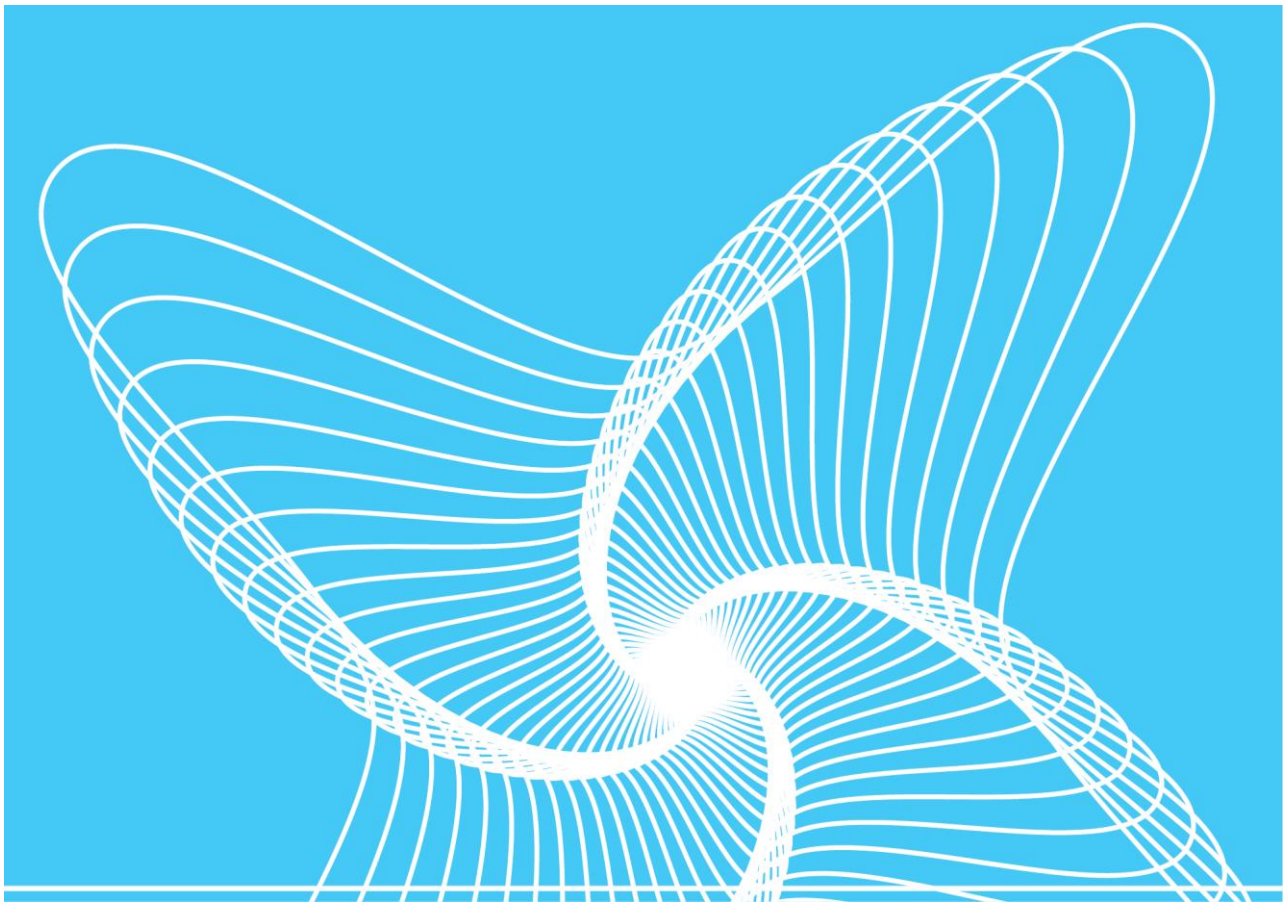
DNV·GL

SESAM USER MANUAL

GeniE

Import SACS and SACS PSI Files

Valid from program version V8.1



Sesam User Manual

GeniE - Import SACS and SACS PSI Files

Date: 15 April 2021

Valid from GeniE version V8.1

Prepared by DNV GL – Digital Solutions

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1. SACS TO FEM CONVERTER

The SACS to FEM converter can be run either from GeniE or Prepost. This reference document will focus on GeniE. For more information with regard to this functionality in GeniE see chapter 9.6 in Volume 3 of the GeniE UM (Help Topics). The SACS Import Guidelines document (Help Topics) describes different kinds of challenges/problems that may occur related to SACS import and how to solve them.

1.1 Introduction

The File | Import | SACS file … command in GeniE converts SACS data into several files, where the following are automatically imported to a GeniE model:

- FEM file (sacstmpT1.FEM)
- wave load (Wajac) input file (sacstmp_WAJAC.INP)
- load combination command input file (sacstmp_CMB.JS)
- pile and soil command input file (SacsPSIToGeniE.js)
- weight data command input file (SacsWeightsToGeniE.js)
- wind area data command input file (SacsWindToGeniE.js)
- corrosion data command input file (SacsCorrosionToGeniE.js)

The created FEM file contains all the principal structural data, i.e. geometry, material and physical properties as well as nodal and element loads. Almost all structural data and nodal/element loads are converted. User need to check the LOG file and CHK file for all warnings and errors.

In addition, a Wajac formatted 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 SACS input file and may require additional data from the user. See table below for what is supported.

The load combination file may also contain wave load combinations. If this is the case it must be read after import of FEM and Wajac data. When SACS import is done from the GUI the sequence will automatically be correct.

The pile and soil data file is generated and read if a SACS PSI input file exists and has been selected as part of the import.

The weight data file is always generated, but is empty if weight data is missing in SACS input file.

The wind area data file is always generated, but is empty if wind area data is missing in SACS input file.

The corrosion data file is always generated, but is empty if corrosion data is missing in SACS input file.

Note that this is a one way converter, i.e. SACS to Sesam only.

This documentation is updated according to latest version of the "Sacses" (SACS to Sesam) conversion routines library. The "SacsPSIToGeniE.js", "SacsWeightsToGeniE.js" and "SacsWindToGeniE.js" files are generated by separate conversion components (rgReadSacsPSI, rgReadSacsWeights and rgReadSacsWind), also referred from this document. The implication of this is that pile/soil, weight and wind data cannot be converted when run from Prepost.

1.2 Units

SACS 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 units are specified the user will encounter lengths defined in centimetres (cm) and meters (m) and forces in Newtons (N) and KiloNewtons (kN). To avoid error the SACS input is converted into a consistent set of units. Internally all SACS input data is converted to Newton and millimetre (mm).

If user wants the units to show in kN or a different unit than the default units user may select these units when creating the workspace.

When executing the converter from GeniE, the FEM file will be created in the current database units in GeniE.

1.2.1 Constants

When importing concentric (grouted) beams the density of the inner beam material is modified using the SACS defined density for grout, i.e. 150 pound/ft^3 (2.4 tonne/m^3).

1.3 Limitations

In general only the data that is converted is described in this documentation. If items of data or options exist on a SACS data card that are not described in this document 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 (.CHK) file. A summary of unsupported cards are written to a log (.LOG) file.

SACS input units handled are options ‘MN’ and ‘EN’ and output is in Newton / kiloNewton / kip and millimetres / meters / feet / inch. (See also Data conversion table below for specific limitations.)

Note that this converter is written especially for conversion of frame structures (offshore engineering).

1.3.1 Model size limitations

- Max number of nodes and elements, respectively, is 75000.
- Max number of load cases: This is flexible, but the initial number is 4000
- Max number of basic loads per load case: This is flexible, but the initial number is 75000
- Max number of load combinations: 3000
- Max number of load cases per load combination: 100

The product of number of load cases times number of basic loads per load case must be less than 4000 * 75000.

1.4 File handling

The input and output files used are listed in the table below.

FILENAME	Description
input:	
'file'.INP	The SACS input data file. Note: must have the suffix .INP
'PSIfile'.INP	The SACS PSI input data file. Note: must have the suffix .INP
output:	
sacstmpT1.FEM	The SESAM input interface file.
'file'.LOG	Log file containing import summary information, warnings and unprocessed data overview.
'file'.CHK	Check file containing unprocessed data details. SACS-GeniE relation tables of - load numbers and load labels - Joint and node data - Member and element data - Plate and element data - Cross section name and type
'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.
sacstmp_WAJAC.INP	Wajac data file.
sacstmp_CMB.JS	Command input file with definitions of load combinations including wave load combinations.
SacsPSIToGeniE.js	Command input file with pile and soil data.
WajacToGeniE.js	Command input file with wave load data.
SacsWeightsToGeniE.js	Command input file with weight data.
SacsWindToGeniE.js	Command input file with wind area data.
SacsCorrosionToGeniE.js	Command input file with corrosion addition data.

1.5 Run from Prepost

The CONVERT command in Prepost can also be used to convert SACS data into a format compatible for use in SESAM and USFOS. A SESAM Input Interface File ('.FEM') is created.

Prepost command:

The conversion process is started by the Prepost command:

CONVERT SACS-TO-FEM inp-fil length-unit force-unit prefix selno

where

inp-fil	= SACS file name (exclusive the suffix .INP)
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. Moreover, pile, soil and weight data cannot be converted when running from Prepost. Use command HELP SUPPORT in Prepost to check actual version of the SACSES library.

As described above, none of the files WajacToGeniE.js, SacsPSIToGeniE.js, SacsWeightsToGeniE.js and SacsWindToGeniE.js are generated when run from Prepost.

1.6 Data conversion of the SACS input file

The following SACS data cards are currently read:

SACS card:	Comment:
OPTIONS	This card specifies analysis options. The following items are read from these cards: - Units. The units are checked to ensure that they are consistent compared to the OPTIONS card and that the converter can handle them. If no unit is specified, 'EN' is used as default - At present Units options 'MN' and 'EN' are consistently handled. 'ME' units is not supported. - Code check options - End moment calculation Cb factor. Note: All other data is ignored.
LDOPT	This card specifies seastate load options. The following items are read from these cards: - Water weight density - Structure weight density - Mudline elevations - Water depth - Units. The units are checked to ensure that they are consistent compared to the OPTIONS card and that the converter can handle them. If no unit is specified, 'EN' is used as default - At present Units options 'MN' and 'EN' are consistently handled. 'ME' option is not supported. Note: All other data is ignored.
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: - TUB – Tubulars, including concentric tubes. - WF, WFC, PGU and PLG – I-sections. - BOX – Rectangular box - PRI – Bar profiles, note that property override values are utilized - CON – Conical tubular transition - CHL – Channel profiles - ANG – Angle profiles - TEE – Converted to I section with bottom flange width equal to web thickness. - DTB – Dented tubular - PGD – Plate girder with double webs

	- PGB – Plate girder with two extra webs (boxed plate girder) Key points to note regarding the conversion of this data are: Stiffness override values and fillet radius are read and utilized when relevant for use in GeniE. Dented tubular section is imported as a tubular without any dent information. The user must manually change/modify regarding how to treat beams with dented tubulars in Sesam/GeniE. 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: - Group Label - This label is used for identify wishbones, i.e. typically named 'W.B'. - Taper Option – defining start and end of tapered section. Tapered section is defined by calculating average values of begin and end section. - Section Label – This is the cross-reference between the GRUP and SECT card. - OD, WT – Tubular properties, as tubular can be defined directly on the GRUP card or cross-referenced to the SECT card. - GAP element type - E, G and F_y - Young's Modulus, Shear Modulus and yield stress. - Member classification. - K-factors –Buckling factors for code check. - Unbraced length (top and bottom). - Tubular ring spacing / stiffener spacing. - Shear area modifier. - Flood code. - ρ - Material density. - Segment length for segmented members. Key points to note regarding the conversion of this data are: - Member classification with value 1-7 in combination with Code Check Option in OPTIONS card is used to decide Moment amplification for code check (AISC/API/NORSOK). - Member classification with value 9 is used to define RES_GRUP set. - MISOSEL and MISOIEP cards are created for use in SEASM and USFOS, respectively. - 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. By default, the discrete members are combined to a beam concept. This behaviour can be turned off by the user. - If several GRUP cards in SACS have the same properties, say OD = 1.2192

	m and THK = 0.0254 m, when imported into GeniE only one section with OD = 1.2192 m and THK = 0.0254 m will be created. All members using multiple GRUP cards with the same OD and THK in SACS will be assigned to one section in GeniE. - To inspect beams that originates from a particular GRUP card select the corresponding set in the Utilities->Set folder. - Note that sections defined from SECT cards are uniquely defined even if they have identical properties. - GAP elements of type C and F are converted to compression-only and tension-only truss elements, respectively. Type N is converted to non-structural beam elements. Type F is not supported by GeniE and is converted to ordinary beam elements.
PGRUP	This card is used to link the plate element to its material and physical properties. The following data are read from this card: - E, μ and Fy - Young's Modulus, Poison's Ratio and yield stress. - ρ - Material density. - Plate type (S, X and Y only partly supported, see Guidelines document) <u>Key points to note regarding the conversion of this data are:</u> - Orientation and stiffener data are not converted.
JOINT	This card is used to define coordinates and boundary conditions. The following data are read from this card: - Coordinates. - Boundary conditions, including SACS definitions 'PILEHD', which is converted as fully fixed for Linear analysis and free for Pile Soil analysis, 'FIXED' converted as fully fixed and 'PINNED' converted as fixed in translations and free in rotations. Retained degree of freedom '2' is transferred to Sesam super-node definition and put into named set "SuperNodes". <u>Key points to note regarding the conversion of this data are:</u> - Joint specified deflection card (PERSET) is not converted. - Joint specified elastic support card (ELASTI) is converted to spring-to-ground elements. (When ELASTI and PERSET are used together, the degree of freedom defined by PERSET is converted to a spring with large stiffness.)
MEMBER + MEMB2 (limited) + MEMBER OFFSETS	This card is used to define beam elements with cross-reference to the GRUP, as well as overrides for specific member properties. The following data are read from this card: - Member offset flag. - Member nodes. - GAP element type - Member end releases. - Chord angle and Local Z reference node. - Member flood and buoyancy - K or L options together with K-factors or Effective length (buckling) - Stiffener spacing + Tubular ring stiffener spacing from MEMB2

	- Unbraced length - Member offsets <u>Key points to note regarding the conversion of this data are:</u> - Member numbers are generated sequentially during the conversion since they do not exist in SACS. - GAP elements of type C and F are converted to compression-only and tension-only truss elements, respectively. Type N is converted to non-structural beam elements. Type F is not supported by GeniE and is converted to ordinary beam elements. - Member end releases are used to generate BELFIX cards. Also, they are used to identify wishbones, i.e. typically with fixations '100111000000'. - Member offsets are used to generate GECCEN cards.
PLATE	This card is used to define three and four nodes 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: - Element nodes. - Plate group label - Plate thickness - Material properties <u>Key points to note regarding the conversion of this data are:</u> - Four nodes elements are converted as thin shell elements (Type=24). - Three-nodes elements are converted as plates type=25. - Element numbers are generated sequentially during the conversion since they do not exist in SACS. Note: Plate offsets are not converted.

CDM	This card is used to define global values of drag and inertia coefficients as function of diameter, Reynolds number or Kuelegan-Carpenter number. The following data are read from the card:
	- Default table selection (only AP option supported)
	- Hydrodynamic diameter
	- One of
	  - Normal and tangential drag and inertia coefficient for clean members
	  - Normal and tangential drag and inertia coefficient for fouled members
	<u>Key points to note regarding the conversion of this data are:</u>
	- The tangential drag coefficients are not used. The other values are written to the CDIA card for use in Wajac.
	- Note that fouled member values are used when specified, since Wajac only supports one set of CDIX cards.
	- The AP option implies use of the API 20th Edition default table for Cd/Cm values. These values are written to CDFN cards for use in.

	- Note that if the SACS input file has no CDM line the default table (see SACS manual) are written to CDFN cards for use in Wajac as default Morison coefficients.
MGROV	This card is used to define Marine Growth over-rides in a particular zone defined as elevation above the mudline. The following data are read from the card - Bottom and top of zone - Marine growth thickness - Mudline elevation - Surface roughness - Dry density of marine growth - Normal drag and mass coefficients <u>Key points to note regarding the conversion of this data are:</u> - The values are written to MGRW or COEF cards for use in Wajac. - The MGRW cards define a default MarineGrowthZLevel property in GeniE defined relative to the seabed. - COEF card is written only if normal drag and mass coefficients are non-zero on the card.
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: - Flooded/non-flooded condition. - Material weight density - Cross section area. - Displaced area. - Dimensions for force in local y and z. - Hydrodynamic coefficient overrides. - Factor option <u>Key points to note regarding the conversion of this data are:</u> - In general GeniE only supports global hydrostatic and hydrodynamic modelling. However, from version 7.1 local hydrodynamic coefficients data Cd and Cm are supported. Please refer Guideline document Section 5.14 if a SACS file contains GRPOV lines defined in some specific load cases. - The above parameters related to 'Displace area' and 'Dimensions for force' are used to modify the buoyant area for non-flooded members. These values are converted into an equivalent diameter and written to the SPEX card for use in Wajac. Highest diameter of the value computed from the area and of the two dimensions is used. - The above 'Cross section area' and 'Displace area' parameters are used to define buoyancy areas for non-flooded and flooded conditions. These values are written to the BUOA card for use in Wajac. - The 'Flooded/non-flooded condition' parameter influence writing of FLOO

	card for use in Wajac. - If non-zero hydrodynamic coefficients data they are written to the CGWD/SPEX card for use in Wajac. - The 'Rey No. elimination option' parameter ('R') is not supported. A warning is written to the LOG file.
MEMOV	This card is used to define over-rides on a MEMBER basis, primarily for hydrodynamic parameters. The following data are read from this card: - Flooded/non-flooded condition. - Material weight density - Cross section area. - Displaced area. - Dimensions for force in local y and z. - Hydrodynamic coefficient overrides. - Factor option <u>Key points to note regarding the conversion of this data are:</u> - In general GeniE only supports global hydrostatic and hydrodynamic modelling. However, from version 7.1 local hydrodynamic coefficients data Cd and Cm are supported. Please refer Guideline document Section 5.14 if a SACS file contains MEMOV lines defined in some specific load cases. - The above parameters related to 'Displace area' and 'Dimensions for force' are used to modify the buoyant area for non-flooded members. These values are converted into an equivalent diameter and written to the SPEX card for use in Wajac. Highest diameter of the value computed from the area and of the two dimensions is used - The above 'Cross section area' and 'Displace area' parameters are used to define buoyancy areas for non-flooded and flooded conditions. These values are written to the BUOA card for use in Wajac. - The 'Flooded/non-flooded condition' parameter influence writing of FLOO card for use in Wajac. - If non-zero hydrodynamic coefficients data they are written to the CGWD/SPEX card for use in Wajac. - The 'Rey No. elimination option' parameter ('R') is not supported. A warning is written to the LOG file. - Reversed member ends are supported.
LOADCN	The load case name is read from the LOADCN card. Also, the load factors "Overall", "Dead", "Wind, wave and current", "User supplied" and "Buoyancy" are read. They are applied to the relevant loads in the load case. <u>Key points to note regarding the conversion of this data are:</u> - If the load case name contains a special character, it will be replaced with an alphanumeric character, e.g. 'P' will replace '+'. The LOG file will contain information about such name mapping. - Structural loads given by LOAD lines and wave loads: For version 7.0-14 and older only "Overall" load factor is supported. For newer versions all load factors are supported.

	- Please refer Guideline document Sections 5.20 and 5.21 for more information of load factors and how they are utilized.
LOADLB	The load case label is read from the LOADLB card.
LOAD	The basic structural loads - Joint loads. - Beam element loads (GLOB and MEMB options) Key points to note regarding the conversion of this data are: - Temperature loads not handled. - Surface loads are not handled.
DEAD	This card is used to specify that self-weight is to be generated. The following data are read from this card: - The direction in which gravity should act. - Water depth override - The Buoyancy calculation method - The Buoyancy below mudline option Key points to note regarding the conversion of this data are: - One BGRAV card is created for each occurrence of DEAD. - Buoyancy is also specified via the water depth and is handled. Please refer Guideline document Section 5.21 for information about limitations in handling water depth override value. - Only Buoyancy calculation method options 'R' and 'M' are supported by GeniE. The 'A' option is treated as the rational method. - In Wajac the Buoyancy calculation method is a global setting, while in SACS it is load condition specific. The highest count of 'R' or 'M' values of all DEAD cards will decide the global setting in Wajac. - In Wajac the inclusion of buoyancy of beams at mudline is a global setting, while in SACS it is load condition specific. The highest count of <blank> or 'BML' values of all DEAD cards will decide the global setting in Wajac. - From version 7.1 the DEAD card will generate CalmSea/SeaStates in GeniE for calculation of hydrostatic loads. Please refer Guideline document Section 5.20 if a SACS file contains DEAD lines defined in some specific load cases.
CURR	This card is used to define current profiles. All data are read except 'Minimum inline current velocity'. However, the following data are not used during the conversion: - Mudline elevation override. - Blockage factor calculations, elevation and option. Key points to note regarding the conversion of this data are: - The current stretching options CN, LN and NL are converted to constant stretching in GeniE. - From version 7.0 the CURR card may generate CalmSea states in GeniE for calculation of hydrodynamic loads. - From version 7.1 the wind/wave/current load factor defined on LOADCN

	line is properly utilized. Please refer Guideline document Section 5.20 if a SACS file contains CURR lines defined in some specific load cases. - From version 7.5 the 'Apparent wave period option' is used for defining the Doppler Effect setting for each seastate in GeniE wave load run.
WAVE	This card is used to define the wave profile. The following data are read from this card: - Spreading Factor. - Wave type. - Wave height. - Still water depth. - Wave Period. - Mudline elevation. - Input mode to define type of wave stepping. - Initial wave crest position. - Step size. - No. of wave steps. - Critical wave position. - Order of stream function. <u>Key points to note regarding the conversion of this data are:</u> - Only Airy, Stream function and Stokes 5th order waves are handled. - MU and MD critical wave positions are not handled. - AL critical wave position details wrt. the conversion is described in chapter 5.3.3 of the SACS-import guidelines document. - Still water depth defined in WAVE card is assigned to the wave load case and overrides the water depth defined in the LDOPT card. - Mudline elevation defined in WAVE card is not used in wave load analysis. Mudline elevation data defined in LDOPT line is used in the analysis. - From version 7.1 the wind/wave/current load factor defined on LOADCN line is properly utilized. Please refer Guideline document Section 5.20 if a SACS file contains WAVE lines defined in some specific load cases.
WIND + WIND AP4F	This card is used to define wind profile and air drag coefficients. The following data are read from this card: - Water Depth or Origin Elevation Option – not supported - Member Loading Option – options are 'W', 'I' or ' ' (blank) - Velocity Units – if English units options are 'M', 'F' or ' ' (blank) - Velocity - Ref. Height, Time or Pressure (column 17-24) - Direction - Water Depth or Origin Elevation – not supported - Height Variation - Wind Area Identifiers (supported in SACS wind import module) <u>Key points to note regarding the conversion of this data are:</u>

	- The Member Loading Option describes a load case dependent behaviour of air drag coefficients in SACS. In GeniE air drag coefficients act globally, i.e. on all load cases. From GeniE version 7.2 the 'I' option is converted in a load case dependent way, see chapter 5.7 of the Guidelines document. - 'W' is handled differently in SACS compared to GeniE. For this case the default air drag coefficients of Wajac are used. For more information see chapter 2.4.9, page 2-37 and 2-38 of the Wajac User Manual. A workaround simulate the behaviour in SACS is given in chapter 5.7 of the Guidelines document. - If the Velocity field is empty the value in column 17-24 equals Pressure. This case is not supported. If encountered, a warning message is issued. - The WIND AP4F card is read, but not supported. If encountered, a warning message is issued. - With regard to Height Variation the following options are supported: - 21AP: API 21st Edition (Value in column 17-24 equals Time) - AP07-AP13: (Value in column 17-24 equals Ref. Height) - ABS2: (Value in column 17-24 equals 'beta' of elev./ref. elev. ratio) - From version 7.0 the WIND card may generate CalmSea states and activate the Wind Field of the general load case in GeniE for calculation of wind loads. - From version 7.1 the wind/wave/current load factor defined in LOADCN line is properly utilized for Calmsea state. Please refer Guideline document Section 5.20 if a SACS file contains WIND lines defined in some specific load cases. - Please refer Guideline document Section 5.20 for information about limitations in handling water depth override value.
WINSHL	This card allows the user to specify elevation zones where the members have no wind loads. All data are read from this card, i.e. 4 wind shield zones given in global Z coordinates. The bottom elevation of the first wind shield zone is given first, then the top elevation of the first zone. The second, third and fourth zones are defined similarly, in order of increasing height.
AREA	This card allows the user to define a wind surface to account for the wind loading on un-modelled items. The following data are read from these cards: - area id - area specification fields (limited support, see below) - centroid of area in global coordinates - shape factor - distribution fields - area options (F, R, A or B) (limited support, see below) <u>Key points to note regarding the conversion of this data are:</u> - Only flat areas perpendicular to global axis (area option 'F') are supported. - Rounded areas ('R'), flat areas with any orientation ('A') and boxed shape areas ('B') are skipped.

LDCOMB	This card is used to specify load combinations. The following data are read from this card: - Load combinations names - Basic load case names and factors. <u>Key points to note regarding the conversion of this data are:</u> If the load combination name contains a special character, it will be replaced with a '_'. Note that if two or more load combination names are identical except for a special character in the same position, e.g. 'PS+' and 'PS-', there will be a name conflict. In this case the user should manually update the input file prior to the import. Option 1: - The combinations are created as JS commands for GeniE. This will also include wave load cases created by Wajac. Option 2: - All dead loads and manually defined loads are combined and factored and written to the FEM file. If wave load cases are to be used in the load combinations, these must be added as manual load combinations in GeniE.
LCOMB	This card complies with the format described in the SACS IV manual – a more recent format. The above description of the LDCOMB command is also valid here.
AMOD	This card describes allowable stress modifier or material factor depending on Code Check Option in OPTIONS card. If this option is one of UC, AA, 10, 16 or 19 AMOD data is input to GeniE. In these cases each AMOD card describes 7 pairs of load case/load combination and allowable stress modifier and results in commands of type 'SX38.designCondition = lcStorm;' in the 'sacstmp_CMB.JS' file.
WGTFP + WGTFP2	These cards describe footprint weights (equipments), i.e. non-structural weights where the load and mass is distributed to members coinciding with the footprint location. Note that a weight footprint is imported to GeniE as placed equipment via the "SacsWeightsToGeniE.js" file only when it is referred from a load case (LOADCN card) via a weight selection (INCWGT card). The following data are read from these cards: - weight group id - weight - weight id - footprint center - footprint size (length and width) - footprint orientation - elevation (not applicable) - weight coordinates (absolute or relative to footprint center) - number of longitudinal and transversal skid beams - Z-tolerance - weight factors (not applicable)

	- radii of gyration (not applicable) - density (not applicable) <u>Key points to note regarding the conversion of this data are:</u> - Weight factors are not applicable to equipment defined as mass with footprint. - Radii of gyration is not supported by GeniE. Moreover, it has only effect when equipment is subject to rotational accelerations. - Density in this context is not supported by GeniE. Moreover, it is an optional value used to determine the buoyancy and/or added mass.
SURFWT + SURFID + SURFDR	These cards describe surface weights (blanket loads), i.e. non-structural weights defined by pressure loading on defined surface areas. Note that a surface weight is imported to GeniE as placed equipment via the "SacsWeightsToGeniE.js" file only when it is referred from a load case (LOADCN card) via a weight selection (INCWGT card). The following data are read from SURFWT card: - weight group id - pressure - weight id - density (not applicable) - weight factors (not applicable) - list of surface areas - surface area local coordinate system - load distribution type - out-of-plane tolerance - list of joint names defining the surface area The following data are read from SURFID card: - load distribution type (not supported) - local coordinates definition - out-of-plane tolerance (not applicable) The following data are read from SURFDR card: - boundary joint names <u>Key points to note regarding the conversion of this data are:</u> - Weight factors are not applicable to equipment defined as mass with footprint. - Density in this context is not supported by GeniE. Moreover, it is an optional value used to determine the buoyancy and/or added mass. - Load distribution type is not supported. All beams included in the footprint area in both X and Y directions are loaded after conversion. User needs to manually define the load interface to specify the loaded beams, please refer to the Guideline document section 5.13.1. - Surface weight with irregular area, i.e. boundary joints not defining a

	rectangular area, is not supported. The irregular surface area is converted to a rectangular area. User needs to manually define the load interface to specify the loaded beams, please refer to the Guideline document section 5.13.2.
WGTJT	This card describes joint weights, i.e. non-structural weights attached to a single joint. Note that a joint weight is imported to GeniE as point load via the "SacsWeightsToGeniE.js" file only when it is referred from a load case (LOADCN card) via a weight selection (INCWGT card). The following data are read from these cards: - weight group id - weight - weight id - joint name - weight factors - radii of gyration (not applicable) - density (not applicable) <u>Key points to note regarding the conversion of this data are:</u> - Radii of gyration is not supported by GeniE. Moreover, it has only effect when equipment is subject to rotational accelerations. - Density in this context is not supported by GeniE. Moreover, it is an optional value used to determine the buoyancy and/or added mass.
WGTCMB	This card describes weight combinations, i.e. it enables the user to generate new weight groups, each defined as a linear combination of basic weight groups and/or other combined weight groups. Weight factors of the combinations will scale the relevant weights. The weight combination data is imported to GeniE via the "SacsWeightsToGeniE.js" file only when it is referred from a load case (LOADCN card) via a weight selection (INCWGT card). The following data are read from this card: - combination weight group id - list of weight groups with corresponding weight factors <u>Key points to note regarding the conversion of this data are:</u> - Currently only joint weights are scaled according to weight factors. - Footprint weights and surface loads will act as weight factor is 1.0.
INCWGT	This card allows the selection of weight groups to be included in a particular load case. The following data are read from this card: - list of weight groups
ACCEL	This card allows the specification of accelerations of the model in a particular load case. Loads generated from these accelerations are based on the most recently encountered center location. The following data are read from this card: - translational accelerations - rotational accelerations - rotational velocities

	- exclude structural weight option - include added mass option (not applicable) - center id Key points to note regarding the conversion of this data are: The “Include added mass” option in GeniE context is a Wajac option that the user must handle manually by utilizing the “Calculate added mass” option in the Wave Load Run dialog. This must be done based on careful engineering judgements.
CENTER	This card defines the global coordinates of the roll center of the structure. The structure’s angular velocities and accelerations are measured about axes through this point. The following data are read from this card: - center id - coordinates of the roll center Key points to note regarding the conversion of this data are: It is assumed that there is only one CENTER card per model (SACS input file).
DUMMY KEEP DELETE	These cards describe connected non-structural elements (dummy structure). The following data are read from these cards: - unique name of the dummy structure (DUMMY card) - set of joints where the dummy structure connects to the elastic structure (KEEP card) - set of joints that describe all elements, plates, etc. of the dummy structure (DELETE card) The conversion results in two sets for each set of DUMMY/KEEP/DELETE cards in GeniE; KD_<name>_KEEP and KD_<name>_DELETE. The KD_<name>_DELETE sets contain the beams and plates connected to the nodes/joints defined on the SACS input DELETE cards.
CORRZ	The line set allows the user to specify decreases of member dimensions due to corrosion. Corrosion zones are specified as a function of elevation.

To our best knowledge the following SACS IV cards are not supported:

SACS IV input cards	**Comment**
CODE EC/AA/IS	Special settings for member code checks. Must be assigned to relevant code check(s) in GeniE.
PCODE	Special settings for panel code checks. Can be assigned to relevant code check(s) in GeniE.
RFLRFD	Override resistance values for LRFD code check. Can be assigned to relevant code check(s) in GeniE.

LCSEL	Load case selection. Active load combinations can be given in GeniE and assigned to relevant analysis or code check.
LCFAC	Load case factors related to load cases given in LCSEL. Factors on load cases can be given when creating load combinations.
REDESIGN/REDES2/ REDES3/REDES4	Code check redesign setting. Not relevant in GeniE.
HYDRO/HYDRO2	GeniE supports member hydrostatic collapse code checks per API RP 2A WSD and LRFD, Norsok, and ISO 19902. When the design code is selected for tubular member code checks, the tubular member hydrostatic collapse check is automatically included in the member code checks.
UCPART	Unity check partition related to reporting. Can be defined in the Report tool of GeniE.
WDEPTH	Water depth override value. Not relevant in GeniE. When importing to GeniE the water depth is taken from the LDOPT card.
GRPRED	Tubular member redesign values. Not relevant in GeniE.
PSTIF	Plate stiffeners. Can be modelled in GeniE.
SHLGRP/SHELL/ SHELL THICK/ SHELL OFFSET	Membrane elements. Can be modelled in GeniE.
SLDGRP/SOLID/ SOLID OFFSET	Solid elements. Not relevant in GeniE.
MASTER	Master-slave joints. May use a SupportRigidLink in GeniE.

To our best knowledge the following Seastate cards are not supported:

Seastate input cards	Comment
FILE	Reference to another file to be read. Must be copied into referencing file.
REYFAC HEAD/ REYFAC	A “Morison coefficient as a function of Roughness/Reynolds number” hydro property may be defined in GeniE and assigned to the structure.
DELGRP/DELMEM/ DELJNT	Non-structural elements. No direct parallel in GeniE. Sets may be defined, similar to what is done for DUMMY/KEEP/DELETE cards.
REPORT/REPLBL/ REPGRP/REPMEM	Report options. Can be given in the Report tool of GeniE. Use e.g. set that corresponds to GRUP given in the REFGRP card.
DYNMAS	Selection of weight groups to be part of dynamic characteristics analysis. Not relevant in GeniE.
RAO/INCRAO	Response amplitude operator data. Not relevant in GeniE.
EXCGRP	Exclude groups from weight calculations. May be manually done in GeniE.
WTSTR	Structural dead weight. Note that weight of marine growth is included in Wajac calculations.
WGTMEM CONC	Concentrated member weight (such as anode weight). Can be defined as point mass in GeniE.
WGTMEM UNIF	Distributed member weight. Can be assigned as “scale mass density” on relevant beams.
WGTNS/WGTNS2	Non-structural weight. Can be defined in GeniE by use of joint footprint of equipment.
MOVLOD/MOVGRP/ MOVSTP	Moving load. Not relevant in GeniE.
VELOC	Velocity input override. Can be defined in GeniE.
MOTION	Motion input override. Can be defined in GeniE.
SFRC/SMOM	Space force/moment relation. Not relevant in GeniE.
GNTRF	Generate transfer functions. Not relevant in GeniE.
PGROV	Plate group override. Can be defined in GeniE.
DRAG	Submerged area/volume to be included in load case. Not relevant in GeniE.
MFLO/MFLO2	Mud flow. Not relevant in GeniE.
LOADRP	Environmental load repeat. May be defined in GeniE.

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

FEM file cards	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
MSHGLSP	General 2-nodes Spring/Shim Element
MGSPRNG	Spring Element to ground
BNTRCOS	Transformation from Global to Local Coordinate System, Direction Cosines
TDSCONC	Beam names
SCONCEPT	Beam segmentation
SCONMESH	Segment definition by reference to GNODE internal id
TDSETNAM	Name and description of a Set
GSETMEMB	Set of nodes or elements (members)
IEND	End of Superelement

The following Wajac data cards are created:

Wajac input cards	**Comment**
SPEX	Hydrodynamic properties
CDIX	Directional Hydrodynamic Coefficients
CDIA	Hydrodynamic Coefficients as Function of Member Diameter
COEF	Hydrodynamic Coefficients as Function of Vertical Position
BUOA	Overriding non-flooded and/or flooded buoyancy areas
MGRW	Marine Growth and Roughness Definition
CDWN	Air Drag Coefficients for Specified Members
CGWD	Global Wave Direction/Seastate dependent Hydrodynamic Coefficients
API	Load calculation according to API RP2-WSD, 20th Edition
MOMT	Moment Reference Point Definition
DPTH	Water Depth
MUDP	Mudline Elevation
FLOO	Definition of flooded members
CRNT	Definitions of Current profiles
WINX	Definition of Wind Profiles for smaller mean period ratio
SEA(2)	Deterministic load calculation
SEAOPT	Additional seastate specification

1.7 Data conversion of the SACS PSI input file

The following SACS PSI data cards are currently read:

SACS PSI card:	Comment:
PSIOPT	PSI analysis and print options. The following items are read from these cards: Upward Vertical – Defining the upward vertical direction (default +Z) Units Option – Input units. Legal options are 'ENG', 'MN' and 'MET' (default 'ENG'). Note: All other data is ignored.
PLSECT	This card is used to specify cross section properties for 'H' piles, tubular piles or grouted tubular piles with properties different from those of standard tubes, for example a tube grouted inside of another tube. The following items are read from this card: - Section Label – The unique section label used by subsequent PLGRUP cards - Section Type – Either 'TUB' or 'H' - Outer Diameter – Only if 'TUB' - Wall thickness – Only if 'TUB' <u>Key points to note regarding the conversion of this data are:</u> - If type 'H' Outer diameter = 100 cm and wall thickness = 1 cm - All other data is ignored. - Grouted pile is not handled.
PLGRUP	This card is used to specify properties of a pile or group of piles. A pile with properties that vary along its length is described with several PLGRUP lines having the same Group Label. Each PLGRUP line specifies the properties for a segment of the pile. The following items are read from this card: - Group Label – The unique group label used by subsequent PILE cards - Outside diameter – Tubular dimension - Wall thickness - Tubular dimension - Ex1000 – Material properties - Gx1000 - Material properties - FY - Material properties - Pile Segment length – - T Factor – Factor modifying the 'T'-value of T-Z data for this pile segment Note: All other data is ignored.
PILE	This card is required for each pile that is to be included in the analysis. It is used to specify each pile's geometry and to designate the soil tables that are to be used for its analysis. The following items are read from this card: - Pilehead Joint Name – JOINT name, reference to SACS input file - Batter Definition Joint Name – JOINT name, reference to SACS input file. If empty the columns 21 to 50 must give the coordinates of Batter point.

	- Pile Grup Label – Reference to PLGRUP - Batter Definition Coordinates – see explanation above - Soil Tabel ID X-Z Plane – Soil table id associated with pile in X-Z plane - Soil Tabel ID X-Y Plane – Soil table id associated with pile in X-Y plane Note: All other data is ignored.
SOIL TZAXIAL HEAD	User input T-Z curves header. The following items are read from this card: - Number of Soil Strata – for this T-Z description - More than 30 data points for T-Z curve – otherwise leave blank - Z Factor – factor to be applied to all "Z" input values - Soil Table Id – used on one or more pile lines to associate soil with pile
SOIL SLOC	Designates soil strata locations. The following items are read from this card: - Symmetrical T-Z curve – enter 'SM' if T-Z curve has same shape whether the pile is in tension or compression. In this case only positive values of 'T' and 'Z' will be entered on the following T-Z line. The first data point must be the origin (0.0, 0.0). - Number of Points per Curve – one point consist of a 'T'-value and a 'Z'-value - Top – Stratum location; distance from the pilehead to the top of this stratum. The stratum and T-Z lines are entered in order of increasing depth. These distances are vertically down and not along the axis of the pile, which may be battered. The first point need not be at the pilehead. - Bot - Stratum location; if the following T-Z data is constant for this stratum, enter the distance from the pilehead to the bottom of this stratum. If left blank, the T-Z data will vary linearly to the top of the next stratum. No gaps should be left between strata. - T Factor – Factor modifying the 'T'-value of T-Z data for this stratum. Entry can be used to change input into more convenient units if desired.
SOIL T-Z	User input T-Z curve data points – peak skin friction vs. Z- displacement. The following items are read from this card: - T – 'T'-values for this T-Z curve - Z – 'Z'-values for this T-Z curve
SOIL BEARING HEAD	User input bearing data header. The following items are read from this card: - Number of Soil Strata – for this bearing T-Z description - More than 30 data points for T-Z curve – otherwise leave blank - Z Factor – factor to be applied to all "Z" input values - Soil Table Id – used on one or more pile lines to associate soil with pile
SOIL SLOC	Designates soil strata locations. The following items are read from this card: - Number of Points per Curve – one point consist of a 'T'-value and a 'Z'-value - Top – Stratum location; distance from the pilehead to the top of this stratum. These distances are vertically down and not along the axis of the pile, which may be battered.

	- Bot - Stratum location; if the following T-Z data is constant for this stratum, enter the distance from the pilehead to the bottom of this stratum. If left blank, the T-Z data will vary linearly to the top of the next stratum. For the last stratum the bottom distance should be entered at some value deeper than the pile tip. - T Factor – Factor modifying the 'T'-value of T-Z data for this stratum. Entry can be used in conjunction with normalized T-Z curves to obtain the correct 'T' magnitudes or to change input into more convenient units.
SOIL T-Z	User input bearing T-Z data points – pile tip resistance vs. Z-displacement. The following items are read from this card: - T – 'T'-values for this T-Z curve - Z – 'Z'-values for this T-Z curve
SOIL LATERAL HEAD	User input P-Y curves header. The following items are read from this card: - Number of Soil Strata – for this bearing P-Y description - More than 30 data points for P-Y curve – otherwise leave blank - P-Y Curve Scaling – enter 'YEXP' to cause both the input 'P' and 'Y' values to multiplied by the ratio of the pile diameter to the reference diameter to produce the working P-Y curve for the pile. If left blank only the 'P' values will be multiplied by the diameter ratio. - Reference Diameter – the diameter for which this P-Y data is generated. - Y Factor – factor to be applied to all "Z" input values - Soil Table Id – used on one or more pile lines to associate soil with pile
SOIL SLOC	Designates soil strata locations. The following items are read from this card: - Symmetrical P-Y curve – enter 'SM' if P-Y curve is the same in positive and negative displacement direction. In this case only positive values of 'P' and 'Y' will be entered on the following P-Y line. The first data point must be the origin (0.0, 0.0). - Number of Points per Curve – one point consist of a 'P'-value and a 'Y'-value - Top – Stratum location; distance from the pilehead to the top of this stratum. These distances are vertically down and not along the axis of the pile, which may be battered. - Bot - Stratum location; if the following T-Z data is constant for this stratum, enter the distance from the pilehead to the bottom of this stratum. If left blank, the T-Z data will vary linearly to the top of the next stratum - P Factor – Factor modifying the 'P'-value of P-Y data for this stratum. Note: Y Shift is ignored.
SOIL P-Y	User input P-Y curve data points – lateral force vs. Y-displacement. The following items are read from this card: - P – 'P'-values for this P-Y curve - Y – 'Y'-values for this P-Y curve

To our best knowledge the following SACS PSI cards are not supported:

SACS PSI input cards	Comment
PILSUP	Pile superelement creation. Not relevant in GeniE.
PLTRQ/PLTPL/PLTLC /PLTSZ	Plot settings. Not relevant in GeniE.
SCOUR	Scour data. Can be defined in GeniE.
TABR AXIAL/ DEFLECTION/ ROTATION/TORSION	Optional table entry values used in case the automatic procedure fails to adequately converge. Not relevant in GeniE.
AXLOAD	Axial load distribution. Not relevant in GeniE.
PHSPG/PLSPRG	Pilehead spring data. Not relevant in GeniE.
PLLOAD/PLOD3D	Pilehead load. Not relevant in GeniE.
DEPLOD	Depth loads. Not relevant in GeniE.
PLSTUB	Pile stub design. Not relevant in GeniE.
LODFL/LTDFL	Axial/lateral load versus deflection. Not relevant in GeniE.
PLCAP	Pile capacity versus length. Not relevant in GeniE.
SOIL AXIAL HEAD	Pile axial behaviour as ‘spring’, ‘API adhesion’ or ‘user adhesion’. Not relevant in GeniE.
SOIL API AXL SLOC	Axial soil properties for each ‘Sand’, ‘Clay’, ‘Rock’ or ‘CPT’ stratum. Not relevant in GeniE.
SOIL TZAPI HEAD	T-Z API axial definition. Not relevant in GeniE.
SOIL API LAT SLOC	Lateral soil properties for each ‘Sand’, ‘Clay’ or ‘10th ed. strata location’ stratum. Not relevant in GeniE.

1.8 Built-in cross section library

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

```
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
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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
W38X282

TEE profiles (AISC)

WT18X17 WT18X16 WT18X15 WT18X14 WT18X13 WT18X12 WT18X11 WT18X12 WT18X11
WT18X10 WT18X97 WT18X91 WT18X85 WT18X80 WT18X75 WT18X67 WT16X17 WT16X15
WT16X14 WT16X13 WT16X12 WT16X11 WT16X10 WT16X84 WT16X76 WT16X70 WT16X65
WT16X59 WT15X11 WT15X10 WT15X95 WT15X86 WT15X74 WT15X66 WT15X62 WT15X58
WT15X54 WT15X49 WT13X10 WT13X97 WT13X89 WT13X80 WT13X73 WT13X64 WT13X57
WT13X51 WT13X47 WT13X42 WT12X88 WT12X81 WT12X73 WT12X65 WT12X58 WT12X52
WT12X51 WT12X47 WT12X42 WT12X38 WT12X34 WT12X31 WT12X27 WT10X83 WT10X73
WT10X66 WT10X61 WT10X55 WT10X50 WT10X46 WT10X41 WT10X36 WT10X34 WT10X31
WT10X28 WT10X25 WT10X22 WT9X71 WT9X65 WT9X59 WT9X53 WT9X48 WT9X43
WT9X38 WT9X35 WT9X32 WT9X30 WT9X27 WT9X25 WT9X23 WT9X20 WT9X17
WT8X50 WT8X44 WT8X38 WT8X33 WT8X28 WT8X25 WT8X22 WT8X20 WT8X18
WT8X15 WT8X13 WT7X365 WT7X332 WT7X302 WT7X275 WT7X250 WT7X227 WT7X213
WT7X199 WT7X185 WT7X171 WT7X155 WT7X141 WT7X128 WT7X116 WT7X105 WT7X96
WT7X88 WT7X79 WT7X72 WT7X66 WT7X60 WT7X54 WT7X49 WT7X45 WT7X41
WT7X37 WT7X34 WT7X30 WT7X26 WT7X24 WT7X21 WT7X19 WT7X17 WT7X15
WT7X13 WT7X11 WT6X168 WT6X152 WT6X139 WT6X126 WT6X115 WT6X105 WT6X95
WT6X85 WT6X76 WT6X68 WT6X60 WT6X53 WT6X48 WT6X43 WT6X39 WT6X36
WT6X32 WT6X29 WT6X26 WT6X25 WT6X22 WT6X20 WT6X17 WT6X15 WT6X13
WT6X11 WT6X9 WT6X8 WT6X7 WT5X56 WT5X50 WT5X44 WT5X38 WT5X34
WT5X30 WT5X27 WT5X24 WT5X22 WT5X19 WT5X16 WT5X15 WT5X13 WT5X11
WT5X9 WT5X8 WT5X7 WT5X6 WT4X33 WT4X29 WT4X24 WT4X20 WT4X17
WT4X15 WT4X14 WT4X12 WT4X10 WT4X9 WT4X7 WT4X6 WT4X5 WT3X12
WT3X10 WT3X7 WT3X8 WT3X6 WT3X4 WT2X9 WT2X8 WT2X6 MT7X9
MT6X5 MT5X4 MT4X3 MT3X2 MT2X9 ST12X60 ST12X53 ST12X50 ST12X45
ST12X40 ST10X48 ST10X43 ST10X37 ST10X33 ST9X35 ST9X27 ST7X25 ST7X21
ST6X25 ST6X20 ST6X17 ST6X15 ST5X17 ST5X12 ST4X11 ST4X9 ST3X10
ST3X7 ST3X8 ST3X6 ST2X7 ST2X5 ST2X4 ST2X3 ST1X3 ST1X2

PLG profiles (AISC)

36B12E 36C12E 36D12E 36C8G 36C12G 36C14G 36C16G 36C18G 36D12G
36D14G 36D16G 36D18G 36E12G 36C12J 36C14J 36C16J 36C18J 36C20J
36C22J 36D8J 36D12J 36D14J 36D16J 36D18J 36D20J 36D22J 36C14L
36C16L 36C18L 36C20L 36C22L 36C24L 36C26L 36D14L 36D16L 36D18L
36D20L 36D22L 36D24L 36D26L 36C14M 36C16M 36C18M 36C20M 36C22M
36C24M 36C26M 36C28M 36C30M 36D14M 36D16M 36D18M 36D20M 36D22M
36D24M 36D26M 36D28M 36D30M 36C14N 36C16N 36C18N 36C20N 36C22N
36C24N 36C26N 36C28N 36C30N 36D14N 36D16N 36D18N 36D20N 36D22N
36D24N 36D26N 36D28N 36D30N 36D14P 36D16P 36D18P 36D20P 36D22P
36D24P 36D26P 36D28P 36D30P 36D14Q 36D16Q 36D18Q 36D20Q 36D22Q
36D24Q 36D26Q 36D28Q 36D30Q 42B12E 42C12E 42D12E 42C8G 42C12G
42C14G 42C16G 42C18G 42D12G 42D14G 42D16G 42D18G 42E12G 42C12J
42C14J 42C16J 42C18J 42C20J 42C22J 42D8J 42D12J 42D14J 42D16J
42D18J 42D20J 42D22J 42C14L 42C16L 42C18L 42C20L 42C22L 42C24L
42C26L 42D14L 42D16L 42D18L 42D20L 42D22L 42D24L 42D26L 42C14M
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96K30P 96K32P 96K34P 96K36P 96L14P 96L16P 96L18P 96L20P 96L22P
96L24P 96L26P 96L28P 96L30P 96J14Q 96J16Q 96J18Q 96J20Q 96J22Q
96J24Q 96J26Q 96J28Q 96J30Q 96K16Q 96K18Q 96K20Q 96K22Q 96K24Q
96K26Q 96K28Q 96K30Q 96K32Q 96K34Q 96K36Q 96L14Q 96L16Q 96L18Q
96L20Q 96L22Q 96L24Q 96L26Q 96L28Q 96L30Q 96K16R 96K18R 96K20R
96K22R 96K24R 96K26R 96K28R 96K30R 96K32R 96K34R 96K36R 96J14S
96J16S 96J18S 96J20S 96J22S 96J24S 96J26S 96J28S 96J30S 96L14S
96L16S 96L18S 96L20S 96L22S 96L24S 96L26S 96L28S 96L30S 96L32S

96L34S 96L36S

BOX profiles (AISC)

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
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)

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)

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)

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)

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)

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)

IPN80 IPN100 IPN120 IPN140 IPN160 IPN180 IPN200 IPN220 IPN240
IPN260 IPN280 IPN300 IPN320 IPN340 IPN360 IPN380 IPN400 IPN450
IPN500 IPN550 IPE140 IPEO240

CHL profiles (Euro)

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)

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)

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)

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)

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)

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)

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)

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)

I100X75 I125X75 I150125 I150X75 I180100 I200100 I200150 I25012A I25012B
I30015A I30015B I30015C I35015A I35015B I40015A I40015B I45017A I45017B
I60019A I60019B

CHL profiles (Japan)

75C40	100C5	125C65	150C75	150C75	180C75	200C70	200C80	200C90
250C90	250C90	300C90	300C90	300C90	380C10	380C10	380C10	

WF profiles (Japan)

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

WF profiles (Japan)

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	

WF profiles (Other)

125X125 150X75 148X100 150X150 198X99 200X100 194X150 200X200 200X204 208X202
248X124 250X125 244X175 244X252 248X249 250X250 250X255 298X149 300X150 294X200
298X201 294X302 298X299 300X300 300X305 304X301 310X305 310X310 346X174 350X175
354X176 336X249 340X250 344X348 344X354 350X350 350X357 396X199 400X200 404X201
386X299 390X300 388X402 394X398 394X405 400X400 400X408 406X403 414X405 428X407
458X417 498X432 446X199 450X200 434X299 440X300 496X199 500X200 506X201 482X300
488X300 596X199 600X200 606X201 612X202 582X300 588X300 594X302 692X300 700X300
708X302 792X300 800X300 808X302 890X299 900X300 912X302 918X303

1.9 Development history

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_'.

In version 2.2-15 of the converter, several enhancements related to implementation in GeniE are included. The most important are: support of hydrodynamic cards CDM, MGROV and MEMOV, import of load combinations, member concepts and concentric (grouted) tubular, in addition to increased model size (10500/25000 nodes and members for 32-/64-bit versions).

In version 2.3-00 the major enhancements are import of wishbone elements and options for converting plates to shell/membrane elements and to turn on/off import of named joints. In addition import of tapered sections is supported. Also model size is further increased (9000/75000 nodes and members, and 400/1000 load cases, for 32-/64-bit versions). For 32-bit version the model size is reduced from 10500 to 9000. A new, separate pile and soil import module handles import of data on the SACS PSI input file.

In version 2.3-01 the major enhancements are handling of concentrated and line loads defined in member local system and import of AMOD cards. Memory handling is significantly improved and model size is increased and equal for 32- and 64-bitversions (75000 nodes and members and 2000 load cases). A new, separate weight import module also supports footprint weights (equipment) of the SACS input file.

In version 2.3-02 the major enhancements are import of wind loads on members and import of non-structural parts. Also, the Buoyancy Calculation Method option of the DEAD card is supported. The pile and soil import module is extended to support the PLSECT card of the SACS PSI input file. Also, the weight import module now supports surface weight (blanket loads), joint weight and weight combinations of the SACS input file. See release note of GeniE 6.6 for more information.

In version 2.4-00 the major enhancements are import of code check data (buckling length/factor and moment amplification) and buoyancy area hydro property, handling of different CD/CM values for fouled/clean members and utilization of property overrides for BAR cross sections. Also, a "Use SACS beam name" option is added to the Import Options dialog. See release note of GeniE 6.7 for more information.

In version 2.5-00 the major enhancements are import of concentrated moment on member and wind area data, in addition to enhancements related to generation of soil layers for linearly varied soil properties in each layer in order to get more accurate soil resistance. Also, AIRY wave type is being supported. This version includes enhanced error/warning messages and documentation in general. See release note of GeniE 6.8 for more information.

In version 2.5-01 the major enhancements are utilization of the plate type info in PGRUP card, support for creating wave loads at each crest position (AL option in WAVE card) and enhanced import of MEMOV and GRPOV cards. Also, this version includes enhanced error/warning messages and documentation in general. See release note of GeniE 6.9 for more information.

In version 7.0-00 the major enhancements are support of "Buoyancy below mudline" parameter in DEAD card and handling of multiple water depths (WAVE card). Other important enhancements are support for GAP element types, handling of current profile relative to mudline and support for load cases with only current loads (CURR card), possibly including wind loads (WIND cards). See release note of GeniE 7.0 for more information.

In version 7.1-00 the major enhancements are support of local hydrodynamic coefficient overrides in MEMOV and GRPOV cards and handling of separated calculation of weight of marine growth and buoyancy of total structure (DEAD and WAVE cards). Another important enhancement is utilization of all load factors of the LOADCN card. An improved organization of load cases/combinations was implemented to facilitate this feature. Import of conical (CON) sections is also part of this version. See release note of GeniE 7.1 for more information.

In version 7.2-00 the major enhancements are conversion of Cd/Cm as factors on GRPOV/MEMOV cards and support of water depth override on DEAD cards. With regard to the WIND card, ABS2 wind profile is supported and a better handling of Member Loading Option 'I' is implemented. Also the AP option of the CDM card is now supported. Several defects are fixed and documentation is updated. See release note of GeniE 7.2 for more information.

In version 7.3-00 the major enhancements are conversion of MGROV cards to one default linear varying MarineGrowth property in GeniE defined relative to seabed and supporting the new IAPP parameter of WINX card of Wajac. The IAPP-value is set equal to 1 to state that both GeniE and Wajac shall use the ProjectedPressure method for calculating wind forces. Several defects are fixed and documentation is updated. See release note of GeniE 7.3 for more information.

In version 7.4-00 the major enhancements are a) conversion of ELASTI cards to Sesam "spring-to-ground" elements, b) creating a named set (BELOWMDL) containing all beams with at least one end below mud-line and c) merging joints for wishbones when joints have different coordinates.

In version 7.5-00 the major enhancements are a) utilizing information regarding stiffener spacing (inclusive tubular ring stiffener spacing), unbraced lengths for top and bottom flange and also bending coefficient Cb, b) cross section type DTB (dented tubular) is read and converted to a tubular without any dent information, c) apparent wave period option of CURR card used for defining Doppler Effect setting of each seastate.

In version 7.11-00 the major enhancement is to convert retained degree of freedom '2' to super-node definition. These super-nodes are stored in named set "SuperNodes".

In version 7.12-00 the major enhancements are a) utilizing fillet radius for I/H and Channel cross sections, b) read cross section types PGD and PGB, and c) utilizing cross section stiffness override values.

In version 7.13-00 the major enhancement is extending the built-in cross section library with AISC TEE and PLG sections.

In version 7.14-00 the major issues are bug fixes related to GRUP and GRPOV cards.

In version 7.9.19 (GeniE v8.0) the major enhancements are a) increase max number of load combinations from 1000 to 3000), b) import GRUP cards as named set, c) support of tapered sections. The major bug fixes are related to wishbone elements with eccentricity, API incorrectly selected and warning message fixes

In version 7.19.20 (GeniE v8.1) the load capacity handling is increased with a factor 4.