# DNV Software, SESAM
# Prepost – StruCAD*3D to FEM converter:

## StruCAD*3D to SESAM INPUT INTERFACE FILE (.FEM) converter

*Introduction:*
The CONVERT command in Prepost (available from version 6.5-01) is updated to also convert StruCAD*3D data into a format compatible for use in SESAM (and USFOS). A SESAM Input Interface File ('.FEM') is created. The created file contains all the principal structural data, i.e. geometry, material and physical properties as well as nodal and element loads. The generated Interface file is 'ready to go' and can be used without modification or addition.

In addition to this, a WAJAC format input file is created that contains key hydrodynamic loading data including wave and current specifications and flooded members. The WAJAC file is a 'raw' file that contains the main sea data found on the StruCAD*3D input file (i.e. SPEC, FLOO, CRNT and SEA cards) and will require additional data from the user (e.g. merge data into template created by Manager).

Note that this is a one way converter, i.e. StruCAD*3D to SESAM Input Interface File only.

This documentation is updated according to version 2.2-10 of the SACSES (SACS and StruCAD*3D) conversion routines library. Use command HELP SUPPORT in Prepost to check actual version of the SACSES library.

*Units:*
StruCAD*3D input is in fixed format, which imposes limits on the size of the input data fields. As a consequence the input units are inconsistent. E.g. if metric SI units are specified the user will encounter lengths defined in millimeters (mm), centimeters (cm) and meters (m) and forces in Newtons (N) and KiloNewtons (kN). To avoid error the StruCAD*3D input is converted into a consistent set of units. Internally all StruCAD*3D input data is converted to Newton and millimeters.

*Limitations:*
In general only the data that is converted is described in this documentation. If other items of data or options exist on a StruCAD*3D data card, but are not described in the manual then the user can presume that those items are not converted. If a particular card type is encountered that cannot be converted at present, then that card will be written to a check file.

StruCAD*3D input units handled are options 'U.S.', 'Metric' and 'SI', and output is in Newton / KiloNewton / Kip and millimeters / meters / feet / inch. (See also Data conversion table below for specific limitations.)

Note that this converter is written especially for conversion of frame structures.

In version 2.2-01 the converter is updated to support alphanumeric joint identities.
From version 2.2-03 the converter has an internal cross section library (extended in version 2.2-10) supporting the cross section names listed at the end of this document. (CHL and ANG implemented in version 2.2-04.) If a cross section defined on the GRUP card is not found (or cross section type is not supported) a message will be written to the check file. The message informs about beam / element number and actual section name. If section is missing the beam will have a 'zero reference' regarding cross section on the FEM file.
In version 2.2-07 the basic loadcase names are written to the FEM file (TDLOAD card). Non-alphanumeric (number only) load case names get the prefix 'LC_'.

*File handling:*
The input and output files used are listed in the table below.

| FILENAME | Description |
|---|---|
| **input**: | |
| 'file'.S3D | The StruCAD*3D input data file.<br>Note: The file must have the suffix .S3D |
| USERSEC | The StruCAD*3D user provided section data file. (Will be used when no SECT cards are defined on the input data file.) |
| **output**: | |
| 'preTx'.FEM | The SESAM input interface file |
| 'file'.CHK | Check file containing warnings and unprocessed data.<br>List of load numbers and load labels. |
| 'file'.USF | USFOS specific data, MISOSEL material cards. |
| 'file'.JNL | This file contains CREATE MEMBER commands, i.e. command input which may be executed by Preframe after reading in the FEM file. The file also gives an overview of element numbers and connected nodes. |
| 'file'.WAJ | WAJAC data file. |
| 'file'.CMB | Interface file with combined loads |

*Prepost command:*
The conversion process is started by the Prepost command:

**CONVERT STRUCAD-TO-FEM inp-fil length-unit force-unit prefix selno**

where:

inp-fil = StruCAD*3D file name (exclusive the suffix .S3D)
length-unit = length unit on output (millimeters / meters / feet / inch)
force-unit = force unit on output (Newtons / KiloNewtons / Kip)
prefix = Interface file prefix
selno = Interface file superelement number (i.e. prefixTselno.FEM)

Note: Do not mix Metric and English units when selecting output units.

*Data conversion:*
The following StruCAD*3D data cards are currently read:

| StruCAD*3D card: | Comment: |
|---|---|
| LDOPT | This cards are used to specify load generation and analysis options, which unlike SESAM, are usually done in a single run in StruCAD*3D. The following items are read:<br><br>- Water density<br>- Steel density<br>- Mudline elevation<br>- Water depth<br><br>NB :<br>All other data is ignored. |
| UNITI | The input unit specification. It is the default unit alternatives that are read, i.e.<br><br>- 'U' for U.S.<br>- 'M' for Metric<br>- 'S' for SI<br><br>NB:<br>If any other data is given on this card the converter cannot handle this input data file and will break the conversion process. |
| SECT | This card is used to specify physical properties for beams and is cross-referenced from the GRUP card. The following section types are read from this card:<br><br>- TUB: Tubulars, but not concentric tubes.<br>- WF, WFC and PLG: I-sections. Fillet radius is read, but ignored<br>- BOX: Box sections.<br>- PRI: Beam defined using stiffness properties only.<br>- CON: Conical section. Converted as a tube with average diameter (OD).<br>- CHL: Channel profiles<br>- ANG: Angle profiles<br><br>NB :<br>All other section types are ignored. |
| GRUP | This card is used to link the beam element to its material and physical properties. The following data are read from this card:<br><br>- Section Label – This is the cross-reference between the GRUP and SECT card.<br>- OD, WT – Tubular properties, as tubes can be defined directly on the GRUP card or cross-referenced to the SECT card.<br>- E, G and $F_y$ - Young's Modulus, Shear Modulus and yield stress.<br>- AISC member classification.<br>- Shear area modifier.<br>- Flood code.<br>- Material density.<br>- Segment length for segmented members.<br><br>Key points to note regarding the conversion of this data are: |

| | |
|---|---|
| | - The member classification is read and stored, but not converted at present.<br>- MISOSEL and MISOIEP cards are created for use in SEASM and USFOS, respectively.<br>- Segmented members are subdivided into discrete members, with additional nodes generated as required. This conversion feature is required in USFOS and predates the implementation of a similar feature in SESAM. |
| PGRUP | This card is used to link the plate element to its material and physical properties. The following data are read from this card:<br><br>- E, μ and Fy - Young's Modulus, Poison's Ratio and yield stress.<br>- Material density. |
| JOINT | This card is used to define coordinates and boundary conditions. The following data are read from this card:<br><br>- Coordinates.<br>- Boundary conditions, including StruCAD*3D definition 'PILEHD' and '222222' which are converted into super-nodes.<br><br>NB:<br>Joint specified deflection card and Joint specified elastic support are not converted. |
| MEMBER | This card is used to define beam elements and also contains the cross-reference to the GRUP, as well as over-rides for specific member properties. The following data are read from this card:<br><br>- Member offset flag.<br>- Member nodes.<br>- Member end releases.<br>- Chord angle and Local Z reference node.<br>- Member flood, buoyancy and density over-rides.<br>- Member offsets<br><br>Key points to note regarding the conversion of this data are:<br><br>- Member numbers are generated sequentially during the conversion since they do not exist in StruCAD*3D.<br>- Member end releases are used to generate BELFIX cards.<br>- Member offsets are used to generate GECCEN cards. |
| PLATE | This card is used to define three and four noded plate elements and also contains the cross-reference to the PGRUP, as well as over-rides for specific element properties. The following data are read from this card:<br><br>- Element nodes.<br><br>Key points to note regarding the conversion of this data are:<br><br>- Four noded elements are converted as thin shell elements (Type=24).<br>- Three-noded elements are converted as plates type=25.<br>- Element numbers are generated sequentially during the conversion since they do not exist in StruCAD*3D.<br><br>NB: |

| | |
|---|---|
| | Plate offsets are not converted. |
| GRPOV | This card is used to define over-rides on a GRUP basis, primarily for hydrodynamic parameters. The following data are read from this card:<br><br>- Displaced area.<br>- Dimensions for force in local y and z.<br><br>Key points to note regarding the conversion of this data are:<br><br>- The above parameters are used to modify the buoyant area for non-flooded members. These values are converted into an equivalent diameter and written to the SPEC card for use in WAJAC.<br>- All other data fields are ignored, but are checked for contents. If any fields contain data a warning is written to the check file. |
| LOADCN +<br>LOADLB +<br>LOAD | These cards are used to define basic loadcases and their constituent loads. The following data are read:<br><br>- The basic load case number is read from the LOADCN card.<br>- The basic load case label is read from the LOADLB card.<br>- Joint loads.<br>- Member loads.<br><br>NB:<br>- Temperature loads are not handled.<br>- Member concentrated moments (GLOB MOMT and MEMB MOMT) cannot be converted.<br>- Beam element loads in member local coordinate system (MEMB UNIF) currently not handled. |
| DEAD | This card is used to specify that self-weight is to be generated. The following data are read from this card:<br><br>- The direction in which gravity should act.<br><br>Key points to note regarding the conversion of this data are:<br><br>- A ‘BGRAV, is created for each occurrence of DEAD.<br>- Buoyancy is also specified via the water depth, but it is not converted. |
| CURR | This card is used to define current profiles. The following data are read from this card:<br><br>- Elevation above mudline.<br>- Current velocity.<br>- Direction. |
| WAVE | This card is used to define the wave profile. The following data are read from this card:<br><br>- Spreading Factor.<br>- Wave type.<br>- Wave height.<br>- Still water depth.<br>- Wave Period.<br>- Mudline elevation. |

| | |
|---|---|
| | - Input mode to define type of wave stepping.<br>- Initial wave crest position.<br>- Step size.<br>- No. of wave steps.<br>- Critical wave position.<br>- Order of stream function.<br><br>Key points to note regarding the conversion of this data are:<br><br>- Only Stream function and Stoke waves are handled at present. |
| LDCOMB | This card is used to specify load combinations. The following data are read from this card:<br><br>- Load combinations number<br>- Basic load case number and factor.<br><br>Key points to note regarding the conversion of this data are:<br><br>- All dead loads and manually defined loads are combined and factored. Loads generated by WAJAC should be added by the user as required.<br>- The combinations are renumbered sequentially starting at 1.<br>- The combinations are written to the '.CMB' file. |

The following SESAM (and USFOS) data cards are created:

| SESAM card: | Comment: |
|---|---|
| IDENT | Identification of Superelement |
| DATE | Date and Program information |
| GNODE | Correspondence between internal and external node number |
| GCOORD | Nodal coordinates |
| GELMNT1 | Element data definition |
| GELREF1 | Reference to element data |
| GUNIVEC | Specification of local coordinate system |
| GPIPE | Cross section type pipe (tubular) |
| GIORH | Cross section type I / H beam |
| GBOX | Cross section type box (rectangular hollow section) |
| GCHAN | Cross section type channel (web orientation = negative) |
| GLSEC | Cross section type angle (web orientation = negative) |
| GBEAMG | General beam element data |
| GELTH | Thickness of two dimensional elements |
| MISOSEL | Material specification for linear elastic structural analysis |
| MISOIEP | For use in USFOS only (put on separate file) |
| GECCEN | Element eccentricities |
| BELFIX | Flexible joint / hinge |
| TDNODE | Joint names |
| TDSECT | Section names |
| TDLOAD | Names connected to basic load cases |
| BNBCD | Nodes with boundary condition |
| BGRAV | Gravity load |
| BNLOAD | Nodal loads |
| BELOAD1 | Line loads on beam elements |
| IEND | End of Superelement |
| | |
| FMOD | To specify prefix for name of Input Interface File and Loads Interface File. (WAJAC input) |
| FWAVE | To specify prefix for file name of the Loads Interface Files different from that of the Input Interface File (WAJAC input) |
| MUDP | To define the mudline with respect to the origin of the global coordinate system (WAJAC input) |
| MOMT | To specify the moment reference point. (WAJAC input) |
| DPTH | To specify the water depth which is defined as the distance between the mudline and the still water line. (WAJAC input) |
| CONS | To specify a different unit system than the SI system used as the default units. (WAJAC input) |
| SPEC | To specify hydrodynamic properties for members which require special attention. (WAJAC input) |
| FLOO | To specify selected members as flooded. (WAJAC input) |
| CRNT | To define stationary current profiles which may be referred to by commands specifying the seastates to be analysed. (WAJAC input) |
| SEA(2) | To specify deterministic load calculation including waves and wave theory to be applied. (WAJAC input) |
| SEAOPT | To specify additional seastate data for each deterministic wave defined by variant 2 of the SEA command. (WAJAC input) |

The built-in cross section library supports the following sections:

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WF profiles (AISC)
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W44X285 W44X248 W44X224 W44X198 W40X328 W40X298 W40X268 W40X244 W40X221
W40X192 W40X655 W40X593 W40X531 W40X480 W40X436 W40X397 W40X362 W40X324
W40X297 W40X277 W40X249 W40X215 W40X199 W40X183 W40X167 W40X149 W36X848
W36X798 W36X720 W36X650 W36X588 W36X527 W36X485 W36X439 W36X393 W36X359
W36X328 W36X300 W36X280 W36X260 W36X245 W36X230 W36X256 W36X232 W36X210
W36X194 W36X182 W36X170 W36X160 W36X150 W36X135 W33X619 W33X567 W33X515
W33X468 W33X424 W33X387 W33X354 W33X318 W33X291 W33X263 W33X241 W33X221
W33X201 W33X169 W33X152 W33X141 W33X130 W33X118 W30X581 W30X526 W30X477
W30X433 W30X391 W30X357 W30X326 W30X292 W30X261 W30X235 W30X211 W30X191
W30X173 W30X148 W30X132 W30X124 W30X116 W30X108 W30X99  W30X90  W27X539
W27X494 W27X448 W27X407 W27X368 W27X336 W27X307 W27X281 W27X258 W27X235
W27X217 W27X194 W27X178 W27X161 W27X146 W27X129 W27X114 W27X102 W27X94
W27X84  W24X492 W24X450 W24X408 W24X370 W24X335 W24X306 W24X279 W24X250
W24X229 W24X207 W24X192 W24X176 W24X162 W24X146 W24X131 W24X117 W24X104
W24X103 W24X94  W24X84  W24X76  W24X68  W24X62  W24X55  W21X402 W21X364
W21X333 W21X300 W21X275 W21X248 W21X223 W21X201 W21X182 W21X166 W21X147
W21X132 W21X122 W21X111 W21X101 W21X93  W21X83  W21X73  W21X68  W21X62
W21X57  W21X50  W21X44  W18X311 W18X283 W18X258 W18X234 W18X211 W18X192
W18X175 W18X158 W18X143 W18X130 W18X119 W18X106 W18X97  W18X86  W18X76
W18X71  W18X65  W18X60  W18X55  W18X50  W18X46  W18X40  W18X35  W16X100
W16X89  W16X77  W16X67  W16X57  W16X50  W16X45  W16X40  W16X36  W16X31
W16X26  W14X730 W14X665 W14X605 W14X550 W14X500 W14X455 W14X426 W14X398
W14X370 W14X342 W14X311 W14X283 W14X257 W14X233 W14X211 W14X193 W14X176
W14X159 W14X145 W14X132 W14X120 W14X109 W14X99  W14X90  W14X82  W14X74
W14X68  W14X61  W14X53  W14X48  W14X43  W14X38  W14X34  W14X30  W14X26
W14X22  W12X336 W12X305 W12X279 W12X252 W12X230 W12X210 W12X190 W12X170
W12X152 W12X136 W12X120 W12X106 W12X96  W12X87  W12X79  W12X72  W12X65
W12X58  W12X53  W12X50  W12X45  W12X40  W12X35  W12X30  W12X26  W12X22
W12X19  W12X16  W12X14  W10X112 W10X100 W10X88  W10X77  W10X68  W10X60
W10X54  W10X49  W10X45  W10X39  W10X33  W10X30  W10X26  W10X22  W10X19
W10X17  W10X15  W10X12  W8X67   W8X58   W8X48   W8X40   W8X35   W8X31
W8X28   W8X24   W8X21   W8X18   W8X15   W8X13   W8X10   W6X25   W6X20
W6X15   W6X16   W6X12   W6X9    W5X19   W5X16   W4X13   M14X18  M12X117
M12X107 M12X10  M10X9   M10X8   M10X75  M8X65   M6X43   M5X189  S24X121
S24X106 S24X100 S24X90  S24X80  S20X96  S20X86  S20X75  S20X66  S18X70
S18X546 S15X50  S15X429 S12X50  S12X408 S12X35  S12X317 S10X35  S10X254
S8X23   S8X184  S7X20   S7X152  S6X172  S6X125  S5X147  S5X10   S4X95
S4X76   S3X75   S3X56   HP14X11 HP14X10 HP14X89 HP14X73 HP13X10 HP13X87
HP13X73 HP13X60 HP12X84 HP12X74 HP12X63 HP12X53 HP10X57 HP10X42 HP8X36

BOX profiles (AISC)
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T161610 T161608 T161606 T161605 T141410 T141408 T141406 T141405 T121210
T121208 T121206 T121205 T121204 T121203 T101010 T101009 T101008 T101006
T101005 T101004 T101003 T090910 T090909 T090908 T090906 T090905 T090904
T090903 T080810 T080809 T080808 T080806 T080805 T080804 T080803 T070709
T070708 T070706 T070705 T070704 T070703 T060609 T060608 T060606 T060605
T060604 T060603 T050508 T050506 T050505 T050504 T050503 T454504 T454503
T040408 T040406 T040405 T040404 T040403 T353505 T353504 T353503 T030305
T030304 T030303 T252505 T252504 T252503 T020205 T020204 T020203 T201210
T201208 T201206 T201205 T200808 T200806 T200805 T200408 T200406 T200405
T180608 T180606 T180605 T161210 T161208 T161206 T161205 T160808 T160806
T160805 T160408 T160406 T160405 T141010 T141008 T141006 T141005 T140608
T140606 T140605 T140604 T140408 T140406 T140405 T140404 T120810 T120809
T120808 T120806 T120805 T120804 T120803 T120610 T120609 T120608 T120606
T120605 T120604 T120603 T120410 T120409 T120408 T120406 T120405 T120404
T120403 T120204 T120203 T100810 T100809 T100808 T100806 T100805 T100804
T100803 T100610 T100609 T100608 T100606 T100605 T100604 T100603 T100510
T100509 T100508 T100506 T100505 T100504 T100503 T100409 T100408 T100406
T100405 T100404 T100403 T100206 T100205 T100204 T100203 T090710 T090709
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T090708 T090706 T090705 T090704 T090703 T090610 T090609 T090608 T090606
T090605 T090604 T090603 T090509 T090508 T090506 T090505 T090504 T090503
T090308 T090306 T090305 T090304 T090303 T080609 T080608 T080606 T080605
T080604 T080603 T080409 T080408 T080406 T080405 T080404 T080403 T080308
T080306 T080305 T080304 T080303 T080206 T080205 T080204 T080203 T070508
T070506 T070505 T070504 T070503 T070408 T070406 T070405 T070404 T070403
T070308 T070306 T070305 T070304 T070303 T070204 T070203 T060508 T060506
T060505 T060504 T060503 T060408 T060406 T060405 T060404 T060403 T060306
T060305 T060304 T060303 T060206 T060205 T060204 T060203 T050406 T050405
T050404 T050403 T050308 T050306 T050305 T050304 T050303 T050205 T050204
T050203 T040305 T040304 T040303 T040205 T040204 T040203 T352504 T352503
T030204 T030203

CHL profiles (AISC)
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C15X50 C15X40 C15X339 C12X30 C12X25 C12X207 C10X30 C10X25 C10X20
C10X152 C10X153 C9X20 C9X15 C9X133 C9X134 C8X187 C8X137 C8X115
C7X147 C7X122 C7X97 C6X13 C6X105 C6X82 C5X9 C5X66 C4X72
C4X53 C3X6 C3X5 C3X41 MC18X58 MC18X51 MC18X45 MC18X42 MC13X50
MC13X40 MC13X35 MC13X31 MC12X50 MC12X45 MC12X40 MC12X35 MC12X31 MC12X10
MC10X41 MC10X33 MC10X28 MC10X25 MC10X22 MC10X83 MC10X65 MC9X254 MC9X239
MC8X227 MC8X214 MC8X20 MC8X187 MC8X85 MC7X227 MC7X190 MC6X18 MC6X152
MC6X162 MC6X151 MC6X12

ANG profiles (AISC)
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L808018 L808016 L808014 L808012 L808010 L808009 L808008 L806016 L806014
L806012 L806010 L806009 L806008 L806007 L804016 L804012 L804009 L804008
L704012 L704010 L704008 L704006 L606016 L606014 L606012 L606010 L606009
L606008 L606007 L606006 L606005 L604014 L604012 L604010 L604009 L604008
L604007 L604006 L604005 L603508 L603506 L603505 L505014 L505012 L505010
L505008 L505007 L505006 L505005 L503512 L503510 L503508 L503507 L503506
L503505 L503504 L503010 L503008 L503007 L503006 L503005 L503004 L404012
L404010 L404008 L404007 L404006 L404005 L404004 L403508 L403507 L403506
L403505 L403504 L403008 L403007 L403006 L403005 L403004 L353508 L353507
L353506 L353505 L353504 L353008 L353007 L353006 L353005 L353004 L352508
L352507 L352506 L352505 L352504 L303008 L303007 L303006 L303005 L303004
L303003 L302508 L302507 L302506 L302505 L302504 L302503 L302008 L302007
L302006 L302005 L302004 L302003 L252508 L252506 L252505 L252504 L252503
L252006 L252005 L252004 L252003 L202006 L202005 L202004 L202003 L202002
L171704 L171703 L151504 L151503 L121204 L121203 L111102 L101002

WF profiles (Euro)
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HEA100 HEA120 HEA140 HEA160 HEA180 HEA200 HEA220
HEA240 HEA260 HEA280 HEA300 HEA320 HEA340 HEA360 HEA400 HEA450
HEA500 HEA550 HEA600 HEA650 HEA700 HEA800 HEA900 HEA1000 HEB100
HEB120 HEB140 HEB160 HEB180 HEB200 HEB220 HEB240 HEB260 HEB280
HEB300 HEB320 HEB340 HEB360 HEB400 HEB450 HEB500 HEB550 HEB600
HEB650 HEB700 HEB800 HEB900 HEB1000 HEM100 HEM120 HEM140 HEM160
HEM180 HEM200 HEM220 HEM240 HEM260 HEM280 HEMC300 HEM300 HEM320
HEM340 HEM360 HEM400 HEM450 HEM500 HEM550 HEM600 HEM650 HEM700
HEM800 HEM900 HEM1000

WF profiles (Euro)
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IPEA80 IPE80 IPEA100 IPE100 IPEA120 IPE120 IPEA140 IPE140 IPEA160
IPE160 IPEA180 IPE180 IPEO180 IPEA200 IPE200 IPEO200 IPEA220 IPE220
IPEO220 IPEA240 IPE240 IPEO240 IPEA270 IPE270 IPEO270 IPEA300 IPE300
IPEO300 IPEA330 IPE330 IPEO330 IPEA360 IPE360 IPEO360 IPEA400 IPE400
IPEO400 IPEA450 IPE450 IPEO450 IPEA500 IPE500 IPEO500 IPEA550 IPE550
IPEO550 IPEA600 IPE600 IPEO600 IPE750W IPE750X IPE750Y IPE750Z

WF profiles (Euro)
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HE100AA HE100A HE100B HE100M HE120AA HE120A HE120B HE120M HE140AA
HE140A HE140B HE140M HE160AA HE160A HE160B HE160M HE180AA HE180A
HE180B HE180M HE200AA HE200A HE200B HE200M HE220AA HE220A HE220B
HE220M HE240AA HE240A HE240B HE240M HE260AA HE260A HE260B HE260M
HE280AA HE280A HE280B HE280M HE300AA HE300A HE300B HE300M HE320AA
HE320A HE320B HE320M HE340AA HE340A HE340B HE340M HE360AA HE360A
HE360B HE360M HE400AA HE400A HE400B HE400M HE450AA HE450A HE450B
HE450M HE500AA HE500A HE500B HE500M HE550AA HE550A HE550B HE550M
HE600AA HE600A HE600B HE600M HE600X HE600Y HE650AA HE650A HE650B
HE650M HE650X HE650Y HE700AA HE700A HE700B HE700M HE700X HE700Y
HE800AA HE800A HE800B HE800M HE80 HE800Y HE900AA HE900A HE900B
HE900M HE900X HE900Y HE900Z HE1000A HE1000B HE1000M HE1000X HE1000Y
HE1000 HL1000A HL1000B HL1000M HL1000X HL1000Y HL1000Z HL1100A HL1100B
HL1100M HL1100R HD2654 HD2668 HD2693 HD2611 HD2614 HD2617 HD3274
HD3297 HD32127 HD32158 HD32198 HD3224 HD32300 HD32368 HD32451 HD36134
HD36147 HD36162 HD36179 HD36196 HD40187 HD40216 HD40237 HD40262 HD40287
HD40314 HD40347 HD40382 HD40421 HD40463 HD40509 HD40551 HD40592 HD40634
HD40677 HD40744 HD40818 HD40900 HD40990 HD41086 HP2043 HP2053 HP2045
HP2054 HP2257 HP2675 HP2687 HP3079 HP3088 HP3095 HP30110 HP30126
HP30149 HP30180 HP30186 HP30223 HP3179 HP3193 HP31110 HP31125 HP3288
HP32103 HP32117 HP32147 HP32184 HP3684 HP36109 HP35109 HP35133 HP35152
HP35174 HP36108 HP36132 HP36152 HP36174 HP36180 HP40122 HP40140 HP40158
HP40176 HP40194 HP40213 HP40231

WF profiles (Euro)
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IPN80 IPN100 IPN120 IPN140 IPN160 IPN180 IPN200 IPN220 IPN240
IPN260 IPN280 IPN300 IPN320 IPN340 IPN360 IPN380 IPN400 IPN450
IPN500 IPN550

CHL profiles (Euro)
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UAP80 UAP100 UAP130 UAP150 UAP175 UAP200 UAP220 UAP250 UAP300
UPN80 UPN100 UPN120 UPN140 UPN160 UPN180 UPN200 UPN220 UPN240
UPN260 UPN280 UPN300 UPN320 UPN350 UPN380 UPN400

ANG profiles (Euro)
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L101008 L101010 L101012 L111110 L111112 L121210 L121211 L121212 L121213
L121215 L131312 L141410 L141413 L151510 L151512 L151514 L151515 L151518
L161614 L161615 L161616 L161617 L181813 L181814 L181815 L181816 L181817
L181818 L181819 L181820 L202015 L202016 L202017 L202018 L202019 L202020
L202021 L202022 L202023 L202024 L202025 L202026 L120808 L120810 L120812
L130708 L130710 L150910 L150911 L151010 L151012 L151014 L160810 L160812
L201010 L201012 L201014

WF profiles (UK)
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914B388 914B343 914B289 914B253 914B224 914B201
838B226 838B194 838B176 762B197 762B173 762B147 686B170 686B152 686B140
686B125 610B238 610B179 610B149 610B140 610B125 610B113 610B101 533B122
533B109 533B101 533B92 533B82 457B98 457B89 457B82A 457B74A 457B67A
457B82B 457B74B 457B67B 457B60 457B52 406B74 406B67 406B60 406B54
406B46 406B39 356B67 356B57 356B51 356B45 356B39 356B33 305B54
305B46 305B40 305B48 305B42 305B37 305B33 305B28 305B25 254B43
254B37 254B31 254B28 254B25 254B22 203B30 203B25 356C634 356C551
356C467 356C393 356C340 356C287 356C235 COLCORE 356C202 356C177 356C153
356C129 305C283 305C240 305C198 305C158 305C137 305C118 305C97 254C167
254C132 254C107 254C89 254C73 203C86 203C71 203C60 203C52 203C46
152C37 152C30 152C23

WF profiles (German)
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IPB100 IPB120 IPB140 IPB160 IPB180 IPB200
IPB220 IPB240 IPB260 IPB280 IPB300 IPB320 IPB340 IPB360 IPB380
IPB400 IPB425 IPB450 IPB475 IPB500 IPB550 IPB600 IPB650 IPB700
IPB750 IPB800 IPB900 IPB000 IPBL100 IPBL120 IPBL140 IPBL160 IPBL180
IPBL200 IPBL220 IPBL240 IPBL260 IPBL280 IPBL300 IPBL320 IPBL340 IPBL360
IPBL380 IPBL400 IPBL425 IPBL450 IPBL475 IPBL500 IPBL550 IPBL600 IPBL650
IPBL700 IPBL750 IPBL800 IPBL900 IPBL000 IPBV100 IPBV120 IPBV140 IPBV160
IPBV180 IPBV200 IPBV220 IPBV240 IPBV260 IPBV280 IPBV300 IPBV320 IPBV340
IPBV360 IPBV380 IPBV400 IPBV425 IPBV450 IPBV475 IPBV500 IPBV550 IPBV600
IPBV650 IPBV700 IPBV750 IPBV800 IPBV900 IPBV000

WF profiles (China)
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W36X300 W40X215 W36X300 W36X300 W36X300 W36X280 W36X260 W36X245 W36X230
W36X210 W36X194 W36X182 W36X170 W36X160 W36X150 W36X135 W33X241 W33X221
W33X201 W33X152 W33X141 W33X130 W33X118 W30X211 W30X191 W30X173 W30X132
W30X124 W30X116 W30X108 W30X99 W27X178 W27X161 W27X146 W27X114 W27X102
W27X94 W27X84 W24X162 W24X146 W24X131 W24X117 W24X104 W24X94 W24X84
W24X76 W24X68 W24X62 W24X55 W21X147 W21X132 W21X122 W21X111 W21X101
W21X93 W21X83 W21X73 W21X68 W21X62 W21X57 W21X50 W21X44 W18X119
W18X106 W18X97 W18X86 W18X76 W18X71 W18X65 W18X60 W18X55 W18X50
W18X46 W18X40 W18X35 W16X100 W16X89 W16X77 W16X67 W16X57 W16X50
W16X45 W16X40 W16X36 W16X31 W16X26 W14X730 W14X665 W14X605 W14X550
W14X500 W14X455 W14X426 W14X398 W14X370 W14X342 W14X311 W14X283 W14X257
W14X233 W14X211 W14X193 W14X176 W14X159 W14X145 W14X132 W14X120 W14X109
W14X99 W14X90 W14X82 W14X74 W14X68 W14X61 W14X53 W14X48 W14X43
W14X38 W14X34 W14X30 W14X26 W14X22 W12X190 W12X170 W12X152 W12X136
W12X120 W12X106 W12X96 W12X87 W12X79 W12X72 W12X65 W12X58 W12X19
W12X16 W12X14 W10X112 W10X100 W10X88 W10X77 W10X68 W10X60 W10X54
W10X49 W10X45 W10X39 W10X33 W10X30 W10X26 W10X22 W10X19 W10X17
W10X15 W10X12 W8X67 W8X58 W8X48 W8X40 W8X35 W8X31 W8X28
W8X24 W8X21 W8X18 W8X15 W8X13 W8X10 W6X25 W6X20 W6X16
W6X15 W6X12 W6X9 W5X19 W5X16 W4X13

WF profiles (China)
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G10 G12.6 G14 G16 G18 G20A G20B G22A G22B
G25A G25B G28A G28B G32A G32B G32C G36A G36B
G36C G40A G40B G40C G45A G63A G63B G63C

WF profiles (China)
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H100100 H100X50 H125125 H125X60 H148100 H150150 H150X75 H175175 H175X90
H194150 H198X99 H200100 H200200 H200204 H244175 H248124 H250125 H250250
H250255 H294200 H294302 H298149 H300150 H300300 H300305 H340250 H344348
H346174 H350175 H350350 H388402 H390300 H394398 H396199 H400200 H400400
H400408 H414405 H428407 H440300 H446199 H450200 H458417 H482300 H488300
H496199 H498432 H500200 H506201 H582300 H588300 H594302 H596199 H600200
H606201 H692300 H700300 H792300 H800300 H890299 H900300 H912302

WF profiles (China)
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Q10 Q12 Q14 Q16 Q18 Q18A Q20 Q20A Q22
Q22A Q24 Q24A Q27 Q27A Q30 Q30A Q33 Q36
Q40 Q45 Q50 Q55 Q60 Q65 Q70 Q70A Q70B

WF profiles (China)
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I100X75 I125X75 I150125 I150X75 I180100 I200100 I200150 I25012A I25012B
I30015A I30015B I30015C I35015A I35015B I40015A I40015B I45017A I45017B

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I60019A I60019B


CHL profiles (Japan)
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75C40   100C5   125C65  150C75  150C75  180C75  200C70  200C80  200C90
250C90  250C90  300C90  300C90  300C90  380C10  380C10  380C10

WF profiles (Japan)
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I10X12  I12X16  I15X17  I15X36  I18X23  I20X26  I20X50  I25X38  I25X55
I30X48  I30X65  I30X76  I35X58  I35X87  I40X72  I40X95  I45X91  I45X115
I60X133 I60X176

WF profiles (Japan)
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W10X9   W10X17  W12X13  W12X23  W15X14  W15X21  W15X31  W17X18  W17X40
W20X18  W20X21  W20X30  W20X49  W20X56  W25X25  W25X29  W25X44  W25X72
W25X82  W30X32  W30X36  W30X56  W30X84  W30X94  W30X106 W35X41  W35X49
W35X79  W35X115 W35X137 W40X56  W40X66  W40X107 W40X140 W40X147 W40X172
W40X197 W40X232 W40X283 W40X415 W40X605 W45X66  W45X76  W45X124 W50X79
W50X89  W50X103 W50X114 W50X128 W60X94  W60X106 W60X120 W60X137 W60X151
W60X175 W70X166 W70X185 W80X191 W80X210 W90X213 W90X243 W90X286
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