

Why do some ASME materials lack the yield strength, tensile strength, elasticity or thermal expansion values?

An explanation on the lack of some values in the NextGen ASME databases that are instead present in the ASME II Part D tables .

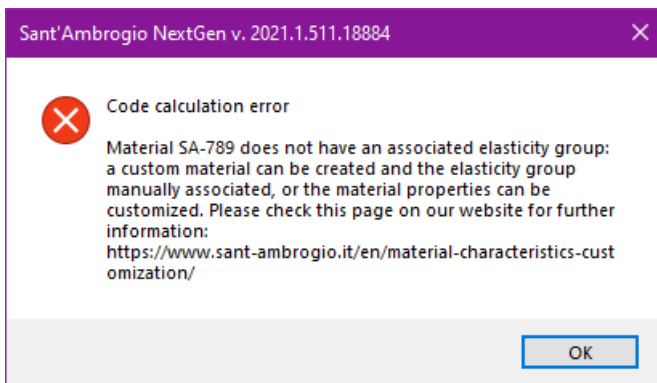
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It may happen, during an ASME calculation, to find that the material in use does not have the temperature values for to yield or tensile strength. In other cases, no elasticity or thermal expansion group is associated with the material.

By checking the ASME II Part D you find that the values are there and then you deduce that there is a problem in the NextGen database.

The situation is highlighted in some contexts by NextGen itself, which shows a specific message when the calculation requires a temperature value that is not found:



Why the values are not present


ASME publishes the characteristics of the materials in paper format, PDF and in tables distributed in Excel format. When this happens, Sant'Ambrogio imports these values into its archives and then makes them available in NextGen.

To be able to perform a *reliable* association between the various tables, there must be a complete correspondence between the values that uniquely identify a material. At first glance we might be led to think that the Material Number is sufficient, but we would soon realize that there are many materials with the same Material Number. We then add other values, such as the Class and the chemical composition. But again, the same material can have different thicknesses.

The number of fields that must correspond between the various tables is quite extensive to obtain this uniqueness: it may therefore happen that, due to a typo, ASME identifies the same material with different values in different tables.

Let's see a concrete example encountered by a NextGen user. The material SA-182 F60 correctly reports the in temprature values for yield and tensile strengths in the NextGen database for Division 1 while for Division 2 these data are missing.

Analyzing the tables of ASME II Part D we realize that the materials listed in the table M1A (allowables, metric, Division 1) and M5A (allowables, metric, Division 2) are not *exactly* the same as those of the MY1 (yield strengths, metric) and MU (tensile, metric) tables:

Content	ASME Table	Nominal Comp...	Product Form	Spec No	Type / Grade	Alloy Designati...	Min Tensile Str...
Div 1 allowables	M1A	22Cr-5Ni-3Mo-N	Forgings	SA-182	F60	S32205	655
Div 2 allowables	M5A	22Cr-5Ni-3Mo-N	Forgings	SA-182	F60	S32205	650 
Div 1/2 tensile	MU	22Cr-5Ni-3Mo-N	Forgings	SA-182	F60	S32205	655
Div 1/2 yield	MY1	22Cr-5Ni-3Mo-N	Forgings	SA-182	F60	S32205	655

in this context, it is the allowables table of Division 2 that reports a value different from the others, the minimum tensile strength value.

For this reason, automatic association between these tables in NextGen is not possible.

How can this be fixed

By manually checking the standard it is evident that it is the same material. We therefore recommend proceeding as follows:

- Create a customized material to proceed with your calculation: the modification on our part may not be possible as often happens with the values relating to groups of elasticity or thermal expansion, or it may take some time to be published
- If the missing values are those of yield and tensile strength, report the mismatch to Sant'Ambrogio: if there is an evident association as in the example, we will manually associate the various tables and in the next version of NextGen the material will be present in its complete form.

Useful resources

- [How to create a customized material](#)
- [How to customize the characteristics of a material for a specific component](#)