# 60.003 BACKUP DEVICE

**Approval Date: 20 May 1998** **Version: 1**

## Introduction

In order to safeguard collected field data, processing results, reports and documents, in each office the HIS related computers should have access to a backup device. In this context, the term backup implies that next to the data original a duplicate of that data is kept on a separate data carrier, e.g. diskette, hard disk or CD-R. Depending upon required reliability, performance and data amounts various backup technologies are available.

If data amounts are limited, it is most practical to set apart a segment of an independent slave PC's hard disk for backup purposes. The slave PC can be used for any purpose except for elaboration of the backup data. Some discipline may be needed to observe the latter. Diskettes are not regarded as reliable backup media. To back up larger amounts of data, more advanced schemes are required.

Data storage technology migrates towards random accessible media like HDU, CD-R (CD recordable), CD-RW (CD Re-Writable), PD (phase difference) and MO (magneto optical) re-writable media, in particular for storage capacities up to several Gbytes. The CD-R media may also be used for archiving and distribution purposes as virtually all CD-ROM readers in the market support CD-R reading. The PD and MO technologies are easy to use, much like a hard disk, but are not compatible with CD-ROM technology. Presently PD/MO capacities up to several Gbytes are available. MO has the potential to become the choice backup medium in the near future. It is recommended to avoid tapes as these have a poor access performance and require maintenance regularly.

During the next one or two years, data production and accumulated data volumes are expected to be limited to such extend that random accessible media, as now commercially available, are quite adequate for backup purposes.

## Purpose

The backup device will be used to record spare copies of computer files for backup, archiving and data exchange purposes.

## Conditions & Requirements

- The backup device shall be of such a design that it operates reliably under the prevailing environmental conditions as encountered in the field, on board and in office.
- The backup device shall be rugged and shock resistant.
- The backup device shall be easy to operate and maintain.
- The backup device shall be supplied with the accessories as needed for effective use.
- All supply and signal cables required to effectively use the backup device shall be part of the delivery.
- Adequate and sturdy power supply devices as required for operation from mains and car battery power shall be part of the delivery.
- The backup device shall have an expected technical lifetime of not less than 5 years.
- The backup media shall have an expected lifetime of more than 20 years.
- The backup device shall be capable to operate without any servicing.
- The backup device, its interface and software shall be compatible with the field and office PCs and allow for reliable and un-interrupted recording.
- An operator's manual, related to the type and model of the backup device, shall be part of the delivery.

## Specifications

**Software specification**
In order to optimise the data storage efficiency, software should be implemented for file selection, data compression and reporting purposes. The software at least should support:

- manual file selection
- automatic file selection based on file inclusion and exclusion parameters, folder inclusion/exclusion
- file age limiting, i.e. files of older age may be ignored
- full and incremental backup support
- standard data compression technology
- error monitoring, control and recovery
- reporting functions

A choice out off two backup solutions is recommended:

1. **CD-R/CD-RW**
   Most cost effective is the CD-R/CD-RW technology. The CD-R media can be recorded one-time only and are compatible with virtually all CD-readers currently in use. CD-R technology may also be used for archiving purposes. It should be noted that CD-R needs some matching of the PC hardware and software, moreover, it requires careful use. The CD-RW disks can be read by most of the latest (fast) CD-ROM reader models but not by older models.

2. **Removable Hard Disk Unit**
   Removable hard disk has a high performance and is very easy to use. An advanced implementation of this approach is RAID technology. RAID provides continuous on-line backup but is rather costly and should not be used for normal hydrological applications.

Backup of large amounts of data on HDU is more costly than on CD-R/CD-RW. HDU is not recommended for archiving purposes. The main advantages of the HDU technology are speed and ease of use.

**Backup device specifications**
**Solution 1 (HDU)**
Solution 1 is recommended for each HIS office. At least one HDU device should be available to service all HIS related computers and data.

- removable Hard Disk Unit (HDU)
- capacity 2.5 Gbyte or more
- hot pluggable drive bay
- enclosure for HDU matching the drive bay

**Solution 2 (CD-R/RW)**
Solution 2 is recommended for each Data Processing Centre. At least one CD-R/RW device should be available to service all HIS related computers and data. Solution 2 may be an addition to a Solution 1 implementation. The HDU is used for online backup and the CD-R/RW for offline backup and archiving purposes.

- CD recorder supporting CD-R and CD-RW media
- SCSI or EIDE interfaces on CD-recorder and HDU
- effective software for file selection and to control the data 'burning' on the CD
- the PC's HDU should have a capacity of at least 1.5 Gbyte
- HDU, CR-recorder, interfaces and software should be matching and allow for reliable and interruption free recording of the data

## Specifications (CD-R/RW)

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| **speed** | ≥2X |
| **media** | CD-R and CD-RW |
| **interface** | EPP / ECP, bi-directional |
| **housing** | external, portable |
| **power supply** | 220 VAC ±25%; 47 to 53 Hz (in office)<br>11 to 18 VDC or wider |
| **operating temperature** | 10 to 45ºC |
| **humidity** | 10 to 80% |