ARNOLD Fastening Systems SHINJO

Hightech bei Blech

HN piercing nuts afford cost-benefit optimisation

- ARNOLD & SHINJO expands field of application for piercing nuts - PIAS HN-product range for sheet metal thickness up to 4 millimetres 30 percent cost reduction possible -

(Dörzbach) With its PIAS HN series ARNOLD & SHINJO is expanding the field of application of piercing nuts to a sheet thickness of up to 4 millimetres and, in the case of aluminium sheet, up to 5 millimetres. This now permits the application of this already proven alternative to the weld nut in industries which depend on the use heavy metal sheet. This system is already being used very successfully in the production of trucks in Sweden. In general, however, manufacturers are still having to cope with the disadvantages, caused by the heat involved, of weld nuts and the process costs arising from this fastening method. In the automotive and the electrical industry, on the other hand, which use mainly thin, weight-saving metal sheet, fastening technology by means of piercing elements has already been widely accepted and is increasing.

Particularly in applications with sheets which need to meet special requirements regarding mechanical strength and vibration resistance, the new, tough fastening elements developed by the Arnold & Shinjo specialists are providing real advantages. In contrast to the welding process, there is no additional, parallel production step required there is no secondary operation cost. The nut is fastened in the correct position in the sheet metal panel with standard tooling by means of a single piercing and pressing cycle.

High processing reliability

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thick. The newest generation originating from the successful PIAS product range is characterised, therefore, mainly by the special quality of the material and is designed, in line with this, for being processed with higher piercing forces, as demanded by the corresponding sheet metal gauge. Secondly the ARNOLD & SHINJO development engineers have concerned themselves with another safety-critical design element, which is the punch collar of the piercing nut. It punches the hole into the sheet metal and provides safe installation of the nut into the panel.

The innovative geometry of the PIAS HN punching collar requires ejection forces which, with sheet metal thickness of 4 millimetres, must substantially exceed 7,000 N, for forcing out the fastening element.

At the same time the twisting resistance has been adapted by careful design to the larger profile of requirements of heavier metal gauge.

The knurls on the punch collar increase the torque moment many times and reaches, depending on metal grade and thickness, over 100 Nm. From this, it follows that removal of the nut is possible only when conditions are extreme.

Quality problems due to thermal influences are eliminated

By expanding the field of application of its piercing elements, ARNOLD & SHINJO is addressing and meeting specific user requirements which, until now, have had to accept the system-related disadvantages of the weld nut. In contrast to the classic alternative, the PIAS HN application variant is fully delivering the expected high quality characteristics in critical joints.

Predominantly, the fact that the thermal effects during the welding process change the microstructure of the sheet metal material and that the strength is therefore reduced directly at the point of fastening, highlights the advantages of the pressed-in alternative. At the same time, the surface treatment no longer suffers due to elimination of the welding process, with the result that extra operations, like additional zinc-coating of the connection and repairing the thread, are now problems of the past.

Processing costs reduced substantially

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Cost aspects are another reason for the design decision to use piercing nuts. Installation and operation of a welding plant are no longer necessary, reducing investment costs considerably. Simultaneously, there is no need for weld filler materials, positively contributing towards the energy efficiency of the company. There are no environmental issues such as noise, sparks or noxious fumes and, consequently, there is no need for any corresponding protective measures. The additional costs related to zinc-plating or weld spatter in the threads are also eliminated. Research work carried out by ARNOLD & SHINJO has proved that processing costs can be reduced by up to 30 percent.

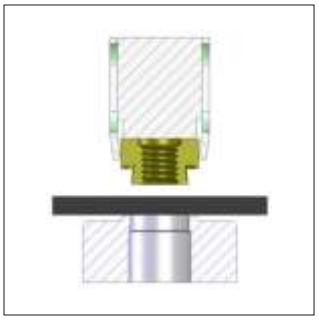
Modular system concept

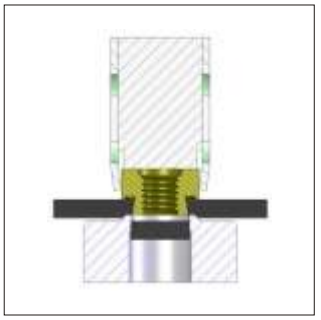
An essential element in this advantageous cost situation is the availability of a comprehensive fastening solution consisting of both fastener and processing technology offered by ARNOLD & SHINJO as the system supplier. To use the PIAS HN piercing nuts, a standardised tooling programme is available. The modular system includes punching and pressing heads, dies, and feeding devices plus the required control systems. If required, complete processing systems can be planned and supplied for use in series production.

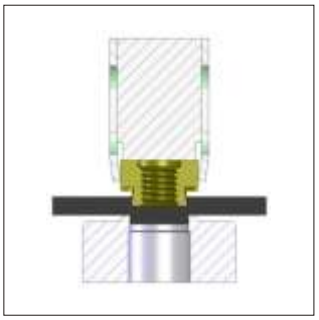
The feeding techniques developed by ARNOLD & SHINJO permit processing of up to 400 nuts per minute. With regard to large tools in transfer presses or in press lines, there are ARNOLD & SHINJO systems where up to 30 nuts are installed at a single stroke. Nuts are fed to the system by means of feeding hoses and distributed to the individual punch heads via the ARNOLD & SHINJO multi-feeder. The system reduces the interfaces to the tool and experience has shown that it minimises set-up times considerably.

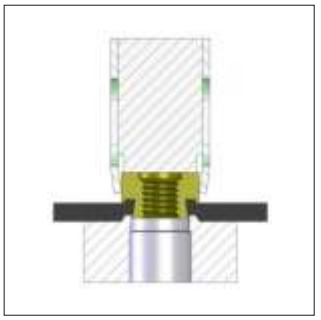
By means of the PIAS® HN piercing nut, ARNOLD & SHINJO has succeeded for the first time in achieving a high strength fastener for use in heavier sheet metal panels up to 4 millimetres thick while, at the same time, reducing process costs.

Arnolds&Shinjo is a 100 percent subsidiary of the global Würth Group with 54,900 employees and 375 companies in 83 countries and global sales of over 7.74bn Euro.









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