Standard for Forest Data and Communication

Appendix: Definitions of variables
- General and country specific

Version (last update) 2012-04-18

Group of variables: Finland

Var#	Name	Type	Definition
5	MACHINE	5	Special variable used by Finnish Apteri-software. Name and version of program or software application used for creating apt-file from oai- and ap1-files. Program is some other than the one in the bucking computer itself, normally program of the forest company or some commercial software product.
23	SITEINFO	1	The following codes from the Solmu private forest planning system are only to be used as default codes in Finland (minutes from 2007-11-29) Code Kuvaus (Descriptions in Finnish) 1 ylispuiden poisto 2 Ensiharvennus 3 harvennus (muu kuin ensiharvennus) 4 Kaistalehakkuu 5 Avohakkuu 6 Verhopuuhakkuu 7 Suojuspuuhakkuu 8 Siemenpuuhakkuu 9 erikoishakkuu (määrittelemätön) 91 erikoishakkuu: myrskytuhojen korjuu 92 erikoishakkuu: tie-, oja-, sähkö- tai muun linjan aukaisu 93 erikoishakkuu: tonttipuuston hakkuu 94 erikoishakkuu: energiapuun korjuu (hakkuutähteiden korjuun kaikki työlajit, ml. kannonnosto) 95 erikoishakkuu: muu erikoishakkuu (esim. tuhopuiden poisto, harsintatyyppinen hakkuu tai metsänomistajien omien puiden valikoiva hakkuu) 96 erikoishakkuu: nuoren metsän kunnostushakkuu, taimikon perkaus, raivaus
121	ASSTDESCR	4	Special variable used by Finnish Apteri-software. .
191	SPECLIST	7	The codes used in var191_t7 (only in ap1-files) are described below: Code Description (Var162 Change price matrix, %; Var191 SPECLIST; Var190 MAXLOG) 1 No adjustments to var162, var191 or var190 carried out (default if variable not included). 0 Not desired/low priority. The value of this cell in price matrix (var155 BASEPRICE) is lowered by the percentage value given in settings of Apteri software. Var191_t4 and var190 are set to 0. (20; 0; 0) -1 Forbidden to buck. The value of this cell in price matrix (var155 BASEPRICE) is lowered by the percentage value given in settings of Apteri software or price is set fixed to 0. Var191_t4 is set to 0. Var190 is set to -1. (90 or 100; 0; -1 (forbidden to buck the log even manually)) -2 Only bucking manually allowed. The value of this cell in price matrix (var155 BASEPRICE) is lowered by the percentage value given in settings of the Apteri software or price is set fixed to e.g. 20 or 2. Var191_t4 is set to 0. Var190 is set to -3. (99; 0; -3 (only logs bucked manually allowed)) -4 Not desired/low priority. The value of this cell in price matrix (var155 BASEPRICE) is lowered by the percentage value given in settings of the Apteri software. Var191_t4 and var190 is set to 0. (15; 0; 0) -5 see previous (10; 0; 0) The exact levels of decreasing the price in var162 are set in the harvester Apteri.

Group of variables: General

Var#	Name	Type	Definition
1	FILETYPE	3	ISO 4 7-bits English ISO 11 7-bits Swedish ISO 21 7-bits German ISO 69 7-bits French ISO 8859-1 8-bits Latin alphabet no 1 ISO 8859-2 8-bits Latin alphabet no 2 ISO 8859-5 8-bits Latin/cyrillic alphabet ISO-2022-JP Japanese encoding with variable size typically using either 8 or 16 bits per character (Double Byte Character Set)
2	ID	1	Swedish interface name: Apt-identitet
3	MCHNNO	1	Swedish interface name: Tillverkningsnr
3	MCHNNO	2	Swedish interface name: Maskinnr, uppdragsgivare
3	MCHNNO	3	Swedish interface name: Maskintyp
5	VARIANT	1	Swedish interface name: Version apt.-program
5	VARIANT	2	Swedish interface name: Version adm-program
5	VARIANT	3	A list describing codes will be compiled by CC-systems and ESE-technique Swedish interface name: Version apt.-program enl adm-program

Group of variables: General

Var#	Name	Type	Definition
6	NATION	1	Examples of country codes Country Code Australia036 Brasil076 Chile152 Denmark208 Estonia233 Finland246 France250 Irland372 Italy380 Canada124 Croatia191 Germany276 Latvia428 Luxemburg442 Norway578 New Zeeland554 Poland616 Portugal620 Rumenia642 Russia643 Switzerland756 Serbia688 Slovakia703 Slovenia705 Span724 GB826 Sweden752 South Africa710 Tjech Republic203 Ukraine804 USA840 Austria040
21	SITENO	1	Swedish interface name: Objektnr Finnish interface name: Leimikon tunnistetiedot
21	SITENO	2	Swedish interface name: Del-objektnr Finnish interface name: Leimikon numero
21	SITENO	3	Swedish interface name: Var21_t3 Finnish interface name: Lohkon numero
21	SITENO	4	Swedish interface name: Var21_t4 Finnish interface name: Kuvion numero
21	SITENO	5	Swedish interface name: Certifierad Finnish interface name: Sertifiointi
31	ORG	1	Swedish interface name: Organisation Finnish interface name: Organisaatiotiedot

Group of variables: General

Var#	Name	Type	Definition
31	ORG	2	Swedish interface name: Förvaltning Finnish interface name: Alue
31	ORG	3	Swedish interface name: Distrikt Finnish interface name: Piiri
31	ORG	4	Swedish interface name: Arbetslag Finnish interface name: Tiimi / Vastuualue
31	ORG	5	Swedish interface name: Var31_t5 Finnish interface name: Varasto
32	BUYER	1	Swedish interface name: Köpare Finnish interface name: Ostaja
32	BUYER	2	Swedish interface name: Mottagningsplats Finnish interface name: Toimituspaikka
33	VENDOR	1	Swedish interface name: Säljare Finnish interface name: Myyjä
33	VENDOR	2	Finnish interface name: Myyjätunnus
33	VENDOR	3	Finnish interface name: Myyjän nimi
33	VENDOR	4	Finnish interface name: Myyjän osoite
33	VENDOR	5	Finnish interface name: Myyjän sähköposti
33	VENDOR	6	Finnish interface name: Myyjän puhelin- ja faxnumerot
34	SUBCON	1	Finnish interface name: Yrittäjä
34	SUBCON	2	Swedish interface name: ID avverkningsföretag Finnish interface name: Yrittäjätunnus
34	SUBCON	3	Swedish interface name: Namn avverkningsföretag Finnish interface name: Yrittäjän nimi
34	SUBCON	4	Swedish interface name: Adress avverkningsföretag Finnish interface name: Yrittäjän osoite
34	SUBCON	5	Swedish interface name: E-post avverkningsföretag Finnish interface name: Yrittäjän sähköposti

Group of variables: General

Var#	Name	Type	Definition
34	SUBCON	6	Swedish interface name: Tele/fax avverkningsföretag Finnish interface name: Yrittäjän puhelin- ja faxnumerot
35	CONTRACTNO	1	Swedish interface name: Storvirkesordernr Finnish interface name: Sopimusnumero
35	CONTRACTNO	2	Viol-code Swedish interface name: Virkesordernr
47	CORRLNGTH	1	The correction/adjustment registered in var47_t1 should be the value for that exact position, it should in other words be independent of whether an interval, regression or other type of calibration is carried.
49	CORRDIA	1	The correction/adjustment registered in var49_t1 should be the value for that exact position, it should in other words be independent of whether an interval, regression or other type of calibration is carried.

Group of variables: General

Var#	Name	Type	Definition
113	BARKPAR	7	Descriptions of codes for bark functions: 1) Bark function developed by Zacco (1974). Linear function: Double bark thickness = a + b * top diameter ob where a is stored as the first parameter in var113_t1 and b as the second parameter. For example: "Bark= 3,28+0,0370*diam" is stored as "113 1 328 370~" in a StanForD file. 2) Bark function based on diameterclasses with fixed bark deductions (double), based on German requirements. Exempel: Bark deduction, mm Lower diameter ob, mm 30 <=320 20 >320 <=200 10 >200 <=0 is stored as "112 2 3~113 2 320 200 0~113 3 3000 2000 1000~" 3) Function developed by Skogforsk (2004) for Scots pine (Pinus Sylvestris) dbh_b=min(dbh,590) /* DBH maximum 590 mm. */ htg=-ln(0.12/(72.1814+0.0789*dbh_b-0.9868*lat))/(0.0078557- 0.0000132*dbh_b) /* Break point in cm calculated */ db=3.5808+0.0109*dbh_b+(72.1814+0.0789*dbh_b-0.9868*lat)* exp(-(0.0078557-0.0000132*dbh_b)*h) /* Double bark thickness below break point calculated, mm */ if h>htg then db=3.5808+0.0109*dbh_b+0.12-0.005*(h-htg) /* Double barkthickness above break point calculated, mm */ db=max(db, 2) /* Bark thickness minimum 2 mm */ 4) Function developed by Skogforsk (2004) for Norway spruce(Picea abies) db=0.46146+0.01386*dbh+0.03571*dia /* Double bark thickness calculated, mm */ db=max(db, 2) /* Bark thickness minimum 2 mm */ Db = double bark thickness (mm) H = height from butt end of stem where bark thickness is to be calculated (cm) Dbh = breast height diameter (mm) Dia = diameter on bark where bark thickness is to be calculated (mm) Lat = latitude (decimal degrees).
121	ASSTDESCR	2	Viol-code Swedish interface name: Sortimentskod

Group of variables: General

Var#	Name	Type	Definition
161	PRICECAT	1	The price categories are used for calculating the price of the individual log as well as for how to register the results of the production. This dual purpose is somewhat complicated in some cases, for example category 3 and 11. Where not stated differently the diameter is measured in mm and length in cm. Where not stated differently price is due to small-end diameter (mm). The "name of the category" (see below) is to be used for presentation. Description of codes: Code 1. Name of category: M3to Price/m3. Volume by small end diameter (SED). Variable 164 defines the exact position where SED is measured. Code 2. Name of category: M3s Price/m3, total solid volume. The total volume of the log using the maximum available number of diameter measurement. However, at least one diameter measurement per dm along the length of the log is used. The average diameter for the present measuring interval is to be used. This unit should be as close to the true volume as possible. Code 3. Name of category: Log Price/log. The volume is measured in m3s (solid volume according to category 2) when registering the production result. Code 4. Name of category: M3sNO Price/m3. Norwegian price category. Volume is calculated based on a cylinder with a theoretical diameter on the middle of the log (M). Length: Length (L) is the total actual length in decimetres. If L is in centimetres it is truncated into decimetres (class bottom). Diameter: By definition a diameter class is 1 cm (independent of the actual price matrix). Registered diameter (T) is measured 10 cm from top. If T is in millimetres it is truncated into centimetres (class bottom). To get the diameter on the middle of the log (M) you use the formula: M = T + (L/2 * 0.1) + 0.5 Example: L = 518 cm, T = 22.3 cm M = 22 + (51/2 * 0.1) + 0.5 = 25.05 cm Volume: Volume is calculated in dm3. PI = 3.14 V = ((M/10)*(M/10)) * PI/4 * L = ((25.05/10)*(25.05/10))*PI/4*51 = 251 dm3 Note: For diameters above 30 cm the diameter class were defined to 2 cm in earlier versions of the definition. This was changed in 1998. Code 5. Name of category: M3tobutt Price/m3. Swedish top and butt end measuring. Measuring the diameters of a log over or under bark at a point 10 cm in from the centre of the top end of the log and 10 cm in from the centre of its thicker end. For a butt log, however, 50 cm in from the centre of the butt end. The volume of a log shall be calculated on the mean value of the length and diameter class. If log diameter is recorded in mm or log length in cm, the volume, however, may be calculated on the rounded down value for diameter or length respectively. By top-butt-measuring the volume is calculated according to the following formula: V = PI/4 * L/100 * [a*(Dr/1000)**2+(1-a)*(Dt/1000)**2] V being the volume of the log in m³, L being the length of the log in centimetres and Dr and Dt butt- and top-diameters in millimetres. The values presented in the following table should be used for constant "a" in the formula: Top diameter (cm) / Length class, cm -349 / 350-449 / 450+ -149: 0.485 / 0.485 / 0.485 150-249: 0.465 / 0.460 / 0.455 250 -: 0.440 / 0.430 / 0.420 Code 6. Name of category: M3toDE Price/m3. German price category.

Var#	Name	Type	Definition

Solid volume, measured at midpoint, price due to small-end diameter, HKS diameter.
Diameter is rounded downwards to the closest lower centimetre.
Example: middia 250-259 mm → HKS 250 mm

Code 7. Name of category: M3miDE
Price/m3. German price category.
Solid volume, measured at midpoint, price due to midpoint diameter, HKS diameter.
Diameter is rounded downwards to the closest lower centimetre.

Code 8. Name of category: M3smimi
Price/m3.
Solid volume, diameter (mm) measured at midpoint for calculating the volume, price due to midpoint diameter (mm).

Code 9. Name of category: Board feet
Price/board feet. American price category.
Not defined in the standard due to the very large number of different calculation methods that exists. It is tfined by each individual user!

Code 10. Name of category: M3sm
Price/m3. Solid volume, diameter (mm) measured at midpoint for calculating the volume, price due to small-end diameter (mm).

Code 11. Name of category: LogNO
Price/log. Norwegian price category
The volume is measured in m3sNO (according to category 4) when registering the production result.

Code 12. Name of category: M3sB

Code 13. Name of category: M3sEST
An Estonian function for calculating log volumes exists. The function is called "Nilsons' formula". The basic idea of this function is to calculate a solid volume based on the top diameter of the log.
The definition of this function is:
V=(D*D*L(a1+a2*L)+a3*L*L)/10000
Where: V = log volume (m3 ub), L = length of log (dm, with at least one decimal), D = top diameter of log, measured under bark (cm, with at least one decimal)
a1, a2 and a3 = conic coefficients are dependent on tree species and stored in var161_t2, var161_t3 and var161_t4.

Conic coefficients normally to be used are:

Tree species	a1	a2	a3
Pine	0,0799	0,000146	0,0411
Spruce	0,07995	0,00016105	0,04948
Hardwood	0,0783	0,000236	0,045

Code 14. Name of category: M3tos
Price/m3. Volume by small end diameter (SED) according to category 1 when registering the production result. Variable 164 defines the exact position where SED is measured.
Price by m3s solid volume as defined according to category 2.

If the price applies to volumes including bark, add 128 to the price-category number, e.g. m3 (solid o.b.) = 130

Group of variables: General

Var#	Name	Type	Definition
170	BUTTDIAM	8	Code 1. DL = [1 + (a0*(1.3-L) + a1*(1.3-L)^a2)/100] * D1.3 where DL = diameter at the distance L from the felling cut point, cm L = distance from the felling cut point, m D1,3 = measured diameter at the height of 1,3 m (reference height) from the felling cut point, cm Models for butt end profile parameters: a0 = a00 + a01*D1.3+a02*D1.3^2 + a03*D1.3^3 + a04*D1.3^4 a1 = a10 + a11*D1.3+a12*D1.3^2 + a13*D1.3^3 a2 = a20 + a21*D1.3+a22*D1.3^2 where D1,3 = min(45; D1,3) The parameters should always be registered in the following order in var 170_t9 to t12: a01, a02, a03, a04, a11, a12, a13, a21, a22 Observe that stems with a DBH above 45 cm should use the relative taper of a stem with DBH 45 cm and stems with a DBH below 8 cm should use the relative taper of a stem with DBH 8 cm..
246	BUNCHEDPRO	1	The net volumes are to represent estimated merchantable log volumes based on previously single processed stems. The exact calculation method for net volumes can be decided by the manufacturers. It is in other words possible to use either the older or the newer calculation methods. Estimation method for total net solid volume of multi tree felled stems 1. Set species and estimate DBH of first cut stem (in multi tree felling). 2. Find the most suitable stem taper prediction curve based on DBH and species. This is to be the same prediction curve that is used for single processed stems. 3. The volume of the stem is calculated based on the taper prediction curve and the distance from stump to the average minimum diameter of previously harvested stems (last cut). 4. Estimate the total net solid volume for the tree bunch by multiplying the number of stems with the volume of the first stem. 5. The net volume calculated by the harvester is registered in var246 (type 1). The net volume will be an estimation of the potential total log volume including unclassified logs. Example The estimated DBH of the first multi tree processed stem is 125 mm. A total of three stems are felled simultaneously. The distance from the stump to the minimum diameter 56 mm is 9.2 m. A taper prediction curve is selected based on DBH and species. The volume is calculated based on the taper curve up to 9.2 m (illustrated in figure below, gray surface represents calculated volume). The estimated volume of the first stem is 0.063 m3sub. The total net solid volume u.b. for a tree bunch is thus 0,189 m3sub (0,063 m3sub*3 trees) in this example.

Group of variables: General

Var#	Name	Type	Definition
246	BUNCHEDPRO	3	The net volumes are to represent estimated merchantable log volumes based on previously single processed stems. Several different methodsare described below. The exact calculation method for net volumes can be decided by the manufacturers. It is in other words possible to use either the older or the newer calculation methods. METHOD 1. Estimation method for total net solid stem volume of stem bunches (prd-file) 1. Estimate DBH of first multi tree harvested stem. 2. Calculate the average stem volume of single processed stems with a DBH as close as possible to the DBH of first multi tree harvested stem. This should be done per species. This function may very well be similar to an adaptive stem (taper) prognosis. 3. Estimate the net solid volume for the tree bunch by multiplying the number of stems with the average stem volume. 4. The net volume calculated by the harvester is registered in var246 (type 3-4 and 6-7). Example The estimated DBH of the first multi tree processed stem is 95 mm. A total of three stems are processed simultaneously. The average measured volume u.b. for single processed stems per DBH-class and species is: DBH-class (cm) Average stem volume , m3sub 8 0,08 9 0,1 10 0,11 11 0,12 Observe that the average stem volume could be based on some kind of interpolation, regression curve or/and adaptive stem volume prognosis rather than a DBH-class table as above. This function may very well be similar to an adaptive stem (taper) prognosis. The total net solid volume u.b. for a tree bunch is 0,3 m3sub (0,1 m3sub*3 trees) in this example. METHOD 2. Estimation method for total net solid stem volume of stem bunches (prd-file) 1. Set species and estimate DBH of first cut stem (in multi tree processing). 2. Find the most suitable stem taper prediction curve based on DBH and species. This is to be the same prediction curve that is used for single processed stems. 3. The volume of the stem is calculated based on the taper prediction curve and the distance of feeding to the last cut. 4. Estimate the total net solid volume for the tree bunch by multiplying the number of stems with the volume of the first stem. 5. The net volume calculated by the harvester is registered in var246 (type 3-4 and 6-7). The net volume will be an estimation of the total log volume including unclassified logs. Example The estimated DBH of the first multi tree processed stem is 125 mm. A total of three stems are processed simultaneously. The distance from the stump to the last cut is 7,2 m. A taper prediction curve is selected based on DBH and species. The volume is calculated based on the taper curve up to 7,2 m. The estimated volume of the first stem is 0.057 m3sub. The total net solid volume u.b. for a tree bunch is thus 0,171 m3sub (0,057 m3sub*3 trees) in this example.
246	BUNCHEDPRO	4	See var246_t3
246	BUNCHEDPRO	6	See var246_t3

Group of variables: General

Var#	Name	Type	Definition
246	BUNCHEDPRO	7	See var246_t3

Group of variables: General

Var#	Name	Type	Definition
256	LOGCODE	1	Log codes describe what kind of data is stored: 1 - Price matrix/assortment number. The number refers to the order of the assortment according to variable 121. Number = 0...n, n = var111 x var116. Assortment no 1 is the assortment that comes directly after the type number in var 121. Observe that no. 0 is used only for logs that do not belong to a certain matrix, that is unclassified logs. 2 - Species number. The number refers to the order of the species in variable 120. Number = 1...n, n = var111. The first species (no 1) is the species that comes directly after the type number in var111. 20 - Unique identification information set automatically in bucking computer. Must be a unique identity / key for a price matrix, never repeated in the same harvester file (pri/prd/stm/apt). Not to be set/changed by operator. (Replaces log code 1 for identifying price matrix.) Same data as in var121_t6. 201 - Diameter top, mm ob. 202 - Diameter top, mm ub. 203 - Diameter mid, mm ob. 204 - Diameter mid, mm ub. 205 - Diameter root, mm ob. 206 - Diameter root, mm ub. 207 - Middle diameter according to HKS measurement, mm ob 208 - Middle diameter according to HKS measurement, mm ub 300 - Forced cross-cut (break) at small end, code according to var300_t1. 301 - Physical length, cm 302 - Length class to which the log is registered, cm. Length classes are defined in var132_t1. Observe that this length is also dependent on var135, type 1, 3 and 5. In case of unclassified logs fixed lengths according to var244 (type 6-8) to be used. 400 - Volume according to Var161. 1400- Volume decimal parts 401 - Volume m3sob. 1401 - Volume m3sob decimal parts. 402 - Volume m3sub. 1402 - Volume m3sub decimal parts. 403 - Volume m3topob. 1403 - Volume m3topob decimal parts. 404 - Volume m3topub. 1404 - Volume m3topub decimal parts. 405 - Volume m3smi ob. 1401 - Volume m3smi ob decimal parts. 406 - Volume m3smi ub. 1401 - Volume m3smi ub decimal parts. 420 - Volume according to Var161 but in dl, not m3. 421 - Volume dl sob. 422 - Volume dl sub. 423 - Volume dl topob. 424 - Volume dl topub. 425 - Volume dl smi ob. 426 - Volume dl smi ub. 500 - Stem number. Unique stem identity to be used for all types of stems (same as var270_t3). Not to be modified by operator. Incremented with each harvested stem. Reset when starting at a new harvesting object. 501 - Log number in stem 1st log =1, 2nd = 2 …and so on … 600 - Number of logs. This code can be used to sum up the assortments, for example pulpwood. This code should normally not be used in Var256, each log is stored individually. Summed assortment must be stored in their own "Var255, Var256, Var257 series" 2000-series - User defined codes, not standardized The following log data must be included in a pri-file: 20, 201, 202, 301, 400 or 420, 401 or 421, 402 or 422, 500, 501

Group of variables: General

Var#	Name	Type	Definition

Group of variables: General

Var#	Name	Type	Definition
256	LOGCODE	3	Log (log bunch) codes in var256_t3 Code Description 1 Price matrix/assortment number. The number refers to the order of the assortment according to variable 121. Number = 0…n, n = var111 x var116. Assortment no 1 is the assortment that comes directly after the type number in var 121. Observe that no. 0 is used only for logs that do not belong to a certain matrix, that is unclassified logs. 20 Unique identification information set automatically in bucking computer. Must be a unique identity / key for a price matrix, never repeated in the same harvester file (pri/prd/stm/apt). Not to be set/changed by operator. (Replaces log code 1 for identifying price matrix.) Same data as in var121_t6. 220 Top diameter of multi tree handled stems (measured as if only one stem is processed), mm ob. 221 Mid diameter of multi tree handled stems (measured as if only one stem is processed), mm ob. 223 Root/butt end diameter of multi tree handled stems (measured as if only one stem is processed), mm ob. 303 Length of a log bunch when multi tree harvesting is used, cm 407 Volume m3sob Volume is based on the total diameter (diameter measured as if only one stem is processed). 1407 Volume m3 sob decimal parts Volume is based on the total diameter (diameter measured as if only one stem is processed). 408 Volume m3sob. Volume of multi tree handled stems as calculated in harvester (definition below). 1408 Volume m3sob decimal parts. Volume of multi tree handled stems as calculated in harvester (definitionbelow). 409 Volume m3sub. Volume of multi tree handled stems as calculated in harvester (definition below). 1409 Volume m3sub decimal parts. Volume of multi tree handled stems as calculated in harvester (definition below). 427 ¬Volume dl sob Volume is based on the total diameter (diameter measured as if only one stem is processed). 428 ¬Volume dl sob. Volume of multi tree handled stems as calculated in harvester (definition below). 429 ¬Volume dl sub. Volume of multi tree handled stems as calculated in harvester (definition below). 510 Processing order (tree bunch number) for multi tree handled stems (same as var270_t4). Incremented with each multi tree processing of stems. Reset when starting at a new harvesting object. Not to be modified by operator. 511 Bunch number in stem, 1st bunch/cut =1, 2nd = 2 etc 2000-series -User defined codes, not standardized The following log data must be included in a pri-file: 220, 301, 407 Or 427, 510, 511 Estimation methods for net volumes of log bunches in pri-file: METHOD1 The net volume of log bunches in pri-files are stored in var256_t3 log code 408, 409, 428, 429. 1. Calculate the gross volume for the stem by summing the gross volumes per log bunch 2. Divide the gross log bunch volume with the total gross stem volume for each log volume in order to calculate the relative log bunch volume 3. Multiply the total net stem volume (defined in var246_t3) with the relative log bunch volume. Example The total net solid volume for a tree bunch is 0,3 m3sub as calculated in previous

example (var246_t3).
Three log bunches were cut when processing this stem bunch. The total gross volume of these bunches are:
Log bunch Gross volume (log code 407 or 427), m3sob Relative log bunch volume
10,447%
20,335%
30,1518%
Total0,85

The resulting net volumes will be:
Log bunchRelative log bunch volumeNet volume (log code 409 or 429) , m3sob
147%0,141 (0,47 * 0,3)
235%0,106 (0,35 * 0,3)
318%0,053 (0,18 * 0,3)
Total100%0,3

METHOD 2
1.Set species and estimate DBH of first cut stem (in multi tree processing).
2.Find the most suitable stem taper prediction curve based on DBH and species. This is to be the same prediction curve that is used for single processed stems.
3.The volume of the logs is calculated based on the taper prediction curve and the distance of feeding to the positions of cutting.
4.Estimate the total net solid volume for each log bunch by multiplying the number of stems with the log volume of the first stem.
5.The net volume calculated by the harvester is registered in var256_t3 (log code 408, 409, 428, 429). The net volume will be an estimation of the total log volume including unclassified logs.

Example
The estimated DBH of the first multi tree processed stem is 125 mm. A total of three stems are processed simultaneously. The distance from the stump to the last cut is 7.2 m. A taper prediction curve is selected based on DBH and species. The volume is calculated based on the taper curve between 0 and 3.3 m for the first log and between 3.3 and 7.2 m for the second log.
Two log bunches were thus cut when processing this stem bunch with three stems. The resulting net volumes will be:
Log bunchEstimated log volume of first stem, m3subLog bunch volume (log code 409 or 429), m3sub
10.0310.093 (0.031 * 3)
20.0260.078 (0.026 * 3)
Total0.0570.171

Group of variables: General

Var#	Name	Type	Definition
266	TREECODE	1	Tree codes describe what kind of data is stored in pri-file: 2 - Species number. The number refers to the order of the species in variable 120. Number = 1...n, n = var111. The first species (no 1) is the species that comes directly after the type number in var111. 500 - Stem number. Unique stem identity to be used for all types of stems (same as var270_t3). Not to be modified by operator. Incremented with each harvested stem. Reset when starting at a new harvesting object. 505 - Adaption of harvesting for retrieving bio energy assortments, in other words whether extraction of logging residues for bio energy purposes is suitable. Codes: 1 = true, 0 = false (observe that this differs from most other boolean variables). 723 - Reference diameter used for predicting DBH in multi tree harvesting. Normally the first measured diameter. The diameter is measured at distance from stump in var266 according to code 724. 724 - Reference diameter height. Height from stump to the reference diameter used for predicting DBH in multi tree harvesting. Normally the first measured diameter. The diameter is registered in var266 code 723. 740 - DBH (on bark) measured at height according to var500_t1, mm 741 - Stem type (Finnish PMP-codes, see Var124 t2) 750 - Operator number. The number refers to the order of the drivers in variable 212, type 1. Number = 1...var211_t2. Operator no. 1 is the operator that comes directly after the type number in Var 212. 760 - Latitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 761 - 1=North, 2=South The code in var522_t2 is valid for all trees if this code is excluded. 762 - Longitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 763 - 1=East, 2=West The code in var522_t4 is valid for all trees if this code is excluded 764 - Altitude, meters above sea level, stored according to var521_t1, var521_t2 and var520_t1. Tree data 760, 762 and 764 must be "-1" when no signal (invalid) is received from the gps 2000-series - User defined codes, not standardized The following tree data must be included in a pri-file: 2, 500, 740

Group of variables: General

Var#	Name	Type	Definition
266	TREECODE	2	Tree (tree bunch) codes in var266_t2 Code Description 3 Species no of first felled stem 505 Adaption of harvesting for retrieving bio energy assortments, in other words whether extraction of logging residues for bio energy purposes is suitable. Codes: 1 = true, 0 = false (observe that this differs from most other boolean variables). 510 Processing order (tree bunch number) for multi tree handled stems (same as var270_t4). Incremented with each multi tree processing of stems. Reset when starting at a new harvesting object. Not to be modified by operator. 512 No of stems processed simultaneously 513 Stem number for previously normally harvested stem (single processed stem), identical with tree code 500 for single processed stems 721 Estimated DBH of first felled stem 723 Reference diameter used for predicting DBH in multi tree harvesting. Normally the first measured diameter. The diameter is measured at distance from stump in var266 according to code 724. 724 Reference diameter height. Height from stump to the reference diameter used for predicting DBH in multi tree harvesting. Normally the first measured diameter. The diameter is registered in var266 code 723 750 Operator number. The number refers to the order of the drivers in variable 212, type 1. Number = 1…var211_t2. Operator no. 1 is the operator that comes directly after the type number in Var 212. 760 Latitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 761 1=North, 2=South The code in var522_t2 is valid for all trees if this code is excluded. 762 Longitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 763 1=East, 2=West The code in var522_t4 is valid for all trees if this code is excluded 764 Altitude, meters above sea level, stored according to var521_t1, ar521_t2 and var520_t1. Tree data 760, 762 and 764 must be "-1" when no signal (invalid) is received from the gps. 2000-series - User defined codes, not standardized The following tree data must be included in a pri-file: 3, 510, 512, 513, 721, 750

Group of variables: General

Var#	Name	Type	Definition
266	TREECODE	3	Tree (tree bunch) codes in var266_t3 Code Description 3 Species no of first felled stem 510 Processing order (tree bunch number) for multi tree felled stems. Incremented with each multi tree felling of stems. Reset when starting at a new harvesting object. Not to be modified by operator. Separate from counter in var266_t2 (code 510). 512 No of stems processed simultaneously 513 Stem number for previously normally harvested stem (single processed stem), identical with tree code 500 for single processed stems 722 Estimated DBH of first felled stem 723 Reference diameter used for predicting DBH in multi tree harvesting. Normally the first measured diameter. The diameter is measured at distance from stump in var266 according to code 724. 724 Reference diameter height. Height from stump to the reference diameter used for predicting DBH in multi tree harvesting. Normally the first measured diameter. The diameter is registered in var266 code 723 730 Predicted merchantable stem volume over bark up to minimum diameter according to available assortments, dl 750 Operator number. The number refers to the order of the drivers in variable 212, type 1. Number = 1…var211_t2. Operator no. 1 is the operator that comes directly after the type number in Var 212. 760 Latitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 761 1=North, 2=South The code in var522_t2 is valid for all trees if this code is excluded. 762 Longitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 763 1=East, 2=West The code in var522_t4 is valid for all trees if this code is excluded 764 Altitude, meters above sea level, stored according to var521_t1, ar521_t2 and var520_t1. Tree data 760, 762 and 764 must be "-1" when no signal (invalid) is received from the gps. 2000-series - User defined codes, not standardized The following tree data must be included in a pri-file: 3, 510, 512, 721, 722, 750 Calculation method for cod 730 The net volumes are to represent estimated merchantable log volumes based on previously single processed stems. The exact calculation method for net volumes can be decided by the manufacturers. It is in other words possible to use either the older or the newer calculation methods. The unit to be used is dl. Estimation method for total net solid volume of multi tree felled stems 1. Set species and estimate DBH of first cut stem (in multi tree felling). 2. Find the most suitable stem taper prediction curve based on DBH and species. This is to be the same prediction curve that is used for single processed stems. 3. The volume of the stem is calculated based on the taper prediction curve and the distance from stump to the average minimum diameter of previously harvested stems (last cut). 4. Estimate the total net solid volume for the tree bunch by multiplying the number of stems with the volume of the first stem. 5. The net volume calculated by the harvester is registered in var246 (type 1). The net volume will be an estimation of the potential total log volume including unclassified logs. Example The estimated DBH of the first multi tree processed stem is 125 mm. A total of three stems are felled simultaneously. The distance from the stump to the minimum diameter 56 mm is 9.2 m. A taper prediction curve is selected based on DBH and species. The volume is calculated based on the taper curve up to 9.2 m (illustrated in figure below, gray surface represents calculated volume). The estimated volume of the first stem is 0.063 m3sub. The total net solid volume u.b. for a tree bunch is thus 0,189 m3sub (0,063

Group of variables: General

Var#	Name	Type	Definition
			m3sub*3 trees) in this example. The estimated volume of the first stem is 0.063 m3sub. The total net solid volume u.b. for a tree bunch is thus 0,189 m3sub (0,063 m3sub*3 trees) in this example.
273	STEMDIA	1	Average values for machine measured (M1) diameters are the values used for bucking optimisation of stems (var273, type 1-4). One of the four variables must therefore always be registered in stm-file independently of measuring technique.
273	STEMDIA	2	See var273_t1
273	STEMDIA	3	See var273_t1
273	STEMDIA	4	See var273_t1
296	PRICEMATR	4	See var161_t1
299	LOGVOL	10	Code 1) Formula for a cylinder to be used when calcualting log volume: Volume = Radius*Radius*Pi*Length. Diameter values are assumed to be midpoint for each "cylinder section". Code 2) Formula for truncated cone to be used when calcualting log volume: Volume = (Pi*Length/3)*(Radius1^2 + Radius1*Radius2 + Radius2^2)). Volume between two diameter values are calculated using this formula. Observe that what calculation method (cut cone versus cylinder) is most suitable can be dependent on how and where the diameters were measured and registered.

Group of variables: General

Var#	Name	Type	Definition
316	RUNTIME	3	Code 3 = Effective work time (E) Time required to perform a specified work element which directly or in directly changes the work object in regard to its form, position or state. E(t) where t is according to var315, type 1. Swedish interface name: Grundtid Code 10/20 = Processing (Mp) Harvester: processing (felling and bucking), Forwarder: loading and unloading Harwarder: processing and loading/unloading Swedish interface name: Upparbetning Code 11/21 = Terrain travel (Md) Harvester: Machine time in terrain, primarily for transport from depot to work place (stand / site / object) Forwarder: Machine time in terrain for transporting logs, excl. Loading and unloading Harwarder: Machine time in terrain, primarily for transport from depot to work place or for transporting logs Swedish interface name: Terräng-körning code 12/22 = Other work (Bo) Other work that is done by machine, for example salvaging / towing other machine, laying out branches on strip roads etc. Swedish interface name: Övrig arbetstid Code 13/23 = Road travel (Bm) Moving machine by it self between different harvesting objects / sites. Preparation before and after moving is included Swedish interface name: Flyttning mellan objekt Code 14/24 =Loading trucks (L) Forest machine loading truck at road side. This means loading whole stems or logs on to trucks. Observe that the sum of times registered according to codes 10, 11, 12 and 13 must be equal to E(t), code 3, and that the sum of times registered according to codes 20, 21, 22 and 23 must be equal to E0, code 2."

Group of variables: General

Var#	Name	Type	Definition
317	IRTIME	3	Code 10 = Repair time (Drep) Repair, adjustments of machine, transportation to repair shop (se also var330) Var317, Swedish interface name: Reparation Code 11 = Waiting for repair time (Drw) Waiting for repairman or spare part, no machine activities Swedish interface name: Väntan reparation Code 12 = Maintenance (Dm) Machine oversight/maintenance according to manufacturer's instruction. Control and calibration of measuring system included Swedish interface name: Skötsel Code 13 = Trailer-transport (Dtr) Moving machine by trailer between harvesting objects / sites. Preparation before and after moving is included. Only time when operator is present (paid work time), e.g. no recording of time at night outside paid working time. Swedish interface name: Trailer-transp. Code 14 = Disturbance (Dd) Disturbances stopping the machine when it otherwise should have been active, e.g. due to machine getting stuck, extreme weather, ordered restrictions of production, visits, pre-harvest planning (se also var330) Swedish interface name: Störning
319	EXTRATIME	3	Code 1 = Lunch/meal break (Um) No machine activities due to meal breaks or other activities not included in the utilised time Swedish interface name: Rast

Group of variables: General

Var#	Name	Type	Definition
330	SPECTIME	3	REPAIR Code = 1101: Carrier - Electrical - Alternator Code = 1102: Carrier - Electrical - Starter Code = 1103: Carrier - Electrical - Battery Code = 1104: Carrier - Electrical - Harnesses Code = 1105: Carrier - Electrical - Electrical connection box Code = 1106: Carrier - Electrical - Instruments Code = 1107: Carrier - Electrical - Working lights Code = 1108: Carrier - Electrical - Controls. Code = 1109: Carrier - Electrical - Sensor(s) Code = 1110: Carrier - Electrical - Solenoide Code = 1111: Carrier - Electrical - Chair equipment Code = 1112: Carrier - Electrical - Communication equipment Code = 1113: Carrier - Electrical - Fire extinguisher Code = 1199: Carrier - Electrical - Miscellaneous Code = 1201: Carrier - Hydr. - Pump Code = 1202: Carrier - Hydr. - Hydrualic motor Code = 1203: Carrier - Hydr. - Hose (pipe) Code = 1204: Carrier - Hydr. - Valves Code = 1205: Carrier - Hydr. - Hydraulic cylinders Code = 1206: Carrier - Hydr. - Controls. Code = 1207: Carrier - Hydr. - Filter Code = 1299: Carrier - Hydr. - Miscellaneous Code = 1301: Carrier - Mech. - Frame Code = 1302: Carrier - Mech. - Hitch, oscillation joint Code = 1303: Carrier - Mech. - Front axle Code = 1304: Carrier - Mech. - Rear axle Code = 1305: Carrier - Mech. - Bogies Code = 1306: Carrier - Mech. - Tracks & chains Code = 1307: Carrier - Mech. - Brake system Code = 1308: Carrier - Mech. - Diesel engine Code = 1309: Carrier - Mech. - Gearbox Code = 1310: Carrier - Mech. - Fuel system Code = 1311: Carrier - Mech. - Cab Code = 1312: Carrier - Mech. - Seat Code = 1313: Carrier - Mech. - Fire extinguisher Code = 1399: Carrier - Mech. - Miscellaneous Code = 1401: Carrier - Air - Compressor Code = 1402: Carrier - Air - Valves Code = 1403: Carrier - Air - Pipes Code = 1404: Carrier - Air - Anti-freeze (coolant) equip. Code = 1499: Carrier - Air - Miscellaneous Code = 2101: Loader/linkage - Electrical - Harnesses Code = 2102: Loader/linkage - Electrical - Controls Code = 2103: Loader/linkage - Electrical - Working lights Code = 2104: Loader/linkage - Electrical - Sensor(s) Code = 2105: Loader/linkage - Electrical - Solenoide Code = 2199: Loader/linkage - Electrical - Miscellaneous Code = 2201: Loader/linkage - Hydr. - Hose (pipe Code = 2202: Loader/linkage - Hydr. - Valves Code = 2203: Loader/linkage - Hydr. - Hydraulic cylinder Code = 2204: Loader/linkage - Hydr. - Motor Code = 2205: Loader/linkage - Hydr. - Rotator Code = 2299: Loader/linkage - Hydr. - Miscellaneous Code = 2301: Loader/linkage - Mech. - Pillar base / slewing device Code = 2302: Loader/linkage - Mech. - Post Code = 2303: Loader/linkage - Mech. - Boom Code = 2304: Loader/linkage - Mech. - Stick Code = 2305: Loader/linkage - Mech. - Telescopic extension

Var#	Name	Type	Definition
			Code = 2306: Loader/linkage - Mech. - Grapple Code = 2307: Loader/linkage - Mech. - Damping linkage Code = 2399: Loader/linkage - Mech. - Miscellaneous Code = 3101: Harvesting head - Electrcal - Harnesses Code = 3102: Harvesting head, - Electrcal - Controls Code = 3103: Harvesting head, - Electrcal - Bucking computer Code = 3104: Harvesting head, - Electrcal - Sensor Code = 3105: Harvesting head, - Electrcal - Solenoide Code = 3199: Harvesting head, - Electrcal - Miscellaneous Code = 3201: Harvesting head, - Hydr. - Pipes (hoses) Code = 3202: Harvesting head, - Hydr. - Valves Code = 3203: Harvesting head, - Hydr. - Hydraulic cylinder Code = 3204: Harvesting head, - Hydr. - Saw motor Code = 3205: Harvesting head, - Hydr. - Feed roller motor Code = 3206: Harvesting head, - Hydr. - Chain tensioner Code = 3299: Harvesting head, - Hydr. - Miscellaneous Code = 3301: Harvesting head, - Mech. - Frame Code = 3302: Harvesting head, - Mech. - Guarding Code = 3303: Harvesting head, - Mech. - Feed roller arms Code = 3304: Harvesting head, - Mech. - Feed roller Code = 3305: Harvesting head, - Mech. - Delimbing knives Code = 3306: Harvesting head, - Mech. - Saw unit Code = 3307: Harvesting head, - Mech. - Chain tensioner Code = 3308: Harvesting head, - Mech. - Chain lubrication Code = 3309: Harvesting head, - Mech. - Measuring devices Code = 3310: Harvesting head, - Mech. - Color marking Code = 3311: Harvesting head, - Mech. - Stump treatment Code = 3399: Harvesting head, - Mech. - Miscellaneous DISTURBANCE Code 1000 = Miscellaneous / other Not define Code 2000 = Administration, telephone For example handling of apt-files, contacts with employer, phone calls, production reporting Code 3000 = Planning/follow up For example pre-harvest planning of site, post harvest assessment of site, reporting of assessment Code 4000 = Machine stuck Machine is stuck (standstill), for example due to wet and soft ground condition Code 5000 = Weather Extreme weather, for example low temperature, resulting in stand still Code 6000 = Ordered stop For example visitors, limitation of production.6000 Code 7000 = Unproductive terrain work. Excessive time spent traveling from pile to pile, cribbing trail, pulling stumps, etc. MAINTENANCE Code 1000 = Other maintenance / miscellaneous Not defined Code 1100 = Control and calibration Control measurement and length/diameter calibration

Var#	Name	Type	Definition
			Code 1200 = Saw maintenance Changing saw chain or saw bar Code 1300 = Refilling and lubrication Lubrication of machine or refilling of fuel/fungicides/colors etc Code 1400 = Preventive maintenance Daily check list, weekly inspection, hoses position, check hydraulic pressure etc. Could in the future be based on notifications from machine condition monitoring system. Code 1500 = Periodic maintenance For example maintenance every 250, 500, 1000, 1500, 2000 and 4000 hours, according to uptime maintenance planner. Code 1600 = Machine wash. Code 1700 = Out of fuel, waiting for refueling. For example used if refueling is dependent on separate service truck.
361	SAMPLE	9	EXAMPLE Minimum log length in this variable is set to 8 m. Log no when operator is notified (var361_t5) is set to 2nd log. Below are four different bucking alternatives and the consequences of the new variable: Example 1. 1st log) 12 m 2nd log) 5 m 3rd log) 3 m. Operator notified when 2nd log is to be cut Example 2. 1st log) 5 m 2nd log) 12 m 3rd log) 3 m. Operator notified when 2nd log is to be cut Example 3. 1st log) 5 m 2nd log) 3 m 3rd log) 12 m. Operator notified when 3rd log is to be cut Example 4. 1st log) 5 m 2nd log) 3 m 3rd log) 3 m 4th log) 6 m. No random control stem
361	SAMPLE	27	EXAMPLE Minimum log length in this variable is set to 8 m. Log no when operator is notified (var361_t5) is set to 2nd log. Below are four different bucking alternatives and the consequences of these settings: Example 1. 1st log) 12 m 2nd log) 5 m 3rd log) 3 m. Operator notified when 2nd log is to be cut Example 2. 1st log) 5 m 2nd log) 12 m 3rd log) 3 m. Operator notified when 2nd log is to be cut Example 3. 1st log) 5 m 2nd log) 3 m 3rd log) 12 m. Operator notified when 3rd log is to be cut Example 4. 1st log) 5 m 2nd log) 3 m 3rd log) 3 m 4th log) 6 m. No random control stem

Group of variables: General

Var#	Name	Type	Definition
446	LOADCODE	1	Load codes 1 - Price matrix/assortment number. The number refers to the order of the assortment according to variable 121. Number = 0...n, n = var111 x var116. Assortment no 1 is the assortment that comes directly after the type number in var 121. Observe that no. 0 is used only for loads that do not belong to a certain matrix, that is unclassified logs 2 - Load number 10 - Transport object number. The number refers to the order of the transport objects according to variable 441. Number = 1...n, n = var440_t1. 20 - Unique identification information set automatically in forwarder computer. Must be a unique identity / key for a price matrix, never repeated in the same forwarder file (prl). Not to be set/changed by operator. (Replaces load code 1 for identifying price matrix.) Same data as in var121_t6. 21 -Unique identification information set automatically in forwarder computer. ID also stored in var441_t12. Must be a unique identity / key for a transport object, never repeated in the same forwarder file (prl). Not to be set/changed by operator. (Replaces load code 10 for identifying transport object). 401 - Volume m3sob. Same data as in var441_t12. 1401 - Volume m3sob decimal parts. 402 - Volume m3sub. 1402 - Volume m3sub decimal parts. 410 - loose volume, m3 411 - solid volume including bark, branches and needles, m3 412 - solid volume of bundles (length*cross sectional area), m 450 - Green/raw masas (kg) 460 - Estimated no of logs 461 - number of bundles 499 - Forwarder's working type when weighting with weight scale is done. Codes: 1 = loading, 2 = unloading. Only used for production reporting and not for weight scale control measurements (var61_t11) 750 - Operator number. The number refers to the order of the drivers in variable 212, type 1. Number = 1...var211_t2. Operator no. 1 is the operator that comes directly after the type number in Var 212. 760 - Latitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 761 - 1=North, 2=South The code in var522_t2 is valid for all trees if this code is excluded. 762 - Longitude, integer as 0.00001 degrees, stored according to var521_t1, var521_t2 and var520_t1. 763 - 1=East, 2=West The code in var522_t4 is valid for all trees if this code is excluded 764 - Altitude, meters above sea level, stored according to var521_t1, var521_t2 and var520_t 2000-series - User defined codes, not standardized The following data (load codes) must be included in a prl-file: 21, 401 or 402, 450

Group of variables: General

Var#	Name	Type	Definition
467	GHDINFO	2	Examples of EPSG-codes (according to EPGS database version 6.14, released 2007-09-02): Name Code Scope, Area of use, Axis WGS 84 4326 Horizontal component of 3D system. Used by the GPS satellite navigation system and for NATO military geodetic surveying.World.Latitude (degree), Longitude (degree) RT90 2.5 gon V 3021 i) Medium and small scale mapping. (ii) Large scale (1:10,000 and greater) topographic mapping, engineering and cadastral survey.SwedenX (metre) Y (metre) SWEREF99 4619 Horizontal component of 3D system.SwedenLatitude (degree), Longitude (degree) SWEREF99 TM 3006 Medium and small scale topographic mapping.SwedenX (metre), Y (metre) The database can presently (2007-11-29) be found at http://www.epsg.org/
515	BNDLNO	1	The term "bundle" in var515 and var516 means "Logs, tops, branches compressed together into bundles"
515	BNDLNO	2	The term "bundle" in var515 and var516 means "Logs, tops, branches compressed together into bundles"
515	BNDLNO	3	The term "bundle" in var515 and var516 means "Logs, tops, branches compressed together into bundles"
516	BNDLDIM	1	The term "bundle" in var515 and var516 means "Logs, tops, branches compressed together into bundles"
516	BNDLDIM	2	The term "bundle" in var515 and var516 means "Logs, tops, branches compressed together into bundles"
516	BNDLDIM	3	The term "bundle" in var515 and var516 means "Logs, tops, branches compressed together into bundles"
605	APTERI	1	Name and version of program or software application used for creating apt-file from oai- and ap1-files. Program is some other than the one in the bucking computer itself, normally program of the forest company or some commercial software product.
605	APTERI	2	Time and date when the ap1-file of the assortment was last saved in the data system of the forest company/ price matrix/tree species: 1…var116_t1/1…var111_t1

Group of variables: Germany

Var#	Name	Type	Definition
601	0A	2	Data descriptions in german hks-file.

Table 1. Description table for text strings starting with 0A.
(Formate: n = numerische Werte, t = alphanumerische Werte)

Position	Format	Länge	Feldbezeichnung	Beschreibung
1	ttt	3	EA	Eigentumsart (z.B. Privat-, Kommunal-, Treuhandwald)
4	ttttttttttttt	13	WBES	Waldbesitzer
17	nnnn	4	FDIR	Forstdirektion, Amt für Forstwirtschaft etc.
21	nnn	3	FA	Forstamt, Oberförsterei etc.
24	nn	2	RV	Forstrevier
26	tt	2	WT	Waldteil (zusätzliche Gliederungsmöglichkeit)
28	nnnn	4	LG	Lagerort des Holzes
32	tttttt	6	DIST	Distrikt
38	nnnn	4	ABT	Abteilung
42	t	1	UA	Unterabteilung
43	nn	2	TFL	Teilfläche
45	n	1	UTFL	Unterteilfläche
46	nn	2	HHJ	Haushaltsjahr (Kalenderjahr, Forstwirtschaftsjahr)
48	nn	2	EKS	Ertrags- und Kostenstelle
50	nnn	3	HAB	Holzaufnahmebuch
53	nnnnnn	6	AUFTR_NR	Auftragsnummer (von Revier vergeben)
59	tt	2	HA	Hiebsart
61	nnnn	4	ATS	Teilarbeitsschlüssel
65	n	1	AU	Aufarbeitungsart (z.B. Regie, Unternehmer)
66	nn	2	HE_TAG	Holzeinschlag-Beginn-Tag
68	nn	2	HEBEG_MO	Holzeinschlag-Beginn-Monat
70	nn	2	HEBEG_JA	Holzeinschlag-Beginn-Jahr
72	nn	2	AUSG_TA	Tag der Datenausgabe
74	nn	2	AUSG_MO	Monat der Datenausgabe
76	nn	2	AUSGA_JA	Jahr der Datenausgabe
78	t	1	STAT	Status (Teil-/Schlußdatenausgabe)
79	ttttttt(20)	20	NAM	Name des Fahrers / der Fahrer
99	nnnn	4	MA_NR	Kennzahl des eingesetzten Kranvollernters
		103		

Group of variables: Germany

Var#	Name	Type	Definition
602	0B	2	Data descriptions in german hks-file.

Table 2. Description table for text strings starting with 0B.

(Formate: n = numerische Werte, t = alphanumerische Werte)

Position	Format	Länge	Feldbezeichnung	Beschreibung
1	nn	2	LOS	Losnummer
3	ttt	3	BA	Baumart
6	ttt	3	SO	Sorte
9	ttt	3	GÜ	Güte
12	t	1	MV	Meßverfahren des Durchmesser (m.R./o.R.)
13	ttt	3	KUB	Kubierungsart (HKS, Sektionen, Zopf)
16	nnnn	4	ST	Stückzahl
20	nnnn.nn	7	VOL	Volumen
27	tttt	4	VE	Volumeneinheit
31	tt	2	FA	Farbe (Los/Holznummer)
33	tttt(30)	30	BEM	Bemerkungen

603 0C 2 Data descriptions in german hks-file.

Table 3. Description table for text strings starting with 0C.

(Formate: n = numerische Werte, t = alphanumerische Werte)

Position	Format	Länge	Feldbezeichnung	Beschreibung
1	nn	2	INX	Indexverweis für Sortimentsdaten
3	nnn	3	LÄ	Länge in Dezimeter
6	nnn	3	DM	"Mitten"-Durchmesser in Zentimeter
9	nnn	3	DZ	Zopfdurchmesser in Zentimeter

The variables 601, 602 och 603 are of the longstring data type. The variables are stored as follows in the hks-file:
601 2 LF <-0A->602 2 LF <-0B-> LF <-0B-> LF <-0B-> LF.....etc.
603 2 LF <-0C-> LF <-0C-> LF <-0C-> LF <-0C-> LF....etc.

Group of variables: Sweden

Var#	Name	Type	Definition
110	STEMSPEC	1	In Sweden: 1 = tall (Scots pine) 2 = gran (Norway spruce) 3 = löv (broadleaves) 4 = övrigt löv (other broadleaves)
110	STEMSPEC	2	1 = tall (Scots pine) 2 = gran (Norway spruce) 3 = löv (broadleaves) 4 = övrigt löv (other broadleaves)
120	TREESPEC	3	Se variable 110 in appendix.
143	GRADDESIG	1	The following grade descriptions are permitted for VMR 87: special (specia), osorterat (unsorted), kvinta (fifths), utskott (waste), halvkvinta (semififths), osorterat/utskott (unsorted/waste), kvinta/utskott (fifths/waste), massaved (pulpwood), The following grade descriptions are permitted for VMR95: Quality1 is called AQ1, Quality2 is called BQ2, and so on up to Quality5 which is called EQ5. Massaved1 (Pulpwood1), Massaved2 (Pulpwood2), Lump (butt-off), it is also acceptable to write 1Massaved (1Pulpwood)- 5Massaved (1Pulpwood). The descriptions are according to VMR, The Swedish Timber Mensuration Society.
276	GRADE	2	See variable 143 in appendix
279	FORMQUOT	1	Form quotient = D60/D20, where D20 is the diameter at 20 % of the total tree height and D60 is the diameter at 60 % of the total tree height.
300	FORCEDCUT	1	1 = operator selected log due to root rot 2 = " " " " " damage 3 = " " " " " sharp crook (tvärkrök) 4 = " " " " " long crook (långkrök) 5 = " " " " " quality limit (kvalitetsgräns) 6 = " " " " " pulp quality (massakvalitet) 7 = " " " " " top failure (toppbrott) 8 = " " " " " compression wood (tjurved) 9 = " " " " " other causes (övrigt/orsak ej angiven) If the log is bucked outside the normal "cutting window" (Swedish "kapfönster") 50 should be added to the code. If the quality change after the bucking 100 should be added. If the log is unclassified 200 may be added to the code. 10 = Automatic, spinning Indicates that harvester head cannot feed any further (feed rollers spinning) and last log is cut.
311	EFFECTTIME	1	G0-time
311	EFFECTTIME	2	G0-time
311	EFFECTTIME	3	G0-time/operator: 1..var211

Group of variables: Sweden

Var#	Name	Type	Definition
311	EFFECTTIME	4	G0-time/operator: 1..var211
312	G15-time	1	(A-time), G15-time
312	G15-time	2	(A-time), G15-time
312	G15-time	3	(A-time), G15-time/operator: 1..var211
312	G15-time	4	(A-time), G15-time/operator: 1..var211
313	BYTIME	1	(B-time), G15-time
313	BYTIME	2	(B-time), G15-time
313	BYTIME	3	(B-time), G15-time/operator: 1..var211
313	BYTIME	4	(B-time), G15-time/operator: 1..var211
441	TRNSDESC	2	Used by SDC for assortment code
442	TRNSSORT	3	1 = tall (Scots pine) 2 = gran (Norway spruce) 3 = löv (broadleaves) 4 = övrigt löv (other broadleaves)
652	TREESPC	1	Normally in Sweden: 1 = tall (Scots pine) 2 = gran (Norway spruce) 3 = löv (broadleaves) 4 = övrigt löv (other broadleaves) 5 = övrigt barr (other conifers)

Group of variables: Sweden

Var#	Name	Type	Definition
655	HEIGHTCODE	1	Codes for heights measured when doing a forest survey (timber cruising) ---- Qualities ----- 1 = Quality 1 2 = Quality 2 3 = Quality 3 4 = Quality 4 5 = Quality 5 ----Normal heights ---- 50 = Total tree height 51 = Height to the live crown base (grönkrongräns) ---- Special heights ---- 60 = Pole (stolpar), start 61 = pole (stolpar), slut --- Defects --- 101 = root rot (rotröta - höjden gäller där rötan slutar) 102 = damage (skada) 103 = sharp crook (tvärkrök) 104 = long crook (långkrök) 105 = quality limit (kvalitetsgräns) 106 = pulp wood quality (massakvalitet) 107 = top failure (toppbrott) 108 = compression wood (tjurved) 109 = other causes (övrigt/orsak ej angiven) 110 = user defined / in reserve (egendefinierad/reserv) 111 = top rot (toppröta - höjden gäller där rötan startar)