

Which HDV format is better to shoot in? 720p or 1080i?

Both will be with a 16:9 widescreen aspect ratio.

720p refers to a frame comprising a 1280x720 pixel grid, with the full frame "progressively" filled in each frame. There is no interlacing or half-frames used. The frame rate can vary and this must be taken into account, but common 720p frame rates are 24fps, 30fps, and 60fps. A true 24fps is like "film" (provided the resolution is high enough). Since each frame is "full" (and not interlaced), motion artifacts are minimized and can be dealt with. Also, because each frame is a full frame, Pausing or freezing the video or even taking a snapshot/still will look very good.

1080i indicates a frame composed of 1920x1080 pixels, usually at 60 interlaced frames per second. This means that there are actually 30 full complete 1920x1080 frames per second made up of two half-frames each 1/60th of a second. The half frames alternate between the even numbered horizontal lines and the odd lines. Upon viewing, the two half-frames are seen as a whole entire frame, although they differ in time by 1/60th of a second.

Which is better? At first glance, the 1080i has a higher resolution and should be capable of showing more picture detail. The "interlaced" trick has been used to good success from the legacy NTSC and PAL video "SD" (Standard Definition) systems. Today, bandwidth isn't as limited as it was in the 1950s, but interlacing does allow the available bandwidth to be used for more video data (finer details and more resolution).

However, because the interlaced half-frames differ in time by 1/60sec, subjects moving rapidly will appear doubled or blurry if one "froze" the video as when hitting Pause (or taking a screen snapshot). When viewed normally, high speed motion will still appear to be very smooth and rest of the scene will be with high detail due to the high resolution.

Making a screen shot/still will be better with progressive. But how many times do we do that? After all we WANT "moving recordings" and these are video cameras, not still cameras!

Note that conversion between 1080i and 720p is possible, but not exact and often introduces artifacts, particularly when high speed motion of the subject is involved. Also, since the overall resolution of 1080i is higher, one will either lose some "real video information" or have to interpolate and "create more information without more video detail".

For this very reason different "TV" stations broadcast in different formats of HDTV (where available). Sports oriented stations will tend to use 720p (1280x720/60p) while other stations use 1080i (1920x1080/60i) which conveys more information and is better suited when the original source was from film or made for film.

Common HD viewing devices can limit you as well - for example, a display with a native WXGA 1280x768 will not display a 1080i video in full resolution but downconvert (and possibly create more artifacts) to reduce the 1080i's 1920x1080 to 1280x768.

Therefore, it is important to remember that you often are only judging the results of your choice based upon what you see (and the limits of the output display device you are using). A recording made in 1080i may not display in full resolution on all of the HDTV displays today, but will still have the higher resolution and can play back even better on the currently very top-end and tomorrow's 1920x1080 display devices.

In summary, 720p recording may hold the edge if you are recording sporting events or where there is a lot of high-speed motion and you want to later Pause and examine, step through frames, extract still snapshots, or do slow motion analysis. This is particularly true if a full 60p frames per second can be done, and less so if only 30p is available. A recording done at 1280x720/60p with 60 full frames per second recorded will allow very nice frame-by-frame examination of the video.

720p (30p or 60p) can also be converted easily to 24fps "film look".

For the highest resolution, 1080i can't be beat today and that high 1920x1080 resolution of the video is superior for "vistas" and general recording (with movement and motion) where critical examination of each frame via slow motion or stills will not be a priority. Overall, for "regular viewing", the 1080i video will look better. A film source can be displayed quite nicely in 1080i, but conversion of a recording in 1080i to "film look" is a little more difficult.

No matter which HDV format one uses though, the results are far superior to DV of today and the legacy NTSC and PAL video systems of yesterday!