our communications and keep the overall look and feel of our brand in sync.

Our visual system is another device that helps us achieve one voice. The system consists of interlocking, kinetic circles which we call Active Circles. Its fluid, organic architecture reinforces the human, emotional side of our company, something that can easily get lost among all our cutting-edge technology.

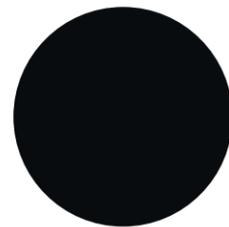
The Active Circles visual system is easily ownable; over time, it will come to be clearly identifiable as Seagate. And it has enough versatility and flexibility to meet all of our myriad communication needs, both internal and external.

6.1 CORE ELEMENTS

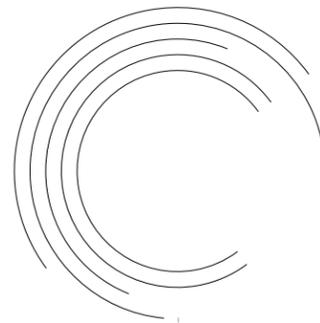
ACTIVE CIRCLES

Active Circles are configurations of 3 core elements inspired by the Seagate wave symbol. The interaction between these elements gives us the ability to create movement and energy—attributes that go hand in hand with the idea of Active Storage.

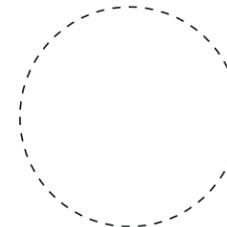
The 3 core elements will be used to create every configuration. They are the only elements permissible in any configuration.



Solid Circle



Concentric Circle

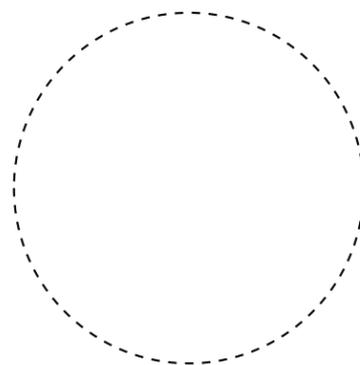


Dashed Circle

THE DASHED CIRCLE

- Each configuration should have only one dashed circle.
- Do not fill a dashed circle with color or images.
- The weight of the stroke should vary proportionately with the size of the circle; it cannot be less than .25pt. It's preferable not to exceed a 1pt stroke unless the application requires it, for instance, a billboard.
- Unless the application requires a specific dash/gap combination, use a 2pt dash/2pt gap or a 4pt dash/4pt gap.
- The value of the stroke is always 100%; never render it as a transparency or a percentage.

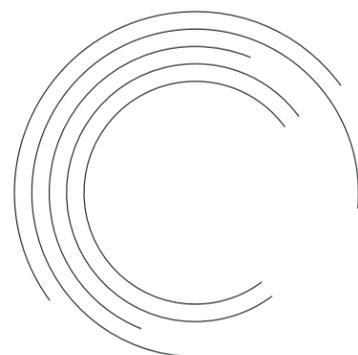
PRIMARY (DASHED CIRCLE)



THE CONCENTRIC CIRCLE

- Each configuration should have only one concentric circle.
- The concentric circle can be rotated in any direction as a whole.
- Never rearrange, recreate, dash or close the concentric circle.
- The weight of the stroke should vary proportionately with the size of the circle; it cannot be less than .25pt. It's preferable not to exceed a 1pt stroke unless the application requires it, for instance, a billboard.
- The value of the stroke is always 100%; never render it as a transparency or a percentage.
- The primary version cannot be used over a solid color or an image; use the alternate version in this case.
- The alternate version cannot be filled with any color except white.

PRIMARY (OUTLINED CONCENTRIC CIRCLE)



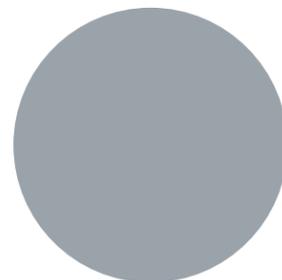
ALTERNATE (FILLED CONCENTRIC CIRCLE)



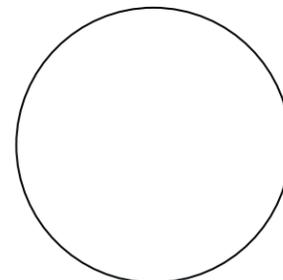
THE SOLID CIRCLE

- Each configuration needs to have at least 1 solid circle and not more than 4 solid circles.
- Solid circles can be any size, but no two in a configuration can be of the same size.
- A solid circle can be either filled or outlined but it cannot be both at the same time.
- If using an outline, the weight of the stroke should vary proportionately with the size of the circle; it cannot be less than .25pt. It's preferable not to exceed a 1pt stroke for a solid circle unless the design expressly calls for it.
- You can increase contrast between solid circles in a configuration by varying their sizes, values, and ratio of solid to outlined circles.

PRIMARY
(SOLID CIRCLE)



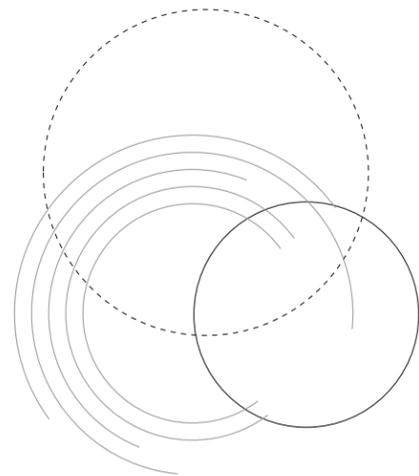
ALTERNATE
(OUTLINED CIRCLE)



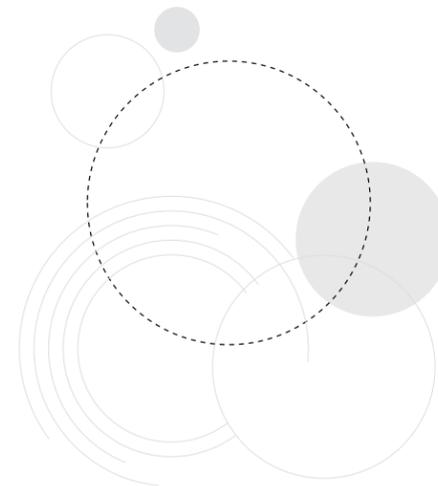
Although there are several rules that govern the core elements, there is a lot of flexibility when it comes to combining them. The goal here is to create configurations that are human, organic, friendly—and to convey a sense of movement and energy. Our visual system was designed to be very versatile and you can use it in a highly creative manner.

On the following pages, we will explore how to combine the core elements in the most effective way.

MINIMUM CONFIGURATION



MAXIMUM CONFIGURATION



Here are just a few of the myriad ways you can create configurations using the core elements, from the minimum allowed (3) to the maximum (6). Note that these are not the only configurations you can use—they are just examples to show you the flexibility of the system and the endless options available to you.

All the elements in a configuration can be outlined as shown here—this is appropriate when your layout is already too involved and you don't want yet another distracting element.

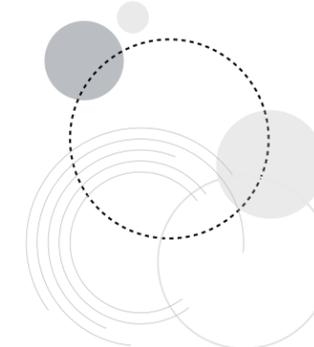
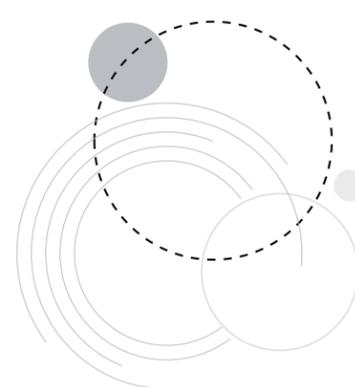
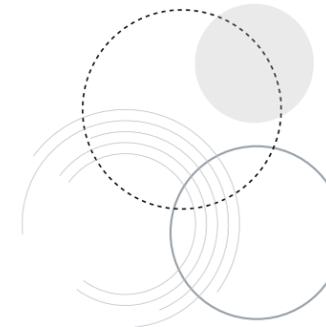
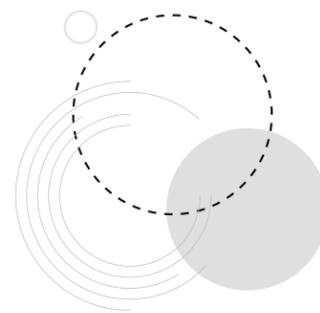
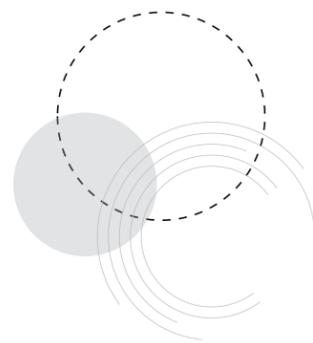




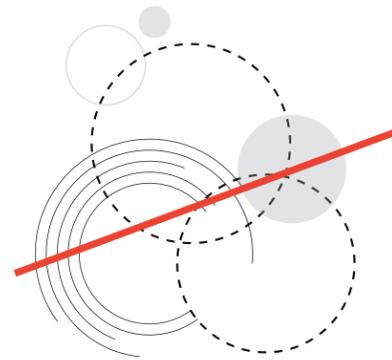
6.2.2 CONSTRUCTION

ACTIVE CIRCLES

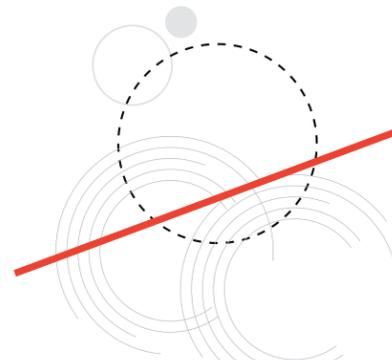
There are no specific rules as to how you should combine the core elements—just make sure that most of them interact and revolve around each other in an interesting, kinetic relationship. It's very important to maximize contrast between the elements; you can achieve this by varying the weight of the strokes, the size and value of the circles, and by filling some of the circles.



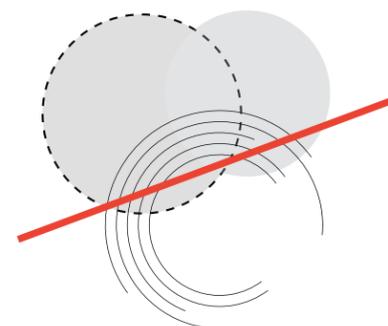
Here are some combinations to avoid when creating configurations.



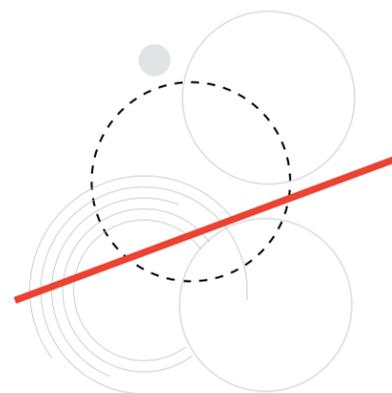
Do not use 2 dashed circles



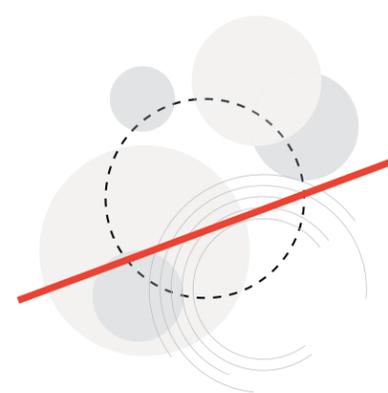
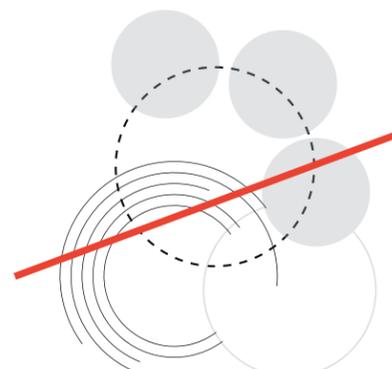
Do not use 2 concentric circles



Do not fill a dashed circle



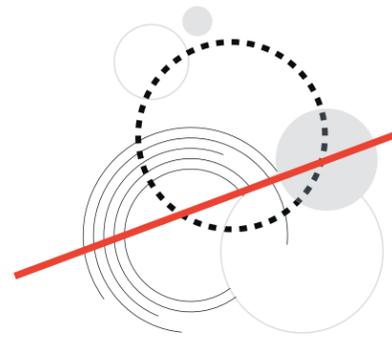
Do not use 2 or more solid circles of the same size



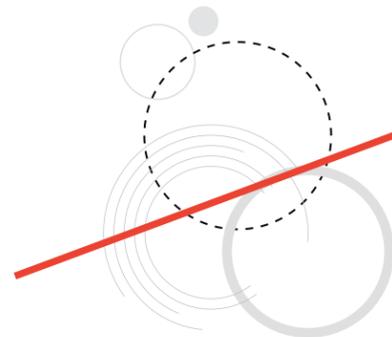
Do not exceed 6 elements

6.3.1 MISUSES

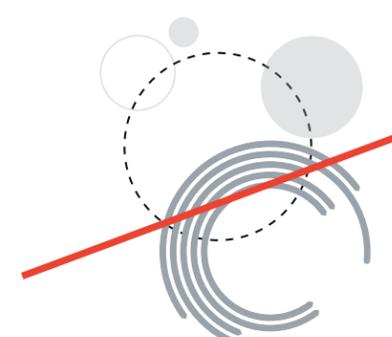
ACTIVE CIRCLES



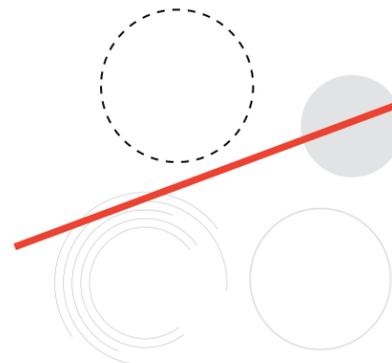
Do not exceed a 1pt stroke for any circle



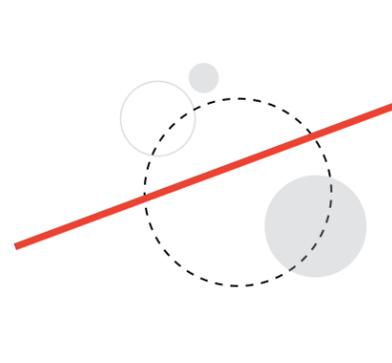
Do not omit a concentric circle



Do not omit a dashed circle



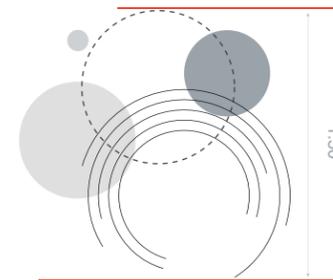
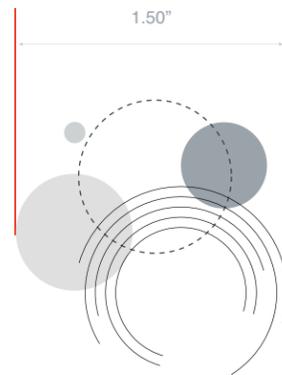
Do not arrange the elements without overlapping



6.4 MINIMUM SIZE

ACTIVE CIRCLES

An Active Circles configuration should be measured from edge to edge. The smallest dimension, horizontally or vertically, should never be less than 1.5".

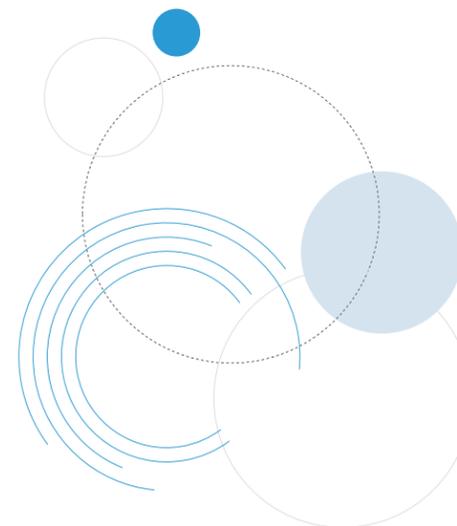
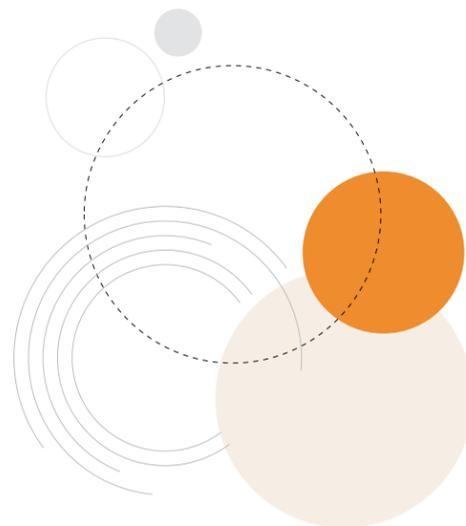


Now that we know how the Active Circles visual system works, we will now explore how to add colors. Colors add another level of sophistication that can help communicate energy, emotion, and a sense of “activeness.” Here are some points to consider when adding color to a configuration:

- Colors can be added to any element of the configuration—filled or outlined.
- When picking colors, always start simple, by adding one color.

Color can also play a role in achieving desirable contrast:

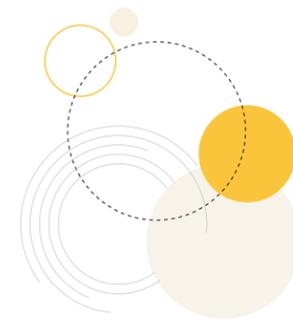
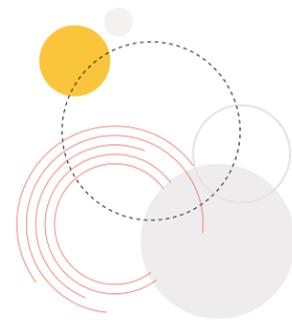
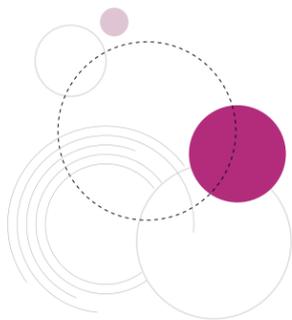
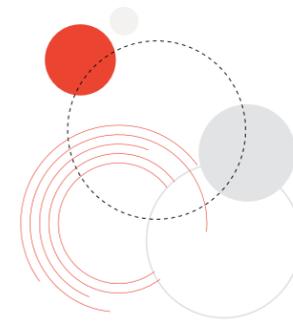
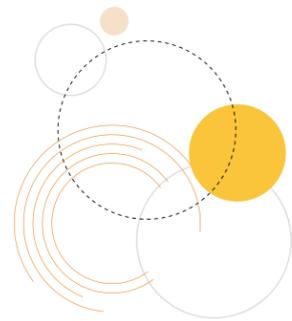
- Elements can have different values of the same color.
- Try not to use the same value for multiple elements, either filled or outlined.



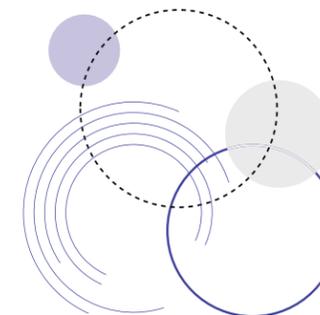
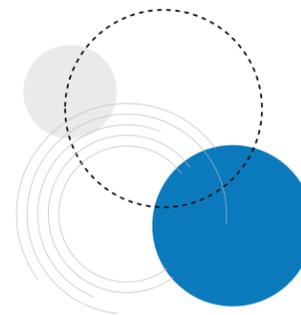
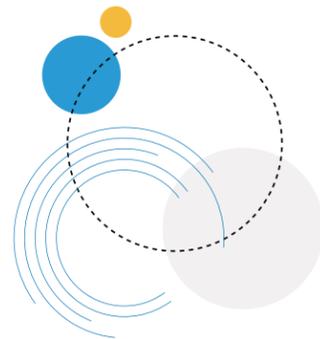
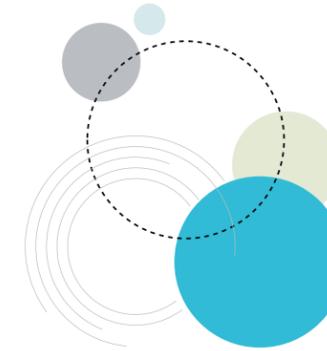
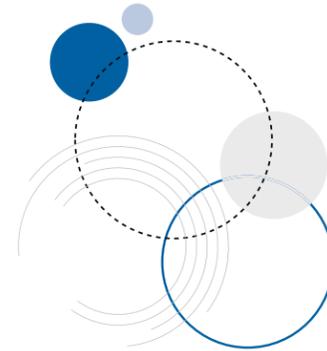
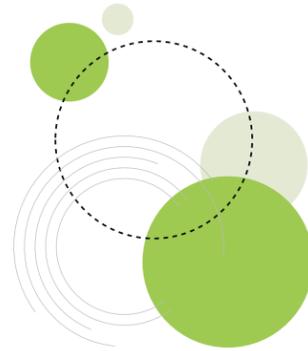
When adding colors, always keep in mind the Seagate brand, the target audience and the message you're trying to communicate. And decide whether your design requires a cool or warm palette. While the visual system was designed to be energetic and visually pleasing, you also want to be careful not to go overboard. The following exhibits show good use of color in a configuration. The rules to follow are:

- You may use up to 2 colors + black in any configuration.
- You may use percentage values of any of these colors.

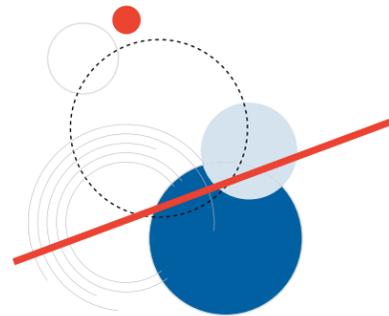
By limiting the number of colors, your design will be simple and clean—yet powerful and kinetic.



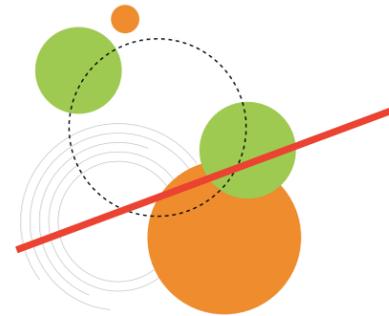
The following exhibits show some more color variations. While the previous page used warm colors, notice how this page is intentionally cool. You can use color combinations to set the tone of your communication: friendly or businesslike, B2B or consumer.



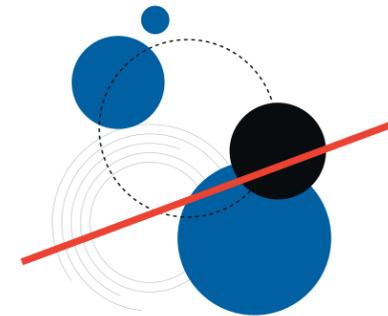
The incorrect use of color can lead to miscommunication and a wrong feeling about our brand. Here are some examples to avoid when using color:



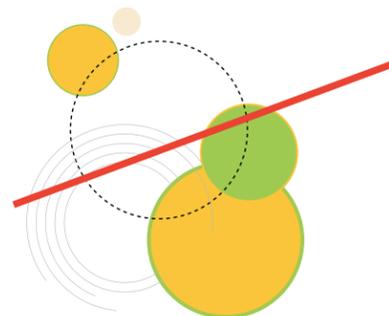
Do not use more than 2 colors



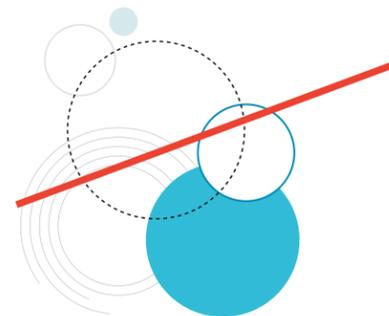
Do not use a garish color combination



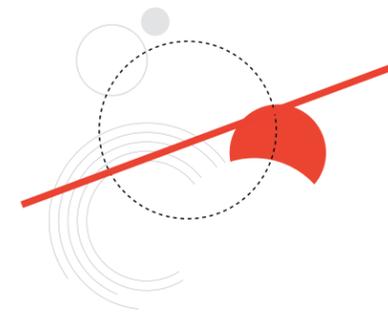
Do not fill a circle with black



Do not outline a filled circle



Do not outline a white circle



Do not fill a circle with a solid white

The Active Circles visual system is flexible enough to accommodate imagery, from our product shots to any other type of images.

PRODUCT IMAGERY

The goal should be to introduce the product in an active, engaging way. To achieve this, the Active Circles should be arranged around the product in a way that draws attention to it, never dominating, obscuring or interfering with it.

Here are just a few variations on how to display the product in the visual system.

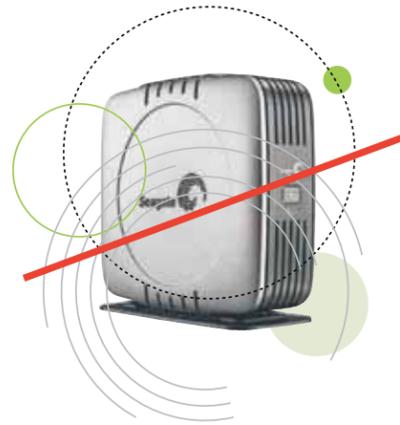


NON-PRODUCT IMAGERY

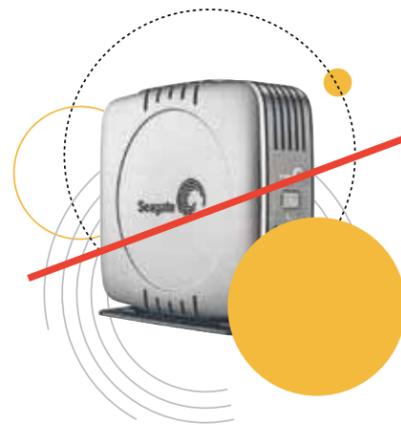
Sometimes we will need images to complete the communication or to tell another side of the story. In those cases, we can add images to the filled circles in any configuration.

Note that all the rules that apply to the core elements in sections 5.2.1 through 5.4.1 will apply here.





Do not place the Active Circles on top of the product



Do not allow the Active Circles to overpower the product

6.8.1 IMAGES—MISUSES

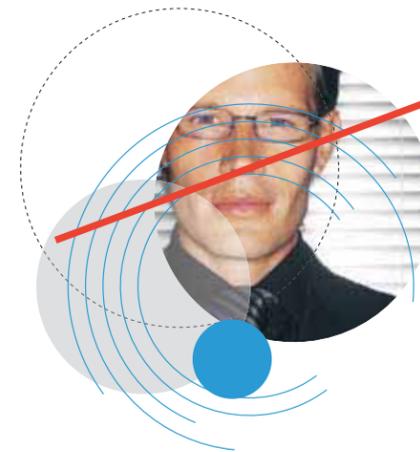
ACTIVE CIRCLES



Do not place more than one image in a configuration



Do not place an image in a dashed circle



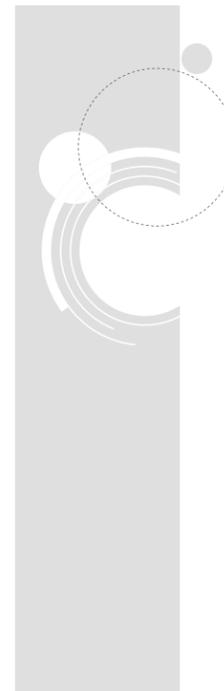
Do not place the Active Circles in front of the image

The focus window is a device to contain the Active Circles. It is a convenient space where you can deposit titles, callouts, and images to associate them with the Active Circles.

The focus window should support the Active Circles, not overpower them. From a visual standpoint, the focus window should always feel like it belongs to the same system.

The focus window can be horizontal or vertical. The size you choose will depend on:

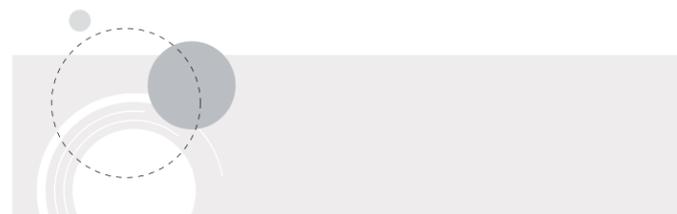
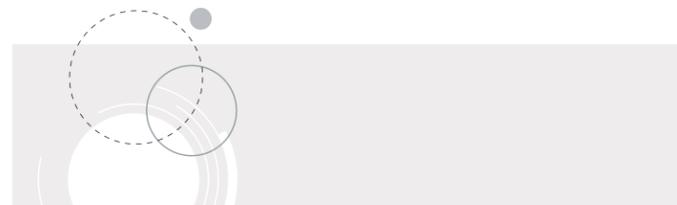
- the grid lines, as we will see in Section 7.0
- what works best with your layout
- the type of communication



HORIZONTAL FOCUS WINDOW

The following exhibits show how the Active Circles configuration can live anywhere along the focus window, depending on the requirements of your design. In every case, the focus window should feel like it belongs to the same system as the circle elements, preferably in a lighter value so that it doesn't overpower the visual system.

Important: A layout can have a maximum of one Active Circles configuration and one focus window.



7.1.1 VARIATIONS

FOCUS WINDOW

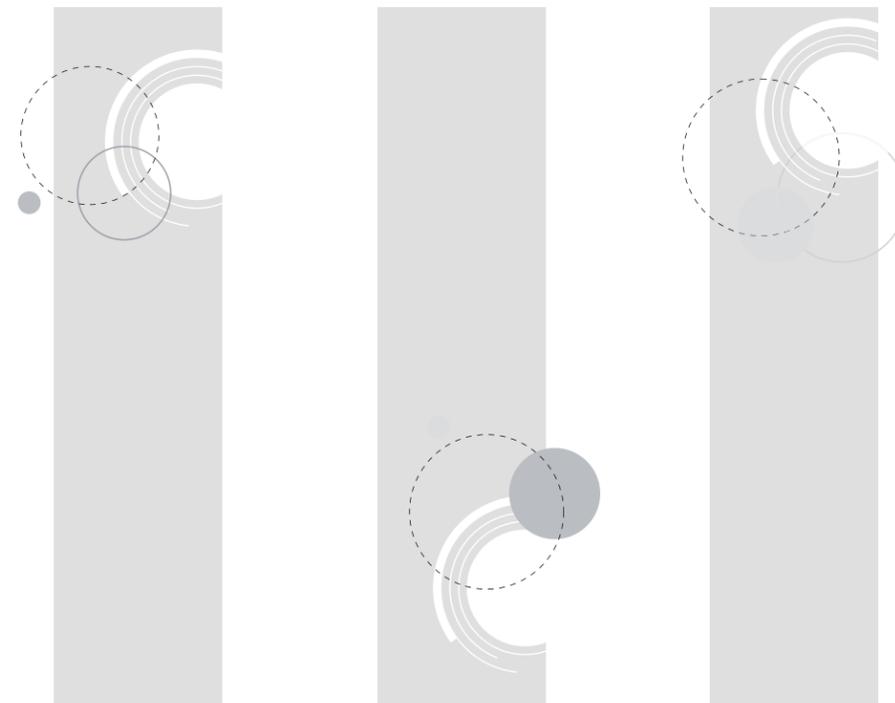
As you can see, it is possible to achieve visual interest even when color is not an option.



VERTICAL FOCUS WINDOW

The vertical focus window follows the same rules as the horizontal version, namely:

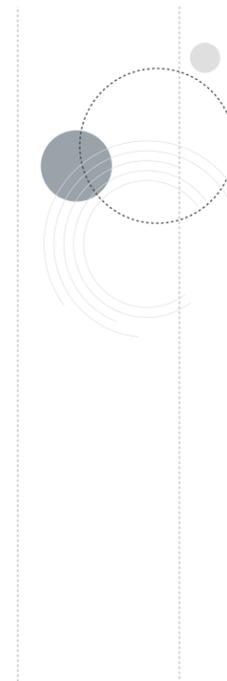
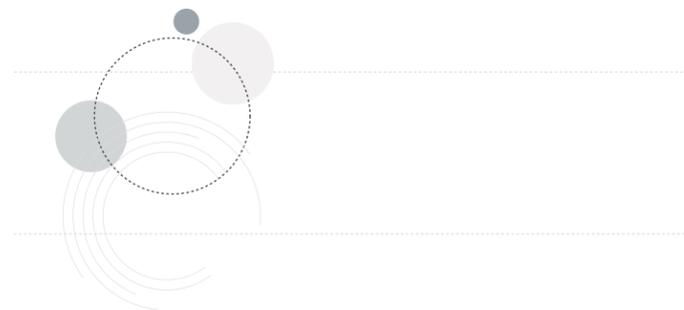
- The Active Circles can live anywhere along the focus window.
- You can have only one Active Circles configuration on the focus window.



DASHED FOCUS WINDOW

Aside from a solid color, the focus window can also be represented as 2 dashed lines that approximate the area a solid bar would normally occupy. Here are some rules to follow when using the dashed focus window:

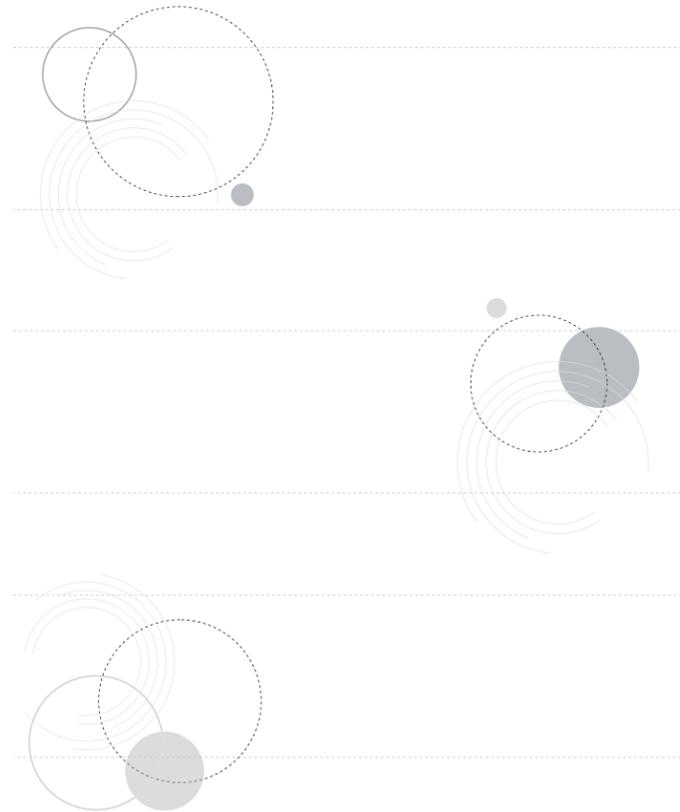
- Always use the outlined concentric circle, never the filled one.
- The weight of the stroke should vary proportionately with the size of the dashed window; it cannot be less than .25pt. It's preferable not to exceed a 1pt stroke for a dashed window unless the design expressly calls for it.
- You may use a 2 pt dash/2 pt gap configuration or a 4 pt dash/4 pt gap configuration.
- Just like the solid focus window, the dashed focus window should not overpower the Active Circle system. To achieve this, it should preferably be in a lighter value.



7.1.4 VARIATIONS

FOCUS WINDOW

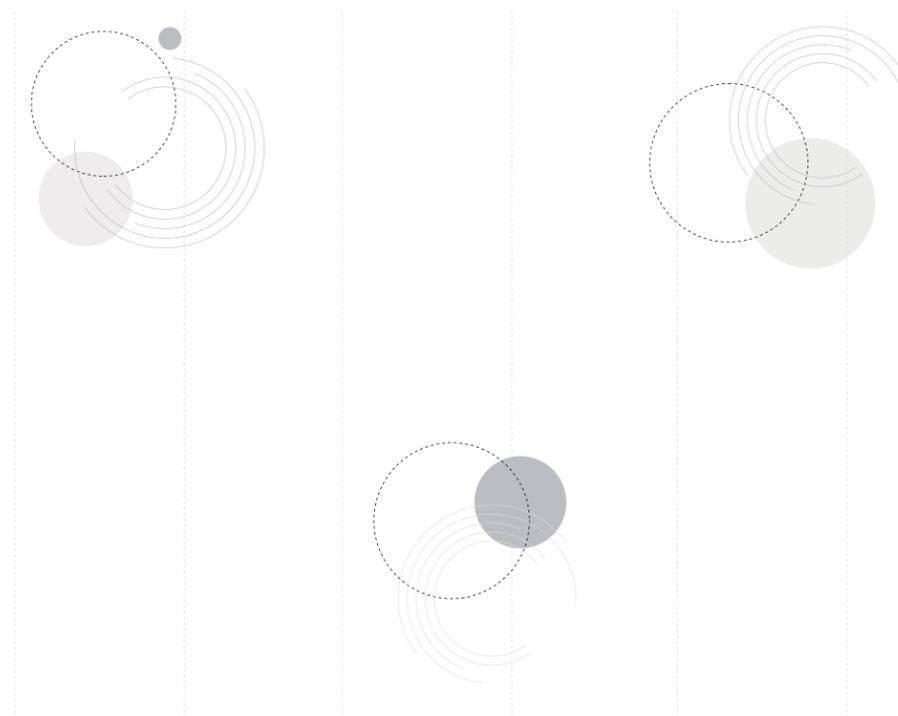
The following exhibits show some variations of the horizontal dashed focus window.



7.1.5 VARIATIONS

FOCUS WINDOW

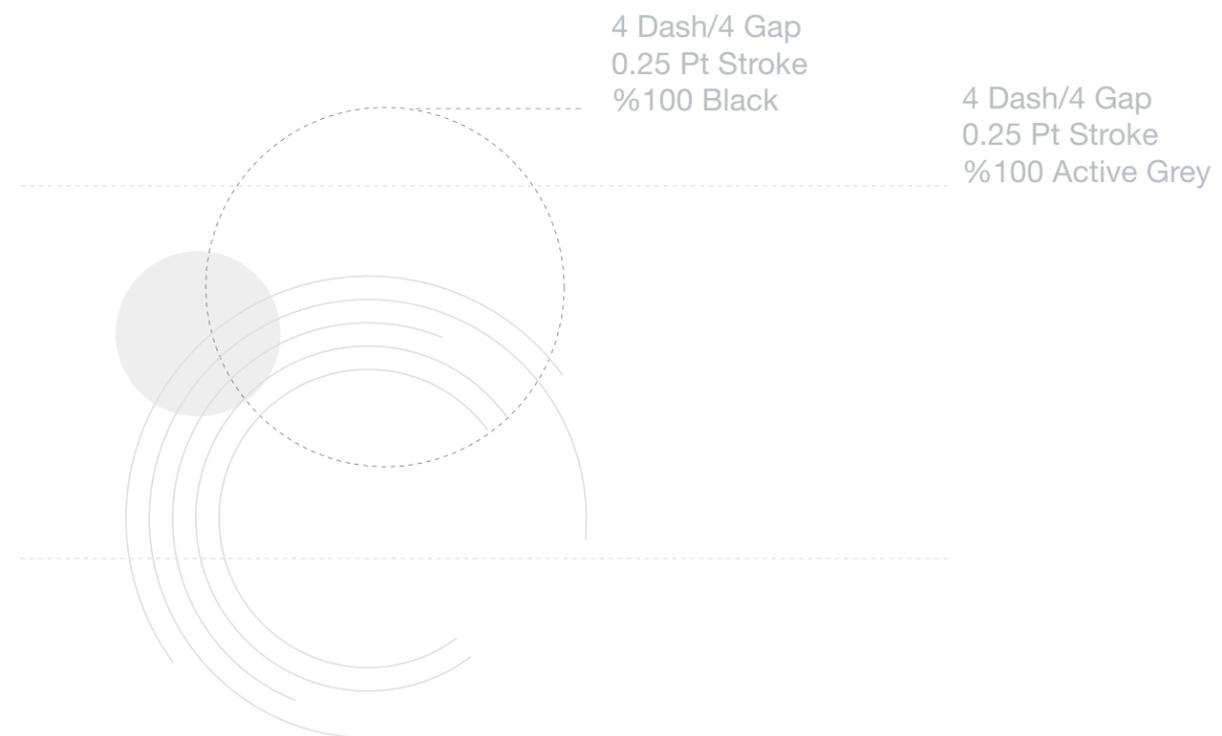
The following exhibits show some variations of the vertical dashed focus window.



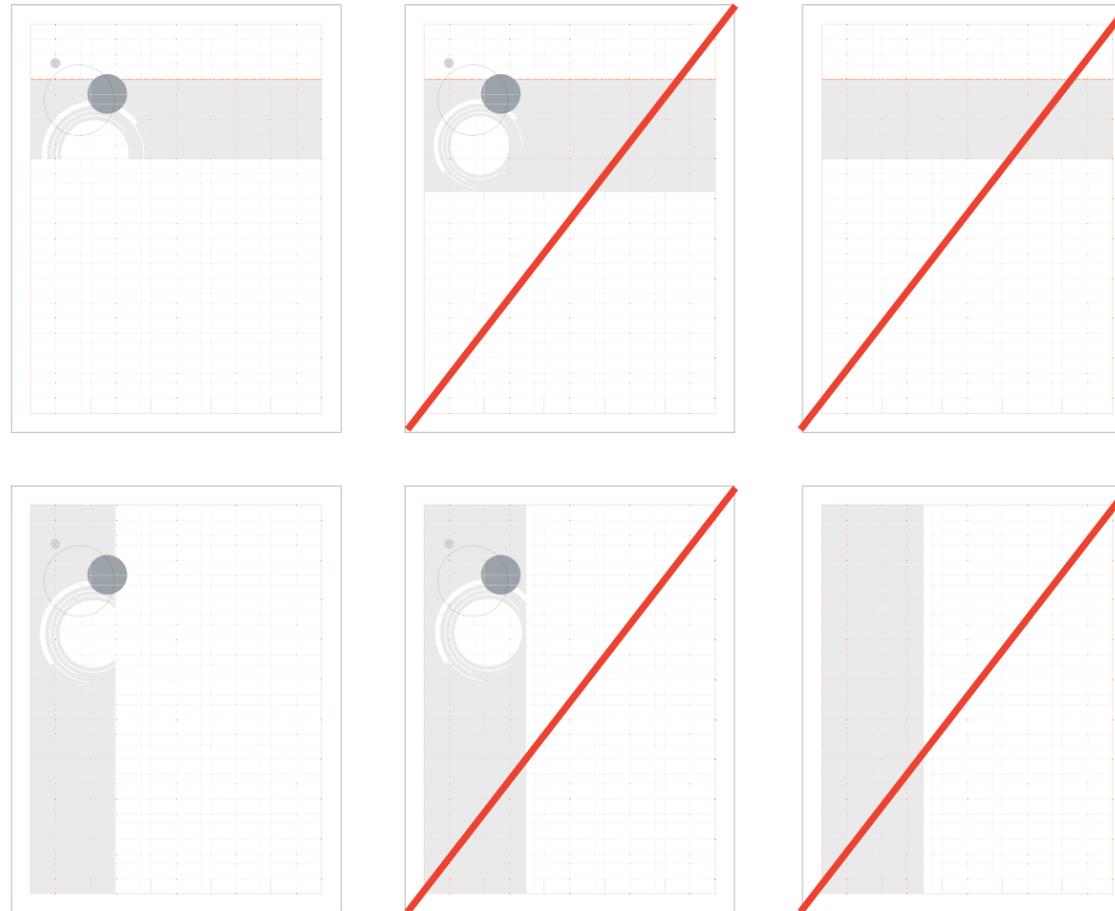
7.2 SPECIFICATIONS

FOCUS WINDOW

The dashed focus window should always be in a lighter value of the color used for the dashed circle. It should also follow the same dash/gap combination as the dashed circle.

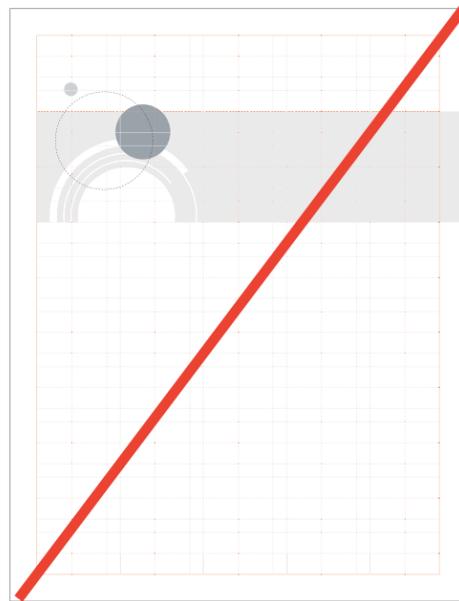


The focus window can be placed on the grid horizontally or vertically. In either case, it should be placed precisely between 2 grid lines. And it should never appear without an Active Circles configuration.

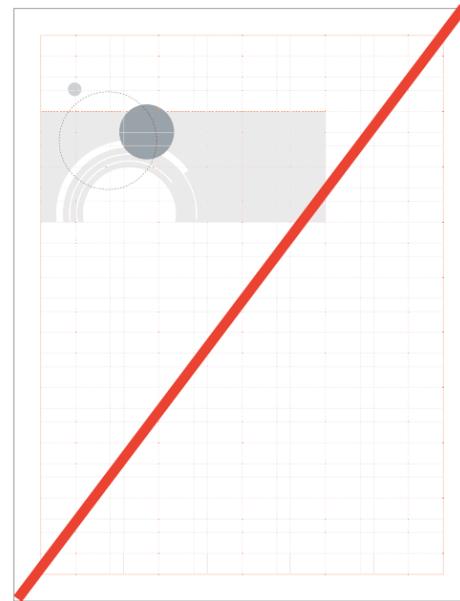


7.4 PLACEMENT — MISUSES

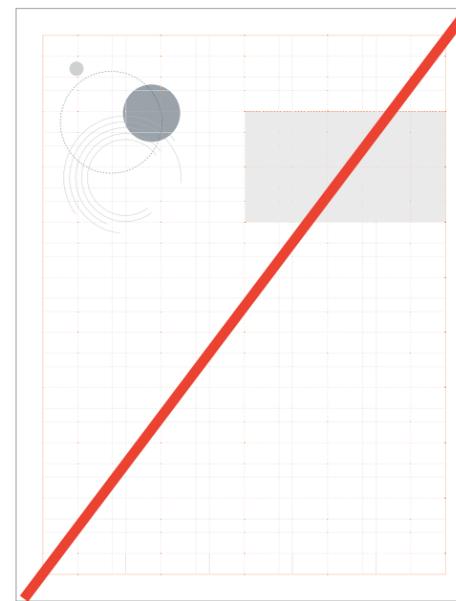
FOCUS WINDOW



Do not intrude into the margin area

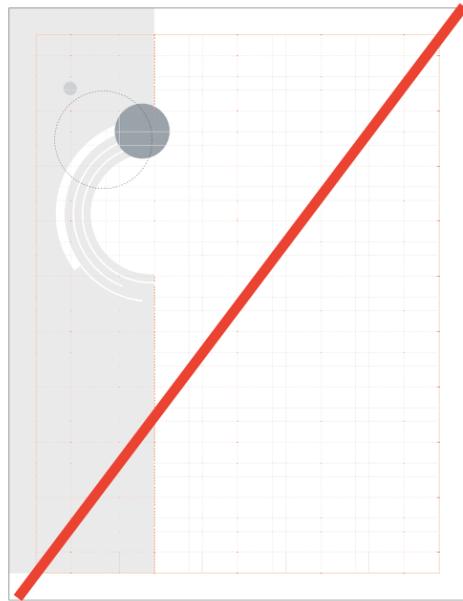


Do not shorten the focus window

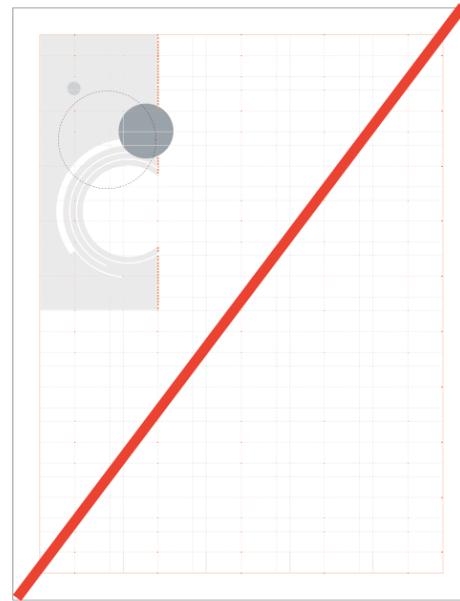


7.4.1 PLACEMENT — MISUSES

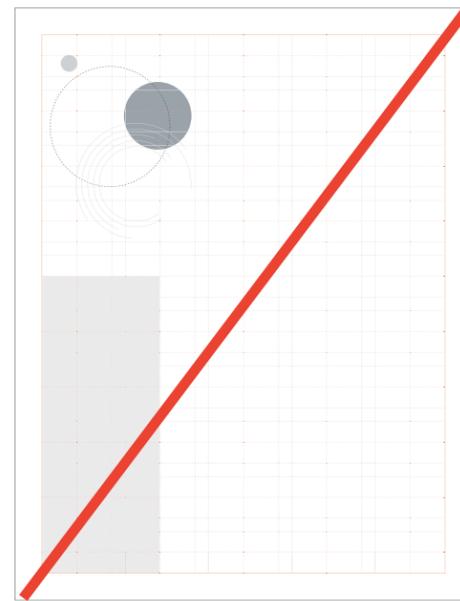
FOCUS WINDOW



Do not intrude into the margin area



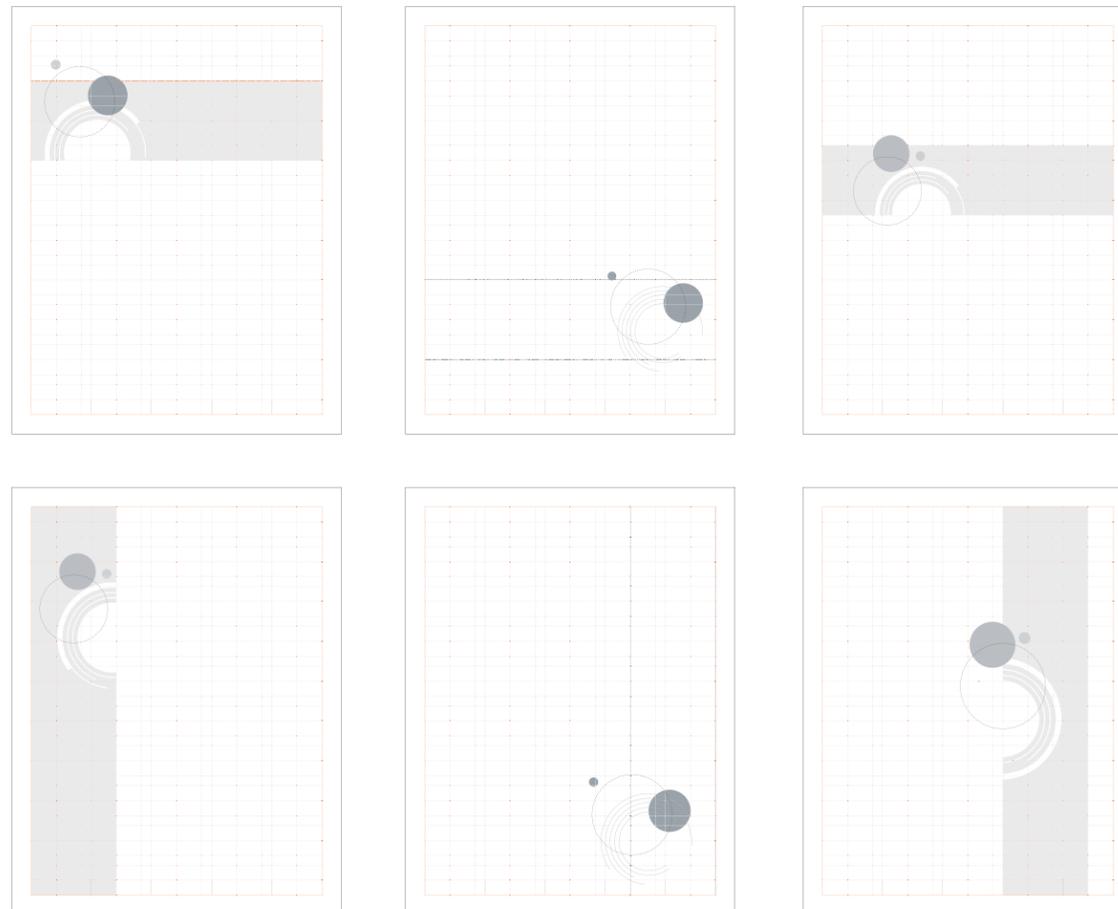
Do not shorten the focus window



7.5 ADDING ACTIVE CIRCLES

FOCUS WINDOW

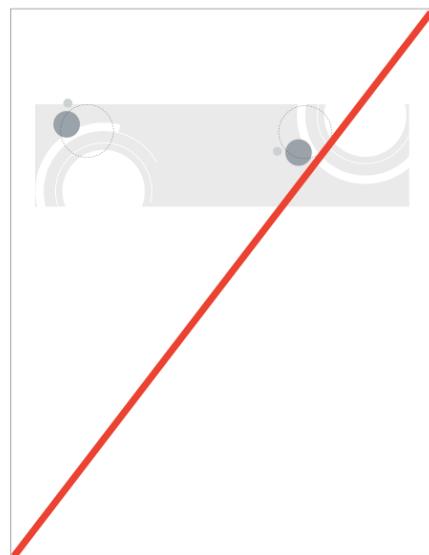
While Active Circles can live anywhere on the grid, in most cases it is preferable to add the configuration to a filled or dashed focus window. Note that the layout cannot accept more than one Active Circles configuration.



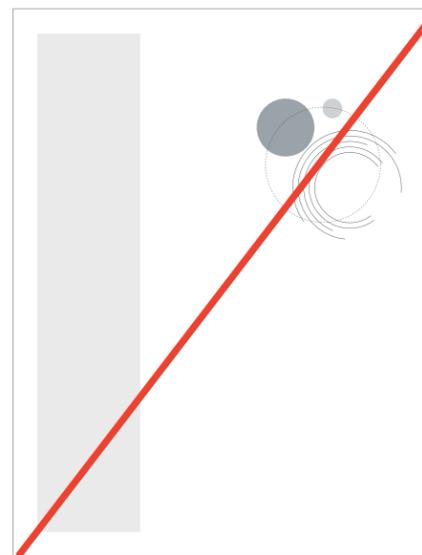
7.5.1 ADDING ACTIVE CIRCLES — MISUSES

FOCUS WINDOW

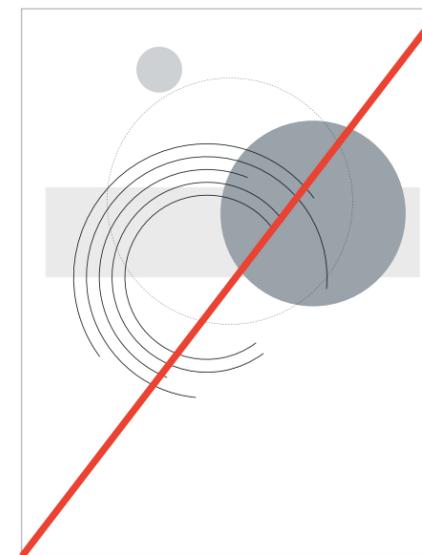
Here are some examples of incorrect placement of Active Circles.



Do not add more than one configuration



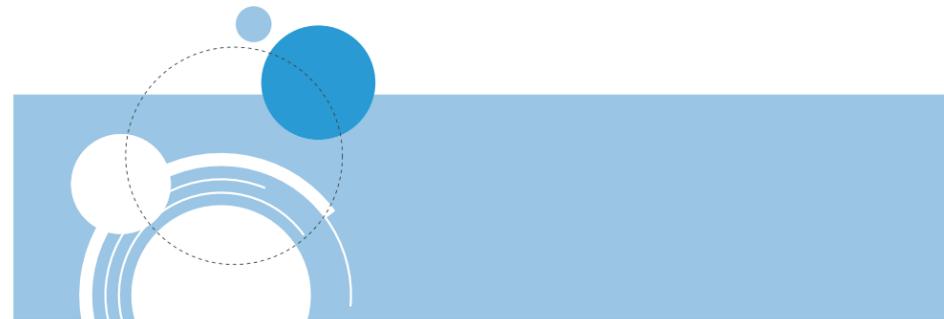
Do not separate the Active Circles from the Focus Window



Do not add a configuration that is not proportionate

Here are some rules to follow when adding color to the focus window:

- Make sure the focus window and the visual system are always in the same unified color scheme.
- It's always preferable to color the focus window using a percentage rather than a 100% value.
- Filled circles on top of the focus window should always be in a different value than the focus window—even if they're in the same color.



7.6.1 COLORS

FOCUS WINDOW

The following exhibits show how to use a percentage value of a color in the focus window.



7.6.2 COLORS

FOCUS WINDOW

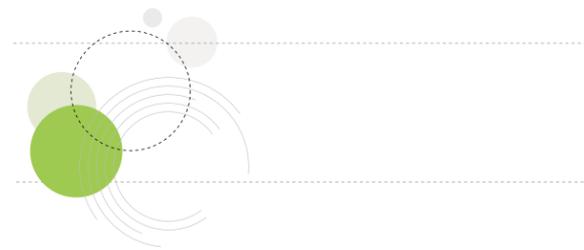
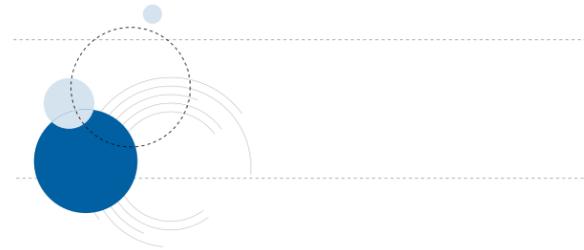
Notice how a solid color in the focus window can be very powerful and dominant. For this reason, a solid color should be used only when your layout is very simple and uncluttered. It can also be used for specific applications like signage where the goal is to attract attention.



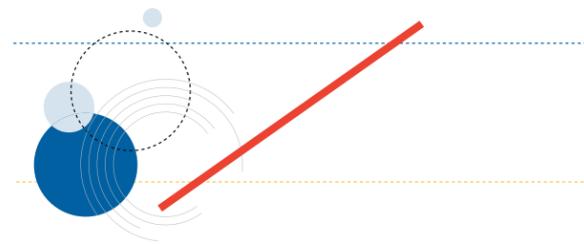
7.6.3 COLORS

FOCUS WINDOW

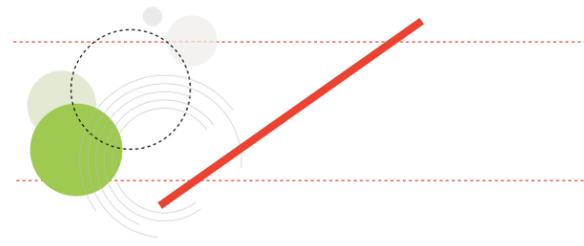
The following examples show a color configuration on a dashed focus window. The dashed focus window itself can also be in a color. It should always be in a 100% value and can be black, gray or the active color applied in the visual system.



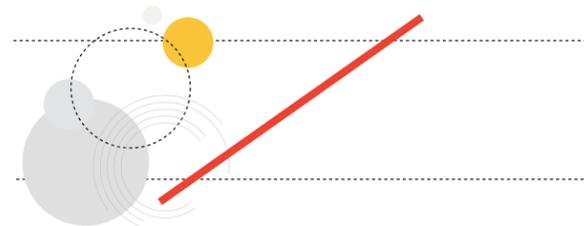
The following examples show a color configuration on a dashed focus window. The dashed focus window itself can also be in a color. It should always be in a 100% value and can be black, gray or the active color applied in the visual system.



Do not use 2 different colors for the dashed focus window



Do not use a different color than the Active Circles



Do not use the same value as the dashed circle

Aside from the circle elements, the focus window may also be used to deposit imagery as shown here. Note that images may not be used in the focus window and the circle elements at the same time.



7.8.1 IMAGES

FOCUS WINDOW

Here are some examples of how you can use imagery in the focus window. Notice how it all works with the Active Circle visual system as one cohesive unit.



7.8.2 IMAGES

FOCUS WINDOW

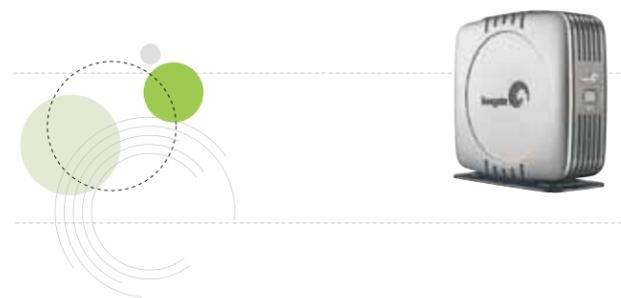
The vertical focus window may also be used to hold imagery, as shown here.



7.8.3 IMAGES

FOCUS WINDOW

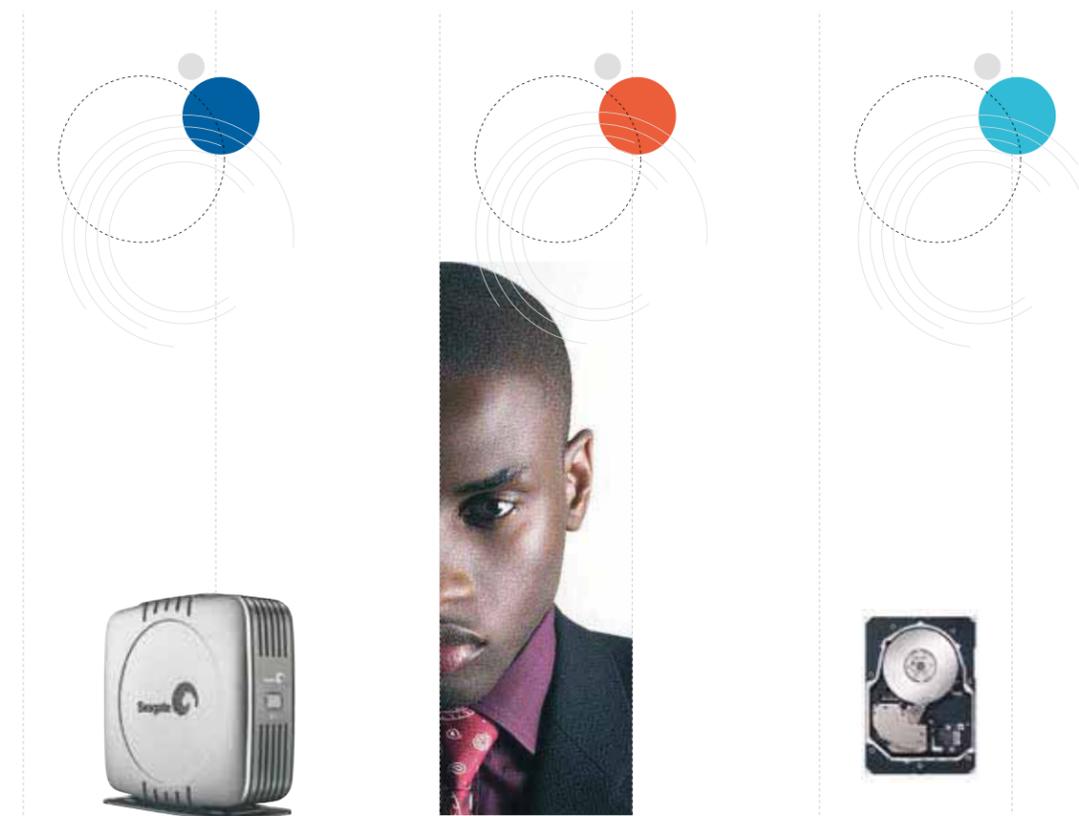
These examples show how images can live in the dashed focus window. Note that you cannot use a full bleed image with a dashed focus window—the image would obstruct the dashes. A product shot would be a good fit here, as well as images with a white or simpler background.



7.8.4 IMAGES

FOCUS WINDOW

Here we see how images can live in the vertical dashed focus window. As with the horizontal version, you cannot use a full bleed image with a vertical dashed focus window. Use a product shot, or an image with a white or simpler background.

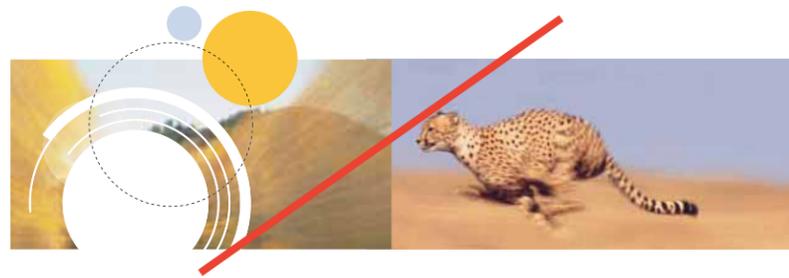


7.9 IMAGES—MISUSES

FOCUS WINDOW



Do not use images in both the focus window and the Active Circles



Do not use 2 images in the focus window



Do not use an image and a color fill at the same time

8.0 SEAGATE COLLATERAL

- 8.1 Data sheets
- 8.2 Product Overviews
- 8.3 Case Studies
- 8.4 White Papers

Our collateral pieces deliver key information about our products, services and technologies to a variety of audiences all over the world. For this reason, each piece must communicate clearly and concisely while maintaining a consistent look, feel and quality.

There are four standard deliverables, each of which conveys distinct information to our customers: Data Sheets, Product Overview, Case Studies and White Papers. The following examples show how our visual system can live within the collateral architecture.



8.1 DATA SHEETS

SEAGATE COLLATERAL

Focused on specifications with some brief marketing information on benefits.



Data Sheet

CHEETAH 15K.4

Mainstream Enterprise Disc Drive Storage

146, 73 and 36 Gbytes • 15K RPM
Ultra320 SCSI, 2 Gb/s FC and SAS

Key Advantages

- Highest performance 15K Enterprise disc drive ever offered by Seagate delivering maximum IOPS with fewer drives
- The price-per-performance value with the new SAS interface make a rock solid drive for enterprise storage
- Proactive, self-initiated background management functions improve media integrity, increase drive efficiency, reduce incidence of integration failures and improve field reliability
- Shared design architecture and firmware with Cheetah 10K.7 and Savvio drives to insure greater factory consistency with reduced time to market



Best-Fit Applications

- Information management/ data warehousing and mining
- Data access- intensive applications
- Storage Area Networks
- Network Attached Storage
- Internet and e-commerce





CHEETAH 15K.4

Mainstream Enterprise Disc Drive Storage

The Seagate® 3D Defense System™—No One Does More to Protect Your Drives

Drive Defense

- SeaShell™ packaging provides more than 1,000 Gs shock protection during handling, reducing returns up to 70 percent.

Data Defense

- Seagate Advanced Multidrive System™ (SAMS) reduces effects of rotational vibration generated by drives operating simultaneously.

Diagnostic Defense

- SeaTools (available in Desktop or Enterprise editions)—this disc diagnostic utility prevents the expense and inconvenience of returning healthy drives.

World-Class Technical Support

- Certified, experienced support staff
- Rated "Above Average to Excellent" by 95 percent of our customers
- Support lines with the shortest wait times in the industry
- Individually archived case histories for quick reference
- Web-based Q&A forum and autoreply e-mail

www.seagate.com
1-800-732-4283 (1-800-SEAGATE)

Specifications	146.8 GB ¹	73.4 GB ¹	36.7 GB ¹
Model Number	ST146848BLFCPS	ST73448BLFCPS	ST36748BLFCPS
Capacity			
Formatted 512 Kbytes/Sector (Mbytes)	146.8	73.4	36.7
Interface	Ultra320 SCSI	Ultra320 SCSI	Ultra320 SCSI
External Transfer Rate (Mbytes/sec)	300	300	300
Interface			
External Transfer Rate (Mbytes/sec)	2.0Gbit/sec FC	2.0Gbit/sec FC	2.0Gbit/sec FC
Interface	SAS	SAS	SAS
External Transfer Rate (Mbytes/sec)	300	300	300
Performance			
Spindle Speed (RPM)	15K	15K	15K
Average Latency (msec)	2.0	2.0	2.0
Seek Time			
Average Read/Write (msec)	3.2/3.0	3.2/3.0	3.2/3.0
Track-to-Track Read/Write (msec)	0.4/0.05	0.4/0.05	0.4/0.05
Transfer Rate			
Internal (Mbytes/sec)	40/16,000	40/16,000	40/16,000
Internal Formatted (Mbytes/sec)	38/16,101	38/16,101	38/16,101
Sustained (Mbytes/sec)	96	96	96
Cache, Multiplatform (Mbytes)	8	8	8
Construction/Organizations			
Discs	4	2	1
Media			
Nonrecoverable Read Errors per Bits Read	1 sector per 10 ¹⁷	1 sector per 10 ¹⁷	1 sector per 10 ¹⁷
MTBF (hours, AFR)	1,400,000 @ 0.4%	1,400,000 @ 0.4%	1,400,000 @ 0.4%
Power Management			
Typical (no jumps) +12V/-5V SCSI	1.25/0.60	0.93/0.60	0.80/0.60
Files Channel	1.01/0.60	0.80/0.60	0.68/0.60
Power Idle (watts) SCSI	10.75	8.40	8.00
Files Channel	13.06	11.44	1.88
Environmental			
Temperature, Operating (°C)	5/40	5/40	5/40
Temperature, Nonoperating (°C)	-40/70	-40/70	-40/70
Shock, Operating, 2 msec (Gs)	20	20	20
Shock, Nonoperating, 2 msec (Gs)	275	275	275
Vibration, 100 Hz (msd—random power)	1.8	1.8	1.8
Vibration, Operating, <400 Hz (Gs)	1.0	1.0	1.0
Vibration, Nonoperating, <400 Hz (Gs)	3.0	3.0	3.0
Physical			
Height (inches)	1.87/1.4	1.87/1.4	1.87/1.4
Width (inches)	4.0/10.4	4.0/10.4	4.0/10.4
Depth (inches)	3.5/1.94/1.88	3.5/1.94/1.88	3.5/1.94/1.88
Weight (lb/kg)	1.5/0.771	1.5/0.771	1.5/0.771
Warranty			
Limited Warranty (years)	5	5	5

¹ 11 Mbytes = 1,000,000 bytes. For additional details, go to cheetah.seagate.com.

CORPORATE HEADQUARTERS: Seagate Technology LLC, 325 Deer Creek, Santa Valley, California 95068, United States 916-438-0200
 ASIA/PACIFIC: Seagate Technology (Thailand) Ltd., 101 Linnang Chaen, New Tech Park 9/06-07, Singapore 306741, 65-6488-7000
 EUROPE, MIDDLE EAST AND AFRICA: Seagate Technology SA, 62 bis, avenue André Morizot, 92043 Boulogne-Billancourt Cedex, France 33 1 41 88 10 50
 © 2006 Seagate Technology LLC. All rights reserved. Printed in USA. Seagate, Seagate Technology and the Seagate logo are registered trademarks or trademarks of Seagate Technology LLC. Other product names are registered trademarks or trademarks of their owners. Seagate reserves the right to change, without notice, product offerings or specifications. (DS-177) Publication Number: 1533-001, August 2006

Focused on marketing benefits with some brief specifications information.



Product Overview

CHEETAH 15K.4
Mainstream Enterprise Disc Drive Storage

146, 73 and 36 Gbytes • 15K RPM
Ultra320 SCSI, 2 Gb/s FC and SAS

Key Advantages

- Highest performance 15K Enterprise disc drive ever offered by Seagate delivering maximum IOPS with fewer drives
- The price-per-performance value with the new SAS interface make a rock solid drive for enterprise storage
- Proactive, self-initiated background management functions improve media integrity, increase drive efficiency, reduce incidence of integration failures and improve field reliability
- Shared design architecture and firmware with Cheetah 10K.7 and Savvio drives to insure greater factory consistency with reduced time to market

Best-Fit Applications

- Information management/ data warehousing and mining
- Data access- intensive applications
- Storage Area Networks
- Network Attached Storage
- Internet and e-commerce





CHEETAH 15K.4
Mainstream Enterprise Disc Drive Storage

Product Description

The new Cheetah 15K.4 enterprise disc drive offers an unprecedented blend of high performance and cost effectiveness. Seagate has dramatically improved Cheetah speed by delivering seek times as fast as 3.3 msec, latencies as low as 2 msec and an increase in data rates of up to 30 percent over the previous generation. This enables the Cheetah 15K.4 to meet throughput requirements under highly demanding conditions with fewer drives, significantly lowering TCO. And the Cheetah 15K.4 achieves these performance gains while maintaining the same power, shock and acoustic characteristics of its 15K.3 predecessor.

Applications

Environments where reliability and I/O performance are paramount, including:

- E-mail
- Online transaction processing (OLTP)
- Enterprise, Internet and e-commerce servers
- Database server applications, data warehousing and mining
- Storage area networks (SAN) and supercomputers
- Multi-user multimedia, digital A/V and image processing
- Graphics and medical imaging, scientific workstations

Enabling New Opportunities

- Cheetah 15K.4 drives are leading storage solutions into greater performance/value parity with today's dynamic, on-demand enterprise systems.
- Cheetah 15K.4 drives offer lasting value, enabling systems to keep up with growing performance needs over a longer period of time.
- Storage Performance Council (SPC) testing, which includes e-mails in its workloads, verifies the cost efficiency of Cheetah 15K drives. SPC test results rank servers equipped with Cheetah 15K drives above the majority of all servers tested. (All top SPC price/performance servers used 15K drives.)

The Seagate Advantage

- The Cheetah 15K.4 is the lowest cost-per-performance disc drive from Seagate, benefiting from the team experience acquired over four generations of Cheetah 15K-RPM products.
- The Cheetah 15K.4 delivers 30 percent more IOPS and 20 percent faster response times than 3.5-inch 10K drives.
- Cheetah 15K.4 enables higher performance with fewer drives, and fewer drives mean lower total cost of ownership.

Specifications

Capacity (Gbytes)	146, 73, 36
Seek Time, Read/Write (average, msec)	3.3/3.3
Transfer Rate, Sustained (Mbytes/sec)	59 to 80
MTBF, Full Duty Cycle (hours)	1.4 million
Power Consumption (W, Idle)	6.85 to 11.84
Interface	Ultra320 SCSI
Warranty (years)	5

www.seagate.com
1-800-732-4283 (1-800-SEAGATE)

CORPORATE HEADQUARTERS: Seagate Technology LLC, 325 Deer Creek, San Jose, California 95068, United States 408-426-5000
ASIA/PACIFIC: Seagate Technology International Ltd., 101 Luning Chan, New Tech Park 936-05, Singapore 656171, 65-6488-7000
EUROPE, MIDDLE EAST AND AFRICA: Seagate Technology SA, 62 rue, avenue André Moreau, 92043 Boulogne-Billancourt Cedex, France 33-1-41 86 10 00

© 2006 Seagate Technology LLC. All rights reserved. Printed in USA. Seagate, Seagate Technology and the Seagate logo are registered trademarks or trademarks of Seagate Technology LLC. Other product names are registered trademarks or trademarks of their owners. Seagate reserves the right to change, without notice, product offerings or specifications. (DS-177) Publication Number: 1533-001, August 2006

Real life stories of how a Seagate customer or partner benefited from using our products.




CASE STUDY

EVERYONE'S WIRELESS

EVERYONE'S WIRELESS USES THE SEAGATE® BARRACUDA® 7200.8 To Consolidate Storage and Increase Efficiencies

Everyone's Wireless preferred not to compare a variety of vendors when it needed to design the storage solution for an unusual client application. The clear choice was 400-Gbyte Barracuda® 7200.8 hard disc drive from Seagate® Technology. Everyone's Wireless is using the Barracuda in a server that drives a variety of service offerings to travelers on Illinois toll roads, and continues to capitalize on new business opportunities where dependable, high-capacity storage solutions matter to clients.

Company
Everyone's Wireless

Location
Milpitas, California

Contact
www.everyoneswireless.com

Primary Focus
Serial ATA (SATA) and Parallel ATA (PATA) storage solutions; worldwide leader in SATA RAID now looking to expand into enterprise class solutions




Making A Roadside Service Infrastructure More Efficient and Reliable

Because of the company's breadth of expertise in challenging scenarios, customers often call on Everyone's Wireless with their more difficult or unusual requirements. One such customer was Connexus, a company that is the exclusive provider of digital connectivity on the Illinois State Toll Highway Authority's tollway system. At Tollway Oases, travelers can avail themselves of a variety of services, including high-speed WiFi Internet access, digital photo processing and music downloads, and voice and video conferencing. They can obtain emergency office supplies, sit at ergonomically designed workspaces and use Ethernet ports to connect to the Internet. Connexus will soon add even more services to its portfolio, such as virtual Web conferencing. Travelers access Connexus' services through standardized workstations, which belong to the company's network.

Connexus wanted to centralize and streamline its network infrastructure for the Tollway Oasis services, and also ensure that the variety of applications would remain available to customers even if a server's drive were to fail. Everyone's Wireless designed and implemented a cost-effective, high-performance server for Connexus.

Thomas Tinsley, Business Development Manager at Everyone's Wireless, explains, "We used virtualization software from VMware to consolidate a half-dozen servers with multiple applications and operating systems into one single, fully redundant server. In doing so, we eliminated multiple points of failure that were present under the previous configuration."

Delivering High Client Value with the Barracuda

"There was no need to shop around," says Tinsley. "My personal experience with Seagate gives me ample proof that they offer innovative,

reliable products and back them up with an excellent warranty policy and a responsive service organization. In my ten years of providing technology solutions to a wide spectrum of business clients, Seagate has the best track record for consistent high quality and strong support for its resellers." The 400-Gbyte Barracuda 7200.8 provides extensive storage capability at a competitive, reasonable cost. The drive's Serial ATA (SATA) interface facilitates fast and dependable drive performance. And Seagate's five-year warranty gives Everyone's Wireless and its customers the assurance that the drives are viable for the long term.

"The return on investment [ROI] for our client is very high, even if you consider cost efficiency alone," says Tinsley. "They invest in a single server and virtualization software, and they can consolidate half a dozen or more individual servers.

The dependability for the customer using the workstation by the toll road to access the services is much improved and, over time, it is very likely that the revenue generated through the service workstations rises." The return on investment [ROI] for our client is very high, even if you consider cost efficiency alone," says Tinsley. "They invest in a single server and virtualization software, and they can consolidate half a dozen or more individual servers. The dependability for the customer using the workstation by the toll road to access the services is much improved and, over time, it is very likely that the revenue generated through the service workstations rises."

To Learn More:
Everyone's Wireless
Visit their Web site at www.everyoneswireless.com

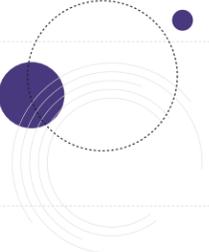
Get the Most From SAS
Seagate® maximizes the value of every SAS investment by delivering a comprehensive family of disc drives purpose-built to leverage the full gamut of SAS strengths (superior throughput, compatibility with SATA, enormous scalability). The flagship of Seagate's SAS range is the 3.5-inch Chertah® 15K.4 disc drive, specifically engineered for maximum performance in demanding, high-availability applications. Chertah 15K.4 ensures you get all the SAS speed you paid for.
To learn more about Seagate Chertah 15K.4 drives, go to www.seagate.com/products/ds0family/chertah.

CORPORATE HEADQUARTERS
ANAHEIM, CA
EUROPE, MIDDLE EAST AND AFRICA

Seagate Technology LLC, 325 Ohio Drive, Sunnyvale, California 95088, United States 811-438-6200
Seagate Technology International Ltd., 101 Lonsing Street, New York Park 920-02, Singapore 656741, 65-6488-7000
Seagate Technology SA, 62 rue, avenue André Morlot, 92043 Boulogne-Billancourt Cedex, France 33 1 41 86 10 00

© 2006 Seagate Technology LLC. All rights reserved. Printed in USA. Seagate, Seagate Technology and the Seagate logo are registered trademarks or trademarks of Seagate Technology LLC. Other product names are registered trademarks or trademarks of their owners. Seagate reserves the right to change, without notice, product offerings or specifications. (DS-177) Publication Number: 1533-001, August 2002

Technology papers focused on educating the industry and validating our innovations to our partners.

Technology Paper

147-GBYTE CHEETAH 10K.6 VS. 147-GBYTE HITACHI DK32EJ (Four-disc vs. Five-disc)

Company
Everyone's Wireless

Location
Milpitas, California

Contact
www.everyoneswireless.com

Primary Focus
Serial ATA (SATA) and Parallel ATA (PATA) storage solutions; worldwide leader in SATA RAID now looking to expand into enterprise class solutions

Hitachi Whopper
Hitachi claims that their DK32EJ 147 Gbyte is a more reliable, higher performing product than Cheetah® 10K.6 because their drive uses five discs (with lower AD) to reach 147 Gbytes versus Cheetah 10K.6 use of four discs (with higher AD) to reach 147 Gbytes.

Hitachi Claims Lack Density
Hitachi disc drives—past, present and future—lack beneficial areal density (Gbit/in²) improvements used by drive manufacturers as follows: to reduce the number of platters required by a drive to reach a certain capacity, to increase internal data rate performance, and to improve disc drive reliability.

Seagate® on the other hand, leads the industry in demonstrating and leveraging areal density improvements to build disc drives that offer high capacity, high performance and leading reliability with the fewest disc platters possible.

The market has proved that Hitachi claims are false; moreover, the market has decided that four-disc, low-profile designs from Seagate are better than five-disc designs from Hitachi.

The Cheetah 73LP was the first Seagate four-disc, low-profile drive. Over five million units of Cheetah 73LP have been shipped for a greater than 50 percent 10K market share.

Four Discs Are More Than Five Discs
Four disc designs with fewer parts are flat-out more reliable than five discs. Cheetah four-disc, low-profile designs translate into important performance, power, acoustics and reliability advantages over Hitachi five-disc products. (Seagate SeaShell® provides greater than 1,000 Gs nonoperating shock).



147-GBYTE CHEETAH 10K.6 VS. 147-GBYTE HITACHI DK32EJ (Four-disc vs. Five-disc)



Cheetah Windfall
One less disc required to reach the same capacity in the same low profile footprint enables a Cheetah design to incorporate the following features not found on Hitachi five-disc designs.

- Added space between disc platters for inertial damper rings reduces rotational vibration.
- Added space also translates into more reliable head-stack "merge" assembly operations.
- Fewer disc platters minimize NRRO (non-repeatable run-out) due to wind turbulence.
- Stiffer actuator arms allow higher quality translation modes during reading and writing of data.

More Advantages for Areal Density Leadership
A quick comparison of Cheetah 73LP and Hitachi DK32 DJ performance using Iometer and Winbench 99 further proves that areal density leadership has more advantages over lagging areal density implementations from Hitachi.

Combining an internal data rate of 671 Mbits/sec and a 5.1-msec seek time, Cheetah 73LP outperforms Hitachi DK32 DJ in all categories, and on average, is 22 percent better than the Hitachi five-disc product.

Cheetah 73LP Performance Increase Over Hitachi Five-Disc Product
The new Cheetah 10K.6 is specified at 841 Mbits/sec (a 170-Mbits/sec gain over Cheetah 73LP) and a seek time of 4.7 msec (a 4-msec reduction over Cheetah 73LP). The new Hitachi DK32EJ is specified at 799 Mbits/sec and a seek time of 4.9 msec (the same access time as older Hitachi DK32 DJ). Consequently, future Iometer and Winbench 99 comparison tests of the Cheetah 10K.6 and Hitachi DK32 E.J. will prove Cheetah 10K.6 performance superiority over the Hitachi five-disc product, especially so since Cheetah

10K.6 read access time is better than Hitachi DK32 E.J.

Desperate Marketing
Hitachi claims that their DK32EJ 147 Gbyte is a more reliable, higher-performing product than Cheetah 10K.6 because their drive uses five discs (with lower AD) to reach 147 Gbytes versus the Cheetah 10K.6 use of four discs (with higher AD) to reach 147 Gbytes.

We call it a last-ditch marketing move to distract customers from the real benefits of areal density leadership and associated four-disc, low-profile designs that Hitachi is incapable of delivering to customers. Frankly, Seagate has been conservative in terms of commercializing areal density improvements relative to what we have been able to demonstrate. The Cheetah 10K.6 areal density is 36 Gbits/in². Seagate demonstrated 101 Gbits/in² in November 2001.

Use Hitachi's actions as a reason to proactively meet with your customers and prospects to discuss the four-disc Cheetah 10K.6 advantage, and make the competition eat their misleading words.

Cheetah 73LP	Hitachi 73LP
147 Gbytes Capacity	147 Gbytes Capacity
4.6/5.2 Seek Time, R/W	4.6/5.0 Seek Time, R/W
84.1 Mbytes/sec Transfer Rate	69.1 Mbytes/sec Transfer Rate
1.4 million bytes MTBF	1.0 million bytes MTBF
Ultra320 SCSI Interface	Ultra320 SCSI Interface
5-Year Warranty	2-Year Warranty

Performance Comparison of the Cheetah 73LP vs. Hitachi 73LP

CORPORATE HEADQUARTERS
450 WASHINGTON
EUROPE, MIDDLE EAST AND AFRICA Seagate Technology LLC, 320 Deer Creek, San Jose, California 95068, United States 408-438-6200
Seagate Technology International Ltd., 101 Lincolns Drive, New York, New York 10017-4900, Singapore 656741, 65-6488-7000
Seagate Technology SA, 62 rue, Avenue André Maréchal, 92043 Boulogne-Billancourt Cedex, France 33-1-41 86 10 00

© 2006 Seagate Technology LLC. All rights reserved. Printed in USA. Seagate, Seagate Technology and the Seagate logo are registered trademarks or trademarks of Seagate Technology LLC. Other product names are registered trademarks or trademarks of their owners. Seagate reserves the right to change, without notice, product offerings or specifications. (DS-177) Publication Number: 1533-001, August 2002

