

For hybrid files (files containing both xref tables and cross-reference streams), the xref table's trailer dictionary contains the key `/XRefStm` whose value is the byte offset to a cross-reference stream that supplements the xref table. A PDF 1.5-compliant application should read the xref table first. Then it should replace any object that it has already seen with any defined in the xref stream. Then it should follow any `/Prev` pointer in the original xref table's trailer dictionary. The specification is not clear about what should be done, if anything, with a `/Prev` pointer in the xref stream referenced by an xref table. The **QPDF** class ignores it, which is probably reasonable since, if this case were to appear for any sensible PDF file, the previous xref table would probably have a corresponding `/XRefStm` pointer of its own. For example, if a hybrid file were appended, the appended section would have its own xref table and `/XRefStm`. The appended xref table would point to the previous xref table which would point the `/XRefStm`, meaning that the new `/XRefStm` doesn't have to point to it.

Since xref streams must be read very early, they may not be encrypted, and they may not contain indirect objects for keys required to read them, which are these:

- `/Type`: value `/XRef`
- `/Size`: value `n+1`: where `n` is highest object number (same as `/Size` in the trailer dictionary)
- `/Index` (optional): value `[n count ...]` used to determine which objects' information is stored in this stream. The default is `[0 /Size]`.
- `/Prev`: value `offset`: byte offset of previous xref stream (same as `/Prev` in the trailer dictionary)
- `/W [...]`: sizes of each field in the xref table

The other fields in the xref stream, which may be indirect if desired, are the union of those from the xref table's trailer dictionary.

9.2.1. Cross-Reference Stream Data

The stream data is binary and encoded in big-endian byte order. Entries are concatenated, and each entry has a length equal to the total of the entries in `/W` above. Each entry consists of one or more fields, the first of which is the type of the field. The number of bytes for each field is given by `/W` above. A 0 in `/W` indicates that the field is omitted and has the default value. The default value for the field type is "1". All other default values are "0".

PDF 1.5 has three field types:

- 0: for free objects. Format: 0 `obj next-generation`, same as the free table in a traditional cross-reference table
- 1: regular non-compressed object. Format: 1 `offset generation`
- 2: for objects in object streams. Format: 2 `object-stream-number index`, the number of object stream containing the object and the index within the object stream of the object.

It seems standard to have the first entry in the table be 0 0 0 instead of 0 0 `ffff` if there are no deleted objects.

9.3. Implications for Linearized Files

For linearized files, the linearization dictionary, document catalog, and page objects may not be contained in object streams.

Objects stored within object streams are given the highest range of object numbers within the main and first-page cross-reference sections.

It is okay to use cross-reference streams in place of regular xref tables. There are no special considerations.