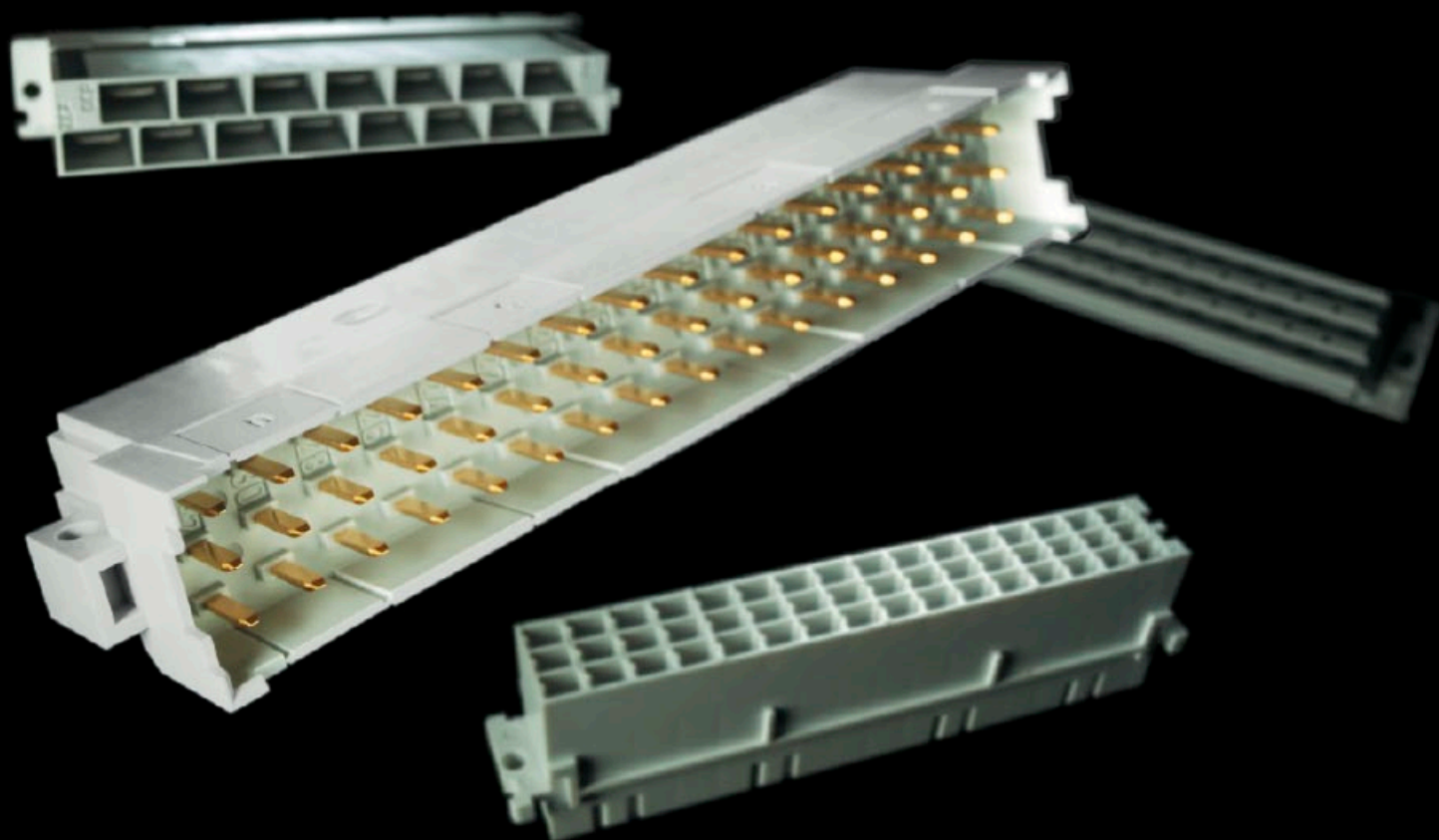




Pushing Performance

# HARTING DIN 41 612

NFF Connectors for Railway



# Railway Specific Article

## DIN 41 612

In addition to the standard demands for connectors, as defined in IEC 60603-2, for example, market and application specific demands and requirements are gaining increasing significance.

In the railway engineering area the demands made on reliability and safety are particularly high, in order to ensure utmost passenger safety in all instances. Especially in the case of routes involving a high share of tunnels that only offer limited escape route possibilities in the event of fire, the technical demands made on the materials employed are very stringent.

The French NFF 16-101 railway standard defines these requirements precisely and presents a structure of application groups by way of a matrix.

NFF 16-101 classifies non-metallic materials used in rail vehicles in terms of fire behaviour, opacity and toxicity of smoke gas emissions in the event that the materials should burn.

In order to enable the classification with regard to the deployment of connectors, the following values must be applied:

### 1. Fire behaviour class

I0	for I.O. $\geq 70$	and no inflammation at 960 °C
I1	for I.O. 45 - 69	and no inflammation at 960 °C
I2	for I.O. 32 - 44	and no inflammation at 850 °C
I3	for I.O. 28 - 31	and no afterburning at 850 °C
I4	for I.O. $\geq 20$	
NC	not classified	

Note: The values are derived from specified test methods determining the oxygen value (I.O.) and testing inflammability by way of a filament.

### 2. Smoke development classification

F0	for I.F. $\leq 5$
F1	for I.F. 6 - 20
F2	for I.F. 21 - 40
F3	for I.F. 41 - 80
F4	for I.F. 81 - 120
F5	for I.F. $> 120$

Note: The values of the smoke index (I.F.) are derived from specified test methods by determining opacity (specific optical density, opacity values), toxicity (critical gas concentration of CO, CO<sub>2</sub>, HCl, HBr, HCN, HF, SO<sub>2</sub> in smoke).

In addition to the fire load, and/or the flammability of a material, the so-called smoke gas density is a key characteristic, which is determined based on the opacity and toxicity of the smoke gas emissions. The risk posed by the two characteristics can not be defined in relationship to each other, which means that both minimal inflammability as well as minimal smoke gas density must be fulfilled. Materials that meet both requirements are very rare and in many instances it is only possible to fully meet one of the two criteria.



DIN 41 612 connectors with NFF classification F1, I2



## NFF Classification: F1 and I2

The matrix from NFF 16-102 shows how the combination of both characteristics results in a classification. This matrix is defined by the contractor in each project put up for bidding. The matrix is geared to the type of train and course of the route, whereby special attention is given to the number of tunnels.

group1							group2						
	I0	I1	I2	I3	I4	NC		I0	I1	I2	I3	I4	NC
F0							F0						
F1			X				F1			X			
F2							F2						
F3							F3						
F4							F4						
F5							F5						

group3							group4						
	I0	I1	I2	I3	I4	NC		I0	I1	I2	I3	I4	NC
F0							F0						
F1			X				F1			X			
F2							F2						
F3							F3						
F4							F4						
F5							F5						

Classification acc. to NFF 16-102, April 1992

By complying with the high classifications I2 and F1, the standards supplementing connectors according to IEC 60 603-2 can be used in all four defined groups and for all railway applications. According to NFF 16-102 the standard DIN connectors (I3, F3) are only permissible for Group 1.

The **HARTING** DIN Power and DIN Signal-Portfolio looks back on a highly successful track record in the railroad engineering industry. Typical application areas include

– among many others – control, steering, monitoring components and modules on board trains, as well as signal technology components or the power supply of electronic components.


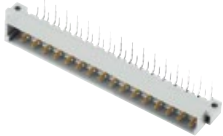
The extended range of connectors complying with the highest classification according to NFF 16-101 and 16-102 considerably reduce our customers' development times: as the selected connectors are suitable for every stipulated hazard or risk class, they are ideal for realizing product platforms, and therefore find use in every conceivable rail vehicle or railroad engineering project. With this complex, product specific development work is not necessary, at least in terms of selecting passive PCB interfaces, while the technical approval process is streamlined considerably.


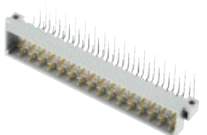


# DIN Signal



<p><b>2B female connector</b> with solder pins 4.5 mm, PL 2</p>  <p>09 22 232 6825 222</p>	<p><b>2B male connector</b> with right angled solder pins, PL 2</p>  <p>09 22 132 6921 222</p>
<p><b>2C female connector</b> with solder pins 4.5 mm, PL 2</p>  <p>09 23 248 6825 222</p>	<p><b>2C male connector</b> with right angled solder pins, PL 2</p>  <p>09 23 148 6921 222</p>
<p><b>B female connector</b> with solder pins 4.5 mm, PL 2</p>  <p>09 02 264 6825 222</p>	<p><b>B male connector</b> with right angled solder pins, PL 2</p>  <p>09 02 164 6921 222</p>
<p><b>C female connector</b> with solder pins 4.5 mm, PL 2</p>  <p>09 03 296 6825 222</p>	<p><b>C male connector</b> with right angled solder pins, PL 2</p>  <p>09 03 196 6921 222</p>
<p><b>M female connector</b> with solder pins 4.5 mm, PL 2, order special contacts separately</p>  <p>09 03 278 6805 222</p>	<p><b>M male connector</b> with right angled solder pins, PL 2, order special contacts separately</p>  <p>09 03 178 6901 222</p>
<p><b>R female connector</b> with right angled solder pins, PL 2</p>  <p>09 73 296 6801 222</p>	<p><b>R male connector</b> with solder pins 4.0 mm, PL 2</p>  <p>09 73 196 6903 222</p>

# DIN Power


<b>D female connector</b> with solder pins 4.5 mm, PL 2 	<b>D male connector</b> with right angled solder pins, PL 2 
09 04 232 6831 222	09 04 132 6921 222

<b>E female connector</b> with press-in pins 11.5 mm, PL 2 	<b>E male connector</b> with right angled solder pins, PL 2 
09 05 248 6851 222	09 05 148 6921 222

<b>F female connector</b> with solder pins 4.5 mm, PL 2 	<b>F male connector</b> with right angled solder pins, PL 2 
09 06 248 6835 222 low profile 09 06 248 6834 222	09 06 148 6901 222

<b>F female connector</b> for crimp contacts 	<b>F male connector</b> with right angled solder pins, PL 2, with snap-in clips 
09 06 248 3201 222	09 06 348 6901 222

<b>H female connector</b> for faston 6.3 x 2.5, PL 1 	<b>H male connector</b> with right angled solder pins, PL 1 
09 06 215 2871 222 low profile with solder pins 4.0 mm 09 06 215 2821 222	09 06 115 2911 222

<b>Shell housings</b> 	All shell housings fulfil NFF classification F1, I2.  Details see catalogue "Connectors DIN 41 612".
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If not stated opposite all shown components are fully loaded.  
 Other performance levels (PL) and contact arrangements are available on request.



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