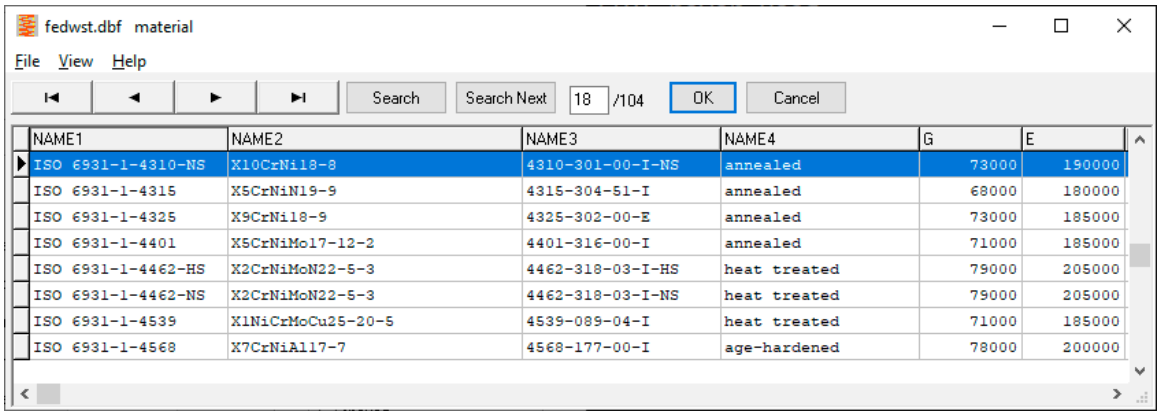
HEXAGON Newsletter 184 Nov./Dec. 2020

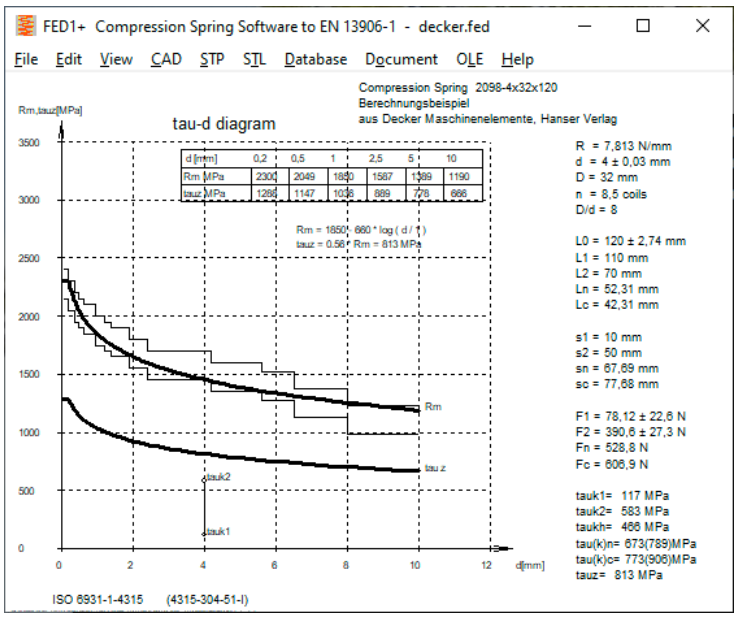
by Fritz Ruoss

FED1+, 2+, 3+, 5,6,7,8,9,10,11,17: New standard ISO 6931-1 replaces EN 10270-3
The EN 10270-3: 2012 standard has been withdrawn and replaced by ISO 6931-1. There are new material numbers: 1.4310 has become 4310-301-00-I, for example. Apparently the new number contains the earlier material numbers from EN, AISI, ASTM. The most important message: apart from the name, not much has changed, the strength values remain the same. 1.4325 (4325-302-00-E) and 1.4315 (4315-304-51-I) were added. There is a common table for the tensile strength of 1.4325 and 1.4315, the values are similar to 1.4301.



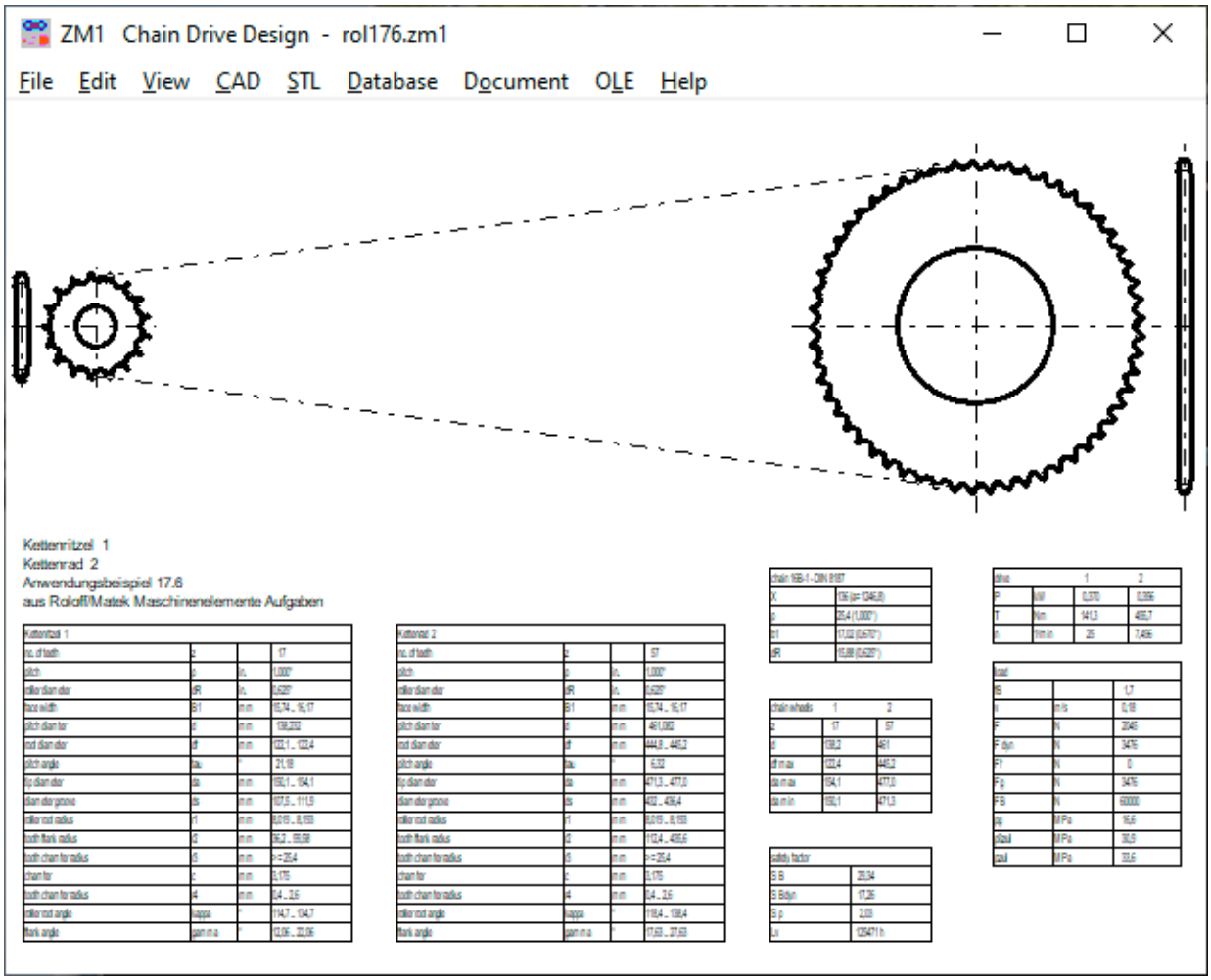
NAME1	NAME2	NAME3	NAME4	G	E
ISO 6931-1-4310-NS	X10CrNi18-8	4310-301-00-I-NS	annealed	73000	190000
ISO 6931-1-4315	X5CrNiN19-9	4315-304-51-I	annealed	68000	180000
ISO 6931-1-4325	X9CrNi18-9	4325-302-00-E	annealed	73000	185000
ISO 6931-1-4401	X5CrNiMo17-12-2	4401-316-00-I	annealed	71000	185000
ISO 6931-1-4462-HS	X2CrNiMoN22-5-3	4462-318-03-I-HS	heat treated	79000	205000
ISO 6931-1-4462-NS	X2CrNiMoN22-5-3	4462-318-03-I-NS	heat treated	79000	205000
ISO 6931-1-4539	X1NiCrMoCu25-20-5	4539-089-04-I	heat treated	71000	185000
ISO 6931-1-4568	X7CrNiAl17-7	4568-177-00-I	age-hardened	78000	200000

Modifications fedwst.dbf:
NAME1: EN10270-3 changed into ISO 6931-1
NAME1: Sandvik materials: designation EN10270-3 omitted, replaced by Sandvik designation
NAME2: chemical composition, no changes
NAME3: Material name according to ISO 6931 (4310-301-00-I)
Material 4325-302-00-E (X9CrNi18-9) and 4315-304-51-I (X5CrNiN19-9) are added.



If you open an old calculation file with the new version, the material name e.g. “ISO 6931-1-4310-HS” is displayed instead of “EN 10270-3-4310-HS”. Otherwise nothing changes, all material parameters remain the same.

ZM1: Chain Drive Calculation according to ISO 606



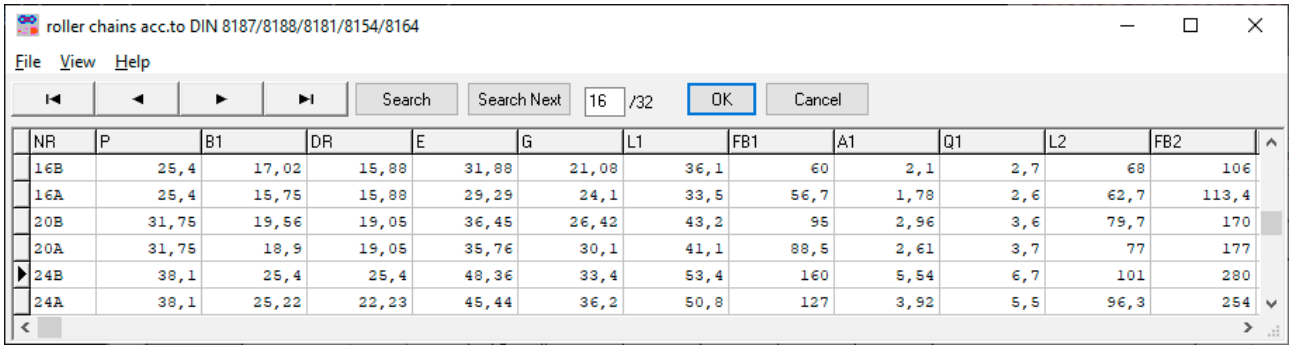
There were extensive changes to the ZM1 software for calculating roller chains and sprockets. The ZM1 software for chain drives has been adapted to ISO 606: 2018. ISO 606 replaces the old DIN standards 8186, 8187, 8196. The chain sizes are partly identical to DIN 8187/8188, partly they differ. Some chain sizes from DIN have been adopted under different names in ISO 606. Example: “08A” becomes “40” and “085” becomes “41”. There is now a new database ISO606.DBF with chain dimensions according to ISO 606. This contains 100 data records, including the reinforced version “H” and the extra reinforced version “HE”. The old database with DIN chains is also available so that old calculation files can still be opened without errors. When selecting the chain size, both the old and the new database are available. To convert old calculations to the new ISO designations, open the calculation file, then simply select the appropriate chain size from the ISO606 database under Edit \ Dimensions, compare the calculation results, save the file.

ISO 606 Corrections

If you use ISO 606: 2018-02, you should correct a few small errors:
5.4.2.2 and 5.4.2.3 have the correction as a footnote, but you have to change the incorrect designation re min / max yourself.

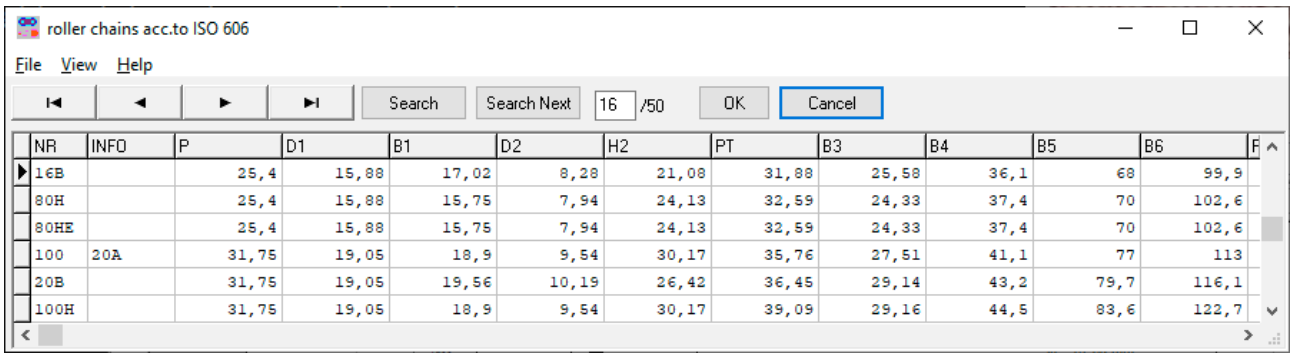
5.5.2: da, min = d + p (1 + 1.6 / z) –d1
instead of
da, min = d + p (1 - 1.6 / z) - d1
further under 5.5.2:
Designation “ha, max” and “ha, min” instead of “da, max” and “da, min”.

ZM1: Database differences ISO 606 and DIN 8187/8188



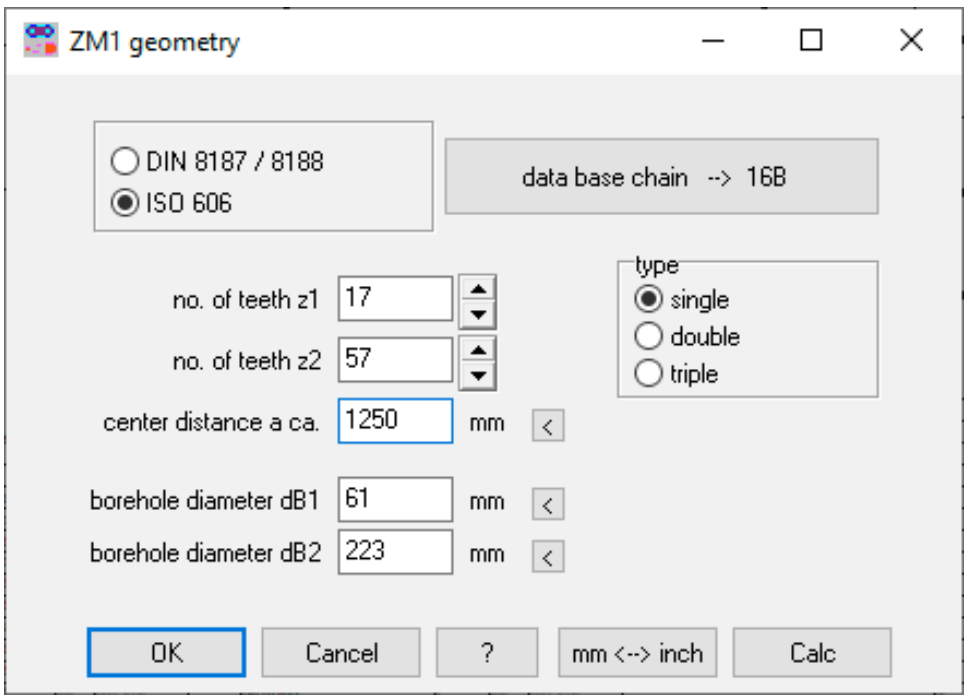
NR	P	B1	DR	E	G	L1	FB1	A1	Q1	L2	FB2
16B	25,4	17,02	15,88	31,88	21,08	36,1	60	2,1	2,7	68	106
16A	25,4	15,75	15,88	29,29	24,1	33,5	56,7	1,78	2,6	62,7	113,4
20B	31,75	19,56	19,05	36,45	26,42	43,2	95	2,96	3,6	79,7	170
20A	31,75	18,9	19,05	35,76	30,1	41,1	88,5	2,61	3,7	77	177
24B	38,1	25,4	25,4	48,36	33,4	53,4	160	5,54	6,7	101	280
24A	38,1	25,22	22,23	45,44	36,2	50,8	127	3,92	5,5	96,3	254

The database fields of the two databases are different because the tables on which they are based are also different. In the old DIN database there are fields A1, A2, A3 for pressure area AG for 1-fold, 2-fold, 3-fold chains. The surface pressure is calculated from this p = F / AG.



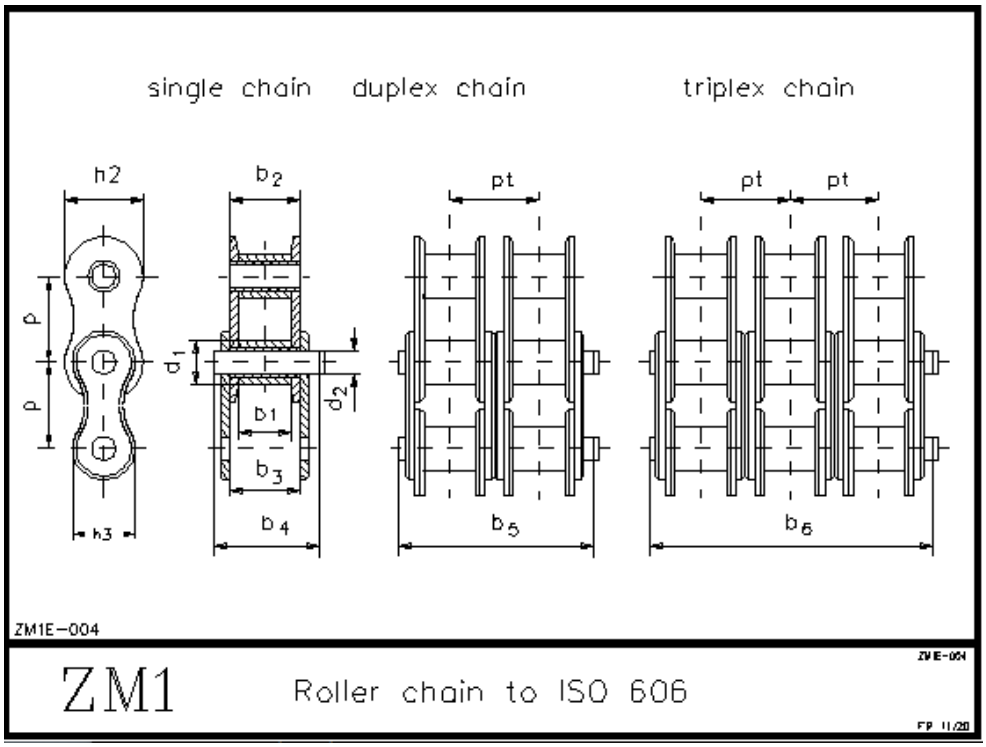
NR	INFO	P	D1	B1	D2	H2	PT	B3	B4	B5	B6	F
16B		25,4	15,88	17,02	8,28	21,08	31,88	25,58	36,1	68	99,9	
80H		25,4	15,88	15,75	7,94	24,13	32,59	24,33	37,4	70	102,6	
80HE		25,4	15,88	15,75	7,94	24,13	32,59	24,33	37,4	70	102,6	
100	20A	31,75	19,05	18,9	9,54	30,17	35,76	27,51	41,1	77	113	
20B		31,75	19,05	19,56	10,19	26,42	36,45	29,14	43,2	79,7	116,1	
100H		31,75	19,05	18,9	9,54	30,17	39,09	29,16	44,5	83,6	122,7	

In the ISO database there are fields D2 with the bolt diameter d2 and B3 with the width between outer plates b3. From this, ZM1 calculates the pressure area AG = b3 * d2 * n.

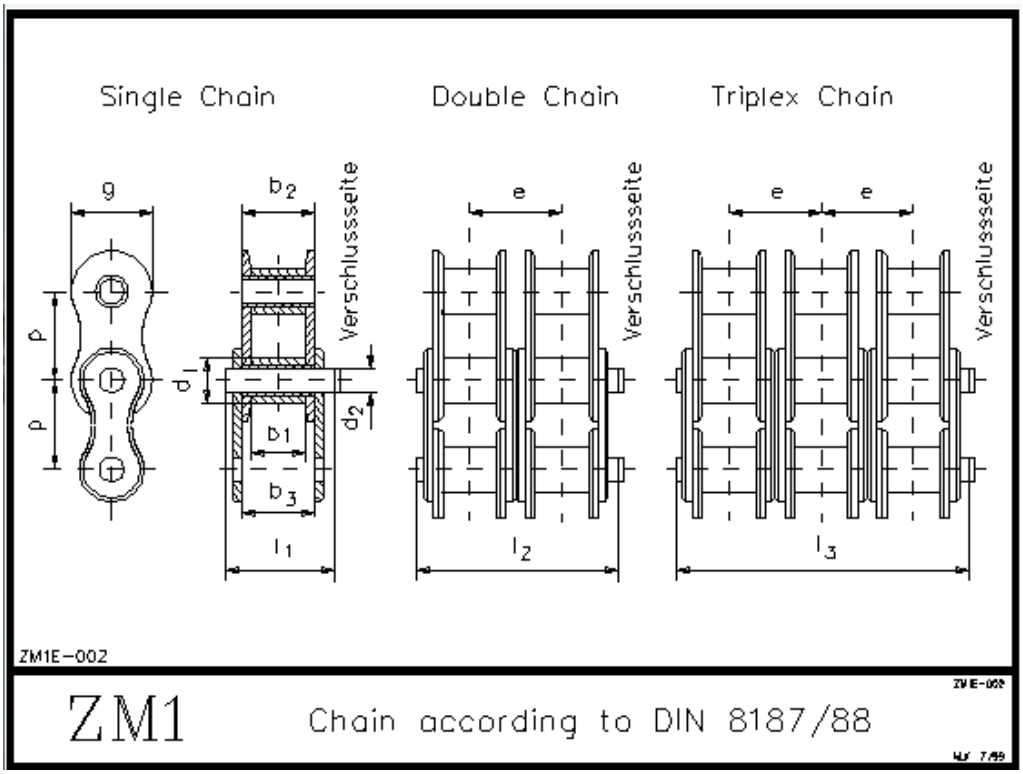


ZM1: Designation differences ISO 606 and DIN

The abbreviations according to ISO 606 differ from the previous designations according to DIN. For this purpose, new help pictures of the chain and sprocket have been created.



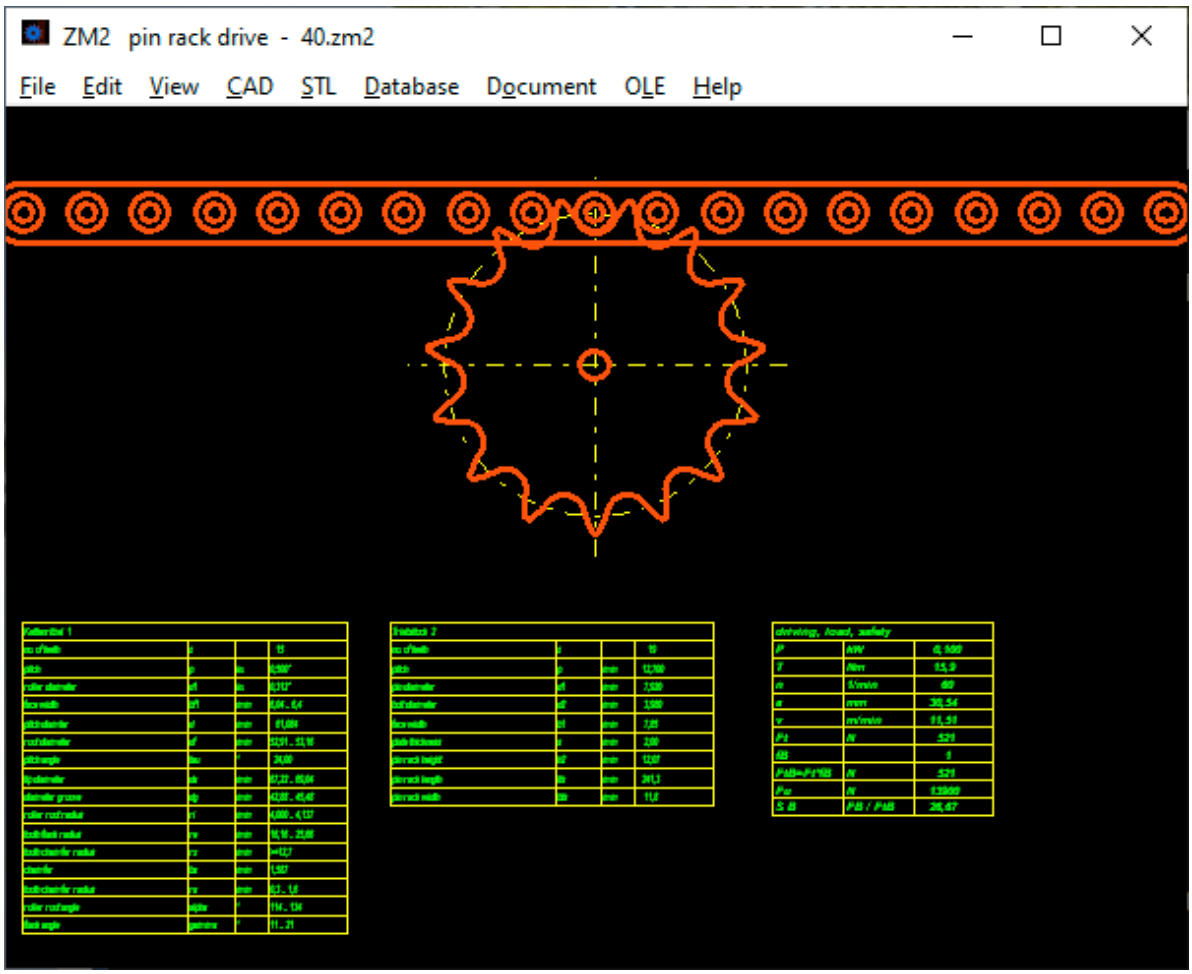
The abbreviations in the ZM1 printout and quick view were not generally changed to the ISO denominations: Depending on whether you have selected a chain from the DIN database or the ISO



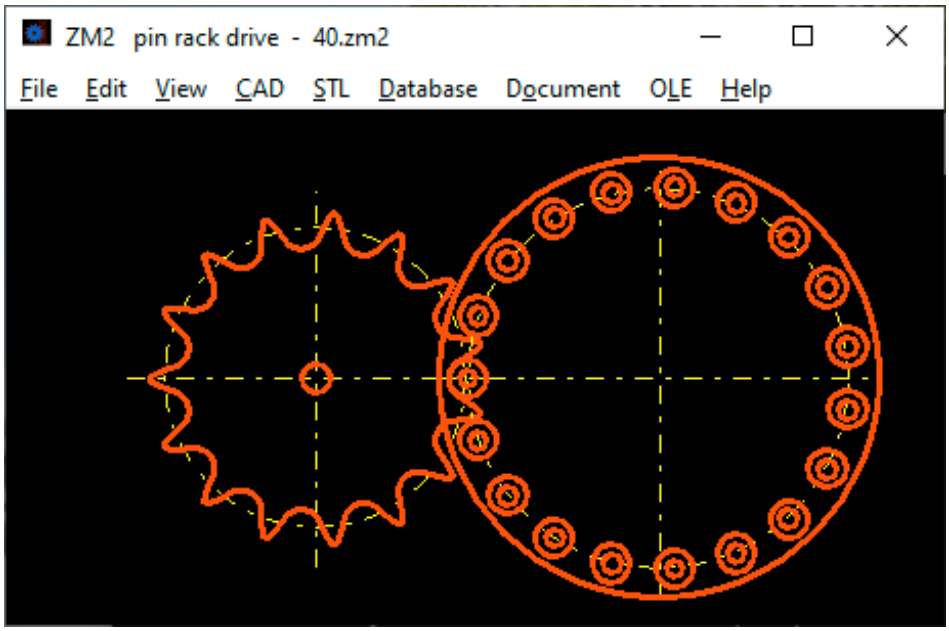
database, the printed abbreviations are according to DIN or ISO. So you can get used to the new names or keep the old ones. Example: The roll diameter is now “d1” instead of “dR”. Confusing: the pitch circle diameter of gear 1 is also “d1”. And “dR” is now the test pin diameter for measuring the root diameter with test dimension dM. And “Fu” is not the circumferential force, but the minimum breaking force of the chain.

ZM2: Software for Pin Rack Drive

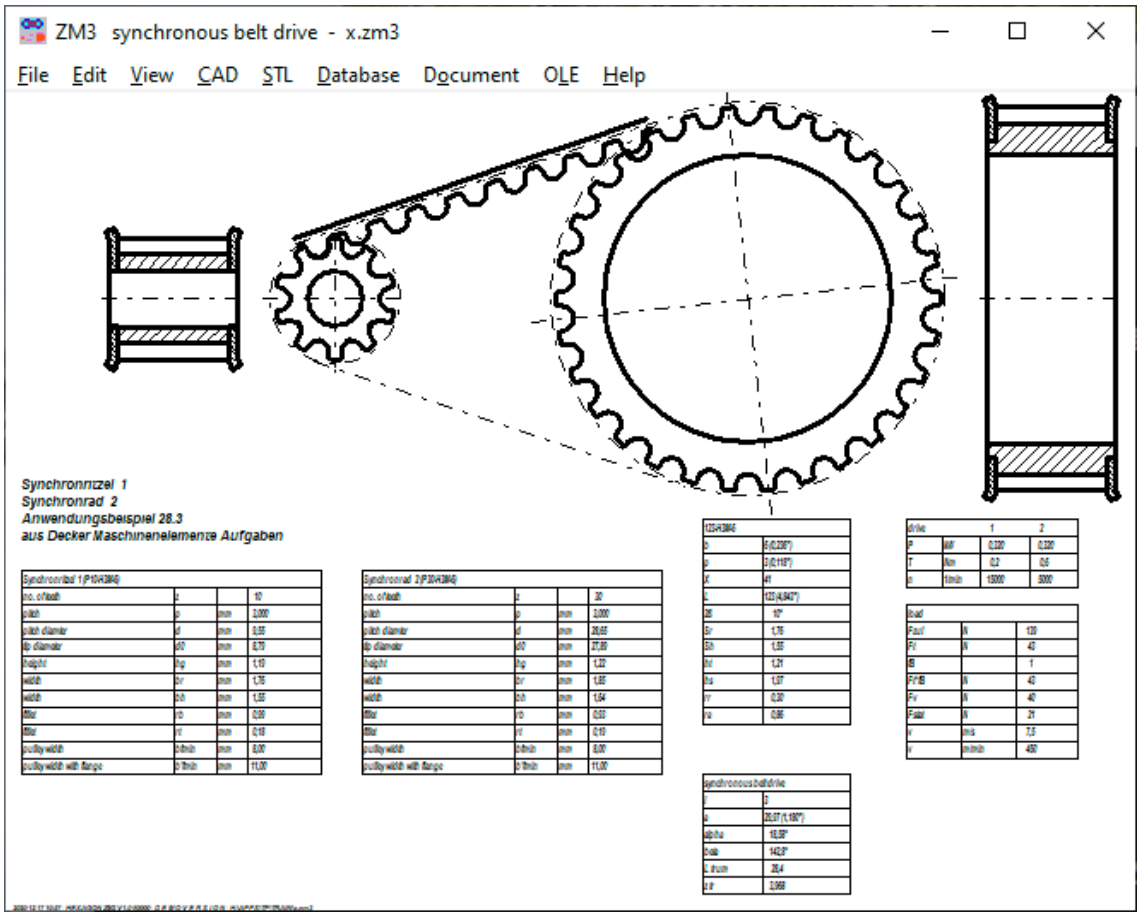
Soon there will be a new program for the calculation of pin rack drives. A sprocket is used as the drive wheel, similar to ZM1. In the past, pin rack drive was often used because a pin rack was easier to manufacture than an involute rack. Nowadays, if you want a quick and inexpensive solution for a linear drive, you buy a commercially available chain and clamp it as a rack.



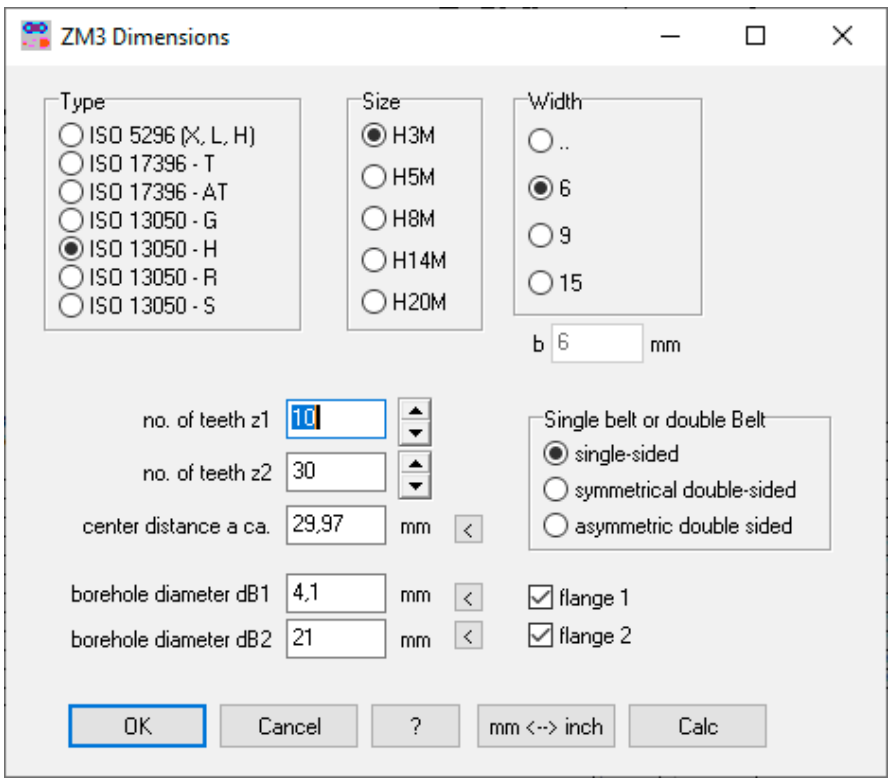
The load on the sprocket is significantly higher with a rack drive than with a chain drive because the torque is transmitted by a single tooth. ZM2 also calculates a sprocket with a pin wheel instead of a pin rack.



ZM3: Software for Synchronous Belt Drive



For synchronous belts according to ISO 17396:2017 (T and AT), ISO 13050:2016 (G, H, R, S) and ISO 5296:2012 there will soon be a new software ZM3. ISO 5296 with inch pitch (MXL, XXL, XL, L, H, XH, XXH) has been withdrawn, apparently the metric dimensions have prevailed.



ZAR4: Export of diagrams into Excel
The parameters of the diagrams travel, speed, acceleration s, v, a = f (phi1), transmission ratio i = f (phi1) and angle of rotation phi2 = f (phi1) can now also be exported as an Excel table.

SR1 / SR1+: Bolt materials 3.7165 (Ti6Al4V) and 3.4365.71 (Al7075 T6 / T651) added
Titanium and aluminum were added as screw materials.

SR1 / SR1+: change in preload force delta FVth
The change in preload force at temperature is now also printed. This value can be positive or negative, depending on the temperature expansion coefficient of the materials of the bolt and clamping plate.

Floating licenses: No virtual server or variable path
Floating licenses from HEXAGON software should be installed on a physical server. When installing on a virtual server or a variable path (..\X$\..) you will sooner or later receive an "invalid license code" error message. Exception: the hardware behind the virtual server is always the same. A HEXAGON floating license is a "floating user license", not a "floating server license".

Warm corona money rain as a Christmas gift from the German government
Companies that are closed due to the Corona receive an amount of 75% of sales as compensation. Of sales! A great business for companies with a lot of turnover and little profit. Get 75% of turnover, without expenditure for goods nor for employees. The difference between gross and net, between sales and profits, between grants and loans seems difficult to discern for full-service officials and politicians. But what would be a fairer alternative for this mindless grant practice? Quite simply: instead of a grant, the government grants an interest-free loan (with 75% of sales as an upper limit).

Corona vaccination probabilities
As soon as a pharmaceutical manufacturer announces that it has a corona vaccine, Spahn and von der Leyen buy everything away. Worse than the toilet paper hamsterers in the supermarket. In at least 90% of the cases, the vaccination with our serum is successful, promises the company Biontech. It even could be 95%. 5 to 10% scrap. A recall campaign would be the result for industrial products. Not so with medication. Theoretically, one could also fill the ampoules with placebos. Anyone who gets infected with corona despite being vaccinated is one of the 5 to 10%. But: Even of the unvaccinated, more than 90% will almost certainly not be infected with the coronavirus. In no country in the world are there more than 10% corona infected residents. Seen in this way, the likelihood of infection for vaccinated and non-vaccinated people is about the same.

Last corona message on December 17th, 2020
In Germany, the cordoning off of areas with particularly high numbers of infections is being checked, reports the ARD today. My comment on this: They should better cancel international flights and close borders. The world's highest new infections (7-day incidence) are in Turkey with 1200, followed by Luxembourg with 700. A lockdown is of little use if the virus is spread unhindered by travelers on public transport. At the Berlin and Stuttgart airports alone, 2 to 3 planes from Istanbul, the Turkish Corona hotspot, land every day. I do not believe that these passengers will all go into voluntary quarantine immediately.

Words of the year 2020
Distance rule, hygiene rules, lockdown, curfew, ban on contact, generation Corona.

HEXAGON PRICE LIST 2021-01-01

Base price for single licences (perpetual)	EUR
DI1 Version 1.2 O-Ring Seal Software	190.-
DXF-Manager Version 9.1	383.-
DXFPLOT V 3.2	123.-
FED1+ V31.1 Helical Compression Springs incl. spring database, animation, relax., 3D,..	695.-
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- **Italiano**: FED1+, FED2+, FED3+, FED4, FED5, FED6, FED7, FED9, FED13, FED14, FED17.
- **Swedish**: FED1+, FED2+, FED3+, FED5, FED6, FED7.
- **Portugues**: FED1+, FED17
- **Spanish**: FED1+, FED2+, FED3+, FED17

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Maintenance contract for free updates: annual fee: 150 EUR + 40 EUR per program

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After installation, software has to be released by key code. Key codes will be sent after receipt of payment.

HEXAGON Industriesoftware GmbH
Stiegelstrasse 8 D-73230 Kirchheim Tel. +49 7021 59578, Fax +49 7021 59986
Mobile: +49 163 7342509 E-Mail: info@hexagon.de Web: www.hexagon.de